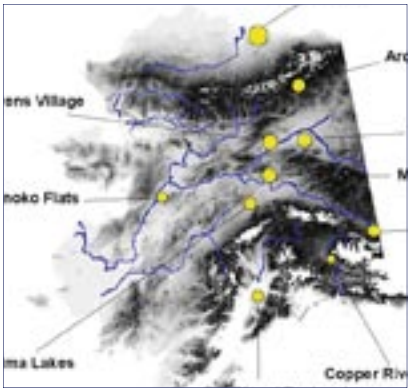


Working for Alaskans: a wealth of knowledge

School of Natural Resources and Agricultural Sciences
Agricultural and Forestry Experiment Station

Strategic Plan 2004

Natural Resource Use & Allocation
Management of Ecosystems
High-Latitude Agriculture
Geographic Information
High-Latitude Soils

Adopted by the Faculty

School of Natural Resources and Agricultural Sciences
Agricultural and Forestry Experiment Station
Glenn P. Juday, Chair, Strategic Plan Committee

From the Dean and Director's desk:

It is my pleasure to present to you the 2004 Strategic Plan of the School of Natural Resources and Agricultural Sciences (SNRAS) and Agricultural and Forestry Experiment Station (AFES). It has been eight years since our strategic plan has had any formal revisions. Since that time, we have added new dimensions to existing programs at the school and experiment station, hired new faculty, initiated new programs, and changed our name. The strategic plan of the school and experiment station does not remain static. The published plan, however, provides us with a baseline that continually guides what we do in traditional and emerging agriculture and forestry and new and exciting arenas that we are entering in the broad field of resources management

We combine economic, social, biological, and physical aspects of natural resources to help address management issues and provide solutions to management concerns. This 2004 strategic plan for SNRAS and AFES tells you our mission and goals. We have identified five emphasis areas that allow us to work within broad guidelines of the USDA Roadmap for Agriculture, University of Alaska Board of Regents, and the strategic and academic plans of the University of Alaska Fairbanks. Emphasis areas take into account the resources of the school and experiment station, as well as the important issues and concerns of our state, clients, and students.

Alaska is a special place. To obtain the benefit of Alaska's abundant natural resources while keeping Alaska special, we must be proactive in the management of our natural resources. Our strategic plan lets you know what we are committed to do in our role as teachers, researchers, and public servants. We welcome your comments, as always.

Sincerely,

Carol E. Lewis

Science Roadmap for Agriculture

Be competitive in a global economy.

Add value to our future harvests.

Adjust agricultural practices to a changing climate.

Be good stewards of the environment and natural resources.

Make our agricultural enterprises profitable.

Make our families and communities strong.

Improve foods and processing for better health and safety.

On the cover, clockwise from top left: Alaska ecosystem photo by Tom Malone; wetland research sites map, courtesy of Brian Riordan; lettuce crop at Palmer by Roseann Leiner; forest soils researcher David Valentine by Jessica Garron; salmon drying racks at Kaltag, by Polly Wheeler, courtesy of the U.S. Fish and Wildlife Service National Image Library (USFWS).

Strategic Plan Summary

This strategic plan for the School of Natural Resources and Agricultural Sciences (SNRAS) and the Agricultural and Forestry Experiment Station (AFES) provides background concerning the natural resource management situation in Alaska. It also describes the school and experiment station and who they serve, analyzes the resource management situation in Alaska and the associated educational and research needs, and identifies areas of emphasis that are the focus of the school's and experiment station's work.

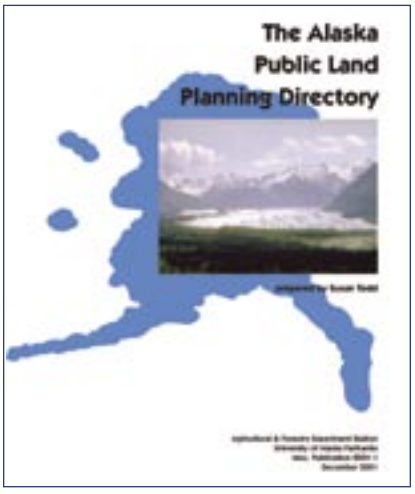
The plan also identifies goals and objectives for the future of SNRAS and AFES. Emphasis areas for the school and the station were carefully chosen to encompass the mission and goals of the University of Alaska, the land-grant university of the state. They also take into account the strategic and academic plans of the University of Alaska Fairbanks, the resources of the school and station, and the needs of the state, our clients, and our students. The emphasis areas are: Management of Ecosystems, Natural Resources Use and Allocation, High-Latitude Soils, Geographic Information, and High-Latitude Agriculture.

The Natural Resource Management Situation in Alaska

Alaska is a special place in which to manage resources. Natural resources—their potential, use, distribution, marketing, and cultural value—dominate the economic, social, and political life of the state's people. It is no exaggeration to say that Alaska is a natural resource state.

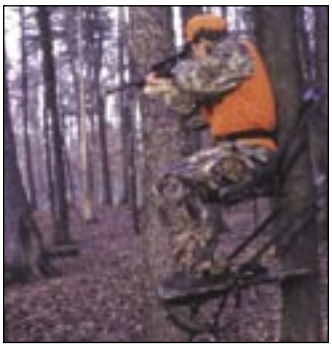
Certain general characteristics of the natural resource scene have to be recognized in planning a program of teaching, research, and service in Alaska. The state is big, about twenty percent of the size of the conterminous states spread out over nearly the same extent of latitude and longitude. Alaska is culturally diverse, a home to Alaska Native communities following traditional ways of life and modern, sophisticated urban centers. Alaska is both productive and diverse for its northern location, with extensive petroleum, mineral, land, forest, and fishery resources. Because Alaska is not contiguous with other states, borders two foreign nations, includes coastline on two oceans, and occupies a major international air crossroads, Alaskans generally have a high geographic awareness and an outward, circumpolar orientation. Alaska has traditionally been a leader in extending telecommunication and information technology. Users include those in small communities not connected to surface transportation. Alaska has major research capabilities in place and a record of significant contributions to science and northern technology.

Alaskans face many choices, challenges, and problems in the use of their resources. In the last part of the twentieth century, Alaska's economy became dependent on oil revenue. Declines in the petroleum revenue stream have begun as the first wave or era of petroleum production ends and new smaller deposits are identified, evaluated, and developed. The state must find new opportunities in its diverse natural resources. However, initiatives or investments in nonpetroleum resources should be cost effective and sustainable. Solving these problems and taking advantage of opportunities to properly manage resources for the long term requires the application of special, in-depth knowledge. The programs of SNRAS and AFES give Alaska's resource owners, public and private, essential components of this knowledge.



Above left, professor John Fox teaches his course in watershed management. Above right, his students take notes during a field trip (photos by Barbara Pierson). Shown at left is The Alaska Public Land Planning Directory, *which is published by the Agricultural and Forestry Experiment Station.*

Important Natural Resource Issues and Problems



From left: moose feeding in water, wolf, and hunter photos courtesy of the USFWS. In 2003, students in the Resource Management Society organized a forum to inform the public about wolves and wolf control issues.

Given the many resource opportunities in Alaska and state budget limitations, the School of Natural Resources and Agricultural Sciences and the Agricultural and Forestry Experiment Station must focus on the most important natural resource issues and problems. The following background of facts, problems, opportunities, and successes in natural resource management provides a basis for shaping a strategic direction for Alaska:

1. Lands now owned by the state of Alaska and Alaska Native corporations were selected to provide an economic base to support the population and economy of the state. The sustained productivity of this land base will remain a priority issue in Alaska's public policy for a long time. Both the people of Alaska and the United States as a whole have high standards for the management of Alaska's resources, as reflected in strong cultural and emotional attachment to the land, national and international media interest, and strict standards in state and federal laws. SNRAS and AFES provide expertise that helps to identify the resource potentials of these lands, helps improve procedures for deciding how to use these resources, and improves techniques to manage these lands on a long-term basis.
2. Several specialized Alaska agricultural products such as reindeer products, native plant materials, small-grain varieties developed by AFES and USDA, and horticultural plant materials, have successfully established themselves in the market. The technical information base is in place should social and market factors (including policy and infrastructure) indicate the desirability of increased production of Alaska agricultural products. SNRAS and AFES have helped to demonstrate the feasibility of production of agricultural products to Alaska conditions.
3. Alaska supports a large forest land base. It is one of few forest regions in the world not currently committed to large-scale harvest of industrial forest products, although before adoption of the Tongass Land Management Plan, it was a factor in world markets. SNRAS and AFES are sources of many kinds of information about Alaska's forests. These include their production capacity and alternative uses, forest management techniques, the likely effects of different forest management options on biodiversity resources, and the effect of fire in the boreal ecosystem.
4. All land-based resource management activities involve the soil resource. Soils information can be a critical factor in the success or failure of diverse resource-based opportunities in Alaska. Soils factors are critical to construction, transportation, water quality, and forest and agricultural productivity. As recent changes in climate have persisted, soils containing permafrost are poised to thaw, with the potential for dramatic changes in stability, water relations, carbon storage, and fertility. Areas of major soil change are present in Alaska now, and the potential for large-scale permafrost change is within a reasonable planning timeframe. SNRAS and AFES have made significant contributions to the knowledge of Alaska's soils and their management.
5. Rural communities in Alaska were traditionally dependent on subsistence lifeways. These communities wish to take advantage of modern technology and services while adapting traditional activities to new circumstances. Resolving these different community desires can be accomplished only through sustainable resource management programs. Federal and state laws and policies contain unresolved contradictions in the allocation and management of resources for subsistence uses. These allocation and management conflicts may have little relationship to the abundance and productivity of the resources, and may be based on cultural mores or lack of basic information about a resource, or both. SNRAS and AFES are involved in helping communities adapt to a changing world while sustaining their traditional lifeways.
6. Legal, practical, and public concerns over the issue of biodiversity often constrain the management of Alaska resources. SNRAS and AFES have provided leadership in identifying biodiversity resources in Alaska, especially at the larger scale, and in developing resource management strategies to sustain biodiversity.

Above, photo of downtown Fairbanks by Mok Kumagai, courtesy of the Fairbanks Convention and Visitors Bureau; at left, the village of Wainwright, courtesy of the USFWS.

7. Of any world region, Alaska has one of the largest proportions of its land base permanently dedicated to strict nature protection. The management of lands for natural ecosystem values will be an important part of the culture, employment base, and quality of life in Alaska for the foreseeable future. SNRAS and AFES train managers of these lands and contribute to the knowledge needed to effectively sustain these resources as they are used for subsistence, recreation, and other purposes.
8. Resource management in Alaska often either results in or is driven by litigation, especially procedural law. Many proposed resource management programs or projects are halted because of procedural challenges in law. SNRAS and AFES have identified and are investigating new approaches and perspectives in law that can make resource management decisions more effective.
9. The scenery, wildlife, large-scale wilderness, and high environmental quality found in Alaska are highly desired by visitors. Awareness of these attractions is increasing nationally and internationally. Management activities and decisions in Alaska provide access to these resources and affect the attractiveness and perception of visitor experiences. The relative attractiveness of Alaska's natural features and destinations also changes as the result of national and international developments that Alaskans do not influence, such as security concerns, currency fluctuations, demographics, investment in travel and tourism capacity, and marketing image. Key information is needed so that resource managers, consumers, and the public in Alaska and the nation can balance these various factors to maximize public benefits, maintain economic opportunities, and respect the rights of Alaskans. SNRAS and AFES provide a place where the diverse information needs and opportunities concerning management of Alaska's lands converge.
10. Alaska's resources are highly climate sensitive, and Alaska is one of the most climatically variable regions of the world. Recognizable climate change has occurred in Alaska in the past few decades. SNRAS and AFES have provided leadership in several aspects of global climate change research, including carbon-dioxide enrichment effects on vegetation, and effects of climate warming on ecosystems and soils. On priority global change issues, SNRAS and AFES actively cooperate with other research units at UAF to efficiently harness the full range of research capabilities, including the collaboration of social and natural sciences.

The disappearance of wetland ponds like the one above is being documented and correlated with weather records by SNRAS graduate student Brian Riordan (USFWS photo by Leslie Kerr). Documenting the growth of seedlings is part of the Forest Sciences growth and yield program. SNRAS investigations of the effects of wildfire on forests, forests soils, and climate are carried out at local and landscape levels. Seedling photo by Tom Malone; wildfire photo courtesy of the USFWS.

Natural Resource Priorities and Strategic Plan 2004

Basis for Setting Priorities

One basis for setting priorities in SNRAS and AFES programs is to identify factors that repeatedly contribute to the success or failure of resource management activities in Alaska. These factors play an important role in influencing natural resource management in Alaska.

Legal and Administrative Factors

The jurisdictional authority over Alaska's resources is tangled—often involving state and federal governments, as well as diverse Alaska Native interests. Unresolved legal issues, such as allocation of fish and wildlife resources, title transportation corridors across public lands, and the necessary standards for environmental analysis, can and have paralyzed resource management. Cooperative management approaches have had some success and will be a key factor assisting important resource management programs to move forward.

A significant part of Alaska's resource lands receive primarily custodial management, and are not likely to require more intensive approaches in the near future. However, even baseline management activities, such as fire control or surveying, when carried out on a very large area, amount to a significant overall level of resource activity.

Human Factors

Alaska's population is young, well-educated, and highly mobile, and has the highest proportion of Native Americans of all the states. The Alaska population is among the most knowledgeable in the country on matters relating to wildlife, natural resources, the environment, and geography.

Alaska is affected by a strong rivalry of rural versus urban interests, such as subsistence, sport, and commercial use of fish and wildlife. Federal and state laws occasionally set controversial priorities for allocation of natural resources to users. Regional priorities in Alaska are a large factor in determining state resource management policies. Alaska confronts many problems relating to state, federal, and Alaska Native resource jurisdiction, and has a unique system of aboriginal sovereignty.

Economic Factors

Alaska is strategically located on the Pacific rim, a rapidly growing economic region. Alaska's resources compete in many markets. The Alaska economy is highly dependent on imports for local consumption. However, there are opportunities for import substitution through improved use of Alaska resources. Alaska's few roads and limited railways tend to concentrate use and development of resources. High energy costs beyond the road/rail system further limit development. On the other hand, communication and data sharing is assisted by a good communication infrastructure.

Although labor costs are still relatively high in Alaska, the difference in labor cost between Alaska and the rest of the U.S. has narrowed. High labor costs have been one factor limiting resource development in Alaska. Alaska has the highest proportion of its work force employed in the public sector of any state in the U.S.

Physical Environment

Several land ecosystems in Alaska are highly productive. One factor that limits land ecosystem productivity in Alaska is a slow cycling of nutrient elements that is caused by cold soils. Management practices that warm soils can significantly increase ecosystem productivity. Permafrost is a special soil phenomenon in Alaska, and special techniques for managing activities on permafrost soils are needed. Some ecosystems in Alaska experience slow rates of recovery following disturbance, especially if proper management practices have not been followed.

Parts of Alaska are exceptionally geologically active and significant areas have been and will be periodically devastated by volcanoes and earthquakes, or affected by glacial ice. Alaska has about 50 percent of the coastline of the U.S., and its land resources are greatly affected by adjacent marine environments. Alaska's near-shore seas are among the most productive in the world. Managing coastal regions is a special challenge because jurisdiction over their many interrelated resources is especially complex.

Introduction to the School and Experiment Station

SNRAS and AFES, along with the Cooperative Extension Service, carry out the land-grant mission for the University of Alaska. The school and experiment station have a statewide mission and operate major facilities in Fairbanks and Palmer, with research projects throughout Alaska. The AFES is the research arm of the school. It is funded by state appropriations, federal land grant program dollars, and competitive research grants. The school is organized into four departments:

Forest Sciences

Geography

Plant, Animal, and Soil Sciences

Resources Management

SNRAS was established in 1975 as the School of Agriculture and Land Resources Management to offer applied degrees in natural resources management. Its name was changed in 2002 to better reflect its emphasis. The school offers B.S. and M.S. degrees in Natural Resources Management, a B.A. in Geography, and a B.S. in Geography (Environmental Studies). Graduate students at SNRAS and AFES can receive an interdisciplinary Ph.D. degree with specialization in resource-related topics.

The work of the school and the experiment station is focused on finding solutions to problems and topics important for the successful long-term management of a broad range of natural resources in Alaska and the circumpolar world, and on discovering and interpreting the geographic character of the Earth as a home for humans. Education is an important part of this work. SNRAS and AFES faculty produce data and information that are shared in publications designed to assist resource users, educate the general public, and contribute to the advancement of scientific knowledge about Alaska's resources and the geography of the north. SNRAS provides formal classroom instruction for degree programs, and conducts or jointly sponsors seminars, workshops, and other meetings for audiences ranging from the general public to elementary and secondary teachers to technical specialists. Outreach involving both supplying knowledge to and gaining knowledge from resource users and the public is a part of the core mission of SNRAS and AFES.

Photos at left: chinook salmon catch by Jo Keller; woman fishing for tom cod; and sea plane at Kanuti National Wildlife Refuge by Philip Martin published courtesy of the USFWS National Image Library. Heavy equipment photo and commercial fishing (far right) are AFES file photos by Cary de Wit. On this page: hermit thrush, Catharus guttatus, *by Dave Menke, courtesy of the USFWS.*

Importance of Natural Resources Management and Geography

Natural resources management is performed to meet real human needs.

Natural resources management is profound—it affects many things, some of which we don't know or don't intend.

Natural resources management is inescapable—it happens because human societies exist and it must take place, whether it is performed skillfully or not.

Natural resources management inherently confronts people with dilemmas and trade-offs

Natural resources management and geography are eclectic—they use data and insights from many different fields of knowledge.

Geographic knowledge is recognized as one of the fundamental competencies of an educated citizen.

Geography includes two traditions; one focuses on physical factors or environments and another on cultural factors.

Geographic awareness equips people with the ability to function in an interacting world of many cultures, instantaneous global communications, world markets, and geographically referenced data.

Camping at Arctic National Wildlife Refuge. USFWS National Image Library photo by Steve Chase.

Programmatic commitments of the school and the experiment station:

Management of ecosystems to produce, conserve, and enhance harvestable products and biodiversity in Alaska and the north.

Improved understanding of the effects of natural resource policies.

Policy and decision-making that enhance economic advancement and sustainable development.

The improvement and diffusion of geographic knowledge of Alaska and the far north.

Integrated and sustainable production of plants and animals adapted to the far north.

Sustainable use, protection, and recovery of the soil resource.

Problem-solving by providing tools for planning and conflict resolution to people who use resources.

Identification of the potentials and natural limits of Alaska's resources.

A legacy of data, experiments, and management information that will be of value to future generations.

Mission Statement

Natural resource management consists of making and implementing decisions to develop, sustain, or protect natural systems to meet human needs and values. Geography seeks to explain how physical environments are organized spatially, and how humans distribute themselves in relation to physical features and human activity. SNRAS and AFES's mission is to generate and provide knowledge and train students for the 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.

Vision Statement

Alaska covers a vast area of mountains, valleys, plains, islands, coastal seas, and great rivers. Alaskans live in an environment, the circumpolar north, 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. Specialized cultures and human institutions have developed in Alaska to equip its people to meet their needs and realize its abundant opportunities. The physical features, living resources, and people of Alaska interact in complex geographic patterns. Analysis and understanding of the geography of the physical features and people of Alaska contributes to the success of human activities and identifies new opportunities.

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, and in a way that can be sustained over the long term.

Sustaining the economy, government, resource management, and social systems of Alaska generates a strong demand for geographic knowledge and education. SNRAS and AFES are dedicated to producing and sharing critical geographic knowledge and awareness and the expertise needed for sustainable resource management. SNRAS and AFES are a unique asset and source of information; no other institution in the country has a mission quite like it.

In all of its programs and activities, the school and the experiment station strive to be a credible source of information, to remain focused on issues that are important in the lives of the people of Alaska, and to equip graduates to perform resource management more efficiently and effectively.

Purpose and Use of the Strategic Plan

The purpose of this strategic plan is to promote high-quality work at SNRAS and AFES, define their mission and programs clearly, achieve integration of their diverse programs, and allow them to meet their mission efficiently. This strategic plan identifies the programs and activities of SNRAS and AFES that will become the focus of their work in the future, justifies levels of support provided to them, and notifies cooperators, clients, and decision-makers of how SNRAS and AFES plan to meet needs of Alaska and society at large.

The strategic plan was produced by the faculty of SNRAS and AFES. It reflects ideas and advice given by SNRAS and AFES client user groups, students, the board of advisors, expert advisors, state and national peers and cooperators, and UAF administration. The plan will be used to set priorities in meeting the many needs for knowledge about Alaska and circumpolar resources and geography, both as opportunities for expansion present themselves and should the need for retrenchment occur.

Areas of Emphasis

One of the principal methods the SNRAS/AFES faculty have decided to use in implementing the strategic plan is to adopt emphasis areas. Emphasis areas define in more specific and concrete terms the different aspects of our mission. Emphasis areas are the natural resource topics, issues, and problem areas that unify and delimit the work of the school and experiment station. The purpose of defining emphasis areas is to allow the concentration of resources (money and people) that will promote high-quality work at SNRAS and AFES. Emphasis areas will be used to provide guidance for our faculty and administrators, to help direct new programs and programs currently in place, and to provide a direction for the kind of new or retained faculty expertise needed. Emphasis areas indicate what our degree programs will stress. Emphasis areas transcend and cut across departments. It is very significant that the identification of emphasis areas also represents a decision about topics that will *not* be emphasized. This plan makes resource management assumptions that justify the adoption of each emphasis area. These are stated in the section that precedes a list of important topics within each emphasis area.

Criteria for Identifying Strategic Emphasis Areas

The University of Alaska is a land-grant university. The land-grant system is a partnership between the federal government and the states that establishes a mutual set of obligations. The federal government provides a predictable pool of matching funds to universities that agree to maintain programs of research, instruction, and public service in agriculture and natural resources relevant to that state, the nation, and the world. A special characteristic of land-grant programs is their commitment to develop and apply knowledge important in the real world for the successful long-term management of natural resources to meet both human needs and values. SNRAS and AFES, along with the Cooperative Extension Service, are the principal units of the University of Alaska that carry out the land-grant mission. Criteria that we use to set priorities in our work must reflect our commitment to the land-grant mission, as well as a commitment to excellence.

The nature of academic work in a land-grant unit requires faculty to constantly monitor developments in their fields of expertise and the changing realities in agriculture and natural resources management. SNRAS and AFES programs are continually adjusted to reflect these changes, as demonstrated by a comparison of the current structure and expertise of the school and experiment station compared to just a few years ago. In developing this strategic plan, we used the following criteria to identify and assign priority emphasis areas for the work of SNRAS and AFES.

Student Needs

SNRAS faculty teach in a wide variety of settings. A major part of the school and experiment station missions is to teach and guide students to the successful completion of degree programs. Enrollment trends are a valuable indication of the demand for our core and service courses. The performance of students in coursework and graduate research indicate successful areas of the curriculum, as well as gaps in student preparation. UAF has a formal system of student evaluation of instruction. We rely heavily on our outcomes assessment plan to adjust our academic programs according to need, and to continually seek improvement. Student course evaluations give us an important source of information on the effectiveness of our instruction. We keep informed of curriculum developments in similar institutions, and about new instructional technologies, to offer a relevant curriculum and teach efficiently. In reviewing our instructional program we use the special perspectives of SNRAS graduates and employers as another measure of our effectiveness.

Students in classroom and field. AFES file photos.

Performing forest fuel load analysis. Photo by Scott Rupp.

Future Job Opportunities for Graduates

As a school that trains professionals, we must keep the needs and interests of employers and potential employees in mind. We obtain a sense of the job market by examining job postings and announcements and inquiring about the hiring needs and plans of employers. We also use experience in placement of SNRAS graduates in professional employment. We are aware of the value of a broad-based preparation of our graduates, because professional employment in natural resources increasingly requires flexibility and continuous career development. Reports from graduates now in mid-career employment provide a useful perspective.

Intellectual and Scientific Momentum

All applied research and teaching must be based on an extensive foundation of up-to-date knowledge of the fundamental disciplines that support it. New developments in science and technology also continually change the set of objective circumstances in which agriculture and natural resources management must be performed. SNRAS and AFES both contribute to and take advantage of new scientific discoveries and new technologies as they occur. We also must identify the specific applications in Alaska and the circumpolar north for these new developments. SNRAS and AFES have provided, and plan to continue to provide, leadership in selected areas of science and technology.

Faculty Currently in Place

Obtaining and keeping creative and well-qualified faculty requires a long-term commitment; short-term turnover of personnel is unrealistic. In general, SNRAS's and AFES's work has demonstrated its value and includes long-term research goals and responsibilities that no other organization is prepared to take on. Consequently, we believe that there is not justification for program direction changes that would require major staff turnover. The direction or emphasis in a particular faculty member's work changes and adapts within an area of expertise over time, but the most suitable way to implement changes in overall direction is at the time new or replacement faculty are hired. To obtain the needed expertise, it is critical to conduct a broad search for the most qualified applicants and to hire on the basis of merit.

Physical Facilities In Place or Realistically Obtainable

Research and instruction are always constrained by the facilities available to do the work. In the fast-changing world of science, facilities must be continually kept up to date. Both agriculture and natural resource management by their nature are long-term activities, and the academic programs that support them require a continuing level of support to maintain capable facilities. Existing facilities at UAF have allowed us to serve many important needs of the people of Alaska, but the inadequacy of current SNRAS and AFES facilities impose increasingly serious limits. On the other hand, in this plan we have felt free to identify important needs and opportunities for agricultural and natural resource facilities at the University of Alaska Fairbanks that realistically match the state's circumstances.

National and State Research Priorities

Research is always carried out in response to identified needs for fundamental and practical knowledge. Both private and public research funding sources invite proposals on topics that they have given a high priority. When state and national research priorities match the SNRAS/AFES programmatic focus and capabilities, then our research programs direct their attention to these topics and seek support or partnerships. Some indications of the demand for SNRAS and AFES research are:

1) topics consistently found in calls for research proposals,
2) research topics that are considered especially important in the natural resources field by society at large, and
3) research problems identified by many different funding sources as important over the long term.

Some of the sponsors and partners of SNRAS and AFES research that define research priorities are the Alaska Legislature, the U.S. Department of Agriculture (especially the Agricultural Research Service, Economic Research Service, Forest Service, and Cooperative State Research, Extension, and Education Service), Alaska resource industries, National Science Foundation, Alaska Department of Natural Resources, Bureau of Land Management, U.S. Geological Survey, National Park Service, U.S. Biological Survey, Environmental Protection Agency, and Department of Energy.

Programmatic Opportunity

Occasionally new research-related programs are established or take shape around topics that are especially significant for natural resources in Alaska. Some examples include global change, the Long-Term Ecological Research program, the Exxon Valdez Oil Spill Trust, and the North & West Alaska Cooperative Ecosystems Studies Unit. SNRAS and AFES use the opportunities offered by these new and emerging major programs in a way that allow them to continue with their fundamental research direction.

Other University Programs

SNRAS and AFES programs relate naturally with several other academic units at UAF and its activities often serve to bring together several UAF programs. Some of the units that SNRAS and AFES have cooperated with include Cooperative Extension Service, the Institute of Arctic Biology, and the School of Management, where faculty hold joint appointments. We have also worked with scientists involved in remote sensing, plant biology, wood products utilization, large animal research, fisheries product technology, environmental quality, bioremediation, rural development, and resource economics. SNRAS faculty are among the most active in working with colleagues from other academic programs at UAF. Among these is a major presence in the IGERT (Integrative Graduate Education and Research Traineeship) program. SNRAS plans to continue to forge links within the university in order to strengthen its programs, make UAF stronger overall, and better meet the needs of Alaska and the north.

Continuing Program Commitments

SNRAS and AFES recognize a responsibility to sustain certain research programs that by their nature are long-term in scope and of continuing value to Alaska and the north. Some examples include: long-term effects of land-use changes, the national Long-Term Ecological Research program, forest growth and yield studies, crop variety trials and domestic animal research appropriate to the circumpolar north, soil tillage research, global change studies, and long-term effects of resource allocation policies.

Board of Regents Criteria for Tenure and Promotion of Faculty

SNRAS and AFES produce its teaching, research, and service accomplishments through its faculty. The faculty are part of a university and larger academic system that demands certain levels of accomplishment. In defining its areas of emphasis, SNRAS must place its work within the scope of activities and standards of excellence defined for academic programs by the Board of Regents through its criteria for faculty retention and promotion, as well as the "unit criteria" recently adopted to assist faculty in meeting the universitywide criteria.

The aerial photo above shows the AFES Fairbanks Experiment Farm, with Smith lake, part of the North Campus Area, in the background (AFES file photo).

Assumptions and Focus in the Emphasis Areas

Geographic Information

Nearly all maps and most data about natural resources are now stored, shared, and analyzed as digital spatial files. Natural resource managers, and increasingly a broad array of stakeholders, need to understand the concepts and practice of creating, analyzing, and displaying spatially referenced natural resource and human community data. SNRAS will be the primary educator in advanced Geographic Information Systems and will continue to provide leadership in the theory and practice of using geo-referenced data.

State and national standards for secondary and elementary schools and students include requirements for competency in geography. SNRAS has a unique role to train and support geography educators. Alaska and Canada share many environmental features and face many of the same resource issues. SNRAS will develop a specialty in geography of Canada and northern regions. The analysis of the spatial relationships among physical, biological resource, and human factors can identify economic issues and opportunities. SNRAS will provide leadership in developing new systems for archiving and sharing spatial data of long-term value.

Within the general topic of Geographic Information, SNRAS will focus on the following:

- ❑ Geographic Information Systems
- ❑ Geography training for teachers
- ❑ Canadian studies and geography of the north
- ❑ Economic geography of Alaska
- ❑ Physical geography and biogeography of Alaska
- ❑ Maps and spatial data sets of long-term value

Management of Ecosystems

Because of the large amount of public land in Alaska, management of natural landscapes will be important into the indefinite future. SNRAS and AFES capabilities will help make this management efficient and effective. The condition and productivity of Alaska's forest and wildland resources is strongly influenced by climate, and climate 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. SNRAS and AFES 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 variability and change to Alaska forests, agriculture, and resource management.

The harvest of products from wildlands will continue to expand as markets develop, population increases, and infrastructure expands. SNRAS and AFES will generate information about new Alaska wildland crop opportunities, including new types of crops, new products and uses, and improved resource management systems.

Concern for the health and survival of resource biodiversity will continue to be a central issue in resources management. SNRAS and AFES will examine biodiversity features of Alaska, develop archives of selected biodiversity information, and examine management systems needed to sustain biodiversity in Alaska and the north. New technology and the integration and improvement of existing technologies will make it possible to obtain a greater range of measurements of on-the-ground forest resources more rapidly and economically.

SNRAS and AFES will play a key role in evaluating the accuracy of forest measurement systems and the study designs necessary to obtain useful and reliable information from them. Students will continue to seek education about natural resources and the environment and will be successful in finding employment in Alaska managing natural resources. SNRAS and AFES will play a pivotal role in teaching and providing information about management of Alaskan and northern ecosystems by focusing on the following topics:

- Alaskan boreal and coastal forest silviculture and forest management
- Ecosystem modeling
- Forest health
- Wildland fire and fire effects
- Forest measurements
- Climate and environmental change and evaluation of its impacts
- Biodiversity and conservation biology
- Wilderness ecosystem management
- Long-term forest data sets
- Education outreach in natural resources management and environmental change
- A statewide program that addresses the multifaceted discipline of geography

Natural Resource Use and Allocation

Resource management in Alaska is constrained by needs to fulfill public expectations, follow processes that are legally required, and meet the substantive requirements of state and federal laws and policies. To actually be implemented, resource management programs must be solidly based on reliable information that can successfully meet legal review and gain public acceptance.

SNRAS and AFES will maintain programs to develop and examine public involvement processes, study planning and assessment procedures, and evaluate the effectiveness of natural resource and environmental laws and policies in meeting their defined purposes.

Costs of harvesting Alaska resources can be high, and most Alaska products face competition in global markets. To remain competitive, Alaska resources must be harvested efficiently and marketed effectively. SNRAS and AFES will play a leadership role in natural resource economics, especially by developing and sharing information to establish more effective market mechanisms, identify new resource use opportunities, and develop non-market valuation systems.

Outdoor and wildland recreation and nature-based tourism have expanded and become a relatively large part of the Alaskan economy and social fabric. This sector is highly dependent on the management of Alaska's public land resources. SNRAS and AFES will be a center of outdoor recreation studies and dissemination of information, including integrated studies of economic, managerial, and ecological aspects of recreation management.

SNRAS and AFES will focus on the following aspects of Alaska natural resource use and allocation:

- Multiresource planning and the process of determining public resource policy
- Nonmarket resource economics
- Outdoor recreation resource management
- Resource economics and policy impact assessment
- Rural community culture and economic development analysis
- Nature-based tourism
- Environmental law and policy
- New product opportunities in forests and wildlands
- Subsistence resource systems

High-latitude Soils

Soils are a fundamental resource, and knowledge about the cold-climate soils of Alaska is crucial for most Alaska resource management, production, and construction activities. Proper knowledge and planning of soil-disturbing activities can prevent major impacts on other resources. SNRAS and AFES operate soil laboratories in Alaska and will remain one of the major sources of information about Alaska soils. Under current Alaska climate variability, cold soils are experiencing significant changes that are in turn causing changes in natural and managed ecosystems. SNRAS and AFES work in the soils area will focus on the following topics:

- Soil properties as they relate to soil quality, ability to resist and recover from disturbance, and soil productivity
- Origin, formation, and classification of high-latitude soils
- Plant nutrition and soil fertility
- Permafrost soil characteristics, limitations, and potential uses
- Soil management, land reclamation, and remediation of contaminated soils
- Soil responses to climate change
- Soil biology and processes of boreal ecosystems in a management context
- Long-term soil data

High-latitude Agriculture

Agriculture will be an important part of the overall activity for SNRAS/AFES for the foreseeable future. Greenhouse, horticulture, and landscape production generate the largest share of agricultural value, and forage crops make up the largest share of crop area in Alaska. New and emerging Alaskan agricultural efforts will need an improved research base. Continued improvements to infrastructure, social and economic changes, and new crops and markets will generate information needs for Alaska agriculture. Alaska will contribute unique cold-climate information to agricultural research topics that reflect national and international information needs. Within the entire agricultural sector, SNRAS and AFES have a unique role and responsibility in long-term agricultural research in Alaska. SNRAS agricultural science endavors will be built around the following topics:

- Production, uses, and adaptive management pertaining to high-latitude crops and landscaping materials
- Greenhouse production systems
- Controlled environment production systems
- Global change effects on agricultural soils, crops, and livestock in Alaska
- Application of molecular technology to northern plant materials
- Identifying value in new plant products and chemistry
- Adaptation of livestock production systems to Alaska conditions
- Development of new agricultural crops for new or existing markets
- Production, management, and marketing of reindeer and other animals adapted to the far north
- Marketing, quality, and acceptance of Alaska agricultural products
- Integrated pest management
- Plant materials for revegetation of disturbed lands and for treatment of waste products in cold climates

Top left: researchers Chien-Lu Ping and Gary Michaelson collect soil samples in northern Alaska; lower left: measuring depth of a soil pit; Above: AFES greenhouse at night by Meriam Karlsson, and Tanana Valley farm fields (AFES file photos).

Goals within the Emphasis Areas

SNRAS/AFES goals within the five emphasis areas are related to the university's three basic obligations of teaching, research, and service. Our teaching mission is to produce high-quality graduates and to meet the needs of the UAF student body. We are dedicated to conducting research that will contribute knowledge of the functions, management, and utilization of high-latitude land-based natural resources and the geography of the north. Finally, it is our goal to provide professional and outreach service that private and public Alaskan constituent groups will seek, value, and use. The following goals will be applied across the five identified emphasis areas.

Core Mission Goals

Teaching

The SNRAS overall teaching goals are to graduate well trained, broadly capable, and thoughtful majors of high character, while meeting the specialized course needs of the UAF student body.

General Educational Goals

- ❑ Educate the whole person—academic, social/civic, and ethical.
- ❑ Maintain high educational standards and train students to understand and appreciate diverse needs and users.
- ❑ Integrate new instructional technology with traditional methods.
- ❑ Facilitate student employment opportunities.
- ❑ Prepare students for lifelong lerning and responsible citizenship.
- ❑ Enhance natural resource management and geography education through real world service projects.
- ❑ Offer instruction for resource users, managers, and the public.
- ❑ Use resource clientele as educators in connection with outreach projects.
- ❑ Take leadership in developing forums, conferences, and workshops for national and international audiences.
- ❑ Enhance public education on natural resources.
- ❑ Provide information about environmental science through professional development workshops.
- ❑ Conduct workshops and offer classes for K-12 teachers.
- ❑ Participate in outreach to K-12 classrooms.

Organizational and Support Goals for Education

- ❑ Obtain adequate SNRAS teaching facilities at Fairbanks and Palmer.
- ❑ Offer appropriate courses within SNRAS that produce credit for UAF core requirements.
- ❑ Expand distance delivery to include the three UA major academic units.

Research

SNRAS is dedicated to conducting research that will contribute knowledge about the functions, management, and utilization of high-latitude land-based natural resources and the geography of the north. SNRAS and AFES seek to obtain and retain faculty necessary to maintain or achieve nationally and internationally recognized research programs that carry out the following goals across the five emphasis areas.

Goals Related to Existing Programs

- ❑ Emphasize the capture, analysis, synthesis, and application of long-term data, including agricultural, ecological, site remediation, and forest growth/yield information.
- ❑ Maintain internationally recognized leadership in forest soils and forest ecosystems.
- ❑ Maintain international leadership in climate change detection and effects studies, and explore opportunities for carbon cropping.
- ❑ Maintain leadership in Geographic Information Systems (GIS) and the application of geographic data and remote sensing in resource management.
- ❑ Sustain unique expertise on specialized agricultural production and marketing systems in Alaska and the north.
- ❑ Expand expertise in forage crop management.
- ❑ Expand knowledge of productions systems for diversified livestock species appropriate for Alaska.
- ❑ Expand knowledge of cold-climate horticulture systems and controlled environment horticulture in Alaska.
- ❑ Maintain expertise on wildland fire effects and integrate that knowledge into fire management.
- ❑ Adapt expertise on site remediation to new needs and issues generated by resource-based activities.

Goals Related to Developing Programs

- ❑ Build a nationally recognized program of outdoor recreation research.
- ❑ Seek out and define the potentials for non-timber forest products.
- ❑ Develop geography studies on sense of place, Canadian Studies, the Circumpolar North, and the Pacific Rim.
- ❑ Rebuild capability in environmental law, policy, and economics.
- ❑ Catalyze the integration of research on human dimensions of resource change and use.
- ❑ Identify and investigate key problems in physical geography and biogeography.
- ❑ Develop a resource planning support capability.
- ❑ Apply existing expertise to improve evaluation of wildlife habitat.

Service and Outreach

SNRAS and AFES are committed to providing professional and outreach service that private and public Alaskan constituent groups will seek, value, and use. The following goals for professional service and outreach will be applied across the five emphasis areas.

- ❑ Improve efficiency of resource management in Alaska through transfer of critical information to resource users and the public.
- ❑ Develop new communication methods and products to improve natural resources and geography outreach.
- ❑ Improve methods of obtaining local knowledge and resource information needs from Alaska resource users.
- ❑ Develop and implement a program to increase awareness and use of SNRAS capabilities, especially for resource professionals new to Alaska and communities experiencing new needs.
- ❑ Continue and expand user-oriented instruction in critical skills and knowledge for private and public resource managers in Alaska.
- ❑ Enhance the skills of Alaska's resource and environmental consulting communities.
- ❑ Improve recognition within the university community of the SNRAS responsibility as a land-grant unit to conduct professional service.

Objectives

Specific and measurable objectives provide a basis to guide the implementation of the SNRAS/AFES goals during the life of this strategic plan.

Teaching Objectives

- ❑ Maintain accreditation from the Society of American Foresters for the undergraduate forestry emphasis program within the Natural Resources Management major.
- ❑ Establish a professional master's degree program
- ❑ Establish an M.S. emphasis area in soil science.
- ❑ Continue five percent annual increase in majors and graduates for five years by:
  - Achieving better retention and graduation rates of already enrolled NRM majors.
  - Attracting Alaska Native students to the NRM major.
  - Increasing faculty involvement in student advising.
  - Maintaining a high priority for the quality of NRM 101 as an introductory course.
  - Recruiting high-quality students with an undeclared major.
  - Working with other departments to identify candidates for transfers.
  - Maintaining an environment that intellectually stimulates and rewards students of all points of view.
  - Developing matriculation agreements with two-year programs within the UA System and with community colleges outside of Alaska.
- ❑ Expand the NRM program in the Palmer/Anchorage area to include all three options.
- ❑ Increase the use of teleconferencing to enhance our distance-delivery capabilities.
- ❑ Establish a special fund to recruit the most qualified graduate students.
- ❑ Facilitate establishment of associates and certificate degree programs in applied natural resources subject areas in cooperation with UA two-year colleges.

The GLOBE Program involves school children and their teachers in local climate observations.

Research Objectives

To enhance external funding opportunities, the school and the experiment station will work toward a programmatic approach that spans departments and incorporates emphasis areas by remaining closely allied to national directives in agriculture, forestry, and resources management.

- ❑ Establish an endowed faculty position that includes a significant program of research in some field of natural resources.
- ❑ Foster or develop new funding sources for research problems important to Alaska communities, resources professionals, and unique Alaska problems and issues.
- ❑ Vigorously work to initiate or adapt national funding priorities to reflect the geographic, social, economic, management, climate, and ecological realities of Alaska.
- ❑ Develop additional expertise in forest health in coordination with partner agencies.
- ❑ Establish a new senior geography faculty position with an associated research program that complements existing areas of research and builds new recognition for geography at UAF.
- ❑ Obtain faculty positions in soil physics and soil chemistry.
- ❑ Increase capabilities and projects in resource planning, recreation, and nonmarket valuation of resources.
- ❑ Obtain additional faculty resources for horticulture and controlled environments.
- ❑ Increase faculty and federal partnerships in integrated pest management and entomology.

- ❑ Establish a position in subsistence research and management.
- ❑ Expand faculty expertise in social sciences and develop integrated, natural science–social science research.
- ❑ Obtain faculty with expertise in decision sciences.
- ❑ To enhance the market potential for Alaska products, obtain faculty or partners who can aid in post-harvest technology, food science, and the expanding neutraceutical and pharmaceutical marketplace.

Service Objectives

We will provide programs that will help advance professionals and provide technical expertise in natural resources management and geography.

- ❑ Offer instruction for practicing resource management professionals in: geographic information systems (GIS), soil science, and ecosystem management.
- ❑ Offer instruction for resource users and the public in crop and livestock management, horticulture, and forest management.
- ❑ Build a network of Internet linkages that will provide a comprehensive interactive information system on boreal forest research results.
- ❑ Build an online SNRAS data archive.

General Support Objectives

While maintaining their autonomy, the school and the experiment station faculty and staff will work toward increasing support from partners outside the units.

- ❑ Retain the school's current level of autonomy, self-governance, and representation in campus decision-making.
- ❑ Retain administrative direction of AFES within SNRAS.
- ❑ Maintain and strengthen international collaborative programs, including student exchanges and topic- or project-oriented research partnerships.
- ❑ Build an endowment to support SNRAS programs.
- ❑ Obtain adequate space to conduct leading-edge work and serve the public. Facilities and Support Objectives

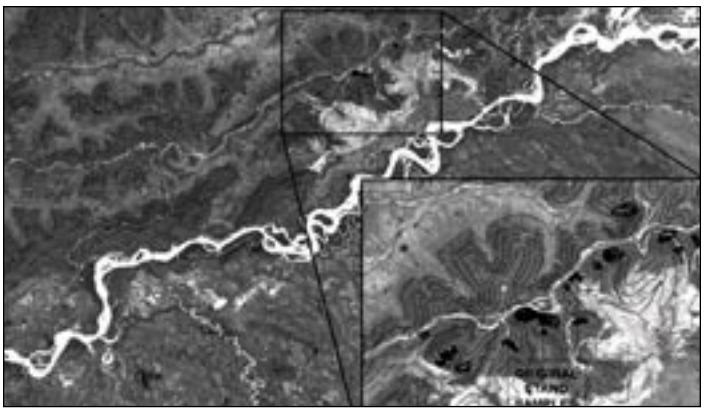
The units will work toward increasing space through renovation and new facilities in both Palmer and Fairbanks. The following are some potential options.

- ❑ Obtain as a UA priority a major renovation of existing buildings to make space more useable (short term).
- ❑ Develop plans for a new building with adequate space and facilities for the School of Natural Resources and Agricultural Sciences and other cooperating UAF academic units.
- ❑ Develop concept criteria and space needs for a Natural Resources building or complex of facilities that would cooperatively meet the needs of SNRAS cooperators such as the USDA Agricultural Research Service and Forest Service and the Alaska Department of Natural Resources.
- ❑ Plan for a University Forest as part of the state land grant, with at least one staff position dedicated to management of the forest.
- ❑ Develop a comprehensive plan to maintain major facilities, including the Matanuska and Fairbanks experiment farms, and use them more fully for the full range of SNRAS and AFES programs and other programs within the UA system.

Funding and Operations Objectives

School and experiment station faculty and staff will endeavor to increase funding through competitive grants, partnerships, and strategic affiliate faculty appointments.

- ❑ Increase full obtainable overhead recovery for research grants and apply a prudent proportion of indirect cost recovery to maintaining and enhancing program continuity and support capability.
- ❑ Seek out and achieve larger research grants; shift balance among all grants from small grants to larger.
- ❑ Set and maintain competitive salaries for new and existing faculty.
- ❑ Make greater use of affiliate appointments with long-term cooperating organizations to expand available disciplinary coverage.
- ❑ Recruit visiting professors, including emeriti, to bring in new or critically needed expertise on a short-term basis.
- ❑ Establish more joint-appointments between schools or departments.
- ❑ Develop a coordinated plan for replacement of the cohort of retiring faculty by 2010.
- ❑ Conduct joint, coordinated research projects using multiple AFES investigators.
- ❑ Establish a specific coordinating mechanism with College of Rural Alaska to better serve the rural Alaska constituents.
  - Implement a regional McIntire-Stennis proposal.
  - Continue expanded efforts to systematically track and pursue new grant opportunities. Goals within emphasis areas



This image identifies locations where tree growth has been shown to have a negative response to warming temperatures, a topic of ongoing SNRAS research.

Description of the School and Experiment Station

Personnel

The four departments of the School of Natural Resources and Agricultural Sciences and Agricultural and Forestry Experiment Station currently (April 2004) include 25 faculty and 102 staff and graduate and undergraduate research positions. Most of the faculty and staff are on the main campus of the University of Alaska Fairbanks. Five faculty are at the Palmer Research and Extension Center in Palmer, Alaska. The center is supported by 23 staff members, who include administrative personnel, Matanuska Experiment Farm employees, and Palmer Research Laboratory employees. A dean and director, resident in Fairbanks, an associate dean in Fairbanks and an associate director resident in Palmer, administer the school and experiment station.

Facilities

The school's facilities, in addition to administration, faculty, and staff offices and laboratories on the UAF Fairbanks campus include:

Fairbanks Experiment Farm
Palmer Research and Extension Center
Matanuska Experiment Farm
Delta Field Research Site
Forest Soils Laboratory
Georgeson Botanical Garden
Reindeer Research Program (facilities in Fairbanks and Nome, Alaska)
Tree Ring Laboratory

Students

The five-year enrollment history of SNRAS shows a relatively flat undergraduate enrollment (66 undergraduate majors in 1998, 70 in fall 2003). During this period, the number of these students majoring in geography varied from a low of 23 percent in 1999 to a high of 48 percent in 2001. The remainer of the undergraduates are natural resources management majors. The number of geography majors in the bachelor of arts program was consistently higher than the number in the bachelor of science program. Students in the Natural Resources Management master's of science program numbered 32 in 1998 to 28 in 2002. Averaged over the past five years, the annual number of interdisciplinary Ph.D. candidates was six.

Overall Fiscal Resources

The SNRAS budget is strongly dominated by the experiment station. The FY 03 funding expenditures of $7.3 million included only $810,000 for instruction from state appropriations. The total dollars from state funds in FY 03 was $3.5 million; from federal formula funds was $1.7 million; and from grants and contracts, $2.1 million.

In FY 03, the school and experiment station expended approximately 6.9 percent of the total UAF $12 million in unrestricted[1] funds available for research, and approximately 7.9 percent[2] of the UAF total of $76 million in restricted[2] funds. In that same fiscal year, SNRAS and APES research produced 1.6 percent of the indirect cost recovery of $20.6 million for the UAF campus. Our expenditures for education (excluding administration of funds used for education) was 2.7 percent of the total $20.6 million UAF state appropriation.

Federal formula funding and funding from the state of Alaska general fund have been stagnant for nearly ten years. This has led to reductions in operating costs as faculty and staff salaries increased due to mandatory raises and to increases in the cost of retirement and insurance benefits. By appropriate reallocation of funds and infusion of dollars from University of Alaska initiative funding (largely due to increases to total university funding from the Alaska state legislature), we have acquired four new faculty. However, the net increase in faculty numbers has been zero, due to three retirements and not replacing the faculty who was hired as dean and director of SNRAS and AFES.

Successes and Strengths

- Northern expertise (high-latitude soils, boreal ecology and forest management, insight into Alaska economy, northern plant cultivation)
- Long-Term Ecological Research program
- Cooperative Ecosystems Studies Unit
- Expertise in alternative livestock management
- Expertise in the soils resources of Alaska
- Multi-resource perspective on management
- Ability to combine economic, social, biological, and physical aspects of resources
- Placement of graduates in Alaska
- Natural areas and biodiversity management expertise
- Continuing and historical programs in crop cultivation in the north
- Specialized expertise on Alaska resources
- GIS and landscape modeling capabilities
- Technology for restoration of stressed and damaged ecosystems
- Strong record of issuing user-oriented and scientific and technical publications
- Highly capable publications unit

1. Funds received from the state of Alaska general funds.
2. The 7.9% included federal formula funds as well as $2.0 million that was previously received from the Alaska Science and Technology Foundation that was discontinued by the State Legislature in 2002, and grants and contracts.

- Undergraduate research opportunities through internships and summer employment
- International research partnerships in resources management, forestry, and agriculture
- Strong integrative elements in curriculum, including core courses, capstone course, and a senior thesis program.

Unique Roles and Responsibilities

SNRAS and AFES host the USDA Agricultural Research Service in Alaska and cooperate closely with the USDA Forest Service, including the Boreal Ecosystem Cooperative Research Unit (BECRU). Without a healthy and vigorous UAF Agricultural and Forestry Experiment Station to cooperate with and host them, these federal research programs would not be located at UAF or in Alaska. Without federal research partners, SNRAS and AFES—and the University of Alaska—would lose a coordinated, collaborative program with entire areas of expertise unique in the state.

Although some institutions outside Alaska specialize in particular subfields, from the national perspective a comparable concentration of the full range of arctic and subarctic resource management knowledge and expertise does not exist elsewhere in the U.S. We have good linkages across the circumpolar north. This allows Alaska to benefit from the findings, experience, and expertise of that particular part of the world that is most like Alaska. No U.S. locality matches our needs as well as the other circumpolar nations.

We are able to deal with the market and nonmarket values of resources. Although small in numbers, our work has always involved a cross-disciplinary perspective that allows us to address the market for natural resources. Cross-disciplinary and interdisciplinary teaching and research are now well recognized as particularly important in geography and natural resources management.

We have good linkages across the UAF campus and we bring people and programs together. We jointly list and teach courses with the College of Engineering, Science, and Mathematics (biology, geophysics), the School of Management (economics), and the UAA campus. We maintain cooperation with the Institute of Arctic Biology in the reindeer program, the Geophysical Institute in studies of resource management and research applications of remote sensing images and data bases, and the School of Management in resource economics studies. The Long Term Ecological Research program involves a high degree of cooperation and collaboration among IAB-SNRAS and the U.S. Forest Service Boreal Ecosystems Cooperative Research Unit, and the UA Experimental Program to Stimulate Competitive Research, EPSCoR. SNRAS has had a significant leadership role in the campus-wide Global Change Center. We are also the lead UA unit in the new North and West Alaska Cooperative Ecosystems Studies Unit.

We teach our classes in a way that students develop an interdisciplinary perspective and the ability to apply insights and skills from our classes in real-world situations. We offer access to an extensive outdoor laboratory on and near the campus for research and instruction. At UAF this includes the Fairbanks Experiment Farm, Georgeson Botanical Garden, and the Reindeer Research Program headquarters, as well as a federal site managed by the U.S. Forest Service and the North Campus area, which includes the Boreal Arboretum. Opportunities offered through our Palmer Research and Extension Center, near the UAA campus, include the Palmer Research Laboratory and the Matanuska Experiment Farm. Our Plant, Animal, and Soil Science degree option is offered through the center. These sites have unique value in the state of Alaska because of their long and well-documented history of management and use.

Who Do We Serve and How?

Clients Outside the UA System

Resource Managers: We develop and communicate knowledge that has specific application in Alaska conditions and we go beyond the theoretical. We always find out what the significant resource management problems are and then apply our programs to address them.

General Public: We publish information of general interest on Alaska resource issues, teach in many information settings and meetings, and release useful and interesting items through our publications office and the news media.

Farmers: We develop and transfer information that helps to establish new crops and livestock in Alaska, more successfully produce and market Alaska farm products, and improve the quality of farm life. We both respond to problems that the agricultural industry brings to us and we take the results of our continuing research programs to farmers through targeted publications and personal contact.

Industry: We propose, plan, and conduct studies on specific problems that confront several resource-based industries in Alaska, including forest products, oil and gas, minerals, tourism, wildlife, and fisheries.

Native Groups: We develop information that has particular application to the Alaska Native community and rural Alaska in general, including subsistence matters, resource planning, resource protection, and resource development issues. We address the special needs of the Alaska Native groups who are major land holders responsible for significant resources across Alaska.

Environmental Groups: We generate and publish information that establishes a base of objective findings for all resource users interested in the environment, including public interest environmental groups, and industry.

Rural Communities: We identify the resource potentials of regions and localities to help rural people understand options available for their future, and we develop methods to identify the needs of rural communities in resource allocation decisions.

Other Interest Groups: We develop information about Alaska resources that has broad application to a variety of public and private purposes, ranging from assisting decisions of local government to financial improvement of private individuals and organizations.

State Government Agencies: We carry out cooperative research programs with state agencies and conduct contract research for them. We provide training, special education, and policy advice for state agencies, such as the Alaska divisions of Forestry, Agriculture, and Land, Water and Mineral Management, the Department of Fish and Game, Department of Commerce and Community Development, and Department of Environmental Conservation.

Federal Agency Clients: We conduct contract research, work jointly to define important research problems, and assist in land and resource management planning for a variety of federal land management agencies.

Federal Agency Partners: We work directly with federal research agencies including the USDA Agricultural Research Service and Forest Service, National Science Foundation, National Park Service, Bureau of Land Management, and National Biological Survey to cooperatively conduct research on high-priority Alaska and national agricultural and natural resource related questions that have been determined to be of mutual interest.

USDA Land Grant System and Cooperative Extension Service: We apply congressionally appropriated formula funds matched by state dollars to the purposes of the national system of land-grant schools. We provide results and findings to the national Cooperative Extension network as well.

State Legislature: We conduct research, teaching, and service on particular items identified directly by the Alaska legislature.

Academic Peers (U.S. and international): The process of conducting scientific and academic work depends on collaboration and evaluation by experts who are not immediately connected with programs. This system of cooperation and review is essential for application of the latest ideas and thinking and as a measure to ensure quality.

Granting Agencies: National and state-level research, resource management, and academic funding agencies issue requests for proposals that indicate topics of concern in the natural resources field. The SNRAS and AFES faculty respond to these opportunities with new ideas that have changed the direction or improved the capabilities of our programs to better meet the needs of Alaska, the nation, and the circumpolar north.

Alaska Congressional Delegation: SNRAS is a unit of the nationwide land grant system established and funded annually by the U.S. Congress. The Alaska congressional delegation defines issues of concern to resource management in Alaska through statutes and the annual appropriations process. SNRAS responds with its programs and activities that reflect these decisions.

Media: We recognize a responsibility to make information about the results of our work available to a wide variety of audiences, including the general public, in a form that they can use and understand. We issue our own general interest publications, such as *Agroborealis,* and work with print and broadcast media to inform the public about Alaska resources.

Services within the UA System

Students: We offer three complete undergraduate degree programs; we have an excellent record in arranging student jobs and internships; we offer service courses unique in the UA system such as soils and resource law for other majors at UAF; we have a good reputation for working with students (formal and informal), being accessible, and caring about helping them through their degree programs. Our graduate students have the opportunity to participate in projects and studies that are recognized as important at the national and international level. We have placed our graduate students in many different responsible positions both in Alaska and elsewhere. We have high levels of rural Alaska high school student participation in UAF outreach programs.

Faculty of SNRAS and AFES: The planning and conduct of good science and teaching requires that the people most involved in delivering the service, the faculty, play a leading role in defining and evaluating program effectiveness.

Board of Advisors: Because of the unique mission of SNRAS and AFES in their land-grant role, the school and experiment station established a board of advisors. The board is made up of representatives of the broad range of groups and interests that make use of our products and people actively engaged in managing Alaska resources. Members of the board of advisors are actively involved in assisting SNRAS and AFES decision-making.

Universitywide Peers: To help us fulfill our mission, SNRAS and AFES carry out cooperative projects that have benefited from the expertise of other faculty at the university. Also, the unique focus and mission of SNRAS and AFES provides opportunities for cooperative academic programs at the university to increase their applicability to Alaskans' lives. We consider the needs of cooperating academic units in determining our focus and direction. We conduct joint education projects with the Cooperative Extension Service, and we obtain ideas about new directions for our programs from CES and its clients.

UAF Administration: Our Strategic Plan fits within the overall direction of the UAF Strategic Plan and responds to identified campuswide priorities. We also contribute ideas about opportunities and have launched initiatives that have become campuswide programs.

Sunflower at Georgeson Botanical Garden (photo by Doreen Fitzgerald); University of Alaska campus (UAF photo by Todd Paris)

Acknowledgements

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Professional Advisors

The following expert advisors provided input for developing the SNRAS/AFES strategic plan. Other participants were the SNRAS Board of Advisors and SNRAS/AFES faculty.

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