

## Management of Ecosystems- AFES

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

#### 1. Program Knowledge Areas and Percentage

- 121 10% Management of Range Resources
- 122 20% Management and Control of Forest and Range Fires
- 123 15% Management and Sustainability of Forest Resources
- 125 5% Agroforestry
- 131 5% Alternative Uses of Land
- 134 10% Outdoor Recreation
- 136 20% Conservation of Biological Diversity
- 610 5% Domestic Policy Analysis
- 803 10% Sociological and Technological Change Affecting Individuals, Families and Communities

### V(C). Planned Program (Situation and Scope)

#### 1. Situation and priorities

Because of the large expanse of public land in Alaska, management of natural landscapes will be important into the indefinite future. SNRAS and AFES capabilities will assist in making this management efficient and effective. In 2004, the boreal forest of interior Alaska encountered wildland fires that burned more acreage than any fire in the past 50 years. AFES scientists are studying causes and effects of large burns. One proposed causative factor in these large fires is climate change. SNRAS and AFES scientists and appropriate partners will maintain a leadership role in examining the sensitivity of northern resources to climate variability and change and will contribute to integrated assessments of the effects of climate change to Alaska's forests, agriculture, and resources management. State leaders plan to develop both renewable and non-renewable natural resources to contribute to the economic well being of its 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.

### V(D). Planned Program (Assumptions and Goals)

#### 1. Assumptions made for the Program

The condition and productivity of Alaska's forest and wildland resources is strongly influenced by climate, which is highly variable in Alaska. Interest in climate change will remain strong and national assessments of climate and resources will be a national and international priority. We assume that in Alaska's and the circumpolar north's future knowledge of ecosystem resources, a data base and data management system will be critical to allow us to:

- Evaluate and manage disturbance
- Recommend sustainable best management practices for recovery
- Enhance product production and use
- Encourage sustainable economic development

The teams we have and will assemble include scientists in key program knowledge areas in forestry, range, recreation, and policy and community development. Funding is secure and is increasing through competitive grants and community, state and federal support. Outreach and education are a part of AFES's mission of applied research to assist clients in sustainable use of natural resources and ecosystem management.

#### 2. Ultimate goal(s) of this Program

The goal of this program is the management of ecosystems to produce, conserve, and enhance harvestable products and biodiversity in Alaska and the north; and to improve understanding of the effects of natural resource policies. Natural resource management leading to:

- Diversity in undeveloped areas
- Long-term monitoring programs
- Data management system to support sustainable ecosystems and communities
- Sustainable community growth

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

#### 1. Activity for the Program

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.

Post Fire Duff Information: Using remote sensing to investigate landscape fire interactions in black spruce ecosystems. The Normalized Burn Ratio is routinely applied on Alaska national lands to generate burn severity maps. Preliminary research shows to relationship between the Normalized Burn Ration and tree regeneration 19 years later. Post-fire duff depth information

is critical in estimating impacts such as soil erosion, plant regeneration.

Long-term Ecosystem monitoring and GIS Modeling of the Taiga Forest Dynamics. This project will determine the influence of primary and secondary plant chemistry from leaf and root tissue and the influence of the bryophyte communities on nutrient element supply for tree growth. Researchers will develop a computer model on the functional aspects of forest ecosystem dynamics at a broad landscape scale in Interior Alaska.

Database and data management system

Models depicting fire disturbance and climate change

Program to provide land-based data to correlate with remotely sensed images

Rural Communities and public lands in the West: Impacts and Alternatives. This multistate project seeks to provide scholarship-based analysis of public land use alternatives with a focus on local social and economic impacts. It will assess private property rights in common law and state law related to federal agencies ability to limit private conduct that may negatively impact federal land management.

Invasive species. Sweetclover is under investigation, as well as other exotic plant species which may be a result of climate warming.