

# 2010 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 and sparse population and its cultural, geographic and environmental diversity. The state represents a major region of renewable and non-renewable natural resources in the United States. Its 365 million acres include the nation's largest oil reserves and coal deposits. The state also contains an array of mineral deposits, including gold, zinc, boron, and molybdenum. 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, and shellfish 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 predominantly extractive in nature. Thus, the use and management of these resources is a predominant force in the planning and delivery of any teaching, research, extension, and engagement programs. The finite nature of the state's non-renewable resources and local and national controversies surrounding resource extraction and related environmental concerns affect the activities of the School of Natural Resources and Agricultural Sciences and the Agricultural and Forestry Experiment Station (SNRAS/AFES) and the Cooperative Extension Service (CES). The University of Alaska Fairbanks in general and SNRAS/AFES and CES in particular, meet the challenges of increasing demands for research, education and outreach relevant to sustainable management of Alaska's resources and bringing communities' ideas to the university for further development of the state's resources.

During the past 40 years, Alaska's economy has become dependent upon revenues related to petroleum development. To diversify its economy, the state is attempting to move toward non-petroleum natural resources for economic opportunities that are cost-effective and sustainable. The programs of SNRAS/AFES and CES play a vital role in linking the knowledge generated by SNRAS/AFES, the University of Alaska Fairbanks, the University of Alaska statewide and other information sources to meet the needs and interests of Alaskans, then providing citizens a way through engagement to influence future research and education priorities. CES is a critical partner for the university as a whole in providing a two-way engagement linkage between researchers and producers to deliver the latest research findings and educational and outreach opportunities.

Alaska imports a high percentage of foods and other agricultural products consumed in the state. Growers in the agricultural sector produce products primarily for in-state consumption including fresh market potatoes, vegetables and herbs; forages, grains, and manufactured livestock feeds; controlled environment products which include bedding plants, florals, landscape ornamentals, short season vegetables and a variety of "niche market" crops. Livestock enterprises include dairy, beef, swine, reindeer, and nontraditional livestock species such as muskoxen, elk, and bison. Producers will require increasing information specific to northern latitudes as consumer demand increases due to changing preference and a growing population. Furthermore, as transport costs increase and Alaska population grows, more locally and regionally produced food will be needed to feed the Alaska citizenry.

The mission of SNRAS/AFES is to "generate and provide knowledge and train students for successful long-term management of natural renewable resources in Alaska and the circumpolar world,

and to discover, describe, explain, and interpret the spatial characteristics of the northern regions of the earth." The School and Experiment Station are committed to assisting and training natural resource managers who make and implement decisions to develop, sustain, or protect natural systems to meet human needs and values.

Cooperative Extension's mission is to educate, engage and support the people and communities of Alaska, connecting them with their university. It 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 services that promote the wise use of natural resources, respecting cultural and ethnic diversity, and being responsive to emerging stakeholder needs and interests.

The elements of this report show strong linkages between CES and SNRAS/AFES supporting agriculture, horticulture, forestry, and rural and economic development. The units work cooperatively as well as separately with other units within UAF, the University of Alaska statewide system, federal and state agencies, non-governmental organizations, private industry; and through multistate collaborations with other land-grant universities. They collectively and individually generate and disseminate knowledge to stakeholders who include K-12 students, higher education students, individuals, businesses, industry, government, non-governmental organizations and families and communities throughout Alaska and the circumpolar north and the nation. CES brings the university to Alaskans while bringing community concerns and issues back to the University.

Planned programs for purposes of this report include Agriculture and Horticulture, Sustainable Individuals, Families and Communities, Management of Ecosystems, Natural Resources and Community Development, Youth Development and Sustainable Energy. We have added the five planned programs mandated by NIFA and will be able to separate them from existing programs in 2011.

## **AGRICULTURE AND HORTICULTURE**

Agriculture and horticultural research focused on new crops and new uses for traditional crops and expansion of knowledge of reindeer as an important Alaska livestock species. New crops and species varieties for production in Alaska were identified and growers were organized to better meet market conditions. Research in tillage methods and fertilizer application, greenhouse and field production methods continued. Variety trials for food crops under hoop house and field conditions, and controlled environment production of cut flowers, vegetables, and herbs continue to provide growers with multiple crop production options in Alaska. At least 75 agricultural producers have adopted varieties identified by AFES researchers as applicable to Alaska growing conditions. In addition, many producers of established crops have adopted new management techniques developed by AFES specifically for Alaska growing conditions.

One very visible outreach activity is the AFES Georgeson Botanical Garden, located within the Fairbanks Experiment Farm, where visitors can see variety trials as well as landscaped gardens. Every year seed companies request testing of varieties in this subarctic location. More than 500 cultivars of ornamentals, vegetables and herbs were grown in trial plots to determine the usefulness in Alaska landscapes. The Peony Growers Association, consisting of 47 growers, has been meeting since 2008. Economic sustainability research focused on helping peony producers enter national and international markets. A hedonic price model was applied to U.S. peony data to help growers understand how basic marketing decisions and cultivar characteristics affect the pricing of cut flower peonies in U.S. wholesale markets. As a result of our peony production work and economic modeling assistance, two peony producers have contracted with Kennicott Bros., of Chicago, Ill., to bring their peony products to market in the 2010 season. Another is the Reindeer Research Program that has incorporated meat quality, reindeer slaughter and meat cutting into its work. This has been made possible by the purchase of a USDA certified mobile slaughter facility located in Nome, Alaska, through a joint project with SNRAS/AFES and the

University of Alaska Fairbanks Northwest Campus. The facility serves the Kawerak Inc. Reindeer Herders Association members who range their animals on the Seward Peninsula in northwest Alaska. Meat quality and market acceptance work is a cooperative effort with HomeGrown Market, a retail outlet in Fairbanks, Alaska, specializing in marketing crops and livestock produced in Alaska. A third and relatively new research and outreach activity is the Controlled Environment Agriculture Laboratory that is expanding its work in the technology of growing in high tunnels or "hoop houses." In cooperation with CES, the production of apples is a subject of continuing research and outreach. As 2010 closed, over 100 hoop houses had been purchased through USDA by rural communities and producers throughout Alaska.

Greenhouse, controlled environment, and extended season research at the Fairbanks and the Palmer research sites identified more than 10 specific varieties for use in commercial production of tomatoes, potatoes, herbs, and beans. Vegetables, fruit and berries were evaluated in rural villages and road system locations. Six rural villages attempted subsistence gardens and produced sufficient output at harvest to distribute food to 30 community elders.

Muskox and reindeer are natural species for livestock production enterprises in Alaska; providing fiber (qiviut), meat, and antler for commercial markets as well as being highly desirable species for agrotourism enterprises in this state. Both species evolved in the Arctic and adapt well to basic husbandry practices, but there is currently little information available on reproductive management. Research objectives are to increase understanding of reproductive biology of high latitude ruminant species and to determine means of improving reproductive management of domestic ruminants on farms in Alaska, as well as investigating the use of locally produced feeds, pasture use, and meat quality and market price sensitivity. Profitability of reindeer ranching can be increased through reducing imported feed components by using locally produced feed and through the development of reproductive management strategies. Profitability of reindeer farming is influenced by the high shipping costs of imported feed components. Grass haylage can be produced in Alaska and reindeer can be pastured in the summer decreasing their dependence on manufactured feeds.

Agriculture and horticulture outreach through CES includes animal agriculture, agronomy, agroforestry, invasive weeds and horticulture. A variety of CES conferences in 2010 provided resources to producers, including the Sustainable Agriculture Conference and Organic Growers School, Alaska Greenhouse and Nursery Conference, Delta Farm Forum, Harvest Wrap-up and Alaska Produce Growers Conference. The livestock specialist also continued to develop and update a series of animal science classes aimed at increasing knowledge of producers. Extension provided support to commercial horticulture clients trying to grow a promising new high-value crop, peonies, which mature in Alaska at a time when they are not available elsewhere in the world. Support was provided in all areas of agriculture and horticulture to producers through phone calls, e-mail and on-site visits. Precision agriculture continued to be extended to Alaska farmers with the expectation of reduced fertilizer use.

Most of Extension's consumer horticultural educational outreach emphasis is targeted toward the home gardener. With the high cost of importing food and concerns about food security, the interest in home gardening has increased. Extension trained 219 Master Gardeners in 2010. Home gardeners also attended a variety of composting, seed starting and organic and home gardening classes.

The invasive weeds, noxious plants and integrated pest management (IPM) program conducted group and one-on-one educational activities with specific sectors of the pest management, agricultural and horticultural businesses and the general public to provide pest identification and management information. The IPM program addressed the public need for pest management education within Alaska with seven seasonal technicians across parts of Alaska and three full-time staff. Altogether, Extension faculty and IPM staff offered 112 workshops and presentations. Technicians monitored selected urban and rural communities for the presence of invasive weeds and noxious plants. They worked with partnering agencies to provide a coordinated response to invasive weeds, noxious plants and pest management and

counsel green industry professionals, farmers, gardeners and horticulturists about the least toxic pest management practices. Alaska's diverse pest management projects include the IPM technician program, the Pesticide Safety Education Program, Western Region IPM and the Western Plant Diagnostic Network. The Alaska Pest Management Program continues to be the premier pesticide use resource for Alaska with more than 2,800 contacts annually through the website at [www.alaskapestmanagement.com](http://www.alaskapestmanagement.com).

Workers who apply pesticides as part of their workplace activity are required to complete pesticide safety training and pass a State of Alaska Department of Environmental Conservation exam and must be recertified annually. Extension faculty taught pesticide applicator safety certification trainings and training for certification of noxious, weed-free forage and straw inspectors.

Nutrient and pest management conservation practices are two components of most farmers' EQIP long-term contracts that require the assistance of Extension to provide nutrient recommendations, pest scouting and Integrated Pest Management recommendations. Through the EQIP program, 67 clients applied pesticides and nutrients at the specified rates and were educated in weed identification and soil sampling techniques.

### **SUSTAINABLE INDIVIDUALS, FAMILIES AND COMMUNITIES**

Health, Nutrition and Foods: Alaska has abundant sources of naturally occurring food in our fish, game meat, and wild berries. Many Alaskans supplement their diets with these foods because of their high nutritional value and high antioxidant values. Additionally, the cost of importing food is high due to transportation costs and this is reflected in the prices consumers must pay in the marketplace. Our food preservation program reflects those needs and concerns. Agents taught 67 food preservation and food safety classes in 22 communities, and created three additional DVDs in a 10-part series that focuses on preserving Alaska's foods. Three additional online instructional modules with similar information were completed, and, in addition, Extension ran a food preservation hotline. Research has also focused on processing procedures for indigenous foods, which resulted in a new publication on processing walrus. Our programming supports healthy living. Alaska has one of the fastest-growing senior populations in the U.S. Extension conducts StrongWomen classes in six districts and our Soldotna agent has trained 22 new leaders. We also trained 41 leaders for the Living Well Alaska program, which teaches skills for living with chronic health conditions. Over the past 20 years, diabetes has increased 80 percent among the Alaska Native population and has increased in other segments of the population as well. Our Dining with Diabetes classes teach people how to embrace a diabetic diet. Childhood obesity is a major concern in Alaska, as elsewhere. Agents received training on a prevention program that emphasizes the importance of nutrition, traditional foods, family meals and physical activity. Five agents taught the program to 89 parents, foster parents and day-care providers of young children.

Outreach to families in the human development area includes early child development and child literacy classes, which are less available in rural areas. Budgeting concerns have come to the forefront in tight times. So agents have taught consumer resource management in regard to the cost of credit to more than 200 high school students and budgeting and money management to other youth and adults.

Outreach to families in the home energy field involved programming that has focused on awareness of energy conservation. An agent taught cold climate homebuilding techniques, retrofitting homes and solar energy design classes to 543 residents in nine communities. Agents also provided energy conservation programs and resources to clients, ranging from maximizing gas mileage to reducing appliance energy consumption.

### **MANAGEMENT OF ECOSYSTEMS**

Research by SNRAS/AFES in the Management of Ecosystems Planned Program concentrated on

data collection and analysis for the development of models related to growth, yield and disturbance in the boreal forest and Alaska lakes. Changes in the availability of soil moisture due to climate change are dramatically affecting the ecosystem in Alaska. Due to the climate change dynamics the recovery potential of ecosystems following a disturbance will be changed. Long-term forest growth monitoring which began in 1968 provides baseline data and leads to a detailed understanding of the boreal forest ecosystem and the effects of climate change.

Models have been created to estimate bark thickness of white spruce in Interior Alaska, to estimate fire severity, to provide recommendations for management for residential or recreational lakes concerned with evaporation, and a temperature model for climate change in Interior Alaska. Numerous scenario models predictive of future climate change effects have been requested by collaborators. Information has been made available to the public at [www.snap.uaf.edu](http://www.snap.uaf.edu). USFS, state foresters and BLM use the Burn Ratio model and the climate data temperature model created and updated to predict fire severity.

Increasing demand for mineral extraction and other land uses and potential infrastructure development due to expanding economies will result in large areas of soil disturbance. The mining industry must comply with federal and state surface mining regulations to protect the environment and to reclaim disturbed areas. Research results will provide the scientific basis for establishing hydric soil parameters and indicators in areas where volcanic ash dominates the soil parent material. This will help regulators to set reasonable standards of success for hydric soil development in tephra-dominated soils at restoration sites across Alaska.

## **NATURAL RESOURCES AND COMMUNITY DEVELOPMENT**

Work in AFES extends from scientific experimentation to applying science to existing law. The courts' failure to correctly apply the term "scientific" is under investigation in collaboration with the U.S. Fish and Wildlife Service. Multiple projects focus on ways to involve the public in decisions that affect their lives and improve the ability of natural resource policy makers to seek out and facilitate the involvement of all concerned stakeholders. These efforts resulted in improved urban/wild lands interface planning and improved planning for Interior Alaska in the face of environmental concerns primarily centered on fuel price fluctuations and atmospheric limitations placed by the U.S. EPA on emissions in the Fairbanks area.

A better understanding of the factors related to natural resources and nature based recreation that impact community resilience and well-being has been realized. Researchers now have a better understanding of what methods might work to assess benefits associated with recreation. A change in knowledge also occurred from the presentation and meetings at the World Wilderness Congress. The meetings provided a forum to exchange information with managers of the protected areas on the Kamchatka Peninsula. This will hopefully lead to a change in action as the Kamchatka managers are aware of new tools available to them.

CES provides outreach education regarding forest resources, mineral resources and mining, water resources, and rural community economic development and well-being. Program faculty and staff partner with a wide variety of local, state and federal governments, local and regional Native Alaskan tribal organizations and non-governmental organizations to address such issues as resource management, economic analysis, public policy education, and rural development relying heavily on stakeholder input and advisory groups. Three areas of focus identified were climate change, renewable energy and rural leadership. Because of particularly high energy costs in rural Alaska, the program has focused on ways to reduce dependence on petroleum resources. Extension personnel continued to work with two rural communities to develop biomass projects to heat schools and worked with a group of sawmill operators to form a biomass cooperative for the manufacture of compressed wood products. CES developed wood heat energy education materials that emphasize burning wood safely efficiently and responsibly. Agents and staff presented information at five renewable fairs or conferences, including new fairs in Bethel and

Juneau. Extension continued to develop a wood heat website with a wealth of information about locations to harvest wood, heating efficiency of wood and safety issues ([www.alaskawoodheating.com/](http://www.alaskawoodheating.com/)).

## **YOUTH DEVELOPMENT**

Alaska 4-H incorporates the Essential Elements, which guide successful youth development programs and services around specific ingredients, through volunteer training, newsletters, videos and handouts. All 4-H activities are grounded in the Essential Elements. 4-H programs focus on developing leadership and competencies that translate into effective work skills and interests and advanced education. Youth who raise and sell market animals learn about showmanship, economics and marketing, and teens who are trained as camp counselors learn leadership skills, management and help run a youth camp. Some have started businesses.

A special focus in 2010 was on engaging youth in active science and new technologies, to spark an interest in studying science. Three thousand youth benefited from science programs, everything from studying embryology to navigating with a GPS. Altogether, in 2010, 14,861 youth participated in clubs, after-school programs and special activities, including camping and video work. Teens participating in the 4-H Youth in Governance Program traveled to Juneau to see firsthand how the Legislature conducts business.

4-H Natural Resource and Youth Development program also supported rural classroom salmon incubation projects as a way to enhance math and science literacy of rural youth, and encourage their involvement in local resource management. Extension hosted a two-day youth event within a large environmental conference. More than 80 youth and 20 youth groups involved in natural resource issues participated. 4-H specialist presented information about the value of integrating youth into programs and several agencies highlighted existing internships or study opportunities.

## **GLOBAL FOOD SECURITY**

Activities in this planned program area are reported in the Agriculture and Horticulture program this year, but will be reported in this section in 2011. Currently, Alaska imports a high percentage (at least 90%) of foods and other agricultural products consumed in the state. Growers in the agricultural sector produce products primarily for in-state consumption and use including fresh market potatoes and vegetables, forages, grains, and other livestock feeds, greenhouse vegetables, and a variety of "niche market" crops and products. Animal enterprises include dairy, beef, swine, reindeer, and alternative game animals such as muskox, elk, and bison. Food security agriculture research and outreach includes the areas of animal agriculture including home and commercial animal production, service in agronomy includes cereal grains and forages, home and commercial vegetable production. Agricultural soils, fertilizer and compost research and outreach are also part of this program area.

## **SUSTAINABLE ENERGY**

On its face, Alaska's forest and agricultural resource potential for bioenergy production is immense. The economic potential of Alaska's forests is under-realized in timber and non-timber products. The potential for Alaska to develop new agricultural land is also under-realized. Furthermore, agricultural lands that are currently in Conservation Reserve Program may lend themselves to sustainable production of bioenergy. The forest ecosystem and agricultural lands can play a role in diversifying the economy of Alaska.

State leaders plan to develop both renewable and non-renewable natural resources to contribute to the economic well-being of their citizens without compromising ecological integrity and biodiversity. To be sustainable, any development activities require production practices that balance technologies and

economic necessity with environmental imperatives. Concern for the health and survival of resource biodiversity will continue to be a central issue in resources management in Alaska and elsewhere.

AFES and CES play a pivotal role in research, teaching and outreach, providing information about management of Alaska and northern ecosystems and the production of sustainable energy sources. As energy continues to become a growing concern throughout the world, the boreal forest has the potential to provide products for the production of fuel alternatives to petroleum and coal. Agricultural research in biomass production includes non-food crops and lignocellulosic crops.

Use of herbicide-induced maturation reduced green seed and hastened maturity of Alaska-grown canola. Oil content remains high and is highly usable for biodiesel or human consumption. AFES researchers have established research plots for agricultural products for energy production in Alaska. Oilseeds, canola in particular, have been identified as a viable Alaska-grown crop. Perennial grasses and woody cellulosic plants for fiber to be used in renewable energy are being established.

Economic development efforts continue in regard to the wood products field. Biofuels and biomass research is testing and characterizing liquid and gas hydrocarbons derived from Alaska woods. Work continues with the goal to offset high energy costs, especially for rural communities. Multistate wood composite research continues with the goal of diversifying the Alaska economy.

## **FOOD SAFETY**

Activities in this area are reported in the Sustainable Individuals, Families and Communities planned program in this report but will be included in this section for 2011. The Food Safety Program Area encompasses food preservation, safety, preparation, and product development. Food safety utilizes various resources and strategies to ensure that all types of foods are properly stored, prepared and preserved so that food is safe for consumption. Food safety programming education involves safety and preparation and preservation, including Alaska indigenous foods.

## **CLIMATE CHANGE**

Activities within this area can be found in the Ecosystems Management and Natural Resource and Community Development planned programs of this report but will be reported in this section in 2011. Alaskans live in an environment that is unlike any other in the United States with unique features such as permafrost, the boreal forest, and continuous summer daylight alternating with sustained winter darkness. Alaska's resources must be properly managed and cared for in order for its people to survive socially and economically, and for the long-term health of its living systems. The soils, forests, tundra, grasslands, and animals of Alaska have long been valued by its people, who have either lived close to these resources for many generations, or who face the need to adapt to a changing environment. Alaska's resources offer many opportunities, but also many natural limitations that must be known and respected if they are to be developed successfully in a way that can be sustained over the long term.

This planned program area will play a pivotal role in teaching and providing information about management of Alaska and northern ecosystems. Management of the boreal and southeast Alaska forests will play an increasing role in fire disturbance and adaptation to climate change. Their understory and tree species will be instrumental in providing market products developed from botanicals. Alaska's forests will have an important role in Alaska's energy future. Geographical Information Systems (GIS) assist natural resource managers, and increasingly a broad array of stakeholders, who need to understand the concepts and practice of creating, analyzing, and displaying spatially referenced natural resource and human community data.

## **CHILDHOOD OBESITY**

Activities in this area are reported in the Sustainable Individuals, Families and Communities planned program of this report but will be reported in this section for 2011. Increases in obesity have occurred rapidly and changes in childhood age-appropriate body weight that have occurred over the past 15 years will have lasting impacts on the health of individuals and of the health-care system for decades to come.

CES will address the problem with a program that focuses on making healthy food choices and increasing physical activity. Training will be conducted with youth, teachers, 4-H leaders, youth group organizers, parents and community partners to supply techniques for working directly with youth in the area of youth obesity. The outreach will focus on risk and protective factors influencing health of youth and adults.

SNRAS/AFES will prepare students for careers in agriculture related fields such as economics, horticulture, marketing and nutrition with awareness of the conditions and demands required for sustainable high latitude food production. It will provide academic training in community based food production and nutrition by building upon existing UAF degree programs in natural resources management and sustainability. A new course will be developed which will prepare students to work directly with families with young children in home, subsistence harvest and local food production settings.

**Total Actual Amount of professional FTEs/SYs for this State**

| Year: 2010 | Extension |      | Research |      |
|------------|-----------|------|----------|------|
|            | 1862      | 1890 | 1862     | 1890 |
| Plan       | 30.0      | 0.0  | 20.4     | 0.0  |
| Actual     | 34.3      | 0.0  | 30.8     | 0.0  |

**II. Merit Review Process**

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

**2. Brief Explanation**

The School of Natural Resources and Agricultural Sciences and the Agricultural and Forestry Experiment Station use an established scientific peer review process to review and evaluate proposals, publications, and specific annual reports that could include the annual narratives that are required to report activities related to the POW. Extension uses the merit review process and uses the general review process for this joint annual report and Plan of Work.

The Agricultural and Forestry Experiment Station (AFES) complies with sections 3(c)(1) and (2) of the Hatch Act and section 1445 of NARETPA (Hatch Regular Capacity Funds) and the amendment to the Hatch Act of 1887 to Section 104 by AREERA for programs funded under section 3(c)(3) of the Hatch Act (Hatch Multistate Research Funds) by using its established scientific review process for all proposals, publications, and specific annual reports that could include annual progress of work accomplished under this Plan of Work. All new and revised Hatch (and McIntire-Stennis) project proposals within the Agricultural and Forestry Experiment Station undergo scientific peer review. All proposals are submitted for director approval. The blind peer review panel is composed of a minimum of three members invited by the Director. The panel consists of competent authorities in the discipline of the proposal/publication/annual report or related disciplines and includes at least one authority in a supporting discipline. 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 Director for

transmittal to the author(s). The author(s) review all comments and recommendations of the reviewers and make adjustments or explanations in the document. The Director reviews all comments and recommendations from the reviewers along with the revised proposal/publication/report. The signature of the Director on form AD 416 submitted to USDA NIFA will indicate approval of the project by the Director and will certify that the proposal has been recommended for approval by a majority of the members of the Peer Review Panel. 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 specific review process can be found in the Section I.G. "Summary of the Western Review Process" in the Supplementary Manual of Procedures for Western Regional Research and also found at <http://www.colostate.edu/Orgs/WAAESD/>. All faculty in SNRAS/AFES who are participants in Hatch multistate projects are usually required to have an approved Hatch General project that is related to the field of study of the Hatch multi-state project in which they are a member. The Associate Director of AFES is a member of the MRC. Peer review of the Extension components of the POW consist of internal and external reviews. Internal review of the Extension components of the POW is achieved by a panel of University of Alaska Fairbanks faculty and administrators. Extension's State Advisory Council conducted external reviews of programs. The different review panels assessed how well the activities and resources proposed in the plan contribute to achieving the proposed goals and established emphasis on climate change, chronic health issues, food security and safety, economic development, positive youth development and renewable energy as priorities for the future. Collective feedback from reviews is incorporated into the future iterations of the Extension components of the Plan of Work. Extension developed metrics in 2010 for the 2011 accreditation of the university by the Northwest Accreditation Commission. The accreditation will cover Extension's research, teaching and outreach process.

### **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 individuals
- Survey of selected individuals from the general public
- Other (SNRAS Website, Newsletter & Blog, CES random poll )

#### **Brief explanation.**

SNRAS/AFES has traditionally met with regional audiences around the state in both formal and informal settings each year. Examples of these include:

Regional and Statewide Farm Bureau  
Alaska Produce Growers  
Delta Farm Forum  
Alaska Greenhouse Growers

Reindeer Herders Association  
Alaska Northern Forest Cooperative  
Alaska Livestock Producers  
Association of Peonies Growers  
On-demand meetings at the request of stakeholders

These traditional meetings are focal points for listening to and receiving input from stakeholders. As required by the AREERA of 1998, and in cooperation with the Cooperative Extension Service, these are advertised as broadly as possible and identified as points of contact for public input into research and extension program development.

Extension sponsors many agricultural and horticultural conferences and outreach activities with SNRAS/AFES involvement and the units share mechanisms to gather formal and informal stakeholder input. Outreach events in 2010 included the Delta Farm Forum, Harvest Wrap-up, Alaska Produce Growers Conference, Alaska Greenhouse and Nursery Conference, Sustainable Agriculture Conference and invasive species conferences. Extension also relies on advisory groups as an important stakeholder needs assessment process. Extension has a Statewide Advisory Council and faculty in districts across the state use local advisory committees to provide them with community input related to local program stakeholder needs and interests. The State Advisory Council met in person twice and conducted six audioconference meetings throughout the fall, winter and spring. The Natural Resource and Community Development area sought program direction through mining and forestry advisory groups. In addition, Extension faculty members gathered stakeholder input as part of their program planning and development process as well as surveys following instructional activities. As an example, the Anchorage Master Gardener Council met eight times in 2010 to plan and direct the program. 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. While developing a new five-year strategic plan in 2010, Extension surveyed stakeholders who attended its classes, advertised and conducted an online survey and commissioned a statewide poll. These needs assessments provided direction for Extension programs for 2010-2015.

**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.**

SNRAS/AFES relies on stakeholder input from agricultural advisory groups, collaborators, federal and state agencies, colleagues, faculty and students for assistance in establishing priorities and developing program direction in consultation with appropriate constituencies. Major

stakeholders include the Fairbanks North Star Borough, Matanuska-Susitna Borough, Alaska Northern Forest Cooperative, USDA/NRCS, USDA/ARS, US Forest Service, Fairbanks Economic Development Corporation, and industries involved in food, fiber, and fuel/energy production. Members from the public who have participated in or who have an interest in Extension's program offerings represent one segment of the organization's stakeholders. Stakeholders often identify themselves by e-mailing or calling Extension faculty or staff. Advisory groups lead us to stakeholders. Another significant stakeholder group is public and private agencies and organizations that have professional and programmatic relationships with Extension or direct interest in Extension programming. Some of Extension's major stakeholder organizations include, but are not limited to, the Alaska State Legislature, Farm Bureau, Grange, Reindeer Herders Association, Greenhouse Growers, Food Banks of Alaska, Department of Natural Resources (Alaska), Forest Service, Boys and Girls Clubs, school districts, electric cooperatives, the Alaska Municipal League, and research service units of the university.

**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
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Survey of the general public
- Meeting with invited selected individuals from the general public

**Brief explanation.**

Survey information was collected using formal survey preparation and analysis techniques. Meetings and workshops were scheduled around themes and to gather specific information in meeting minutes and transcripts, which was used in strategic planning of research and Extension programs. The feedback loop provided information to research and outreach programs and from research and outreach programs to stakeholders and individuals.

Extension agents use advisory or focus groups to collect stakeholder input. Specialists also have specific groups they rely on for information. For example, the housing specialist works closely with the Alaska Building Science Network and the Alaska Housing Finance Corporation for additional input. The food specialists work with small business owners and agency groups to plan programming, workshops and consultations in order to influence the development and marketing of products. Extension also collected stakeholder input as part of its 2010 strategic planning process. Surveys were made available online, advertised through the media, and handed out to participants in CES workshops.

**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.**

SNRAS/AFES and CES joint research and outreach planned programs are directly related to the SNRAS/AFES and CES Strategic Plan produced by faculty. The Plan reflects ideas and advice given by client user groups, students, the board of advisors, expert advisors, state and national peers and cooperators, and UAF administration. During the 2010 reporting period, the four focus areas of energy, climate change, local and regional food production and food safety, and the need for adult and youth education and training to fill Alaskan job and career demands began to emerge. These focuses were used to set priorities in meeting the many needs for knowledge about Alaska and circumpolar resources and geography. Input was considered in the budget process. Capacity funds were used in response to research needs based on the four emerging focus areas.

Needs assessments helped Extension faculty identify emerging issues in five planned programs, generating plans based on logic models. The faculty used this information to generate their individual work plans. Based upon information generated by the needs assessments, future programming needs related to hiring have been affected. Stakeholder needs will continue to be a driving factor in determining Extension priorities and programming. Cooperative Extension is a grass roots-driven program. Agents use the stakeholder input to identify programming needs and work to offer programs and information that meet those needs. Stakeholder input in 2010 led to increased programming in rural energy options, energy-efficient home construction, climate change, health programming, food security and positive youth development.

**Brief Explanation of what you learned from your Stakeholders**

Alaskans desire information necessary to make decisions related to a healthy lifestyle and a healthy economy. Issues pertinent to subsistence and small agriculture carry particular impact for our stakeholders. Food security, energy, climate change, chronic health issues and youth development have risen to the forefront as areas of particular importance for our Alaskan stakeholders and are therefore leading to development of research and extension programming in those particular areas.

IV. Expenditure Summary

| <b>1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)</b> |                       |                 |                    |
|--|-----------------------|-----------------|--------------------|
| <b>Extension</b>   |                       | <b>Research</b> |                    |
| <b>Smith-Lever 3b &amp; 3c</b>   | <b>1890 Extension</b> | <b>Hatch</b>    | <b>Evans-Allen</b> |
| 1128187  | 0                     | 1127643         | 0                  |

| <b>2. Totaled Actual dollars from Planned Programs Inputs</b> |                                |                       |                 |                    |
|---|--------------------------------|-----------------------|-----------------|--------------------|
| <b>Extension</b>  |                                |                       | <b>Research</b> |                    |
|   | <b>Smith-Lever 3b &amp; 3c</b> | <b>1890 Extension</b> | <b>Hatch</b>    | <b>Evans-Allen</b> |
| <b>Actual Formula</b>   | 1155781                        | 0                     | 11303156        | 0                  |
| <b>Actual Matching</b>  | 1128187                        | 0                     | 2487582         | 0                  |
| <b>Actual All Other</b>                                       | 6282579                        | 0                     | 11446175        | 0                  |
| <b>Total Actual Expended</b>                                  | 8566547                        | 0                     | 25236913        | 0                  |

| <b>3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous</b> |        |   |        |   |
|--|--------|---|--------|---|
| <b>Carryover</b>   | 839321 | 0 | 818249 | 0 |

## V. Planned Program Table of Content

| S. No. | PROGRAM NAME                                      |
|--------|---|
| 1      | Agriculture and Horticulture                      |
| 2      | Natural Resources and Community Development       |
| 3      | Sustainable Individuals, Families and Communities |
| 4      | Youth Development                                 |
| 5      | Management of Ecosystems                          |
| 6      | Global Food Security and Hunger                   |
| 7      | Sustainable Energy                                |
| 8      | Food Safety                                       |
| 9      | Climate Change                                    |
| 10     | Childhood Obesity                                 |

**V(A). Planned Program (Summary)**

**Program # 1**

**1. Name of the Planned Program**

Agriculture and Horticulture

**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                        | 5%              |                 | 10%            |                |
| 203     | Plant Biological Efficiency and Abiotic Stresses Affecting Plants | 10%             |                 | 0%             |                |
| 204     | Plant Product Quality and Utility (Preharvest)                    | 10%             |                 | 5%             |                |
| 205     | Plant Management Systems  | 10%             |                 | 18%            |                |
| 212     | Pathogens and Nematodes Affecting Plants                          | 0%              |                 | 5%             |                |
| 213     | Weeds Affecting Plants  | 10%             |                 | 0%             |                |
| 216     | Integrated Pest Management Systems                                | 10%             |                 | 2%             |                |
| 301     | Reproductive Performance of Animals                               | 0%              |                 | 10%            |                |
| 302     | Nutrient Utilization in Animals                                   | 0%              |                 | 5%             |                |
| 307     | Animal Management Systems   | 14%             |                 | 8%             |                |
| 308     | Improved Animal Products (Before Harvest)                         | 10%             |                 | 3%             |                |
| 401     | Structures, Facilities, and General Purpose Farm Supplies         | 4%              |                 | 9%             |                |
| 402     | Engineering Systems and Equipment                                 | 0%              |                 | 9%             |                |
| 404     | Instrumentation and Control Systems                               | 4%              |                 | 0%             |                |
| 405     | Drainage and Irrigation Systems and Facilities                    | 0%              |                 | 9%             |                |
| 502     | New and Improved Food Products                                    | 4%              |                 | 5%             |                |
| 504     | Home and Commercial Food Service                                  | 4%              |                 | 0%             |                |
| 601     | Economics of Agricultural Production and Farm Management          | 5%              |                 | 2%             |                |
|         | <b>Total</b>  | 100%            |                 | 100%           |                |

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

| Year: 2010 | Extension |      | Research |      |
|------------|-----------|------|----------|------|
|            | 1862      | 1890 | 1862     | 1890 |
|            |           |      |          |      |

|        |      |     |      |     |
|--------|------|-----|------|-----|
| Plan   | 9.0  | 0.0 | 12.0 | 0.0 |
| Actual | 10.4 | 0.0 | 12.5 | 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    |
| 352454              | 0              | 2782604        | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 344040              | 0              | 1392727        | 0              |
| 1862 All Other      | 1890 All Other | 1862 All Other | 1890 All Other |
| 1370943             | 0              | 2022455        | 0              |

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Research and CES outreach will be integrated to assure that best management practices appropriate to Alaska and tailored to Alaska are provided to the target audience. There will be new directions in energy crops, resilience and adaptability of crop and animal production techniques to changes in the subarctic and arctic climate, and a revitalization in research and extension programs relevant to regional and local food production and food safety. An emphasis will also be placed on educating and training youth and adults in new fields opening in the Alaska workforce and continuing education and training programs that emphasize current needs as an aging workforce retires.

Group and one-on-one educational activities with specific sectors of the pest management industry, the agricultural community, and the horticultural industry will provide individuals and businesses with important information. Increased reliance on distance delivery and the Internet will enhance delivery to more people. Increasing partnerships will become important strategies in maintaining pest species below threshold levels. Outreach will also include conferences, field trips, forums, tours, response to emails, phone calls and walk-in stakeholders.

Through university controlled environment research and funding made available through the NRCS, technology transfer has made it possible for the creation of over 100 hoop houses statewide.

**2. Brief description of the target audience**

Arborists, botanical garden volunteers, farmers, food service organizations, garden and plant associations, public and commercial greenhouses, homeowner associations, landscapers, state and federal park employees, master gardeners, museums, military base personnel, boroughs and urban municipalities, pest control operators, property managers, public health organizations, public and private schools, school districts, recreational facilities, resorts and hotels, rural residents, youth groups, and school districts.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

| 2010          | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---------------|------------------------|--------------------------|-----------------------|-------------------------|
| <b>Actual</b> | 19338                  | 136838                   | 1276                  | 6837                    |

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

**Patent Applications Submitted**

Year: 2010

Actual: 9

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

| 2010          | Extension | Research | Total |
|---------------|-----------|----------|-------|
| <b>Actual</b> | 2         | 21       | 23    |

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Output Target 1: Field faculty will provide agricultural and horticultural workshops and conferences, including information on invasive weeds, noxious plants and integrated pest management.

| Year | Actual |
|------|--------|
| 2010 | 205    |

**Output #2**

**Output Measure**

- Output Target 2: Field faculty will provide agricultural, horticultural and pest management information through one-on-one consultations and consultations with other organizations (in contact hours).

| Year | Actual |
|------|--------|
| 2010 | 4144   |

**Output #3**

**Output Measure**

- Output Target 3. Horticultural field crop research will concentrate on home and commercial varieties appropriate to Alaska and crops that fill niche markets with high-end values. Business starts and publications are the output measures.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 13            |

**Output #4**

**Output Measure**

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

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 104           |

**Output #5**

**Output Measure**

- Output Target 5. Focus will be on best management practices for feed crops, evaluation of crops and varieties for fuel production. Output measures will be publications.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 0             |

**Output #6**

**Output Measure**

- Output Target 6. Potato varieties will be evaluated for niche market sales, disease resistance, and yield and best management practices determined. Output measures will be number of varieties selected and publications.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 3             |

**Output #7**

**Output Measure**

- Output Target 7. Turf research will continue including variety selection and expansion into multiple use. Output measure will be publications.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 0             |

**Output #8**

**Output Measure**

- Output Target 8. Animal research will continue to concentrate on alternative livestock emphasizing diet, meat quality and reproductive biology. Output measure will be publications.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 7             |

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

| O. No. | OUTCOME NAME  |
|--------|---|
| 1      | Outcome Target 1: Increase agronomic crop producers' ability to understand and assess optimum production practices.                             |
| 2      | Outcome Target 2: Increase traditional and alternative livestock producers' ability to understand and assess optimum production practices.      |
| 3      | Outcome Target 3: Increase participants' commercial and home horticulture optimum techniques and improve management practices.                  |
| 4      | Outcome Target 4: Increase participants' crop and livestock optimum production techniques and management practices.                             |
| 5      | Outcome Target 5: Increase the number of activities that monitor and control invasive species that threaten agriculture and natural ecosystems. |
| 6      | Outcome Target 6: Support participation in Community Supported Agriculture (CSA) through technology transfer and information sharing.           |

## **Outcome #1**

### **1. Outcome Measures**

Outcome Target 1: Increase agronomic crop producers' ability to understand and assess optimum production practices.

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

| <b>Year</b> | <b>Quantitative Target</b> | <b>Actual</b> |
|-------------|----------------------------|---------------|
| 2010        | 20                         | 74            |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

New agronomic varieties being developed possess important characteristics such as increased yield, disease and insect resistance, improved quality, and adaptation to the local growing conditions. Reliable information about these new varieties is important for Alaskan producers to meet the demand for niche crops. Current cropping systems, for most producers, do not include a rotation crop that protects the land from disease and erosion. Educational opportunities and research-based practical advice offered to farmers will help new producers enter the market and improve economic viability. Management of farm nutrients, pest scouting and pesticides also will improve financial sustainability of farm operations while making producers cognizant of environmental concerns.

#### **What has been done**

Oilseed crops, for crop rotation, are important by providing valuable niche crops for markets which will also benefit the land. Variety trials continued evaluation of spring barley, wheat, and oilseeds including canola selected from northern Canadian and U.S. sources for testing against the standard Alaska varieties. The 2010 Delta Farm Forum offered research information relating to cereal grain production, black grass bugs and information about the NRCS Conservation Reserve Program. The 2009 Harvest Wrap-Up brought researchers and farmers together to discuss the past crop season, current and future research by AFES and other agencies. Extension provided nutrient and pest management plans to farmers associated with EQIP long-term contracts.

#### **Results**

Events that bring producers, researchers and agencies together encourage an exchange of ideas and information and provide opportunities to prioritize research needs. Presentations on ARS research on phenology and proper identification of black grass bugs helped forage producers understand the critical nature of the timing of control efforts. A presentation on AFES canola

research has helped growers with production decisions and another AFES presentation has led to greater production of hulless barley for human consumption. One producer is considering a milling operation. Yearly updates are provided on new and better adapted crop varieties, the response of agronomic crops to dryland farming conditions and harvest methods. It also provides a database for local producers to determine the economic viability for those crops. Through the EQIP program, 67 participants in Kenai and Delta districts applied pesticides and nutrients at the specified rates and were educated in weed identification and soil sampling techniques. Participants improved soil and water conservation.

**4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>                                    |
|----------------|--|
| 102            | Soil, Plant, Water, Nutrient Relationships               |
| 205            | Plant Management Systems                                 |
| 213            | Weeds Affecting Plants                                   |
| 216            | Integrated Pest Management Systems                       |
| 601            | Economics of Agricultural Production and Farm Management |

**Outcome #2**

**1. Outcome Measures**

Outcome Target 2: Increase traditional and alternative livestock producers' ability to understand and assess optimum production practices.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| <b>Year</b> | <b>Quantitative Target</b> | <b>Actual</b> |
|-------------|----------------------------|---------------|
| 2010        | 20                         | 40            |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Livestock production enterprises in Alaska provide fiber, meat and antler for commercial markets as well as agrotourism enterprises in this state. Educating livestock producers will improve their ability to assess production practices. The program goal is to facilitate the development of management strategies to support sustainable, high-latitude livestock production in species ranging from poultry to ruminant animals.

### **What has been done**

The insemination protocol was simplified and the use of commercially available products was validated for farmed reindeer. A series of animal-science modules were updated for presenting in workshops. Modules were developed on livestock castration and selecting a show calf and market steer development. Workshops were taught in six Alaska communities and more than 170 hours were logged consulting with livestock producers and organizations. Chicken University taught 190 participants about chicken and egg production. The Sustainable Agriculture Conference provided information on poultry and goat production.

### **Results**

The first documented successful pregnancy of a reindeer by artificial insemination (AI) using frozen/thawed semen led to the birth of a reindeer calf. Also, five elk calves sired by AI were born. Results were reported at the joint American Society of Animal Science meetings. Results were also prepared as a book chapter and an invited talk at the 8th international Ruminant Reproduction Symposium held in Anchorage. Results for AI were incorporated into Alaska Diversified Livestock Assoc. and Kawerak Reindeer Herders Association meetings; workshops, farm consultations and SNRAS animal science classes. Tests show increased knowledge after animal nutrition presentations to producers. A beef producer used a feed ration the specialist developed that included dried fish waste. The livestock specialist worked with state/federal agencies on issues facing a herd of wood bison and with dairy farmers on balancing feed rations. One-third of Chicken University participants learned they could get their hens to lay year-round. Participants in Sustainable Ag conference requested more programming on goat and other alternative livestock.

## **4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>                                    |
|----------------|--|
| 301            | Reproductive Performance of Animals                      |
| 307            | Animal Management Systems                                |
| 308            | Improved Animal Products (Before Harvest)                |
| 601            | Economics of Agricultural Production and Farm Management |

## **Outcome #3**

### **1. Outcome Measures**

Outcome Target 3: Increase participants' commercial and home horticulture optimum techniques and improve management practices.

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | 50                  | 78     |

**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 how to garden increases the quality of food available to consumers and lowers food security risk. Commercial horticulture is limited due to climate and poorly developed agriculture infrastructure. The state also seems well placed to benefit from certain high-value crops.

**What has been done**

Vegetable and flower trial research is designed for commercial and home owners providing comparative trial information useful in developing regional truck farms and expanding produce choices at farmers' markets. Peony research continued on market opportunities. Many short- and long term composting and gardening classes included hands-on components. Greenhouse and Nursery Conference participants received information about topsoils, landscaping, high tunnels, pest control, market gardening and funding opportunities. Sustainable Agriculture Conference presentations included fruit and berry research, organic certification, funding opportunities, high tunnels and Community Supported Agriculture. Extension and AFES horticulture faculty also presented research and production information at a peony conference.

**Results**

As a direct result of peony research, 47 commercial businesses have planted trial plots of peonies for field cut flower production. More than 100 Alaskans attended a meeting of the Alaska Peony Growers Association to explore the market potential for field grown peonies in Alaska. Peonies mature from July-September, a time they are not available elsewhere in the world. 219 Master Gardeners completed the course and practiced the techniques they were taught. Participants contribute 40 hours of community service, so their work spreads knowledge. A survey of Master Gardeners, nine months after the class, showed that more than 90 percent utilized information they learned, including growing new plants and varieties, and changing fertilizer and pest management practices. Ten greenhouse conference participants intended to start new horticulture businesses. Evaluations following Sustainable Ag Conference showed that half of participants who had attended past conferences had made changes in fertilization, marketing, pest management, grant writing and weed management.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area  |
|---------|---|
| 102     | Soil, Plant, Water, Nutrient Relationships                        |
| 203     | Plant Biological Efficiency and Abiotic Stresses Affecting Plants |
| 204     | Plant Product Quality and Utility (Preharvest)                    |
| 205     | Plant Management Systems  |

|     |   |
|-----|---|
| 212 | Pathogens and Nematodes Affecting Plants                  |
| 213 | Weeds Affecting Plants                                    |
| 216 | Integrated Pest Management Systems                        |
| 401 | Structures, Facilities, and General Purpose Farm Supplies |
| 405 | Drainage and Irrigation Systems and Facilities            |
| 502 | New and Improved Food Products                            |
| 601 | Economics of Agricultural Production and Farm Management  |

**Outcome #4**

**1. Outcome Measures**

Outcome Target 4: Increase participants' crop and livestock optimum production techniques and management practices.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | 50                  | 66     |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Alaska imports most of its food supply and with increasing shipping costs, commercial agriculture may become more viable for small and medium-sized crop producers in the state. Constraints include a short growing season, isolation from other producers and markets and high transportation costs. A need exists for educational support and expertise for producers to help make their operations more economically viable. Developing rations and pasture strategies to take advantage of local feedstuffs and forage is needed to decrease feeding costs without compromising meat quality.

**What has been done**

It was found that farmed reindeer will readily consume rations supplemented with a fish byproduct (bonemeal). Recommendations to producers on two commonly grown pasture grasses, smooth brome grass and Nugget bluegrass as well as haylage will be made. Three conferences help optimize production, improve farm management and bring the latest research and trends to producers. Produce Growers Conference provided information on the latest potato and rhubarb research, fertilizer recommendations, pest management and an agriculture grant-writing workshop. An agent helped establish a precision agriculture cooperative in the Palmer area.

**Results**

A trained sensory panel could not find any differences in attributes of the meat; smell intensity, tenderness, juiciness, game flavor, blood flavor and sweet flavor meat among reindeer fed only a concentrate or pasture supplemented animals. Range studies show that south-facing sites are selected by reindeer mothers for calving due to shelter from wind and a minimum snow depth. Fifteen farmers who participated in the 2010 Produce Growers Conference said they would change the way they apply fungicides because of the effect cold soils have on the chemicals. A large Palmer farm saved \$60,000 in implementation costs for a precision ag guidance system, and the farmer was able to use precision fertilization, starting in fall 2010. A GIS study indicated that his fields were under-fertilized with potassium.

**4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>   |
|----------------|---|
| 102            | Soil, Plant, Water, Nutrient Relationships                        |
| 203            | Plant Biological Efficiency and Abiotic Stresses Affecting Plants |
| 204            | Plant Product Quality and Utility (Preharvest)                    |
| 205            | Plant Management Systems  |
| 212            | Pathogens and Nematodes Affecting Plants                          |
| 213            | Weeds Affecting Plants  |
| 302            | Nutrient Utilization in Animals                                   |
| 307            | Animal Management Systems   |

**Outcome #5**

**1. Outcome Measures**

Outcome Target 5: Increase the number of activities that monitor and control invasive species that threaten agriculture and natural ecosystems.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| <b>Year</b> | <b>Quantitative Target</b> | <b>Actual</b> |
|-------------|----------------------------|---------------|
| 2010        | 5                          | 1             |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Alaska hosts thousands of visitors every year. Alaska 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**

Researchers incorporate IPM in their work. Agents and IPM staff hosted 112 workshops and presentations and worked with producers and other agencies to identify pests and reduce impacts. Two invasive species conferences bring together researchers, agencies and citizens statewide to discuss research and prevention efforts. Pest technicians trap for invasive species of concern, including the gypsy moth and the emerald ash borer. Extension provides training for pesticide applicator certification and for certification of inspectors doing noxious weed-free forage and straw inspections.

#### **Results**

A master's thesis was completed and presented on An Invasive Weed Plan for the University of Alaska Fairbanks Campus. Alaska has not been challenged by invasive plants and pests to the degree that many other states have so far. Extension and other agencies remain vigilant and monitor, detect and identify species. In the past 10 years, three gypsy moths have been trapped in Alaska, but none in 2010. IPM placed approximately 500 delta traps in 14 census districts last year. Sixty-eight traps for emerald ash borers were placed in trees in seven census districts but none were detected. Raising the awareness of agencies and the public to the threat invasives pose will help contain the errant species. After the 2010 invasive species conferences, many participants agreed to increase efforts to manage and monitor invasive species. There was an increased awareness of the need for the better management of high priority invasive species.

#### **4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>                    |
|----------------|--|
| 212            | Pathogens and Nematodes Affecting Plants |
| 213            | Weeds Affecting Plants                   |
| 216            | Integrated Pest Management Systems       |

#### **Outcome #6**

##### **1. Outcome Measures**

Outcome Target 6. Support participation in Community Supported Agriculture (CSA) through technology transfer and information sharing.

##### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

##### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | {No Data Entered}   | 16     |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Alaskans all over the state are looking for local options for their food, and more and more small farmers are considering using the CSA model as a means of lessening the economic risk of farming, and encouraging interest in locally grown, fresh food. Issues of food security and the desire for locally grown food may result in viability for this partnership between local farms and a community of "shareholder" consumers.

**What has been done**

SNRAS hosted a CSA roundtable in 2009 which resulted in the Alaska Community Agriculture Association (ACAA) being formed in 2010. The state Alaska Grown program hosted its Eat Local Challenge 2010. This year, the Alaska Center for the Environment joined Alaska Grown as a sponsor as part of the local foods and sustainable communities program.

**Results**

There are 26 CSA member farms statewide at this time. SNRAS personnel assisted and advised ACAA in the creation of their website and faculty and staff continue to facilitate meetings. Alaska residents were encouraged to eat at least one home-cooked meal during the Eat Local week. Meals were to be made of mostly local ingredients, incorporate at least one never-before-used local ingredient; brown-bag at least one meal made primarily of local ingredients; talk to at least one local food retailer and one food producer about local food options; and choose local food products whenever possible.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area            |
|---------|---------------------------|
| 205     | Plant Management Systems  |
| 307     | Animal Management Systems |

## **V(H). Planned Program (External Factors)**

### **External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

### **Brief Explanation**

The high cost of petroleum products and fertilizers is expected to impact the productivity and the economic viability of horticultural and agricultural operations in the state. The small number of agricultural staff working for Extension, the geographic distances between communities and high transportation costs involved in traveling to communities off the road system all present challenges to Extension, which tries to provide a supporting role for horticultural and agricultural production in the state. The Tanana District ag and hort agent reduced her time with Extension in August because of a new shared position. A poor growing season in 2010 affected growth in Southcentral and Interior Alaska. Thrip affected vegetation and vegetable and flower production in Southeast. High winds destroyed two high tunnels in Palmer and Fairbanks which will change the study on apple trees giving us an opportunity to study apples begun in a high tunnel but now exposed to the weather. The AFES greenhouse was dismantled to make way for a state-of-the-art natural science facility and a new, high technology controlled environment facility is in the construction phase. It is scheduled to be in operation by October 2011. In the meantime, we are borrowing the use of other greenhouses at the university.

## **V(I). Planned Program (Evaluation Studies and Data Collection)**

### **Evaluation Results**

Extension agents used surveys after major conferences and many agents regularly conducted surveys following individual classes. Several agents survey participants of workshops or conferences to get participants' responses to particular presentations or overall what they learned from previous presentations. Most of our agriculture agents do evaluations after an event for recording impacts but our livestock specialist and a number of agents do pre- and post-test surveys to determine what participants in their workshops learn. We are learning through surveys what areas interest clients for future programming. For example, participants in the 2010 Sustainable Agriculture Conference requested more information about goats and alternative livestock, and the following conference highlighted goat production. Evaluations also show what is most useful to participants in a class. A followup survey of Master Gardeners after a growing season showed which practices they used as a result of the class.

### **Key Items of Evaluation**



**V(A). Planned Program (Summary)**

**Program # 2**

**1. Name of the Planned Program**

Natural Resources and Community Development

**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             | 10%             |                 | 0%             |                |
| 112     | Watershed Protection and Management                 | 20%             |                 | 10%            |                |
| 122     | Management and Control of Forest and Range Fires    | 10%             |                 | 10%            |                |
| 123     | Management and Sustainability of Forest Resources   | 20%             |                 | 30%            |                |
| 131     | Alternative Uses of Land                            | 10%             |                 | 0%             |                |
| 134     | Outdoor Recreation                                  | 10%             |                 | 10%            |                |
| 605     | Natural Resource and Environmental Economics        | 5%              |                 | 10%            |                |
| 608     | Community Resource Planning and Development         | 10%             |                 | 10%            |                |
| 610     | Domestic Policy Analysis                            | 5%              |                 | 10%            |                |
| 805     | Community Institutions, Health, and Social Services | 0%              |                 | 10%            |                |
|         | <b>Total</b>  | 100%            |                 | 100%           |                |

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

| Year: 2010 | Extension |      | Research |      |
|------------|-----------|------|----------|------|
|            | 1862      | 1890 | 1862     | 1890 |
| Plan       | 4.0       | 0.0  | 2.0      | 0.0  |
| Actual     | 5.2       | 0.0  | 2.3      | 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    |
| 93357               | 0              | 3618352        | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 91128               | 0              | 346636         | 0              |
| 1862 All Other      | 1890 All Other | 1862 All Other | 1890 All Other |
| 1246752             | 0              | 4120200        | 0              |

## V(D). Planned Program (Activity)

### 1. Brief description of the Activity

Research products will provide science-based information in resource planning, economic and environmental impact of natural resource use, market and non-market value of resources, and conflict resolution in rural communities and villages along with basic information in agriculture and horticulture, forest sciences, and soil sciences for use by planners, economists, and policy makers. Measurable outcomes will include peer-reviewed publications, lay publications, rural community business/development plans, and citizen participation. Extension activities involve partners from other UAF units including AFES to assure that there is a feedback loop that will continue to make the information provided to stakeholders relevant to their needs. These activities will develop integrated and/or multi-state projects concerning natural resources stewardship within the University of Alaska Fairbanks and with other land grant institutions; develop criteria to broadly define the temporal natural resource interests of stakeholders so the program's activities address the needs of those Alaskans most directly impacted by specific natural resource matters; develop partnerships with government agencies to identify and address stakeholder needs; regularly assess stakeholder needs and emerging natural resources issues impacting stakeholders; conduct literature reviews and review contemporary research relevant to this program; develop culturally and educationally relevant CES publications, fact sheets, bulletins, and newsletters that provide unbiased, scientific information about natural resource issues; develop, review, and revise a website to be the electronic portal for UAF CES information on natural resources stewardship matters of concern to stakeholders; develop, plan, deliver, evaluate and revise as needed extension workshops, demonstrations and basic skill trainings; facilitate discussions and other meetings that address stakeholder needs in or near their communities; develop, conduct and review 4-H projects related to the natural resource stewardship program; develop, plan, conduct, evaluate and revise as needed young adult stakeholder workforce readiness trainings that prepare youth for entry-level positions in natural resource management positions; develop, deliver, facilitate and evaluate natural resource stewardship informational discussions with urban populations to increase their awareness of natural resource issues and the values and needs of stakeholders relative to natural resources; coordinate and assist the UAF School of Natural Resources and Agricultural Sciences and other units of the University of Alaska in recruiting and graduating young Alaskans with endorsements, certificates and degrees that result in careers in managing, using and protecting natural resources.

### 2. Brief description of the target audience

This program will focus on industry and entrepreneurs including communities, families, and newly forming cooperatives and businesses, non-profit and for-profit development corporations. Efforts will be

made to address problems of the traditionally underserved rural populations within the limit of resources available. Stakeholders are 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, and persons in natural resource related occupations who wish to increase their skill and/or knowledge level.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

| 2010          | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---------------|------------------------|--------------------------|-----------------------|-------------------------|
| <b>Actual</b> | 6210                   | 4291                     | 178                   | 226                     |

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

**Patent Applications Submitted**

Year: 2010

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

| 2010          | Extension | Research | Total |
|---------------|-----------|----------|-------|
| <b>Actual</b> | 1         | 6        | 7     |

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

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

| Year | Actual |
|------|--------|
| 2010 | 48     |

**Output #2**

**Output Measure**

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

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 33            |

**Output #3**

**Output Measure**

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

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 7             |

**Output #4**

**Output Measure**

- Output Target 4: Conduct at least two formal needs assessments per year of stakeholders with interest in natural resource management.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 3             |

**Output #5**

**Output Measure**

- Output Target 5. Develop regional economic models that depict the impact of Alaska resource management scenarios on Alaskan communities. Output will be electronic and written publications.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 8             |

**Output #6**

**Output Measure**

- Output Target 6. Develop, adapt, and implement public involvement processes that meet public expectations. Output measure will be public input sessions conducted and publications.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 10            |

**Output #7**

**Output Measure**

- Output Target 7. Provide analyses of the effectiveness of natural resource and environmental laws. Output measure will be publications.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 2             |

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

| O. No. | OUTCOME NAME  |
|--------|---|
| 1      | Outcome Target 1: Increase the number of partnerships with stakeholder groups, government agencies, and other institutions that will enhance the land grant mission.  |
| 2      | Outcome Target 2: Increase the number of integrated and multi-state research-Extension activities to 25% within five years.   |
| 3      | Outcome Target 3: Increase the recruitment and retention of youth appreciating and considering natural resource management careers.   |
| 4      | Outcome Target 4. Increase the number of communities and organizations participating in public involvement processes that target community economic development and policy and law. Out come measure will be the increase in number of communities. |
| 5      | Outcome Target 5. Identify situations in which existing resource management laws with conflicting purposes are reconciled.  |
| 6      | Outcome Target 6. Increase the number of cultural tourism economic development opportunities in communities.  |
| 7      | Outcome Target 7: Provide critical information to meet energy needs to Alaska citizens. Measure will be workshops, presentations and publications.  |

## **Outcome #1**

### **1. Outcome Measures**

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

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

| <b>Year</b> | <b>Quantitative Target</b> | <b>Actual</b> |
|-------------|----------------------------|---------------|
| 2010        | 5                          | 13            |

### **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, 3.2 million are state parks, and federal land totals 54 million acres. Sixty-five percent of Alaska is federally managed. AFES seeks to provide research that meets the needs of the private, state and federal stakeholders and with CES assures that stakeholders are engaged with UAF in the application of that research. Partnerships are critical to assuring this happens. Our partners work with us, often assisting in the research and outreach efforts.

#### **What has been done**

In AFES, bio-economic models were constructed to inform the North Pacific Fisheries Management Council, the Alaska Board of Fisheries, the Alaska Department of Fish and Game and the National Marine Fisheries Service. Surveys and interviews were designed in collaboration with the U.S. Forest Service to understand how natural resource recreation contributes to well-being and resilience in Alaska. Six Extension personnel joined the Sea Grant Marine Advisory Program agents in Fairbanks to hear climate change presentations from scientists and to develop a climate assessment model for Alaska coastal communities.

#### **Results**

Formal AFES partnerships have been formed with the CES, USDA ARS, Forest Service, Cooperative Ecosystems Study Unit, Cold Climate Housing Research, Kawerek Reindeer Herders Association, UAF Northwest Campus, Bristol Bay Campus, Chena Hot Springs Resort, Pikes Waterfront Landing, Alaska Berry Growers Association, National Geographic. Research collaboration includes the AT&T and Google Earth, AK Board of Fisheries, AK Department of Fish and Game, National Marine Fisheries Service, North Pacific Fisheries Management Agency, U.S. Fish and Wildlife Service, Corp of Engineers, World Wilderness Congress, Marine Mammal Commission, City of Fairbanks, Fairbanks North Star Borough, and the Nyarkoa Foundation,

Ghana. CES partnerships were formed as a result of the MAP association. Agents developed a climate change assessment model, and the Southeast Extension agent worked with MAP agents to develop a regional food security survey that was distributed to the region's residents and organizations in FY11. The goal is to develop a plan that will increase food security in a region accessible by boat or plane and vulnerable to interruption in supply lines.

#### 4. Associated Knowledge Areas

| KA Code | Knowledge Area                                    |
|---------|---|
| 112     | Watershed Protection and Management               |
| 122     | Management and Control of Forest and Range Fires  |
| 123     | Management and Sustainability of Forest Resources |
| 605     | Natural Resource and Environmental Economics      |
| 608     | Community Resource Planning and Development       |
| 610     | Domestic Policy Analysis                          |

#### Outcome #2

##### 1. Outcome Measures

Outcome Target 2: Increase the number of integrated and multi-state research-Extension activities to 25% within five years.

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | 2                   | 16     |

##### 3c. Qualitative Outcome or Impact Statement

###### **Issue (Who cares and Why)**

Alaska's geographic isolation and the expense of traveling elsewhere present challenges to maintaining multi-state relationships. At the same time, many issues, particularly natural resource, energy and climate change, have implications that extend well beyond our borders. Tapping into other state's experiences and research will strengthen our ability to assist Alaskans. Integrated activity between researchers and extension personnel provides the best possible information for stakeholders in the unique environments of our state.

###### **What has been done**

Progress was made on the multistate research project NECC1011 Balancing Natural Resource Recreation Management, Human Well-Being, and Community Resilience. Extension hosted the June 2010 national Association of Natural Resource Extension Professionals Conference, which emphasized collaborations to respond to climate change and energy challenges. Agent worked with other land-grant colleagues to create an online learning environment for 4-H youth that has interactive components, including the opportunity to engage in climate research and to learn about how climate change impacts the environment.

### **Results**

The Resources Management Issues at High Latitudes field course is a success story. The first day of the 10-day trip is organized by research and extension faculty who connect students and agency partners through field presentations in the Delta Junction area. These included lake water loss by AFES faculty, riverbank stabilization by NRCS, management of military lands by the Center for the Environment, fisheries management by AKF&G, the Clearwater Flood Control project by Soil and Water Conservation, invasive weed management by Salcha Delta SWCD and state forestry presented by AK Forest Service and the owners of the Northern Lights Dairy, the R&R Bison and Woods Elk Ranch, and a yak farm. The Association of Natural Resource Extension Professionals (ANREP) meets every two years to exchange ideas about natural resource programs. Collaborating with University of Idaho and Oregon State, the CES/AFES forester is assessing the knowledge of private forest landowners regarding the impacts of climate change. Meetings held for local forest owners in five Alaska communities resulted in adding Native focus groups and prioritizing community climate adaptation work.

## **4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>                             |
|----------------|---|
| 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 Target 3: Increase the recruitment and retention of youth appreciating and considering natural resource management careers.

### **2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | 30                  | 85     |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

As professionals retire, employers are concerned about the quality of new employees. SNRAS provides graduate and undergraduate degrees in Natural Resources Management and a Ph.D. in Natural Resources and Sustainability to educate future resource managers and policy makers. K-12 teachers need STEM preparation and employers are concerned about quality of employees. Faculty members appointments require teaching, research and community service commitments. Youth who are introduced to natural resource issues through an organization or agency in their community are more likely to consider natural resource careers. Agencies can offer internships or other opportunities to engage youth successfully and find youth can be real assets and problem solvers.

**What has been done**

SNRAS recruits new students, connects them with faculty advisors and broadens the reach of the university in the communities of Alaska. Internships provide students with hands-on experience and contact with federal and state agencies. The Alaska Forum on the Environment is a large annual statewide gathering of environmental professionals from government agencies, nonprofits, businesses, as well as community members. Extension hosted a two-day youth event in 2010 within the forum. More than 80 youths and 20 youth groups who are involved in natural resource issues participated, and a 4-H specialist presented information to forum participants about the value of integrating youth into programs and tips on how to do it.

**Results**

Teens are reached through One Tree experiences with science and art education, summer employment in gardening, tours provided of university, gardens, greenhouses, and reindeer. Faculty serve as the statewide FFA advisor, Ag in the Classroom participant, and science fair judges. The enrollment director participates in the annual campus Inside Out when high school students come to experience college. Youth can gain information on natural resource careers through the SNRAS blog, newspaper articles, pamphlets, brochures and campus activities like RAHI and Major Mania. Several agencies at the forum highlighted existing internships or study opportunities or other programs that foster youth leadership. Youth who had participated in some of these activities spoke about successful partnerships. Youth and young adult participants interacted with potential mentors and learned about resources and individual agencies that they could participate with. Representatives of a variety of agencies gained an understanding of the value of involving youth and suggestions on how to build a successful youth-adult partnership.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area                          |
|---------|---|
| 111     | Conservation and Efficient Use of Water |

- 112 Watershed Protection and Management
- 123 Management and Sustainability of Forest Resources
- 131 Alternative Uses of Land
- 134 Outdoor Recreation
- 608 Community Resource Planning and Development

**Outcome #4**

**1. Outcome Measures**

Outcome Target 4. Increase the number of communities and organizations participating in public involvement processes that target community economic development and policy and law. Out come measure will be the increase in number of communities.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | 3                   | 85     |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Community decision makers and the citizenry need research and outreach that provides guidance for development. In a state where community needs have to balance city, borough, state and federal concerns, it is helpful to have resources to assist in possibly divisive issues.

**What has been done**

New projects include a bioeconomic framework on the implications of reducing size limits to the sustainability of the fisheries; how policies affect local participation and economic viability of salmon fisheries if compromised by farmed fish; and a food security and sustainable food systems study to develop understanding of local food production. An undergraduate student project estimated the impact of establishing riparian greenbelts on property values in the FNSB. The feasibility of developing a storm water utility in the City of Fairbanks determined if the City of Fairbanks would save money on legally-mandated storm water management services by creating a Storm Water Utility. The Invasive Plant Plan for the UAF Campus developed a collaborative management plan for controlling invasive plants on campus.

**Results**

The riparian greenbelt project established additional evidence that new greenbelts should not

decrease tax revenues and is currently being used by the Tanana Watershed Association in its efforts to protect water quality and reduce the risks of flood damage in the watershed. 2) The feasibility of a storm water utility project to help the City of Fairbanks produce cleaner storm water while remaining fiscally solvent was presented to the mayor and the City Council for their consideration in passing a new user-fee to pay for EPA-mandated storm water systems.3) The invasive plant management plan was endorsed by the University Master Planning Committee and the Landscape Committee unanimously. A website has been created to provide ready access to the plan. One local park used our plan as a model for creating its own plan and the local weed control network wants to create something similar for the community as a whole.

**4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>                        |
|----------------|--|
| 605            | Natural Resource and Environmental Economics |
| 608            | Community Resource Planning and Development  |
| 610            | Domestic Policy Analysis                     |

**Outcome #5**

**1. Outcome Measures**

Outcome Target 5. Identify situations in which existing resource management laws with conflicting purposes are reconciled.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| <b>Year</b> | <b>Quantitative Target</b> | <b>Actual</b> |
|-------------|----------------------------|---------------|
| 2010        | {No Data Entered}          | 4             |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Federal land managers are required to act within a prescribed statutory and regulatory framework that guides their decision making. The courts have failed to properly apply the "Best Scientific Data Available" standard. Clarity is needed for what the term "scientific" means, and failure to consider whether data is scientific can have significant repercussions.

**What has been done**

Presentations were made at the Annual Meeting of the Alaska Chapter of The Wildlife Society concerning "Agencies in Limbo: Migratory Birds and Incidental Take by Federal Agencies," to the Defenders of Wildlife National Carnivores Conference on "Predator Control and the BLM: The

Interplay Between NEPA and ANILCA," and at the George Wright Society Annual Conference on "Advising Noah: A Legal Analysis of Assisted Migration." USDA multistate participation was in the W192/1192 Western Working Group on Rural Communities and Public Lands in the West.

**Results**

Both the assisted migration project and the "best scientific data available" projects have broad national implications for resource management. The work related to the National Refuge System and Intensive Management was specifically requested by USFWS employees needing a better understanding of the implications of USFWS law. The work related to the Migratory Bird Treaty Act analyzes why agencies continue to violate the statute, what they are risking, and suggests regulatory changes for Fish and Wildlife that could correct this regulatory gap. This work resulted in a change of action within Denali National Park where research conclusions were used to justify higher standards of avian protection during construction and maintenance projects. This analysis will be of interest to NPS managers in other states faced with similar state statutes and can provide a clearer understanding of duties and responsibilities and provide a better understanding of the laws that constrain federal counterparts.

**4. Associated Knowledge Areas**

|                |                          |
|----------------|--------------------------|
| <b>KA Code</b> | <b>Knowledge Area</b>    |
| 610            | Domestic Policy Analysis |

**Outcome #6**

**1. Outcome Measures**

Outcome Target 6. Increase the number of cultural tourism economic development opportunities in communities.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | {No Data Entered}   | 2      |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Communities often value cultural tourism as it relates to indigenous populations but can overlook possibilities associated with other cultural groups and not recognize opportunities to diversify.

**What has been done**

Agent worked with a team of community leaders, volunteers and organizations to develop events that honor the memory of Jujiro Wada, a Japanese immigrant who helped pioneer the Iditarod Trail from Seward to Nome, which would make the community a major outfitting and departure point for the gold rush. Wada was a marathon athlete, dog musher and figure important to the history of other communities in the state.

**Results**

A Wada memorial association was formed in Alaska, and delegates from the Japan Jujiro Wada Memorial Association toured Alaska in March 2010. Wada and another Iditarod pioneer were honored at a September 2010 event in Seward. A 5k race and the event were part of a 100-year anniversary commemoration of the Iditarod Trail involving Jujiro Wada memorial organizations in Alaska, Japan and Yukon Territories. Agent also made a presentation in Nome to promote the cultural heritage of Jujuo Wada. This resulted in a better understanding of Wada’s place in Alaska history and new tourism possibilities for the communities involved.

**4. Associated Knowledge Areas**

|                |   |
|----------------|---|
| <b>KA Code</b> | <b>Knowledge Area</b>                               |
| 805            | Community Institutions, Health, and Social Services |

**Outcome #7**

**1. Outcome Measures**

Outcome Target 7: Provide critical information to meet energy needs to Alaska citizens. Measure will be workshops, presentations and publications.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | {No Data Entered}   | 10     |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

A need exists, particularly in rural Alaska, for less expensive energy. Because of the high cost of fuel oil, wood heat is a logical choice for many residents.

**What has been done**

Extension personnel developed wood heat energy education materials that emphasize burning wood safely, efficiently and responsibly. Agents and staff presented information at five renewable fairs or conferences, including new fairs in Bethel and Juneau. CES also continued to update its

wood heating website at [www.alaskawoodheating.com](http://www.alaskawoodheating.com) with information about wood availability, harvesting and safety information. The goal is to increase the number of properly installed stoves that burn seasoned wood and to reduce the dependence on oil in rural Alaska. CES also conducted a wood heat feasibility study for the Fairbanks region.

### Results

Recipients of wood heat information became more informed about air quality and efficiency issues relating to catalytic and noncatalytic stoves, heating with wood safely and with the minimum amount of emissions.

## 4. Associated Knowledge Areas

| KA Code | Knowledge Area                                    |
|---------|---|
| 123     | Management and Sustainability of Forest Resources |
| 605     | Natural Resource and Environmental Economics      |

## V(H). Planned Program (External Factors)

### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

### Brief Explanation

External factors affecting Alaska natural resources include drought, which has reduced tree growth and made the forests susceptible to insect predation and forest fire. Climate change is having a dramatic effect on communities in the far north. All communities are struggling with the high price of fuel, and state government wrestles with a burgeoning budget and the drop in oil production. Long distances between rural communities not on a road system and accessible by plane or boat, affect development. Health and education of rural residents is slowly improving but is not on par with rural towns in the rest of the country.

Extension's Natural Resources and Community Development Program is fairly new and is also small. A full time specialist position was replaced in 2009 with a one-quarter shared position. An advisory group recommended that our area focus our work on climate change, rural leadership and economic development but it takes time to develop a unified stakeholder base, identify problems we can address, develop and deliver Extension education programs. The economy of rural Alaska continues to be depressed.

## V(I). Planned Program (Evaluation Studies and Data Collection)

**Evaluation Results**

**Key Items of Evaluation**

**V(A). Planned Program (Summary)**

**Program # 3**

**1. Name of the Planned Program**

Sustainable Individuals, Families and Communities

**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   | 20%             |                 | 0%             |                |
| 703     | Nutrition Education and Behavior   | 15%             |                 | 0%             |                |
| 724     | Healthy Lifestyle  | 20%             |                 | 0%             |                |
| 801     | Individual and Family Resource Management  | 10%             |                 | 0%             |                |
| 802     | Human Development and Family Well-Being  | 15%             |                 | 0%             |                |
| 804     | Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures | 10%             |                 | 0%             |                |
| 805     | Community Institutions, Health, and Social Services  | 5%              |                 | 0%             |                |
|         | <b>Total</b>   | 100%            |                 | 0%             |                |

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

| Year: 2010 | Extension |      | Research |      |
|------------|-----------|------|----------|------|
|            | 1862      | 1890 | 1862     | 1890 |
| Plan       | 10.0      | 0.0  | 0.3      | 0.0  |
| Actual     | 10.2      | 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    |
| 352897              | 0              | 0              | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 344472              | 0              | 0              | 0              |
| 1862 All Other      | 1890 All Other | 1862 All Other | 1890 All Other |
| 2194232             | 0              | 0              | 0              |

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Field faculty will conduct workshops and meetings, deliver educational services, provide training, and conduct consultations with clientele. Researchers will develop products, curricula and resources, provide training and conduct consultations with clientele.

Educators and researchers will conduct needs assessments, work with the media, partner with other agencies and organizations, write articles, publications and fact sheets, and facilitate events, activities, and teachable moments.

**2. Brief description of the target audience**

The Sustainable Individuals, Families and Communities programming involves parents, caregivers of children, school children (public and private), school teachers (public and private), home and building owners, individuals interested in healthy lifestyles, individuals and families needing assistance managing their finances, low- income individuals and families, (especially women with young children), individuals interested in a subsistence lifestyle, individuals interested in food preservation, individuals and professionals interested in emergency preparedness, and human development and social work professionals.

Institutional cooperation will include food banks, housing and energy authorities and organizations, and individuals or families experiencing life transitions.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

| 2010          | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---------------|------------------------|--------------------------|-----------------------|-------------------------|
| <b>Actual</b> | 10013                  | 998147                   | 1040                  | 52535                   |

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

Year: 2010  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

| 2010   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 1         | 1        | 0     |

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

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

| Year | Actual |
|------|--------|
| 2010 | 204    |

**Output #2**

**Output Measure**

- Output Target 2: Extension district offices will updated emergency planning for internal operations and constituent communities.

| Year | Actual |
|------|--------|
| 2010 | 4      |

**Output #3**

**Output Measure**

- Output Target 3: Energy extension workshops and conferences will provide individuals and families with immediate and long-term actions they can implement for energy conservation.

| Year | Actual |
|------|--------|
| 2010 | 22     |

**Output #4**

**Output Measure**

- Output Target 4: New food products will be developed using Alaska produced ingredients.

| Year | Actual |
|------|--------|
|------|--------|

2010

25

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

| O. No. | OUTCOME NAME   |
|--------|--|
| 1      | Outcome Target 1: Participants in food preservation and food safety classes will improve their food preservation and food safety practices.  |
| 2      | Outcome Target 2: Participants in healthy lifestyle classes and workshops will adopt knowledge gained to maintain healthy lifestyle practices one year after participation.            |
| 3      | Outcome Target 3: Participants will use knowledge gained in parent education classes to increase their application of developmentally appropriate practices.                           |
| 4      | Outcome Target 4: Awareness gained in workshops and will result in active energy conservation efforts by 20% each year over 2007 levels.   |
| 5      | Outcome Target 5: Energy efficiency awareness will result in an increase in collaborations for energy conservation by 25% per year over five years.                                    |
| 6      | Outcome Target 6: New Varieties and new uses of animal and plant products will result in increased production of Alaska based products. Outcome is number of products and publications |

## **Outcome #1**

### **1. Outcome Measures**

Outcome Target 1: 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**

| <b>Year</b> | <b>Quantitative Target</b> | <b>Actual</b> |
|-------------|----------------------------|---------------|
| 2010        | 190                        | 722           |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

A sizable percentage of 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 canned or preserved game meat or fish. Our state has the nation's highest rate of botulism, a foodborne illness that occurs in low-acid foods, such as fish and game meat. It is particularly important that we teach residents how to safely preserve these Alaska staples. Food preservation also decreases reliance on high-cost imported foods.

#### **What has been done**

\* Agents taught 67 food preservation classes in 22 communities. Fifty-four were hands-on classes in which 722 participants practiced food preservation/safety skills.

\* The Extension Food Safety and Preservation Hotline fielded more than 300 calls from 34 Alaska communities.

\* Agents and staff created three additional DVDs and three online modules of a how-to series on preserving local foods.

\* Agents tested 887 pressure canner gauges with an average 15-20 percent failure rate. Nearly 65 percent of tested gauges required adjustment.

#### **Results**

\* Clients who practice hands-on food preservation skills will be able to continue to preserve foods safely. It is difficult to quantify our impact here, but as more Alaskans learn the proper methods of preserving foods the risk of botulism decreases and clients can be less dependent on imported foods. An estimated 95 percent of Alaska's food is imported, so food preservation training increases Alaska's food security.

\* Approximately 130 pressure canner gauges were recommended to be replaced and 580 required adjustment, resulting in safely canned foods.

\* Our interactive food preservation Flash web modules reach users who may not have access to food preservation classes. Many Alaskans live in communities off the road system and without a district agent. Forty-seven users filled out surveys during 2010 after viewing a module and nearly all said they planned to use the information. One wrote, "I will finally feel comfortable using a can sealer for wet-packed foods! Great module."

#### 4. Associated Knowledge Areas

| KA Code | Knowledge Area                   |
|---------|----------------------------------|
| 504     | Home and Commercial Food Service |

#### Outcome #2

##### 1. Outcome Measures

Outcome Target 2: 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 | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | 310                 | 330    |

##### 3c. Qualitative Outcome or Impact Statement

###### **Issue (Who cares and Why)**

Alaska faces the challenge of our senior population remaining active and healthy in a difficult environment. Alaska has one of the fastest-growing populations of seniors. The Alaska Department of Labor estimates that the number of seniors ages 65 and older will double in the next 25 years. Alaska health-care costs are high and a need exists for improved nutrition and self-management of chronic diseases.

###### **What has been done**

\* Since 2005, one of our agents has trained 145 StrongWomen instructors in Alaska. During the past year, 24 new instructors were trained. Four agents led StrongWomen classes or hosted groups and another agent led a yoga class that combines nutrition and healthy lifestyle information.

\* Our Anchorage agent trained 41 new instructors of Living Well Alaska, a six-week program that teaches individuals how to manage their chronic health conditions. Extension is coordinating efforts to bring this program to Alaska seniors.

\* A campaign to inform residents of Northwest Alaska about vitamin D deficiency continued and

included presentations at a Nome health fair and a survey.

**Results**

\* Most participants in StrongWomen classes report feeling stronger and they lead more active lives. Many who participated for a year or more reported increased bone density and better balance. Sponsoring StrongWomen leader courses has helped establish many community programs. A recent survey shows that 300 ongoing participants attend two to three times a week in 21 StrongWomen community sites.

\* During the past five years, an agent has trained about 90 percent of the Living Well Alaska leaders, who have taught 95 classes. The federal Agency for Healthcare Research has researched this Stanford University program extensively and found that participant health behaviors and health status were improved, and they had fewer medical office visits and reduced hospital stays. Improvements persisted at one-year follow-ups.

\* A year after the vitamin D campaign began, 204 Nome health fair participants were surveyed. Fifty-five reported they had started taking vitamin D, 39 increased their vitamin D intake, and 19 realized they were taking enough vitamin D.

**4. Associated Knowledge Areas**

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

**Outcome #3**

**1. Outcome Measures**

Outcome Target 3: Participants will use knowledge gained in parent education classes to increase their application of developmentally appropriate practices.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | 80                  | 110    |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Childhood obesity is a major concern in Alaska, as elsewhere. Imported food, particularly in rural areas, have caused nutrition concerns among a population that historically relied on nutritionally

superior subsistence foods. To be effective, parent education programs must be sensitive to the cultural values of residents. Parent training opportunities are less available in rural Alaska.

#### **What has been done**

\* Seven agents received training on a childhood obesity prevention program that emphasizes the importance of good nutrition, traditional foods, family meals and physical activity. Five agents modified the program and taught it to parents, foster parents and day-care providers of young children. Additional funding allowed individuals from surrounding villages to travel to Nome or Kotzebue for a two-day training. Altogether, the program was delivered in seven communities to 89 participants.

\* Nome agent offered three hands-on classes on making baby food from scratch that reached 21 individuals.

\* Our Palmer agent offered classes on positive guidance, communication skills, positive parenting of preschoolers, Sudden Infant Death Syndrome and Shaken Baby Syndrome; 125 attended.

#### **Results**

In addition to presentations from nutrition specialists, participants in Nome and Kotzebue heard a presentation on traditional foods and gathering techniques. The trainings underscored the point that solutions need to come from communities. Participants created a list of ideas they thought would work from the presentations and their own ideas for getting children to become more physically active and to encourage children to eat more healthy foods. They also developed a list of goals, which was sent back to the participants six weeks after the workshops. Because training possibilities are especially rare in remote, rural communities, one of the participants in the Kotzebue workshop, who lived in a village, said this was the first time she had attended a training. A follow-up survey after a year will show how they used the information. Participants in the baby food classes practiced making baby foods that they brought home, so they learned a new skill.

#### **4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>                   |
|----------------|---|
| 703            | Nutrition Education and Behavior        |
| 724            | Healthy Lifestyle                       |
| 802            | Human Development and Family Well-Being |

#### **Outcome #4**

##### **1. Outcome Measures**

Outcome Target 4: Awareness gained in workshops and will result in active energy conservation efforts by 20% each year over 2007 levels.

##### **2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | 500                 | 543    |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Alaska has high energy prices and interest in energy conservation remains high. It is a pocketbook issue, particularly in rural areas, where energy costs are the highest and heating oil can run \$8 a gallon or more.

**What has been done**

- \* The state offered a \$300 million program aimed at energy conservation and efficiency in 2008. That acted as a great stimulus for information and the program work has continued.
- \* Energy specialist encouraged energy conservation through a quarterly newsletter aimed at homebuilders.
- \* Energy conservation was promoted in 18 solar design, housing retrofit, cold climate homebuilding and sustainability classes taught to 543 residents in nine communities.
- \* Specialist updated his solar design manual, which is a technical resource and guide.
- \* Bethel agent helped organize a community energy fair.

**Results**

- \* Funding for the state energy program decreased, but high energy prices increased the impact Extension has had on promoting energy conservation. Energy ratings on more than 21,000 homes statewide show an intent to retrofit those homes. The energy rebate program, begun two years, has now been fully encumbered and more is being invested in energy conservation than we could have imagined two years ago.
- \* The solar design manual includes new information on solar water heating performance predictions, which help homeowners evaluate the value of solar in their region. The manual also updates the latest solar design technologies. The goal of the guide is to improve energy security in Alaska through the use of solar power.
- \* Bethel energy fair brought agencies and vendors from around Alaska, who discussed futuristic alternatives and basics, such as replacing old wood stoves. Eighty participants left with tools to address home energy issues.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area   |
|---------|--|
| 804     | Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures |

## **Outcome #5**

### **1. Outcome Measures**

Outcome Target 5: Energy efficiency awareness will result in an increase in collaborations for energy conservation by 25% per year over five years.

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

| <b>Year</b> | <b>Quantitative Target</b> | <b>Actual</b> |
|-------------|----------------------------|---------------|
| 2010        | 6                          | 5             |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

New collaborations with organizations that can help spread knowledge about energy conservation and sustainability will help improve the energy security of Alaska.

#### **What has been done**

\* Energy specialist worked with other Extension sustainability educators to lead efforts to develop a new eXtension community of practice on sustainable living. He also is a contribute/reviewer for eXtension's Home Energy Community Page.

\* New collaborations with community outreach coordinator have given Extension a highly visible and effective presence in the annual Bioneers Conference in Anchorage, which promotes sustainability.

#### **Results**

\* Extension has been asked to coordinate and facilitate the Bioneers Conference in the future, but lacks the resources to do so. Our efforts have resulted in major networks being established for allowing community efforts statewide to get in touch with each other and discuss ways to build more sustainable and self-reliant communities through information sharing and cooperative development.

\* The Home Energy Community Page compiles information that enables people to improve home energy measures, while reducing residential energy use.

## **4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>  |
|----------------|--|
| 804            | Human Environmental Issues Concerning Apparel, Textiles, and Residential and |

## Commercial Structures

### **Outcome #6**

#### **1. Outcome Measures**

Outcome Target 6: New Varieties and new uses of animal and plant products will result in increased production of Alaska based products. Outcome is number of products and publications

#### **2. Associated Institution Types**

- 1862 Extension

#### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

#### **3b. Quantitative Outcome**

| <b>Year</b> | <b>Quantitative Target</b> | <b>Actual</b> |
|-------------|----------------------------|---------------|
| 2010        | 6                          | 25            |

#### **3c. Qualitative Outcome or Impact Statement**

##### **Issue (Who cares and Why)**

Research conducted by through the UAF Agricultural and Forestry Experiment Station led to the development of a new variety of hulless barley in 2009 that matures early, grows well in Alaska and is low in gluten. Increased awareness of how this distinctive-tasting barley can be used will help create a demand for the grain and bolster agricultural production. Value-added products using Alaska's wild berries can provide additional sources of revenue for Alaska producers.

##### **What has been done**

\* An Extension food research technician worked with the foods specialist to develop 13 recipes that use flour from the Sunshine barley. These ranged from a variety of baked goods to noodles and barley soup. Nutrition information is included for each recipe and individual fact sheets were created and marketed by Extension.

\* Small business development specialist worked with Alaska producers to develop and market new berry-based products.

##### **Results**

A few specialty food stores are carrying barley. Under the terms of the USDA grant that supported this work, more than 2,800 fact sheets were printed and most have been distributed to district offices and individuals. Additionally, the publications were accessed 793 times online. A grower in Delta who planted the barley with seed from AFES is considering adding a mill operation in FY11. Twelve new berry products were developed, from mead to candy.

#### 4. Associated Knowledge Areas

| KA Code | Knowledge Area                 |
|---------|--------------------------------|
| 502     | New and Improved Food Products |

#### V(H). Planned Program (External Factors)

##### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

##### Brief Explanation

The Home, Health and Family Development Program staff in Alaska is small with six agents in district offices and one specialist at the state office. This translates into agents covering large geographic areas. The Tanana District in the Interior includes an area the size of the state of Montana with one agent on staff to cover the entire area. The Mat-Su District agent covers an area the size of Georgia. Travel dollars are an issue because air travel is necessary for most agents to travel beyond their district office. Though agents have been very successful in partnering with other governmental and private entities to make each travel dollar go farther, they are still unable to travel as often as requested. Staff vacancies have been an issue. The position in Juneau has been vacant since June and has not been advertised yet. Our foods specialist and our energy specialist retired in June and neither position has been filled. Staff vacancies have also been a factor in the Alaska Nutrition Education Program (formerly FSNE) and EFNEP programs. We have had difficulties in replacing nutrition aides that were willing to work 20 hours a week at the pay rate. Even when we have been successful in rehiring, the time for recruiting and filling positions has left positions open in Alaska Nutrition Education Program and EFNEP and has pulled HHFD agents away from their normal duties to complete the process. We have been able to fill some of the positions this past year. In October of 2010, we had six of seven ANEP nutrition aide positions filled and three of five positions filled for EFNEP.

#### V(I). Planned Program (Evaluation Studies and Data Collection)

##### Evaluation Results

We have made strides this year to evaluate our programs better. A pop-up survey has yielded results for the online food preservation modules and surveys have been included in the food preservation DVDs. We can count the number of times our online food modules were viewed. The survey was created after staff brainstormed with an evaluation specialist. Respondents on the web module surveys reported that they found the modules very valuable (4 on a scale of 1 to 4). One respondent was an Extension agent in Maryland who said she would recommend the modules to her clientele. Agents have done a better job of

doing pre- and post-tests and evaluations following classes. As new programs are created, evaluations for outcomes are planned with the program.

**Key Items of Evaluation**

Evaluation for outcomes is an ongoing challenge. Additional training is always welcome.

**V(A). Planned Program (Summary)**

**Program # 4**

**1. Name of the Planned Program**

Youth Development

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

| KA Code | Knowledge Area                            | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|---------|---|-----------------|-----------------|----------------|----------------|
| 607     | Consumer Economics                        | 5%              |                 | 0%             |                |
| 801     | Individual and Family Resource Management | 5%              |                 | 0%             |                |
| 806     | Youth Development                         | 90%             |                 | 0%             |                |
|         | <b>Total</b>                              | 100%            |                 | 0%             |                |

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

| Year: 2010 | Extension |      | Research |      |
|------------|-----------|------|----------|------|
|            | 1862      | 1890 | 1862     | 1890 |
| Plan       | 9.0       | 0.0  | 0.0      | 0.0  |
| Actual     | 8.5       | 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    |
| 357073              | 0              | 0              | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 348547              | 0              | 0              | 0              |
| 1862 All Other      | 1890 All Other | 1862 All Other | 1890 All Other |
| 1470652             | 0              | 0              | 0              |

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

With the use of a 4-H Volunteer Leaders Training Manual, CDs and accompanying web-based tutorials that incorporate Essential Elements training , various methods of delivery will be developed

including district workshops, the development of digital learning platforms, teleconference trainings, highlights for newsletters and web-based tutorials. In addition to redefining the Alaska State 4-H Leaders Training Manual, portions of 4-H 101 have been added to the training.

Many youth enter the workforce without the key skills needed to advance in the workplace. By creating collaborations with local district schools, area businesses, federal, state and tribal agencies and other civic organizations, training programs will be made available for youth and opportunities for employment can be achieved.

Ideals of entrepreneurship will be presented at the 4-H club level by conducting trainings with local volunteer leaders, junior leaders, and youth of the 4-H clubs. District agents will assist in promoting the ideals of youth-based enterprises through additional leader and junior leader trainings, providing enterprise opportunities, and collaborate with organizations that can aid such enterprises.

Collaborations with local schools and other youth programs across the state will lead to new volunteer opportunities for 11-18 year olds. Though there are many opportunities for youth of this age, a key to success in this program will be though developing cross-over collaborations with local schools, other youth programs, and area University of Alaska campuses.

**2. Brief description of the target audience**

- Grades k-12
- Parents of school-age children
- Adults interested in positive youth development

4-H Extension educators

Other Extension educators

4-H adult volunteers

Military youth educators

Community leaders

Federal and state agency representatives

Native corporations and tribal representatives

Youth-serving organizations and their representatives

University of Alaska faculty

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

| 2010          | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|---------------|---------------------------|-----------------------------|--------------------------|----------------------------|
| <b>Actual</b> | 9005                      | 175291                      | 22887                    | 175291                     |

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

**Patent Applications Submitted**

Year: 2010  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

| 2010   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 0        | 0     |

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Output Target 1: 4-H educators will train volunteer organizational leaders in the Essential Elements of Youth Development

| Year | Actual |
|------|--------|
| 2010 | 182    |

**Output #2**

**Output Measure**

- Output Target 2: Extension will develop relevant workforce skill development projects for youth 15-18.

| Year | Actual |
|------|--------|
| 2010 | 12     |

**Output #3**

**Output Measure**

- Output Target 3: 4-H will create opportunities for membership or involvement for underserved and minority youth.

| Year | Actual |
|------|--------|
| 2010 | 15     |

**Output #4**

**Output Measure**

- Output Target 4: Youth Development will create initiative programming in science, engineering

and technology.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 17            |

**Output #5**

**Output Measure**

- Output Target 5: 4-H educators will create inter and intra-district educational and service collaborations.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 11            |

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

| O. No. | OUTCOME NAME   |
|--------|--|
| 1      | Outcome Target 1: 100% of faculty and staff associated within the program area will understand the Essential Elements of Youth Development   |
| 2      | Outcome Target 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 Target 3: 4-H educators will expand programming to underserved and minority youth by 5% in each year of the five-year plan of work.  |

## **Outcome #1**

### **1. Outcome Measures**

Outcome Target 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**

| <b>Year</b> | <b>Quantitative Target</b> | <b>Actual</b> |
|-------------|----------------------------|---------------|
| 2010        | 9                          | 19            |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

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

#### **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 and leaders participate in district trainings that emphasize delivery of the subject matter within the context of the Essential Elements. A biennial state volunteer leader forum and monthly audio conferences on various issues include Essential Elements.

#### **Results**

All of the 4-H staff in the Alaska program trained and presented information to their constituents about the Essential Elements of 4-H. 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. As a result of her commitment to 4-H within its framework of the Essential Elements, a club leader in the Tanana District received the National 4-H Salute to Excellence Award -- the second Alaska leader in two years to be recognized with this award. She has made a difference in the lives of youth in her community and has been recognized among her peers and Extension staff across the nation for her leadership. The experience has energized those around her as well as across the state.

#### 4. Associated Knowledge Areas

| KA Code | Knowledge Area    |
|---------|-------------------|
| 806     | Youth Development |

#### Outcome #2

##### 1. Outcome Measures

Outcome Target 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 | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | 200                 | 198    |

##### 3c. Qualitative Outcome or Impact Statement

###### **Issue (Who cares and Why)**

Applying the Essential Elements in program development and delivery is what makes 4-H unique from other youth programs. These four elements define volunteer roles in the lives of 4-H members as mentors, role models and coaches.

###### **What has been done**

Leaders are asked to provide information on events throughout the 4-H year for their clubs and also to show how activities will incorporate at least two Essential Elements. Evaluation tools have been used at the beginning and end of a project to see whether projects incorporate Essential Elements. The club charter application includes the identification of Essential Elements in club activity planning, making it an intentional step in the planning of club activities. This process is being done all across the state as well as on military installations.

###### **Results**

We know youth are benefiting from the intentional application of the Essential Elements. Examples abound. With reoccurring problems of theft by youth, the Bethel 4-H Teen Council put together skits on lying, cheating, stealing and gossip. The skits were delivered after school at the Bethel 4-H Youth Center for youth in grades K to 6. An example of generosity is that boys used their welding skills to improve the fencing at the Kenai district fairgrounds. Two examples show mastery. A nine-year 4-H member garnered recognition through her work to promote environmental action. Her proposal to amend the state tax code so that local governments can

exempt residential renewable energy systems from property tax was passed as part of S.B. 220. Another example involves a young man with technological talent who uses his expertise to be the teen leader of a club called Bang Up Club. He is responsible for directing the club with the help of an adult 4-H mentor. His club is popular with youth who like to invent, see action and create.

#### 4. Associated Knowledge Areas

| KA Code | Knowledge Area    |
|---------|-------------------|
| 806     | Youth Development |

#### Outcome #3

##### 1. Outcome Measures

Outcome Target 3: 4-H educators will expand programming to underserved and minority youth by 5% in each year of the five-year plan of work.

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | 5                   | 12     |

##### 3c. Qualitative Outcome or Impact Statement

###### **Issue (Who cares and Why)**

In many rural communities, activities for youth are limited. Special opportunities are also needed for minority youth. Many schools, urban and rural, are ethnically diverse. In order to keep the program viable and current, 4-H must reach out to these populations.

###### **What has been done**

\* Agents are making connections in rural Interior communities. GPS programs have been offered to youth in Eagle on the Yukon River and in Minto, a largely Native village in Interior Alaska. Agent met with interested community members in another village. Special outreach efforts also occurred in Kodiak.

\* An inservice training co-hosted by Extension trained 24 teachers from rural Alaska on a classroom salmon incubation project.

\* Youth in two rural Interior communities and in Interior villages received ATV safety training and public speaking training at a lock-in, and ongoing programs exist in two communities.

\* 4-H and the City of Bethel operate a youth center, which is open for youth through sixth grade after school and for teens at night weekdays. The center works with the USDA foods program to provide snacks after school and meals for community youth through the Summer Food Service Program, and offers a variety of classes.

### Results

- \* The salmon incubation project shows teachers how to improve math and science literacy with lessons tied to salmon and ecology. Teachers agree to develop a follow-up unit incorporating the salmon program and some aspect of the research they learned about. The result is relevant education. More than 70 communities and 40 school districts have been involved in this program.
- \* 4-H leaders have built relationships with adults in rural Alaska that has led to more programming for youth. 4-H partnered with Kodiak housing authority to expose summer youth program to 4-H programs; 12 youth enrolled in regular 4-H programs.
- \* Teens in the ATV project acquiring critical thinking and life skills along with safe riding techniques. They will serve as ambassadors providing an safety program.
- \* Youth attending the Bethel 4-H Youth Center program have a safe haven, something to eat and drink, and caring youth and adults interact with them. With the success of the youth center model in Bethel, a brochure is being developed to help promote partnerships with other Alaska communities.

## 4. Associated Knowledge Areas

| KA Code | Knowledge Area    |
|---------|-------------------|
| 806     | Youth Development |

### V(H). Planned Program (External Factors)

#### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Outreach activities)

#### Brief Explanation

Vast geographic distances between communities and communities that are accessible only by air or boat are a challenge for program delivery and development and maintenance of relationships between club leaders and 4-H staff. It also presents challenges for groups of 4-H youth from different communities getting together. All of the state school districts are on different calendars so arranging programs during breaks or in-service times so everyone can get together is not possible. Travel time is a factor in being able to meet face to face also. Another challenge is that the demographics of the state are rapidly changing, particularly in the Anchorage area. The economic downturn has also affected 4-H with more blended and single-parent families working and unable to volunteer or support the program. Alaska has some of the highest energy costs in the nation, along with increased costs of food and basic supplies for many communities off the road system. Many communities lack resources and capacity for youth opportunities. At the same time, we see

increasing need for out-of-school time activities, especially for teens. Many areas of the state lack sufficient job opportunities for youth to demonstrate job readiness skills. Rural Alaska is constantly challenged with the large number of volunteer turnover in "Bush" communities. New 4-H programs are started with great expectations, and then the families leave.

## **V(I). Planned Program (Evaluation Studies and Data Collection)**

### **Evaluation Results**

4-H offers post-activity surveys for almost all of our programs. The market livestock program, horse contests, youth in governance, Science Saturdays, afterschool clubs, day camps, residential camps and others are evaluated by participants and stakeholders for program improvements as well as documentation of life skill outcomes. The club chartering process also serves as a planning and evaluation tool for the intentional inclusion of life skill activities, which serve the needs and interests of club members. Over the past year, the state horse committee revised the State Horse Rule Book, completed in spring of 2010 in time for the riding/show season. In response to an identified need to collect and analyze data more effectively to package program outcomes for stakeholders, we are documenting impacts of several programs with the use of an online evaluation system from Washington State University. Outcomes are being shared with sponsors and donors.

It is a challenge to get volunteers interested in the Shooting Sports Program because of a 20-hour commitment to leader training, the Alaska 4-H shooting sports development committee is looking at different training models to find a fit for Alaska with fewer hours of training required.

### **Key Items of Evaluation**

Youth want opportunities to be able to meet each other across the state. Alaska 4-H has difficulty participating in multistate programs because of the cost of travel but one dozen Tanana District 4-Hers did travel to Hawaii in June 2010 for an exchange with 4-H'ers there. Travel is also expensive within Alaska but a group of eight teens from three districts traveled to Juneau with the Youth in Governance program to attend legislative committee meetings, be pages for the day and meet with legislators. Our annual state horse contest brought 30 youth from four districts together.

**V(A). Planned Program (Summary)**

**Program # 5**

**1. Name of the Planned Program**

Management of Ecosystems

**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                       | 0%              |                 | 10%            |                |
| 121     | Management of Range Resources                     | 0%              |                 | 10%            |                |
| 122     | Management and Control of Forest and Range Fires  | 0%              |                 | 10%            |                |
| 123     | Management and Sustainability of Forest Resources | 0%              |                 | 40%            |                |
| 132     | Weather and Climate                               | 0%              |                 | 10%            |                |
| 315     | Animal Welfare/Well-Being and Protection          | 0%              |                 | 10%            |                |
| 404     | Instrumentation and Control Systems               | 0%              |                 | 10%            |                |
|         | <b>Total</b>                                      | 0%              |                 | 100%           |                |

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

| Year: 2010 | Extension |      | Research |      |
|------------|-----------|------|----------|------|
|            | 1862      | 1890 | 1862     | 1890 |
| Plan       | 0.0       | 0.0  | 12.0     | 0.0  |
| Actual     | 0.0       | 0.0  | 13.6     | 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    |
| 0                   | 0              | 4563242        | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 0                   | 0              | 545895         | 0              |
| 1862 All Other      | 1890 All Other | 1862 All Other | 1890 All Other |
| 0                   | 0              | 5087402        | 0              |

## **V(D). Planned Program (Activity)**

### **1. Brief description of the Activity**

The Agricultural and Forestry Experiment Station ecosystem research is climate change related. We will endeavor to separate the ecosystem management research from the climate change research for the 2011 annual report.

Our efforts will be directed toward environmental and economical sustainable development and conservation of our natural resources that will benefit all citizens and help them adapt and become resilient as the climate changes. Research and outreach strategies will include a data base and data management system necessary for:

- Forest stand characterization and growth and yield for the Alaska northern forest.
- Long-term ecosystem monitoring and GIS modeling of the Taiga forest dynamics.
- Remote sensing to investigate landscape level responses in response to burn severity within black spruce ecosystems in Alaska
  - Land-based data sets to correlate animal distributions on the landscape with remote images.
  - Explorations of evaporation process in the boreal forest hydrologic environment.

High latitude soil research over the next five years will center on the following research topics and activities:

- Characterization of northern forest soils in boreal regions of Alaska in terms of the organic carbon pool and relationship with forest management practices.
- Soil carbon balance and nitrogen dynamics following disturbance by wildfire and logging.
- Soil respiration following wildfire in lowland black spruce, upland black spruce and mixed hardwoods.
  - Wetland protection and hydric soils
  - Evaluation of the relationship between local climate and soil carbon balance.

Research, education and outreach activities include:

- Correlating land-based information with remotely sensed images
- Geographic Information Systems
- Regional maps and spatial data sets and models of long-term value for adaptation and mitigation

Product development activities includes:

- Providing standards for Alaska woods.
- Developing non-timber forest products with business entrepreneurs.
- Investigating the fuel potential of Alaska's forests.

### **2. Brief description of the target audience**

The target audiences, in general, include foresters, forest land owners and managers, government agencies, educators, students, native corporations, general public, producers and consumers, communities and small business entrepreneurs, individuals and groups concerned about the quality of the Alaska environment, and public resource agencies, public and private resource managers, other faculty and researchers, and undergraduate and graduate students, K-12 teachers. In particular target audiences are the Statewide Board of Advisors, Alaska Forest Association, Society of American Foresters, Alaska Farm Bureau, and the Alaska Northern Forest Cooperative, US Geological Survey, US Fish & Wildlife, the USDA Natural Resource Conservation Service, the Salcha-Delta Soil & Water Conservation District, the Alaska Department of Natural Resources and its Division of Forestry and Dept. of Fish & Game, the USDA Forest Service, and borough governments, Alaska Native Corporations, the Harding Lake Watershed Assoc., the Harding Lake land owners association, and the Fairbanks North Star Borough as well as

private land owners and managers.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

| 2010   | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|--------|------------------------|--------------------------|-----------------------|-------------------------|
| Actual | 0                      | 0                        | 0                     | 0                       |

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

**Patent Applications Submitted**

Year: 2010

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

| 2010   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 12       | 0     |

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

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

| Year | Actual |
|------|--------|
| 2010 | 6      |

**Output #2**

**Output Measure**

- Output Target 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.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 4             |

**Output #3**

**Output Measure**

- Output Target 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.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 1             |

**Output #4**

**Output Measure**

- Output target 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.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 4             |

**Output #5**

**Output Measure**

- Output Targe 5. Climate change will affect northern forest ecosystems that will impact economic development of communities and will have cultural implications as well on communities and individuals. Causes and effects of change on ecosystems and reverberations felt by communities and individuals will be investigated. The measured output will be publications.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 0             |

**Output #6**

**Output Measure**

- Output Target 6. Research related to product development to include timber products and non-timber products including energy will continue. Forest management specific to fuel/energy demand will be initiated. Measureable outputs will be publications and business starts.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 4             |

**Output #7**

**Output Measure**

- Output Target 7. Recreation opportunities are important in urban and rural forests and are a part of ecosystem services. Recreation management in northern ecosystems is a part of management of ecosystems research. Measurable outputs are publications.

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2010        | 3             |

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

| O. No. | OUTCOME NAME  |
|--------|---|
| 1      | Outcome Target 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 Target 2. Increase animal producer and wildlife manager knowledge on range use and animal impact. Measurable outcomes are publications, workshops, and conferences.   |
| 3      | Outcome Target 3. Increase knowledge through classroom and field course delivery. The outcome measures will be curricula delivered and number of students reached.  |
| 4      | Outcome Target 4. Increase community and individual knowledge on the impact of climate change in northern ecosystems and affects on cultural lifeways, economies, and individual well-being. Outcome measures will be publications, workshops, and conferences. |
| 5      | Outcome Target 5. Provide research information that leads to product development and recreational opportunities. Outcome measures will be publications, business starts, conferences, and workshops.  |

## **Outcome #1**

### **1. Outcome Measures**

Outcome Target 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**

| <b>Year</b> | <b>Quantitative Target</b> | <b>Actual</b> |
|-------------|----------------------------|---------------|
| 2010        | 12                         | 16            |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Increasing demand for development will result in large areas of soil disturbance. The mining industry must comply with federal and state surface mining regulations to protect the environment and to reclaim disturbed areas. Due to the climate change dynamics, the recovery potential of ecosystems following a disturbance will be changed. The boreal forest, which occupies 60 to 70 percent of Alaska's land area, consists of eight species--three conifers, white spruce, black spruce, tamarack; and five hardwoods, Kenai birch, Alaska birch, quaking aspen, balsam poplar, and western black cottonwood. Of these, white spruce, Alaska birch, Kenai birch, and quaking aspen are currently of significant commercial importance.

#### **What has been done**

We are monitoring hydric soils sites in cooperation with the USDA-NRCS, the National Soil Survey Center, and USGS. Long-term ecological monitoring involves plot measurement across the state, tree ring analysis for growth stress due to climate change and exclusion sites designed to mimic climate change involving moisture stress. In fire management, a field method was developed and tested to reconstruct pre-fire organic soil depth and canopy biomass in black spruce sites, thus providing a basis for quantifying fire severity in the field.

#### **Results**

The hydric soil study verified the reducing condition of some volcanic-derived soils that lack distinct morphological features. The study site in the northern boreal region is the first in a carbonate-saturated yet permafrost-affected system. The cooperative study provided ground zero and time zero geochemical properties of volcanic ash. The Cooperative Alaska Forest Inventory (CAFI) was updated and made available at the Long Term Ecological Research (LTER) Bonanza Creek Project. A conventional and geospatial matrix model for the Alaska boreal forest was published. The two forest dynamics models published this year mark the first density-

dependent species and size-structured forest population dynamics model for the Alaska boreal forest. A change in knowledge resulted when we learned that a sustained and substantial reduction in tree growth has occurred for the last several decades in Interior Alaska where temperature increases are producing a negative effect on tree growth, and a simultaneous increase in growth has occurred in narrow zone of far western and southwestern Alaska where temperature increases are producing a positive effect on growth.

**4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>                             |
|----------------|---|
| 101            | Appraisal of Soil Resources                       |
| 122            | Management and Control of Forest and Range Fires  |
| 123            | Management and Sustainability of Forest Resources |
| 132            | Weather and Climate                               |

**Outcome #2**

**1. Outcome Measures**

Outcome Target 2. Increase animal producer and wildlife manager knowledge on range use and animal impact. Measurable outcomes are publications, workshops, and conferences.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| <b>Year</b> | <b>Quantitative Target</b> | <b>Actual</b> |
|-------------|----------------------------|---------------|
| 2010        | 7                          | 6             |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

In order for Alaskan beef ranchers and reindeer herders to be successful they need good animal management practices to enhance production, promote sustainability, decrease predation and out-migration, and address ecological concerns.

**What has been done**

An animal distribution model that accurately predicts animal use patterns on the landscape was created as a valuable addition to the land manager's toolbox. Employing this model offers economic benefits through increased production and sustainable pasture management. It also allows ranchers/herders to efficiently and effectively plan year-round grazing strategies. Free ranging reindeer are being tracked through ARGO satellite collars to prevent overgrazing.

**Results**

The results from this project were used to further develop and refine the KRESS (Kinetic Resource and Environmental Spatial System) software developed in conjunction with Oregon State University. Information is currently being incorporated into the Alaska Rangelands website ([http://www.uaf.edu/snras/AGNIC web/](http://www.uaf.edu/snras/AGNIC_web/)). This is the Alaska site for the Western Rangelands Partnership (WERA 1008). The information will be available to the public as part of the Agriculture Network Information Center and its efforts to make pertinent management information readily available on the Internet. The Western Rangelands Partnership is also getting ready to launch a related project the "Rangelands" community of practice for the eXtension program. Information from this project will be primarily disseminated to the public through these two websites. This will allow for new NRCS guidelines for management of reindeer using state-of-the-art technology and a fine scale picture of habitat use and diet on the Seward Peninsula.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area                           |
|---------|--|
| 121     | Management of Range Resources            |
| 315     | Animal Welfare/Well-Being and Protection |
| 404     | Instrumentation and Control Systems      |

**Outcome #3**

**1. Outcome Measures**

Outcome Target 3. 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 | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | 100                 | 189    |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

In a state with 375 million acres of which 3.2 million acres are in state parks, and federal land comprises 5 national parks, preserves, and monuments covering a total of 54 million acres land management issues are in the forefront. The School of Natural Resources & Agricultural Sciences (SNRAS) along with the Agricultural & Forestry Experiment Station offer a world-class learning and research environment to both undergraduate and graduate students.

**What has been done**

Undergraduate courses are augmented by such learning experiences as the field course in resource management, internships, and the senior thesis project. The school provides leadership in research, education and outreach emphasizing natural resources management to benefit Alaskans and their environment. Our research, education, and outreach programs reflect the interest of our diverse clientele: Native people, rural communities, industry, environmental organizations, state and federal agencies, farmers, foresters, tourists, fishers, and sports enthusiasts.

**Results**

In the 2010 academic year, faculty taught 30 credited courses in resource or forestry-related classes. One example of knowledge transferred is through the field course Resources Management Issues at High Latitudes, NRM 290, a required course for Natural Resources Management majors. This gives students a close-up look at specific natural resources in Alaska during a 10-day field course around the state, with stops and activities at significant resource locales. During their stops, students participate in on-site analysis of resource management needs, opportunities, and conflicts in various industries: agriculture, forestry, mining, seafood, petroleum, recreation and tourism.

**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 Target 4. Increase community and individual knowledge on the impact of climate change in northern ecosystems and affects on cultural lifeways, economies, and individual well-being. Outcome measures will be publications, workshops, and conferences.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | 7                   | 75     |

**3c. Qualitative Outcome or Impact Statement**

### **Issue (Who cares and Why)**

It has long been expected that the Earth's high latitudes, but especially the Arctic and Subarctic regions, would experience climate warming from greenhouse gas processes. Recent syntheses confirm widespread, although not universal, warming effects across the Arctic and Subarctic in the last 30 years. But change in Alaska is happening at a rapid rate, and coherent and consistent evidence of warming is seen in changes in hydrology, permafrost, forests, disturbances, and other features. In recent decades, the Arctic and Subarctic regions have experienced the greatest warming on earth. Everyone--from engineers to wildlife managers to farmers--will need to take economic change, social change, and climate change into account when planning for the future, as well as take advantage of potential opportunities, in order to avoid costly mistakes.

### **What has been done**

The Scenarios Network for Alaska Planning (SNAP) is a network linking university researchers with communities and resource managers. Through collaborative partnerships involving data sharing, research, modeling, and interpretation of model results, SNAP addresses some of the complex challenges of adapting to future conditions. As a starting point, SNAP offers statewide maps of temperature and precipitation projections, and basic data for 441 communities. These projections are based on global models used by the Intergovernmental Panel on Climate Change (IPCC), using a moderate scenario.

### **Results**

Results from five scenario models in Alaska and other northern regions predict that in general, temperatures and precipitation are expected to increase across all regions. For some coastal communities, expected erosion is by far the most pressing issue. In central Alaska, changes in fire patterns are likely to have significant impacts on ecosystems. Fires may become more frequent and more intense due to drying soils. In Southcentral Alaska, warming temperatures and associated drought stress may increase invasive species and other species shifts, including the incidence of insect outbreaks. Warmer weather, drying, and insect killed trees may also increase the incidence and severity of forest fire. Changing ocean temperature, invasive species, erosion and storms may impact the fishing industry in southeast Alaska. Increased incidence and severity of storms are likely to be of concern in Southwest Alaska. Tree line will continue to move westward as wet tundra areas dry and become occupied by the westward movement of the boreal forest. Warming ocean temperatures are altering the Bering Sea ecosystem, impacting fish, marine mammals, and birds.

## **4. Associated Knowledge Areas**

| <b>KA Code</b> | <b>Knowledge Area</b>                             |
|----------------|---|
| 121            | Management of Range Resources                     |
| 122            | Management and Control of Forest and Range Fires  |
| 123            | Management and Sustainability of Forest Resources |
| 132            | Weather and Climate                               |

**Outcome #5**

**1. Outcome Measures**

Outcome Target 5. Provide research information that leads to product development and recreational opportunities. Outcome measures will be publications, business starts, conferences, and workshops.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | 3                   | 0      |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

In 2011 The Forest Products Research and their outreach efforts will move to the Sustainable Individual, Families and Communities Planned Program. Heavy restrictions on harvesting in the Tongass National Forest have caused the closing of lumber mills and forestry-related industries and have had a major negative impact on communities in Southeast Alaska. The Forest Products Research (FPP) and Education program in Alaska conducts research and outreach to assist with the restructuring of the forest products industry in Alaska.

**What has been done**

The Forest Products Program conducted log building classes that demonstrate new greener construction techniques, and initiated the One-Tree curriculum. One Tree brings together artisans, teachers and students to teach concepts while utilizing every part of a tree. A marketing project researched higher value niche markets in Asia and the Middle East that might benefit Alaska's forest products industry. Sixty aspen trees were cut for the log cabin building class and acoustical testing was started to develop standardized curves for the non-destructive testing of Populus. Samples were collected for a Handbook of Alaska Woods. This will be a key to macroscopic and microscopic properties of Alaska species and will include test results from prior projects, such as the in-grade testing that resulted in new design and grade standards for Alaska species.

**Results**

The most significant output of the Alaskan Timber Resources for Wood Plastic Composites (WPC) project was demonstration of commercially viable wood-plastic composites for local markets using low value woody biomass in Alaska. Classes were conducted utilizing Alaska

wood and non-timber forest products especially using underutilized aspen. The log cabin building class with aspen showcased the beauty of the wood. Several builders who attended are utilizing the new, energy efficient techniques in their own work. It was determined that the Middle East has a strong demand for softwood lumber but the market is price sensitive. In order for Alaska to compete, they must differentiate their products, develop strong business relationships with their customers and demonstrate a clear value proposition to potential customers. Canada dominates the North American coniferous lumber exports to Dubai capturing 75% of the market. With the recent bug infestation and die back of many of their forests and plantations, there is opportunity for Alaska forest products.

#### 4. Associated Knowledge Areas

| KA Code | Knowledge Area                                    |
|---------|---|
| 123     | Management and Sustainability of Forest Resources |

#### V(H). Planned Program (External Factors)

##### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

##### Brief Explanation

Climate change is the single most important external factor affecting the forests and ecosystems in Alaska. Drought brings insect predation, disease and forest fire. Loss of federal and state funding could severely impact research and outreach in a state on the edge of great change. There is a danger that the forest may not be sustainable as fuel costs rise and citizens turn to wood heat.

#### V(I). Planned Program (Evaluation Studies and Data Collection)

##### Evaluation Results

##### Key Items of Evaluation

**V(A). Planned Program (Summary)**

**Program # 6**

**1. Name of the Planned Program**

Global Food Security and Hunger

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

| KA Code | Knowledge Area           | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|---------|--------------------------|-----------------|-----------------|----------------|----------------|
| 205     | Plant Management Systems | 0%              |                 | 100%           |                |
|         | <b>Total</b>             | 0%              |                 | 100%           |                |

**V(C). Planned Program (Inputs)**

1. Actual amount of professional FTE/SYs expended this Program

| Year: 2010 | Extension |      | Research |      |
|------------|-----------|------|----------|------|
|            | 1862      | 1890 | 1862     | 1890 |
| Actual     | 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    |
| 0                   | 0              | 0              | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 0                   | 0              | 0              | 0              |
| 1862 All Other      | 1890 All Other | 1862 All Other | 1890 All Other |
| 0                   | 0              | 0              | 0              |

**V(D). Planned Program (Activity)**

1. Brief description of the Activity

Our programs that relate to this planned program area are usually reported under the Agriculture and Horticulture planned program area. We are developing our data management system to differentiate between food and non-food crops and livestock. We anticipate being able to separate food and non-food statistics for the 2011 annual report.

**2. Brief description of the target audience**

- Commercial nursery and greenhouse operators
- Commercial producers
- Chain stores
- Home greenhouse owners
- Community gardeners
- Home gardeners
- Youth and 4H
- FFA
- Policy makers
- K-12 school food programs
- K-12 school lunch programs
- Child care centers
- Researchers
- Federal and state agencies
- Farmer & rancher organizations

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

| 2010          | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---------------|------------------------|--------------------------|-----------------------|-------------------------|
| <b>Actual</b> | 0                      | 0                        | 0                     | 0                       |

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

**Patent Applications Submitted**

Year: 2010

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

| 2010          | Extension | Research | Total |
|---------------|-----------|----------|-------|
| <b>Actual</b> | 0         | 0        | 0     |

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Faculty will provide agricultural and horticultural workshops, short courses, classes, field days, and conferences aimed at improving food production and best management practices. The number given will be the output measure.  
Not reporting on this Output for this Annual Report

**Output #2**

**Output Measure**

- Faculty will provide agricultural and horticultural information through one-on-one consultations and consultations with other organizations to provide information on best management practices of food production (in contact hours).  
Not reporting on this Output for this Annual Report

**Output #3**

**Output Measure**

- Horticultural crop research will concentrate on home and commercial varieties and best management practices appropriate as Alaska food crops. Publications are the output measures.  
Not reporting on this Output for this Annual Report

**Output #4**

**Output Measure**

- Controlled environment agriculture will focus on technology and technology transfer concerning appropriate food crops and best management practices for crop production in specific environments. Output measures will be publications.  
Not reporting on this Output for this Annual Report

**Output #5**

**Output Measure**

- Agronomic focus will be on best management practices for food crops and variety evaluation. Output measures will be publications.  
Not reporting on this Output for this Annual Report

**Output #6**

**Output Measure**

- Focus will be on best management practices for livestock management and production for food. Output measures will be 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      | Increase agronomic crop producers' ability to understand and assess best management practices including variety selection of food crop production.  |
| 2      | Increase traditional and alternative livestock producers' ability to understand and assess optimum production practices for food animal production. |
| 3      | Increase participants' commercial and home horticulture optimum food crop growing techniques and improve management practices.                      |
| 4      | Increase the number of activities that monitor and control invasive species.  |

**Outcome #1**

**1. Outcome Measures**

Increase agronomic crop producers' ability to understand and assess best management practices including variety selection of food crop production.

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Increase traditional and alternative livestock producers' ability to understand and assess optimum production practices for food animal production.

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

Increase participants' commercial and home horticulture optimum food crop growing techniques and improve management practices.

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

Increase the number of activities that monitor and control invasive species.

Not Reporting on this Outcome Measure

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

**Brief Explanation**

Alaska is the harbinger of climate change in the North. The region is already seeing impacts of the changing climate in its sea ice degradation, the ecology of the boreal forest, and its ice-impregnated northern soils. This will influence the thrust of agriculture in coming years. Policy and regulation and competing public priorities are already coming to the fore as endangered species affect land use and food and feed crops are increasingly used for fuels. Programmatic challenges will occur as consideration is given to the production of crops and the management of the forests for fuels to mitigate demands on petroleum and coal supplies. A continuing rise in transportation costs is already drawing attention to regional and local food production and processing. Finally, as demographics of the population change and demographics of the agricultural industry change, there will be a need for continuing adult education and higher education to fill workforce vacancies.

## **V(I). Planned Program (Evaluation Studies and Data Collection)**

### **Evaluation Results**

### **Key Items of Evaluation**

**V(A). Planned Program (Summary)**

**Program # 7**

**1. Name of the Planned Program**

Sustainable Energy

**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 | 0%              |                 | 20%            |                |
| 125     | Agroforestry                                      | 0%              |                 | 20%            |                |
| 131     | Alternative Uses of Land                          | 0%              |                 | 20%            |                |
| 205     | Plant Management Systems                          | 0%              |                 | 20%            |                |
| 511     | New and Improved Non-Food Products and Processes  | 0%              |                 | 20%            |                |
|         | <b>Total</b>                                      | 0%              |                 | 100%           |                |

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

| Year: 2010 | Extension |      | Research |      |
|------------|-----------|------|----------|------|
|            | 1862      | 1890 | 1862     | 1890 |
| Actual     | 0.0       | 0.0  | 2.4      | 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    |
| 0                   | 0              | 338958         | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 0                   | 0              | 202324         | 0              |
| 1862 All Other      | 1890 All Other | 1862 All Other | 1890 All Other |
| 0                   | 0              | 216118         | 0              |

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

AFES researchers will concentrate primarily on yield potential of lignocellulosic crops as well as evaluate oilseed crops as bioenergy crops in Alaska. If successful, this research will lead to development of "best practices" management regimes and genetics of bioenergy crops. In the future, we intend to conduct research in remote locations in Alaska to determine the feasibility of various crops in small villages where people often have little experience in agriculture. For this purpose, we will concentrate on crops likely to be successful in these situations, especially woody crops, which will require little agricultural knowledge and simple technology.

AFES researchers are continuing to work on the utilization of low value biomass for fuels and chemicals, mostly through thermochemical means (gasification, pyrolysis, supercritical fluids). The chemical composition of alder, birch, hemlock, yellow cedar, Sitka spruce, red cedar, white spruce, and aspen will be evaluated for biofuel production via supercritical liquefaction. CES is working with communities on use of biomass products and with producers to develop value added forest products. AFES researchers will seek to assimilate all existing information on the total forest and crop biomass available in Alaska into one database, determine the gaps in the database and the information needed to fill the gaps, and determine the biological, physical, and economic feasibility of using Alaska biomass as biofuels.

**2. Brief description of the target audience**

The target audiences include 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. Our efforts will be directed toward environmentally and economically sustainable development and conservation of our natural resources that will benefit all citizens and help them adapt and become resilient as the climate changes. Advisors and the target audience include: Statewide Board of Advisors, Alaska Forest Association, Society of American Foresters, Alaska Farm Bureau, and the Alaska Northern Forest Cooperative.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

| 2010   | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|--------|---------------------------|-----------------------------|--------------------------|----------------------------|
| Actual | 0                         | 0                           | 0                        | 0                          |

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

**Patent Applications Submitted**

Year: 2010

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

| 2010   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 0        | 0     |

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Research related to product development to include timber products and non-timber products including energy will continue. Forest management specific to fuel/energy demand will be initiated. Measureable outputs will be publications.

| Year | Actual |
|------|--------|
| 2010 | 4      |

**Output #2**

**Output Measure**

- Determine the potential for biomass crops as feedstocks for energy uses by testing Alaska grown plant species. Measure will be species tested.

| Year | Actual |
|------|--------|
| 2010 | 3      |

**Output #3**

**Output Measure**

- Determine chemical composition of Alaska woody species for biomass to biofuel production.

| Year | Actual |
|------|--------|
| 2010 | 3      |

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

| O. No. | OUTCOME NAME   |
|--------|--|
| 1      | Identify crops suitable for sustainable production of bio-based energy in Alaska. The measure is number of crops.    |
| 2      | Identify new value-added uses for by-product from bio-based energy crops and woody species. Measure is publications. |

## **Outcome #1**

### **1. Outcome Measures**

Identify crops suitable for sustainable production of bio-based energy in Alaska. The measure is number of crops.

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

| <b>Year</b> | <b>Quantitative Target</b> | <b>Actual</b> |
|-------------|----------------------------|---------------|
| 2010        | {No Data Entered}          | 27            |

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Fuel costs are high in Alaska and especially in remote areas of rural Alaska. Currently in northern rural villages fuel is as much as \$8.50 per gallon in spite of the fact that Alaska produces and exports large quantities of crude oil. Alternative energy sources need to be developed in wind, solar, and biomass. Several communities in the boreal forest region of Alaska are considering using biomass for fuel, but there is a question of sustainability due to slow tree growth. Communities outside boreal forested regions could use other hardwoods and willows. Grass and forb species are found throughout the state.

#### **What has been done**

Cultivation techniques are being developed for production and management of species suitable for biomass fuel that could ultimately lead to development of a sustainable, renewable biomass energy resource in Alaska. Field research grass plots have been established in Fairbanks and in Delta Junction for smooth brome grass, hairgrass and wheatgrass, as well as willow spacing and coppicing studies. Fall and spring harvests were compared. The higher yields for wheatgrass were likely because it stood up better under snow than other species. At both locations, harvesting twice produced similar yields to a single harvest at the end of the growing season, indicating no advantage to a two harvest management regime.

#### **Results**

A preliminary study at Fairbanks showed comparable yields for tall fireweed and better yields for bluejoint reedgrass, both species native to the area. No yields are yet available for woody species as the first harvest is not scheduled until fall 2011. It is too early to provide impacts for this project. Expected impacts include provision of management information for farmers and communities wishing to grow biomass crops for energy use in high latitude environments.

### **4. Associated Knowledge Areas**

|                |  |
|----------------|--|
| <b>KA Code</b> | <b>Knowledge Area</b>                            |
| 205            | Plant Management Systems                         |
| 511            | New and Improved Non-Food Products and Processes |

**Outcome #2**

**1. Outcome Measures**

Identify new value-added uses for by-product from bio-based energy crops and woody species.  
Measure is publications.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|------|---------------------|--------|
| 2010 | {No Data Entered}   | 4      |

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Energy costs in Alaska are the highest in the nation, with Native and remote communities being the most affected. Alaska's 180 remote villages are paying 10% of their annual income for diesel fuel at \$8/per gal. The available forest resources include small diameter, non-merchantable species, including fire killed and beetle killed biomass that has no commercial value. Most rural communities in Alaska lack transportation infrastructure that most of the states enjoy, which results in energy costs being prohibitively expensive. This biofuel program is providing urgently needed research support and educational outreach to find alternatives to fossil fuels.

**What has been done**

Pyrolysis was used to produce and characterize liquid and gaseous hydrocarbons derived from local small diameter trees. Characterization of black spruce and alder was conducted. Small scale pyrolysis for molecular modeling was conducted. Large scale pyrolysis of alder was conducted. Downdraft gasification was used as a means of producing combustible gases to run a small electric generator unit. Characterization and optimization of the gasification parameters was based on available small diameter trees. Characterization of alder syngas was conducted. Small scale pyrolysis for molecular modeling was conducted. Large scale Gasification of alder was conducted.

**Results**

Pyrolysis oil from small diameter alder was sent to Thermochem Recovery International in Baltimore, MD, for helping this startup gasification Fisher-Tropsch company address tar scrubbing issues. We are still in the early stages of this research. Several stakeholder groups have toured

the bioproducts facilities, and invited talks have been given to local schools. Videos of the gasification process have been shown to several stakeholders. Work on renewable based hydrocarbons was presented at the Chena Hot Springs Energy Fair. Gasification of alder and other biomass work was presented at an ACS National Conference.

#### 4. Associated Knowledge Areas

| KA Code | Knowledge Area                                    |
|---------|---|
| 123     | Management and Sustainability of Forest Resources |
| 131     | Alternative Uses of Land                          |

#### V(H). Planned Program (External Factors)

##### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

##### Brief Explanation

Alaska is the harbinger of climate change in the North. The region is already seeing impacts of the changing climate in its sea ice degradation, the ecology of the boreal forest, changing weather patterns, and its ice-impregnated northern soils. This will influence the thrust of agriculture in coming years. Changes in state and federal policy and regulation will affect appropriations to the university and the economy of the state of Alaska. Current energy dialogue in the state centers on oil and gas despite discussions of alternate energy. Should a successful proposal for a gas line be announced, this will inject jobs and dollars into Alaska and most likely change priorities from an increasing focus on using alternative forms of energy that are regionally produced to, once again, export of a raw resource.

#### V(I). Planned Program (Evaluation Studies and Data Collection)

##### Evaluation Results

##### Key Items of Evaluation

**V(A). Planned Program (Summary)**

**Program # 8**

**1. Name of the Planned Program**

Food Safety

**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  | 10%             |                 | 0%             |                |
| 503     | Quality Maintenance in Storing and Marketing Food Products  | 20%             |                 | 0%             |                |
| 504     | Home and Commercial Food Service  | 60%             |                 | 0%             |                |
| 712     | Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins | 10%             |                 | 0%             |                |
|         | <b>Total</b>  | 100%            |                 | 0%             |                |

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

| Year: 2010 | Extension |      | Research |      |
|------------|-----------|------|----------|------|
|            | 1862      | 1890 | 1862     | 1890 |
| Actual     | 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    |
| 0                   | 0              | 0              | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 0                   | 0              | 0              | 0              |
| 1862 All Other      | 1890 All Other | 1862 All Other | 1890 All Other |
| 0                   | 0              | 0              | 0              |

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

For 2010, information about Extension's Food Safety program will be reported on in the Sustainable Individuals, Families and Communities area, Outcome Target 1.

Field faculty will conduct workshops and meetings, deliver educational services, provide training, and conduct consultations with clientele. Researchers develop products, curricula and resources, provide training and conduct consultations with clientele. Educators and researchers will conduct needs assessments, work with the media, partner with other agencies and organizations, write articles, publications and fact sheets, and facilitate events, activities and teachable moments.

**2. Brief description of the target audience**

Food preparers in homes and schools, school teachers (public and private), individuals interested in healthy lifestyles, low- income individuals and families, especially women with young children, individuals interested in a subsistence lifestyle, individuals interested in food preservation, home food growers and hunters.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

| 2010          | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---------------|------------------------|--------------------------|-----------------------|-------------------------|
| <b>Actual</b> | 6750                   | 900                      | 125                   | 250                     |

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

**Patent Applications Submitted**

Year: 2010

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

| 2010          | Extension | Research | Total |
|---------------|-----------|----------|-------|
| <b>Actual</b> | 0         | 4        | 4     |

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Output Target 1: Extension faculty will offer workshops in a wide range of home economics and family and consumer science topics.  
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 Target 1: Participants in food preservation and food safety classes will improve their food preservation and food safety practices. |

**Outcome #1**

**1. Outcome Measures**

Outcome Target 1: Participants in food preservation and food safety classes will improve their food preservation and food safety practices.

Not Reporting on this Outcome Measure

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

**Brief Explanation**

**V(I). Planned Program (Evaluation Studies and Data Collection)**

**Evaluation Results**

**Key Items of Evaluation**

**V(A). Planned Program (Summary)**

**Program # 9**

**1. Name of the Planned Program**

Climate Change

**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                       | 0%              |                 | 25%            |                |
| 122     | Management and Control of Forest and Range Fires  | 0%              |                 | 25%            |                |
| 123     | Management and Sustainability of Forest Resources | 0%              |                 | 25%            |                |
| 132     | Weather and Climate                               | 0%              |                 | 25%            |                |
|         | <b>Total</b>                                      | 0%              |                 | 100%           |                |

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

| Year: 2010 | Extension |      | Research |      |
|------------|-----------|------|----------|------|
|            | 1862      | 1890 | 1862     | 1890 |
| Actual     | 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    |
| 0                   | 0              | 0              | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 0                   | 0              | 0              | 0              |
| 1862 All Other      | 1890 All Other | 1862 All Other | 1890 All Other |
| 0                   | 0              | 0              | 0              |

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Our current planned program, Ecosystem Management, is primarily concerned with the effects of climate change. We will separate management from climate change on the 2011 annual report. Climate change programming is also reported this year in the Natural Resource and Community Development area.

**2. Brief description of the target audience**

The target audiences, in general, include individuals and groups concerned about how climate change is affecting the Alaska environment such as scientists, foresters, forest land owners and managers, state and federal government agencies, educators, students, native corporations, general public, producers and consumers, communities and small business entrepreneurs, public and private resource managers, undergraduate and graduate students, K-12 teachers.

In particular, state target audiences are:

- the Statewide Forest Board of Advisors,
- Society of American Foresters,
- Alaska Farm Bureau,
- Alaska Northern Forest Cooperative,
- AK Dept of Natural Resources,
- AK Division of Forestry,
- AK Dept of Fish & Game,
- borough governments,
- Alaska Native Corporations,
- Fairbanks North Star Borough.

Federal target audiences include:

- US Geological Survey,
- US Fish & Wildlife,
- USDA Natural Resource Conservation Service,
- Salcha-Delta Soil & Water Conservation District,
- USDA Forest Service.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

| 2010          | Direct Contacts<br>Adults | Indirect Contacts<br>Adults | Direct Contacts<br>Youth | Indirect Contacts<br>Youth |
|---------------|---------------------------|-----------------------------|--------------------------|----------------------------|
| <b>Actual</b> | 0                         | 0                           | 0                        | 0                          |

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

**Patent Applications Submitted**

Year: 2010

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

| <b>2010</b>   | <b>Extension</b> | <b>Research</b> | <b>Total</b> |
|---------------|------------------|-----------------|--------------|
| <b>Actual</b> | 0                | 0               | 0            |

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Climate change will affect northern forest ecosystems that will impact economic development of communities and will have cultural implications as well on communities and individuals. Causes and effects of change on ecosystems and reverberations felt by communities and individuals will be investigated. The measured output will be 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      | Increase community and individual knowledge 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. |

## **Outcome #1**

### **1. Outcome Measures**

Increase community and individual knowledge 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.

Not Reporting on this Outcome Measure

### **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
- Populations changes (immigration, new cultural groupings, etc.)

#### **Brief Explanation**

Climate change is the single most important external factor affecting the forests and ecosystems in Alaska. Drought brings insect predation, disease and forest fire. Loss of federal and state funding could severely impact research and outreach in a state on the edge of great change. There is a danger that the forest may not be sustainable as fuel costs rise and citizens turn to wood heat.

### **V(I). Planned Program (Evaluation Studies and Data Collection)**

#### **Evaluation Results**

#### **Key Items of Evaluation**

**V(A). Planned Program (Summary)**

**Program # 10**

**1. Name of the Planned Program**

Childhood Obesity

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

| KA Code | Knowledge Area                               | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|---------|--|-----------------|-----------------|----------------|----------------|
| 605     | Natural Resource and Environmental Economics | 0%              |                 | 100%           |                |
| 703     | Nutrition Education and Behavior             | 30%             |                 | 0%             |                |
| 724     | Healthy Lifestyle                            | 45%             |                 | 0%             |                |
| 806     | Youth Development                            | 25%             |                 | 0%             |                |
|         | <b>Total</b>                                 | 100%            |                 | 100%           |                |

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

| Year: 2010 | Extension |      | Research |      |
|------------|-----------|------|----------|------|
|            | 1862      | 1890 | 1862     | 1890 |
| Actual     | 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    |
| 0                   | 0              | 0              | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 0                   | 0              | 0              | 0              |
| 1862 All Other      | 1890 All Other | 1862 All Other | 1890 All Other |
| 0                   | 0              | 0              | 0              |

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

For 2010, Extension will report on its childhood obesity activities in the Sustainable Individuals, Families and Communities planned program area, Outcome Target 3.

CES will collaborate with other organizations including Public Health, schools, day-care facilities, 4-H, community organizations, tribal organizations and youth groups to offer programming on childhood obesity focusing on physical activity and nutrition. Programming will be conducted with parents in choosing nutritional foods and preparing meals for their families. Group and one-on-one educational activities with day care providers and parents will provide individuals with information necessary to increase physical activity of children.

**2. Brief description of the target audience**

The target audience includes teachers and parents of youth and caregivers.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

| 2010   | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|--------|------------------------|--------------------------|-----------------------|-------------------------|
| Actual | 0                      | 0                        | 0                     | 0                       |

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

**Patent Applications Submitted**

Year: 2010

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

| 2010   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 0         | 0        | 0     |

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Outcome Target 4. Increase community and individual knowledge of healthy food choices and benefits of physical fitness. Outcome measures will be publications, workshops, and conferences.

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      | Increased knowledge of healthy food choices. |

**Outcome #1**

**1. Outcome Measures**

Increased knowledge of healthy food choices.

Not Reporting on this Outcome Measure

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

**Brief Explanation**

**V(I). Planned Program (Evaluation Studies and Data Collection)**

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}