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

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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.

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The University of Alaska Fairbanks is accredited by the Commission on Colleges of the Northwest Association of Schools and Colleges. UAF is an AAIEO employer and educational institution.
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.
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.
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.
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 workforce 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.

**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.

**Strategic Plan 2004, MP 2004-6**
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.
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.

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 endeavors 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
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 learning 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.

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 nutraceutical 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 remainder 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 FY03 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 funds available for research, and approximately 7.9 percent of the UAF total of $76 million in restricted 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.

Strategic Plan 2004, MP 2004-6
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.
Acknowledgements

The SNRAS/AFES 2004 Strategic Plan was developed by the SNRAS/AFES faculty. A special thank-you to Nancy Scheetz-Freymiller, who facilitated the faculty retreat portion of the strategic planning session. From outside the university system, those consulted during plan development were the SNRAS Board of Advisors and other expert advisors. Input was also provided by SNRAS administrators.

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.

David Banks, State Director, The Nature Conservancy of Alaska, Anchorage

Keith Boggs, Interim Program Manager, Alaska Natural Heritage Program

Alex Carter, Biological Resources Team Leader, National Park Service Alaska, Anchorage

Chip Dennerlein, Director, Alaska Regional Office, National Parks Conservation Assoc., Anchorage

Larry deVillbus, Wolverine Farms, Palmer

Judy Gottlieb, Associate Regional Director, National Park Service Alaska, Anchorage

Jeff Jahnke, State Forester, Alaska Div. of Forestry, Anchorage

Annette Johnson, Director, University of Alaska Center for Economic Development, Anchorage

James N. Kenworthy, Executive Director, Alaska Science & Technology Foundation, Anchorage

Winnifred Kessler, Director, Wildlife Fisheries Ecology & Watershed Staff, Alaska Region, USDA Forest Service, Juneau

Lee Koss, Science Coordinator, Alaska State Office, Bureau of Land Management, Anchorage

Mike McClellan, Project Leader, Forestry Sciences Laboratory, USDA Forest Service, Juneau

Tom Richards, Program Specialist, Economic Development Administration, Anchorage

Jeffrey Stacer, Federal Co-Chairman, Denali Commission, Anchorage

Meade Tredwell, Director, Hickel Industries, Anchorage

Robert Wells, Director, Alaska Division of Agriculture, Palmer

SNRAS Board of Advisors

Chris Maisch, Chair, Alaska DNR Division of Forestry, Fairbanks

Mike Hoyt, Vice Chair, Chugach Alaska Corporation, Anchorage

Ray Jakubczak, BP Exploration (Alaska) Inc., Anchorage

Stan Stephens, Tourism and Environmental Specialist, Valdez

Cynthia Warbelow-Tack, Owner-Operator, Plant Kingdom Greenhouse and Nursery, Fairbanks

Nancy Welch, Deputy Director, Alaska DNR, Division of Mining, Land, and Water, Anchorage

Elaine Williams, former Student Representative, Fairbanks

Michael Woods, Natural Resource Management Educator, King Career Center, Anchorage

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Allen Mitchell, Associate Director, Agricultural and Forestry Experiment Station (746-9450; pfgam@uaa.alaska.edu)

Stephen Sparrow, Associate Dean, School of Natural Resources and Agricultural Sciences (474-7620; stephen.sparrow.uaf.edu)
Please fill in your name & group number and staple this to the front of your paper.

YOUR FIRST & LAST NAME: ____________________________ YOUR GROUP NUMBER: __________

Directions & Grading Criteria: A Sand County Almanac — Reflection #2:
Write an ecological lesson "disguised" as a nature essay.

Write an ecological lesson "disguised" as a nature essay. Most of Leopold's essays in Part I of SCA are just that. For example, consider what he teaches the reader about competition, succession and the role of fire in "Bur Oak." It is hard for most of us to write a lesson without sounding either preachy or boring. Leopold sets a high standard in this regard. For examples of ecological principles that you could weave into your essay, read Chapter 3 in our text by Chiras, et al. If you have questions, write Alina at ftasc@uaf.edu.

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<td>The essay includes at least one lesson in ecology, &quot;disguised&quot; as part of the story.</td>
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<td>At the end of the essay, paper includes a separate, brief explanation of what ecological lesson(s) are included.</td>
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<td>Paper accurately portrays the specified ecological lesson(s)</td>
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<td>Paper includes original and creative elements such as word choice, approach, graphics, unusual points or insights, etc.</td>
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<tr>
<td>-10 pts/paper</td>
<td>Paper is not STAPLED (if more than one page). Be professional. Get a stapler.</td>
</tr>
</tbody>
</table>

**Subtotal for Errors and Omissions**

Total Points (points for content less errors and omissions)

**COMMENTS:**
## TENTATIVE SCHEDULE

This schedule will change, as adjustments are often necessary to accommodate our guest speakers.

### INTRODUCTION, HISTORY & PHILOSOPHY OF NATURAL RESOURCE CONSERVATION

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>READINGS (finish before class)</th>
<th>WRITTEN ASSIGNMENTS (Due in class)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F</strong> 3-Sep</td>
<td>Course Logistics.</td>
<td>Read the syllabus &amp; handouts passed out in class.</td>
<td></td>
</tr>
<tr>
<td><strong>M</strong> 6-Sep</td>
<td>Differing Viewpoints, Classification of Resources, History of NRM</td>
<td>Chiras Ch.1: NRM Past, Present, Future</td>
<td></td>
</tr>
<tr>
<td><strong>W</strong> 8-Sep</td>
<td>History of NRM—Pinchot vs. Muir; Conservation vs. Preservation</td>
<td>Chiras Ch.2: Econ. &amp; Ethics</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong> 10-Sep</td>
<td>History &amp; Philosophy of NRM</td>
<td>6 p.m. Annual NRM Picnic at the UAF Farm—all NRM 101 students invited. Directions to farm are on Blackboard.</td>
<td></td>
</tr>
</tbody>
</table>

SAT 11-Sep: OPTIONAL: Res. Mgmt Society Trip to Angel Rocks. Arctic Health, 11 a.m. To reserve a seat, contact Jeff Werner at fjw@uaaf.edu.

### THE DEMAND FOR NATURAL RESOURCES

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>READINGS (finish before class)</th>
<th>WRITTEN ASSIGNMENTS (Due in class)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M</strong> 13-Sep</td>
<td>Inflation—Impacts of consumer culture</td>
<td></td>
<td>Complete the entry knowledge survey online. More information will be forthcoming.</td>
</tr>
<tr>
<td><strong>W</strong> 15-Sep</td>
<td>The Human Population Challenge</td>
<td>Chiras Chap 4: Population &amp; Chap 5: Hunger</td>
<td>An email must be received from your UAF account by 10 p.m. Sep 13 to count for credit. Send it to Aline <a href="mailto:ftas@uaaf.edu">ftas@uaaf.edu</a> (cc Dr. Todd). See syllabus for what to include.</td>
</tr>
</tbody>
</table>

### KEY CONCEPTS

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>READINGS (finish before class)</th>
<th>WRITTEN ASSIGNMENTS (Due in class)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F</strong> 17-Sep</td>
<td>Sustained Yield and our Footprints</td>
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<tr>
<td>SAT 18-Sep: OPTIONAL: Res. Mgmt Soc Trip to Denali National Park. To reserve a seat, contact Jeff Werner at <a href="mailto:fjw@uaaf.edu">fjw@uaaf.edu</a>.</td>
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<tr>
<td><strong>M</strong> 20-Sep</td>
<td>Sustained Yield</td>
<td></td>
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<tr>
<td><strong>W</strong> 22-Sep</td>
<td>Ecological Principles of NRM</td>
<td>Chiras Ch.3: Lessons from Ecology</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong> 24-Sep</td>
<td>Sustainability &amp; the Value of a Species</td>
<td>Chiras Ch.14: Plant &amp; Animal Extinction</td>
<td></td>
</tr>
<tr>
<td><strong>M</strong> 27-Sep</td>
<td>Protecting Biodiversity</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>W</strong> 29-Sep</td>
<td>Ecosystem Management</td>
<td>Begin reading Sand County Almanac, pages vii to 77</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong> 1-Oct</td>
<td>SUMMARY</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>M</strong> 4-Oct</td>
<td><strong>TEST 1</strong></td>
<td>Elvey Auditorium AND the Globe Room (across hall)</td>
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</tbody>
</table>

### MANAGING RENEWABLE RESOURCES (while keeping in mind that these are all connected...)

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>READINGS (finish before class)</th>
<th>WRITTEN ASSIGNMENTS (Due in class)</th>
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</thead>
<tbody>
<tr>
<td><strong>W</strong> 6-Oct</td>
<td>The Legacy of Aldo Leopold &amp; Intro to Commons</td>
<td>READ Leopold's 1949 Foreword to Sand County (on Blackboard) and SCA, Pages vii to xxviii</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong> 8-Oct</td>
<td>1ST LEOPOLD DISCUSSION GROUP</td>
<td>READ Sand County Almanac (SCA), Pages 3 to 77</td>
<td>Reflection Paper #1 DUE In Class: Write a Nature Essay similar to those in Part I of SCA</td>
</tr>
<tr>
<td><strong>M</strong> 11-Oct</td>
<td>Commons Game in GREAT HALL, RASMUSON LIBRARY</td>
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<tr>
<td><strong>W</strong> 13-Oct</td>
<td>Commons Game in GREAT HALL, RASMUSON LIBRARY</td>
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<tr>
<td><strong>F</strong> 15-Oct</td>
<td>Common Discussion—Elvey Auditorium</td>
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<tr>
<td><strong>M</strong> 18-Oct</td>
<td>The Nature of Soils</td>
<td>Chiras Ch.6: Nature of Soils AND Ch.7: Soil Conservation, Pages 134-150</td>
<td></td>
</tr>
<tr>
<td><strong>W</strong> 20-Oct</td>
<td>Thoughts on our &quot;Sense of Place&quot;</td>
<td>Handout of readings by Dr. Nelson</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong> 22-Oct</td>
<td>2ND LEOPOLD DISCUSSION GROUP</td>
<td>READ SCA, Pages 78 through top of 149</td>
<td>Reflection Paper #2 DUE In Class: Write an Ecology Lesson Disguised as a Nature Essay</td>
</tr>
<tr>
<td><strong>M</strong> 25-Oct</td>
<td>Agriculture and Agroforestry</td>
<td>Chiras Ch.7: Sustainable Agriculture, Pages 150-160</td>
<td></td>
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<tr>
<td><strong>W</strong> 27-Oct</td>
<td>Agriculture Case Study of Range Mgmt</td>
<td></td>
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<tr>
<td><strong>F</strong> 29-Oct</td>
<td>Forestry &amp; Silviculture</td>
<td>Chiras Ch.14: Forest Management</td>
<td></td>
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<tr>
<td><strong>M</strong> 1-Nov</td>
<td>Forest Management</td>
<td></td>
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<tr>
<td><strong>W</strong> 3-Nov</td>
<td>Forestry Case Study: FIRE</td>
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<tr>
<td><strong>F</strong> 5-Nov</td>
<td>3RD &amp; Final LEOPOLD DISCUSSION GROUP</td>
<td>READ SCA Pages 149-226</td>
<td>Reflection Paper #3 DUE In Class: Write Your Own Land Ethic</td>
</tr>
<tr>
<td><strong>M</strong> 8-Nov</td>
<td>Wildlife Management</td>
<td>Chiras Ch.10: Wildlife Management</td>
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<tr>
<td><strong>W</strong> 10-Nov</td>
<td>Wildlife Management: Charges since Leopold</td>
<td></td>
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<tr>
<td><strong>F</strong> 12-Nov</td>
<td>Wildlife Case Study: Ice, plankton &amp; polar bears</td>
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<tr>
<td><strong>M</strong> 15-Nov</td>
<td>Fisheries Management</td>
<td>Chiras Ch.12: Fisheries Conservation</td>
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</tr>
<tr>
<td><strong>W</strong> 17-Nov</td>
<td>Fisheries Case: The Plight of Salmon in the Pacific NW</td>
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<tr>
<td><strong>F</strong> 19-Nov</td>
<td>SUMMARY</td>
<td></td>
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<tr>
<td><strong>M</strong> 22-Nov</td>
<td><strong>TEST 2</strong></td>
<td>Elvey Auditorium AND the Globe Room (across hall)</td>
<td></td>
</tr>
<tr>
<td><strong>W</strong> 24-Nov</td>
<td>No Class</td>
<td></td>
<td></td>
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<tr>
<td><strong>F</strong> 25-Nov</td>
<td>THANKSGIVING Holiday</td>
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</tbody>
</table>

### PUTTING IT ALL TOGETHER

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>READINGS (finish before class)</th>
<th>WRITTEN ASSIGNMENTS (Due in class)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M</strong> 29-Nov</td>
<td>Key Natural Resource Legislation</td>
<td></td>
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<tr>
<td><strong>W</strong> 1-Dec</td>
<td>Planning and Environmental Mediation</td>
<td></td>
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<tr>
<td><strong>F</strong> 3-Dec</td>
<td>Planning Case: Wolves and Gribou</td>
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<tr>
<td><strong>M</strong> 6-Dec</td>
<td>Ecosystem Mgmt Revisited</td>
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<tr>
<td><strong>W</strong> 8-Dec</td>
<td>SUMMARY</td>
<td></td>
<td></td>
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<tr>
<td><strong>F</strong> 10-Dec</td>
<td>SUMMARY</td>
<td></td>
<td></td>
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<tr>
<td><strong>W</strong> 15-Dec</td>
<td><strong>FINAL EXAM 10:15 to 12:15 a.m. Elvey Auditorium AND the Globe Room (across hall)</strong></td>
<td></td>
<td>NO EARLY EXAMS WILL BE GIVEN</td>
</tr>
</tbody>
</table>
COURSE SYLLABII
FOR
REQUIRED FORESTRY COURSES
Conservation, viewed in its entirety, is the slow and laborious unfolding of a new relationship between people and land.

—Aldo Leopold,
Wisconsin Wildlife Chronology (1940)

Tell me the landscape from which you come, and I will tell you who you are.

—Jose Ortega y Gasset

The Stone Age came to an end, but not because we ran out of stones.

—Ernesta Ballard, Commissioner, Alaska Dept. of Environmental Conservation

The king who cannot take good care of the mountain, forest, lake and meadow, will not be able to rule the nation.

—Guan Zhong (645 BC)

A nation deprived of its liberty may win it, a nation divided may unite, but a nation whose natural resources are destroyed must inevitably pay the penalty of poverty, degradation, and decay.

—Gifford Pinchot, founder, U.S. Forest Service

Despite our artistic pretensions, sophistication and accomplishments—we still owe our existence to a six-inch layer of topsoil and the fact that it rains.

Attributed to an ancient Chinese text

Primary Instructor/Coordinator:
Dr. Susan Todd,
Assoc. Professor of Resource Planning
email: susan.todd@uaf.edu
Office: 349 O'Neill Bldg
Office Hours: Mon 1:00 to 3:00

Course Description:
The course examines the conservation of natural resources, including its history and ecological, economic and social foundations. First we discuss the basic principles of resource management including sustained yield, carrying capacity, policy formation, and the effects of world population growth. With this foundation, we take a more detailed look at the management of specific resources, including agriculture, rangeland, forest, wildlife, fisheries, recreation, minerals and energy.

The Goal of Resource Conservation:
“...to learn to live on a piece of land without spoiling it.”

—Aldo Leopold

Resource conservation is about survival—survival of both ourselves and our planet. Over the long-term, human welfare and environmental integrity are inseparable. Resource conservation is about working with nature to provide what we need while trying to minimize our impact on the environment. We cannot “lock up” all of Earth's natural resources. People are consumers—when we stop using the Earth's bounty, we die. We must try to limit our population and to stop consuming far more than we need. But even if we succeed at doing so, the remaining humans will still need food, water and shelter. We will still need to obtain everything we require from the Earth. And as Leopold said, we must learn to do so without spoiling the very source of our livelihood.

Course Objectives:
Upon completion of this course, the student should:

- Recognize our total dependence on natural resources and our own personal impacts on them. All of us “live off the land,” though for most of us, this link is so remote that we are no longer aware of it. All of us are consumptive users of the environment.
- Recognize the complexity of our resource problems; that there are often no simple answers.
- View resources as communities of living, interacting organisms and their environments.
- Be able to challenge both the optimistic and the pessimistic perceptions about the state of our resources.
- Be able to explain what sustained yield is and why it is important in resource management.
- Consider both human needs and the needs of ecosystems.
- Be able to tolerate, and even appreciate, diverse viewpoints.
- Recognize the often confrontational nature of the resource management process.

Required Texts:
1. Natural Resource Conservation, by Chiras, et al. You don’t have to outline the chapters in Chiras, but do read each assigned chapter. The book provides important background and supplementary information.
2. A Sand County Almanac by Aldo Leopold. We will read and discuss this book in detail in discussion groups.

There will be additional short readings passed out in class (and/or available on Blackboard, the online resource for this class at http://classes.uaf.edu/). The test can include questions from ALL reading assignments, including this syllabus.

Handouts:
When we have handouts, if the students in the back row will set extras near the door, those who come in later can pick them up there. If I have electronic versions, I will put them on Blackboard.

Grading Policy:
1. The percentage of points (90%, 80%, 70% break for A, B, C, respectively) earned out of the total possible points in the course, as shown below.
Editing and Spelling Matters...

One point will be deducted for each spelling error on each written assignment except tests. If you have trouble spelling, ask the Writing Center or a friend to proofread your papers. The Writing Center on 8th Floor Grainger has trained staff who will proofread your paper for FREE. Save points by turning your paper there before turning it in. If your first paper loses many points for grammar and spelling, your section instructor will require that you take you last two papers to the Writing Center.

The following are taken from papers submitted in this class. It takes longer to read each sentence. When the entire paper is like this, it can take no times as long for me just to try to figure out what the writer was trying to say, let alone grade the paper. Take pity on your readers! Spell check and READ your papers (AND your email messages) before turning them in.

- "In terms of a dame, I say no, under he presidents we promote adversity of life very seminler to Leeplod."
- "Darwin saled around the world on a bout called "The Bagel."
- "To put out a plot, you machure 10 meteters and drive in a steak."

Jobs in natural resources, wildlife and fisheries are highly competitive. The first contact most applicants make with potential employers is through their cover letters and resumes. Would an employer spend half an hour reading a poorly written letter, when she could read a well-written one in just three minutes? I doubt it. An ability to write so that others can easily understand what you mean is essential to finding a job in this field.

A Sand County Almanac (SCA) by Aldo Leopold

Discussion Sessions

On two Fridays we will have discussion sessions on Sand County Almanac. These sessions provide an opportunity for student participation and discussion of this influential work. You will have the same room and the same group leader for all three sessions. In the next few weeks, we will assign each student to a group.

Attendance at each discussion session is worth 30 points. You must be present within the first 10 minutes of class and remain the rest of the period to be counted. If you do not know where the room is, please try to find it in advance so you do not miss the first session. If you do miss one, it will not be possible to "make-up" the points for attendance.

However, you can still complete the reflection paper, subject to the late paper policy described below (i.e. no extra time is given if you miss the discussion session, UNLESS you were seriously ill). We may not have room assignments until late September.

The grading criteria and directions for the first two essays are included on the next two pages.

"Bear in mind that the hardest part of writing is staying in the chair."

- Bob LeVitus

Points Deducted for Late Papers:

<table>
<thead>
<tr>
<th>Points Deducted for Late Papers:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Papers submitted outside my office (349) O'Neill after 1 p.m. but before 5 p.m. on the day it is due.</td>
<td>-20</td>
</tr>
<tr>
<td>Papers submitted after 5 p.m. on FRIDAY, but before 1 p.m. the following Monday.</td>
<td>-30</td>
</tr>
<tr>
<td>NO papers will be accepted after this without a letter from a doctor or the Dean of Students.</td>
<td>-ALL</td>
</tr>
</tbody>
</table>

LATE PAPERS:

Each written assignment is turned in AT THE END OF CLASS on the DATE DUE. It is far easier to keep track of papers if they are all collected in class at the same time. To encourage everyone to turn them in on time and to reward those who do so, the following points will be deducted from late papers.

Compute your Ecological Footprint Online

See the directions at the back of this packet for this assignment which is due on Sept 17.

Take the Entry Knowledge Quiz

We are required to give a "survey of knowledge" of students when they begin this course. It will count for 30 points (2% of total grade), but you are not expected to do very well on it. I give some credit for trying to get the correct answers, otherwise students haven't even tried to do well on the quiz. If you get a 70% on the quiz, you will get 70% of the 30 points, etc. More info on this item coming soon!

Log onto Blackboard

We use the online course center called "Blackboard" (abbreviated BB) for many things in this class. It allows us to post copyrighted material without charge (since only those with a password can access it), the gradebook is kept online where you can view your grades anytime, and you can access lecture notes, announcements, handouts, etc. Go to http://classes.uaf.edu and log on using your UAF userid (the fxy2 part of your UAF email address) and a password that you create. New students should use their social security number without any dashes as their password. Once logged in, you can change your password by going to "TOOLS" and then to "PERSONAL INFORMATION" where you can click on "CHANGE PASSWORD."

Site: http://weblookup.edu. You will need to input your SSN as your id number (rather than your UAF id number).

As soon as you have your account, please send an email to Alina Itasc@uaf.edu with a copy to me susan.todd@uaf.edu. In order to get full credit, you must include a SUBJECT (e.g. NRM 101) and your IDENTITY must appear in the "from" column. To set your identity in Webmail, login to the site and select OPTIONS at the top of the page. Click on PERSONAL INFORMATION, then put your first and last name where it says FULL NAME.

Please tell us 1) where you grew up, or where you call home, 2) why you chose this class and 3) what your favorite outdoor place is (your back yard, the top of Denali, or downtown Seattle...). 4) If you have a photograph of yourself that you can attach, that would be terrific (it helps me remember your names!)

I wish I could say that my favorite place was some mountain top, but it's actually the garden outside my house overlooking the Tanana River.

By the way, most faculty get 50-100 messages/day, many of which are spam. If you want us to read your email, ALWAYS include a subject and your identity. Otherwise, it is likely to be considered spam and will be deleted.
Approaches to Management: A Prologue
by Kenneth Boulding

A Conservationist’s Lament
The world is finite, resources are scarce,
Things are bad and will be worse,
Coal is burned and gas exploded,
Forests cut and soils eroded.
Wells are dry and air’s polluted,
Dust is blowing, trees uprooted.
Oil is going, ores depleted,
Drains receive what is excreted.
Land is sinking, seas are rising,
Man is far too enterprising.
Fire will rage with Man to fan it,
Soon we’ll have a plundered planet.
People breed like fertile rabbits,
People have disgusting habits!
Moral: The evolutionary plan went astray by evolving Man.

The Technologist’s Reply
Man’s potential is quite terrific,
You can’t go back to the Neolithic!
The cream is there for us to skim it,
Knowledge is power, and the sky’s the limit!
Every mouth has hands to feed it,
Food is found where people need it.
All we need is found in granite,
Once we have the men to plan it.
Yeast and algae give us meat,
Soil is almost obsolete.
Men can grow the pastures greener,
Till all the earth is Pasadena.
Moral: Man’s a nuisance, Man’s a crackpot
But only Man can hit the jackpot.

Have we lost our connection to the Earth?
If we have, is that good, bad, or neutral?

1. Thoreau tried growing a bean patch, but he felt guilty destroying weeds and fighting woodchucks. He concluded that farming should be condemned as discrimination against innocents. Thereafter, he obtained his beans from his mother’s garden.

2. A timber harvesting protest is held in lovely log home; dozens of flyers printed on paper, protesters hold paper placards on wooden stakes. Are they aware of the paradox?

3. New Alaskan: “You know, when I came to Alaska from Baltimore, I was totally opposed to cutting trees. But since I got here, I’ve realized something. I—well, I like wood!”

4. Man who condemns any manipulation of nature by resource management agencies sees porcupines in his own garden and yells: “I’m going to firebomb those devils!”

5. Leslie: “My mother always bought chicken drumsticks in packages of four. As a result, my sister was 12 years old before she discovered that chickens don’t have four legs.”

6. Park Service employee announces to tourists that he is “strictly a nonconsumptive user of the environment. I do not support consumptive uses of resources.” But he just finished lunch, he is standing on a lovely redwood deck, wearing a cotton-poly uniform, breathing oxygen... Is there such a thing as a “nonconsumptive user of the environment?”

7. A Native woman describes how she was sad when she caught a mother lynx with two kittens on her 50-mile trapline. The kits would surely die. Asked how she dealt with that, she said, “Well I know that someday it will be my turn. It’s like they say, ‘First the salmon feed me, then I feed the salmon.’”

8. An Eskimo hunter harvests a seal and follows an ancient tradition to show thanks and reverence that the seal “gave” itself to feed the people. Contrast that with our modern approach to getting food. We rush through the grocery store, getting apples from New Zealand, oranges from Australia, salmon from Chile, a shirt from China. Do we have any relationship to these items like the Eskimo’s relationship to the seal? Do we have any idea how much oil it took to get these items here? How much water it took to grow them? What habitats were used that water before it was diverted to the crops? Which animal’s habitat was obliterated so that these products could be grown and sold to us?

9. They say a grizzly bear on the north slope of Alaska requires 100 square miles of habitat to survive. How much land do you and I require? (our Footprint Exercise will attempt to answer this).

10. A few years ago the question, “Who is he/she?” meant “where are they from?” Today, the same question generally means “what do they do for a living?” What does this indicate about our connection to the Earth?

11. A pilot takes biologists to the Brooks Range in Alaska. In the past, the biologists always carried a map and carefully traced the route to tell the pilot
"God, who hath given the World to Men in common, hath also given them reason to make use of it to the best advantage of Life, and convenience. The Earth, and all that is therein, is given to Men for the Support and Comfort of their being." — John Locke, *Second Treatise of Government*

1840. "Nature becomes purely an object for men, something merely useful, and is no longer recognized as a power working for itself." — Karl Marx, 1818-1883

1864. Through wanton destruction and profligate waste the earth is fast becoming an unfit home for its noblest inhabitant. Another era of human improvidence will reduce it to such a condition of impoverished productiveness, of shattered surface, of climatic excess; as to threaten the depravation, barbarism and extinction of our species!! — George Perkins Marsh, (1864), *Man and Nature*

1949. There are two spiritual dangers in not owning a farm. One is the danger of supposing that breakfast comes from the grocery. The other, that heat comes from the furnace. — Aldo Leopold, (1949), "Good Oak", *Sand County Almanac*, page 6.

1949. A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. — Aldo Leopold, (1949), "The Land Ethic," *Sand County Almanac*, p. ___


1979. "It makes no sense for the current generation to forego resource consumption for the sake of future generations because experience shows us that beyond any doubt they will be better off than we are." William Baumol, *Economics, Environmental Policy and the Quality of Life*. (1979)

1991. Indeed, the ability to control energy, whether it be making wood fires or building power plants, is a prerequisite for civilization. — Isaac Asimov

1996. We're an adolescent country, a tough, macho, posturing Madison Avenue slick-jawed Marlboro Man's caricature of strength. We need the strength of lilies, ferns, mosses and mayflies. We need the masculinity of ponds and rivers, the femininity of stone, the wisdom of quietness, if not silence. — Rick Bass, *The Book of Yaak*, p.xv, 1996

2001. There are still chores in mapping that cannot be done with helicopters, lasers, aerial photography, or any other of the modern technologies, not if you want to be faithful to every nuance of the land. "You have to steep yourself in the place, its trails and rocks and vegetation," Brad Washburn was saying, "if you are to produce a map with more authenticity, one that has the right feel as well as the right mathematics." John Wilford, *The Mapmakers*, 2001 p 469.

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**A Comparison of Two Environmental Ethics**

Here are two examples of very different ethics toward the environment. What environmental impacts will each of the following ethics have on the environment and on human health and well-being? Which ethic do you prefer?

1. **Principles of the American Conservation Ethic**

   [http://www.nwu.org/](http://www.nwu.org/) The National Wilderness Institute is a conservative organization working to promote "individuals, liberty and the environment" and a "voice of reason on the environment." This has been a dominant ethic in Western culture. Would we have such a high standard of living and long life expectancy if our forefathers had not followed this? But can we continue on this path forever? And even if we can, would we lose something in the process?

2. **Excerpts from The Web of Life by Ted Perry**

   [http://www.synaptic.bc.ca/ejournal/seattle.htm](http://www.synaptic.bc.ca/ejournal/seattle.htm) Written as a speech for a "great chief" in a movie on ecology, it spread quickly and was quoted widely. An illustrated book of the text sold 280,000 copies in its first 6 months in 1991. Its continued popularity can be interpreted as an indication that many people, including the late mythologist Joseph Campbell, feel it represents their ideal environmental ethic. They contend that western culture needs to adapt more of this way of thinking in order to survive. [For more on Campbell, who defined myths to include religions, folklore and ethics, see [http://www.rain.org/~young/articles/campbell.html](http://www.rain.org/~young/articles/campbell.html).]
One Northwest Resident Says What's Good for Salmon Is Good for People Too

Unlike other environmental crises in the Pacific Northwest, the salmon crisis is one none of us who live here can escape. What I mean is that the recent decision by the federal government to order new protections for nine types of Northwest salmon is a problem that urbanites and suburbanites can't take care of neatly, or at least not in the manner of past environmental crises here.

Back when the controversy over old-growth logging was at its height, you could sit at home and write a check (preferably printed on recycled paper) and vote for a forestry-reform candidate. Then, at backyard Gardenburger barbecues, you could feel good about having done your part.

Now, with the salmon crisis, you step out the door and the rain that's running off your front lawn, awash in fertilizer, is a problem. You drive to work (alone) and you are adding to the oil and other chemicals that all eventually drain into the streams.

You work for a company that wants to expand its offices into what is a salmon habitat, which describes just about every wetland within a day's drive of Seattle. At home, you turn on a light that is fed cheaply by the very dams that make it nearly impossible for salmon to swim upstream.

For us to change this chain of events requires more than just writing checks. It requires changing our life-styles, which is something most Northwesterners have always seemed loath to do. We'll happily buy coffee from farmers who pay the Central American pickers a decent wage, but we don't want anyone to tell us what to do with our lot size or with that instrument that is most integral to life here: the sport utility vehicle.

After all, we're here for the life-style, for the trees, for the fact that it's not so crowded (even if it is starting to look kind of crowded after all). We're here to recreate, to enjoy. We're here for us.

During the spotted owl "war," the fight often was between the people who lived in the cities and the people who lived in the rest of the Northwest. The rural people resented a bunch of out-of-towners telling them how to go about their jobs, not to mention their lives. The city side held distinct advantages: It home wherever you'd like, being for increased taxes, being prepared to change suburban life.

Of course, the fact that the crisis is so enormous and that we're all at fault will be used as an excuse to do nothing at all. If it's not just clear-cutting that is killing the fish (the bare hillsides erode, sending silt into clear streams), then the logging companies can say, well, we should be able to keep logging. The corporate contingent — farmers and farm corporations that rely on barge traffic and dam-powered irrigation — may blame housing development.

But these arguments are as easy to see through as a clear stream in a protected forest, if for no other reason than this: Before the Columbia River and its tributaries were blocked with dozens of dams, 10 million to 16 million salmon made the annual run back up to their spawning grounds; in 1996, a little less than a million did.

Likewise, as this new debate continues, the phrase "putting salmon before people" will be heard over and over, but even the young people hanging out here today — the wannabe kayaking champions, fishing guides and future water drinkers — know that somehow the people need to line up behind the fish, that the fish are like the canary in the coal mine.

For a long time, we tried in vain to jury-rig the system with huge hatcheries that churned out weak genetic Xerox copies of the wild fish, with concrete fish ladders that simulate the submerged waterfalls that salmon need to commute up the Columbia to spawn and die.

Now the salmon are making us look not just at what we can do with the rivers but at what we can do with the way we commute and choose our homes and shop and live. The question is, will it be too much of a hassle for us to look at ourselves?

Your Ecological Footprint
NRM 101 Assignment DUE:
Friday September 17th in Class.
30 points

This assignment must be typed, spell-checked and stapled (if more than 1 page)
It can be single spaced, however.

First, calculate your ecological footprint at http://www.lead.org/leadnet/footprint/intro.htm.

A. Copy or print the web page that shows: a) your total footprint (in acres); b) how much of an average American’s footprint this represents; c) what % of land you would like set aside for other species; and d) how many earths it would take to support the current human population at your standard of living. You will NOT be graded on how low or high you are (most of us score quite high on this). Simply report what you come up with.

B. Type your results (or print them from the website), then NUMBER and briefly answer the following (1-2 sentences each). Bring both your web printout and your answers, stapled together if more than one page.
1) Explain why you may have scored higher or lower than the average American.
2) According to this approach, what are the biggest contributors to a large footprint? If a person wanted to reduce their footprint, what should they do?
3) Paul Ehrlich (who wrote the influential book The Population Bomb) came up with the PAT equation: I=(PA)/T where human impact (I) on the environment is directly proportional to the human population (P) and its level of affluence (A) (i.e. its consumption of resources per person) and inversely proportional to the technology available to reduce the impact.
   a) Using the PAT equation, explain which country has more impact on the environment: poor countries or rich countries? Explain using these variables.
   b) Holding the other variables constant, what happens to I when P increases? When A increases? and when T increases?
4) Based on this equation, if a country wants to reduce its environmental impact, what are its choices?
5) Go to http://opr.princeton.edu/popclock/ and include the current estimated world population (down to the second!) in this assignment. We'll do this again at the end of the semester and compare the two!

What’s your ‘Ecological Footprint’?
Karen Youso, Star Tribune April 22, 2003
Everybody loves the Earth. And why not? It supplies us with food, a place to live, places to go and ways to get there.

All this human activity puts a demand on the planet. That’s not a problem as long as the demand doesn’t exceed nature’s ability to supply.

The question on this 33rd anniversary of the first Earth Day is: Are we taking more from nature than nature can give? Or, more specifically, are we drawing more than our fair share of the Earth’s resources?

One way to address the question is by calculating an "ecological footprint." The bigger your footprint, the more of Earth's resources are needed to support you as you live, eat and move about. Add your footprint to everybody else’s and you get the total human demand on nature.

Nature, in this case, is figured as the acres of Earth's land and water that produce food, absorb so-called "greenhouse" gases from fossil fuels and provide space for roads and homes. In other words, the part of Earth that supplies us.

Take the number of productive acres and divide it by the number of people on Earth, and you get nature's available capital, according to Mathis Wackernagel of Redefining Progress, a think tank in Oakland, Calif.

Every person on the planet would get 4.5 acres before overdrawing on nature's bank, Wackernagel says. But some say that people should have access to the amount that exists in their country, which doesn’t always fit the average. For example, productive land in the United States allows about 14 acres per resident. Yet the average American footprint approaches 24 acres per person.
What percentile are you in?
These statistics give us a wider perspective on the state of the world and the pressure on natural resources worldwide. For most humans, things like parks and recreation are unthinkable luxuries. Clean water is even beyond their reach. If we could shrink the earth's population to a village of precisely 100 people, with all the existing ratios remaining the same, it would look something like the following. This is from the book, *If the World Were a Village*, by David Smith.

There would be:
61 Asians
17 Europeans
14 from the Western Hemisphere, both north and south
8 Africans

52 would be female
48 would be male

70 would be non-white
30 would be white

70 would be non-Christian
30 would be Christian

89 would be heterosexual
11 would be homosexual

6 people would possess 59% of the entire world's wealth and all 6 would be from the United States.

80 would live in substandard housing
70 would be unable to read
50 would suffer from malnutrition

One would be near death; one would be near birth
One (yes, only 1) would have a college education
One would own a computer

If you woke up this morning with more health than illness...you are more blessed than the million who will not survive this week.

If you have never experienced the danger of battle, the loneliness of imprisonment, the agony of torture, or the pangs of starvation...you are ahead of 500 million people in the world.

If you can attend a religious or spiritual gathering without fear of harassment, arrest, torture, or death...you are more blessed than three billion people in the world.

If you have food in the refrigerator, clothes on your back, a roof overhead and a place to sleep...you are richer than 75% of this world.
NRM 106 - ORIENTATION TO NATURAL RESOURCES MANAGEMENT
Spring - 2006 (1 credit, pass/fail)

Schedule:
Wednesday 03:30 - 04:30 pm  183 Arctic Health Research Bldg

Course Objective:
To acquaint new and prospective Natural Resources Management majors with the NRM degree and provide an overview of career opportunities and requirements for employment in professional natural resource related positions.

Expected Student Outcome:
Improved focus on career goals, understanding career opportunities within natural resources management, stronger commitment to graduation, and ability to successfully pursue fulfilling and stimulating jobs or graduate school opportunities.

Course Description:
Much of the course will involve invited speakers representing a broad range of natural resource related agencies and companies. Speakers will discuss their positions and professional opportunities in various aspects of natural resources management. Students should feel free to interact with speakers and ask questions.

Course Requirements:
Students are expected to attend all sessions. Failure to submit the required assignment (see below) will result in a failing grade.

Assignment:
Develop your personal resume and a cover letter to pursue a position/career in natural resources management. The draft of these two documents is due in class on or before March 22, 2006 and the revised resume and cover letter are due in class on or before April 26, 2006.

Course Coordinators:
Dr. Meriam Karlsson
Office: 240 Arctic Health Research Bldg, Phone: 474-7005, Email: ffmngk@uaf.edu
Office hours: Tuesday/Thursday 9-11 am, 240 Arctic Health Research Bldg
                Friday 9-11 am, Academic Advising Center, 509 Gruening Bldg

Student Disability Services:
In collaboration with UAF Office of Disability Services (203 Whit), 474-7043, reasonable accommodations will be made to assist students with documented disabilities.

WEB
Blackboard
National Association of Colleges and Employers
State jobs (Workplace Alaska)
Federal jobs
http://classes.uaf.edu
www.jobweb.com
www.jobs.statc.ak.us/
www.usajobs.opm.gov
**Tentative schedule:** Wednesdays 03:30 - 04:30 pm, 183 Arctic Health Research Bldg.

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<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>January</td>
<td>25</td>
<td>Course introduction</td>
</tr>
<tr>
<td>February</td>
<td>1</td>
<td>Patti Picha, Director, Career Services Department, <a href="http://www.uaf.edu/career/">www.uaf.edu/career/</a>, 512 Grunening Bldg, <a href="mailto:fnplt@uaf.edu">fnplt@uaf.edu</a>, 474-7596</td>
</tr>
<tr>
<td>February</td>
<td>8</td>
<td>George Aguiar, NRM graduate, Reindeer Research Prog., <a href="http://reindeer.salm.uaf.edu/">http://reindeer.salm.uaf.edu/</a>, <a href="mailto:fsgaa@uaf.edu">fsgaa@uaf.edu</a></td>
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<tr>
<td>February</td>
<td>15</td>
<td>Tim Faval, Chena Recreational Area, U.S. Army Corps of Engineers</td>
</tr>
<tr>
<td>February</td>
<td>22</td>
<td>Dr. Norm Harris, Geographic information systems (GIS) and range management, Palmer Research and Extension Center (907) 746-9467, <a href="mailto:fnrh@uaf.edu">fnrh@uaf.edu</a></td>
</tr>
<tr>
<td>March</td>
<td>1</td>
<td>Chris Swisher, Forest Technician, Alaska Fire Service, Bureau of Land Management <a href="mailto:fses@uaf.edu">fses@uaf.edu</a></td>
</tr>
<tr>
<td>March</td>
<td>8</td>
<td>Julie Shalvoy, Employment specialist, SNRAS 474-7963, <a href="mailto:julie.shalvoy@uaf.edu">julie.shalvoy@uaf.edu</a></td>
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<tr>
<td><strong>March</strong></td>
<td><strong>15</strong></td>
<td><strong>Spring break</strong></td>
</tr>
<tr>
<td>March</td>
<td>22</td>
<td>Resume and cover letter due Dr. Charlie Knight, AK Dept. of Natural Res. (DNR). Div. of Agriculture (<a href="http://www.dnr.state.ak.us/ag/">http://www.dnr.state.ak.us/ag/</a>), 451-2762, <a href="mailto:charles_knight@dnr.state.ak.us">charles_knight@dnr.state.ak.us</a></td>
</tr>
<tr>
<td>March</td>
<td>29</td>
<td>Wendy Sailor, Executive Director, Alaska Wilderness Recreation &amp; Tourism Association, <a href="http://www.awrta.org">www.awrta.org</a>, <a href="mailto:wendy@awrta.org">wendy@awrta.org</a>, (907) 258-3171</td>
</tr>
<tr>
<td>April</td>
<td>5</td>
<td>Merben R. Cebrian, Wildlife biologist, Tetlin national wildlife refuge, US Fish and Wildlife Service - Alaska <a href="mailto:Merben_Cebrian@fws.gov">Merben_Cebrian@fws.gov</a>, (907) 883-5312</td>
</tr>
<tr>
<td>April</td>
<td>12</td>
<td>Chris Maisch, Dept of Natural Res. (DNR), Division of Forestry, (<a href="http://www.dnr.state.ak.us/forestry/">http://www.dnr.state.ak.us/forestry/</a>) <a href="mailto:chris_maisch@dnr.state.ak.us">chris_maisch@dnr.state.ak.us</a>, 451-2666</td>
</tr>
<tr>
<td>April</td>
<td>19</td>
<td>Tom Zimmer, Director, Calypso Farm and Ecology Center, (907) 451-0691 <a href="http://www.calypsofarm.org">www.calypsofarm.org</a></td>
</tr>
<tr>
<td>April</td>
<td>26</td>
<td>Final resume and cover letter due Steve Ulvi, National Park Service 457-5752, <a href="mailto:Steve_Ulvi@nps.gov">Steve_Ulvi@nps.gov</a></td>
</tr>
<tr>
<td>May</td>
<td>3</td>
<td>Discussion and wrap up</td>
</tr>
</tbody>
</table>
Public Lands Law and Policy  
NRM 204, 3 Credits  
Spring Semester 2006  
Natural Sciences Building, Room 136  
Tuesday & Thursday, 3:40 - 5:10

Syllabus

Instructor: Julie Lurman  
Assistant Professor of Resources Law and Policy  
364 O’Neill  
Office Hours: TBD (or by appointment)  
474-6794  
ffjil@uaf.edu

If you have a physical or learning disability, please advise me in writing of any special consideration necessary by the beginning of the second class. I will do everything possible to accommodate you in accordance with the Americans with Disabilities Act.

This class covers the major laws and policies governing the management of federal public lands. The goals of the course are to gain an understanding of the agencies that manage the different land units and the laws which animate their management strategies. Additionally, we will cover important issues that affect public lands in the Western United States and Alaska.
Class Schedule

Thursday January 19
First Day of Class - Course Introduction

Tuesday January 24
1. The Philosophy of Public Land
   - Wise Use v. Preservation (Pinchot v. Muir) [Reading packet 1-15]
   - Tragedy of the Commons [Reading packet 16-18]

Thursday January 26-Tuesday January 31
2. The National Forests
   - Organic Act and Multiple Use Sustained Yield Act (MUSY) [Reading packet 19-27; Wilkinson 120-142]
   - National Forest Management Act and Forest Management Planning [Wilkinson 142-174]

Thursday February 2- Tuesday February 7
3. The National Rangeland
   - Taylor Grazing Act [Wilkinson 75-113]
   - Federal Land Policy and Management Act (FLPMA) [Reading packet 28-36]

Thursday February 9
4. Wild and Scenic Rivers
   - Wild and Scenic Rivers Act [Reading packet 37-44]

Tuesday February 14- Thursday February 16
5. The National Park Service
   - National Parks Organic Act [Reading packet 45-49]
   - Antiquities Act [Reading packet 50-59]

Tuesday February 21- Thursday February 23
6. Wildlife Refuges [Reading packet 60-81]
   - National Wildlife Refuge System Administration Act of 1966 and the Refuge Recreation Act
   - 1997 National Wildlife Refuge System Improvement Act and “Compatibility”

Tuesday February 28- Thursday March 2
7. Wilderness
   - The Preservation Ethic [Reading packet 82-139]
   - The Wilderness Act [Reading packet 140-170]

*** There will be an optional review class that we will schedule together ***

Tuesday March 7
Midterm

Thursday March 9 - No Class
Tuesday March 14- Thursday March 16
Spring Break

Tuesday March 21- Thursday March 23
8. Public Lands and Land Law in Alaska
   - Alaska Native Claims Settlement Act (ANCSA) [Reading packet 171-206]
   - Alaska National Interest Lands Conservation Act (ANILCA) [Reading packet 207-221]

Tuesday March 28- Thursday March 30
9. National Environmental Policy Act (NEPA) [Reading packet 222-243]
   - About NEPA
   - When must an EIS be prepared?
   - How to tell if the EIS is adequate?
   - Does NEPA work?

Tuesday April 4- Thursday April 6
10. Marine Mammal Protection Act (MMPA) [Reading packet 244-257]
    - About MMPA
    - Management Principles
    - Tuna-Dolphin Conflict

Tuesday April 11- Thursday April 13
11. Water Law
    - Riparian Rights v. Prior Appropriations [Reading packet 265-287]
    - Tribal Land, Federal Land, Wildlife [Reading packet 288-289]
    - Damming the West [Wilkinson 219-292]

Tuesday April 18- Thursday April 20- Tuesday April 25
11. Endangered Species Act (ESA)
    - Why Should We Save the Endangered? [Reading packet 290-300]
    - About the ESA [Reading packet 301-319]
    - Tellico Dam, the Snail Darter, and the God Squad [Reading packet 320-327]

Thursday April 27
12. Constitutional Law
    - Property Clause [Reading packet 328-345]
    - Fifth Amendment [Reading packet 346-350]

Thursday May 2
In Class Review
Prepare for Final

Thursday May 4
Final Exam in class
Course Requirements and Grading:

Textbooks:
The required reading packet, as well as the textbook, must be purchased at the campus book store. The text is *Crossing the Next Meridian: Land, Water, and the Future of the West*, by Charles F. Wilkinson (Island Press, Washington DC, 1992). In the syllabus, readings in the text will be denoted as “Wilkinson” and those in the reading packet as “Reading packet.”

Exams:
There will be one mid term exam and one final exam, the final exam is cumulative. Each exam will account for 40% of your total final grade. Exams will take place in class and will be “closed book.” Exam questions will be drawn from the required readings, lectures, and classroom discussions. A close understanding of the course material is important as exam questions may require you to apply information you learned in class to new situations, rote memorization will often not be enough to get an A. Exams will include essay and short answer questions. Please make sure that you write legibly as illegible answers may not be graded. There will be no makeup exams, if you are unable to take the exam on the date scheduled and you have a good reason, please see me as soon as possible.

Attendance, Preparation, and Class Participation:
Attendance and proper preparation for each class session are mandatory. Regular class participation is strongly encouraged and will impact your grade. Together these three components will make up 20% of your final grade.

Grades:
This course is graded with a letter grade.
For exams numerical grades will correspond to the following letter grades:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tr>
<td>A</td>
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<td>B</td>
<td>80 - 89.5</td>
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<td>C</td>
<td>70 - 79.5</td>
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<tr>
<td>D</td>
<td>60 - 69.5</td>
</tr>
<tr>
<td>F</td>
<td>0 - 59.5</td>
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</table>

Extra Help:
If you find, at any time during the semester, that you are having trouble understanding the concepts discussed in class, please see me before you fall behind. I am happy to provide additional explanations and other help to any student who is interested.

Class Cancellations:
Class will be canceled if the temperature at the Fairbanks airport registers -50 F or lower at 10:30am.

Good luck to each of you this semester.
Economics 235
Introduction to Natural Resource and Environmental Economics
Fall 2005

WHERE: 201 Irving

WHEN: T,TR, 2:00-3:30

INSTRUCTOR: Joshua Greenberg

OFFICE: 372 O'Neil

PHONE: 474-7189

EMAIL: j.greenberg@uaf.edu

OFFICE HOURS: Wed., 10:00-1:00. If you can’t make office hours, not to worry; you are always welcomed to make an appointment for another time or stop just stop by my office.

PREREQUISITES: None

TEXT: T. Tietenberg, Environmental and Natural Resource Economics, 6th ed (earlier editions should be ok).
http://wps.aw.com/wps/media/access/Pearson_Default/431/441486/login.html

Additional readings will be assigned and placed on Blackboard.

DESCRIPTION:
This course introduces students to the economic paradigm as it applies to the natural environment, its resources and environmental assets. The course focus is on neoclassical economics as it applies to evaluating human interaction with the natural world. Students will be introduced to a variety of economic concepts including evaluating the current and future states of the world, economic valuation, supply and demand, property rights, externalities, impact analysis, cost benefit analysis, market failure and government failure. The course assumes no prior economic background. Accordingly, a portion of the class will be devoted to developing the fundamental economic theory of supply and demand.
COURSE OBJECTIVES:
- Develop fundamental economic concepts needed to understand the economic approach toward valuation and allocation of natural resources and environmental assets.
- Develop an appreciation for the economists’ world view
- Develop the economic concept of efficiency.
- Present economic prescriptions for optimal allocation of scarce natural resources and environmental assets.

CLASSROOM EXPECTATIONS:
- Class attendance is strongly encouraged. Class discussion and participation are essential to the success of this class. You cannot participate and discuss if you are absent. Excessive absences will result in a reduced course grade.
- Please avoid the disruption of arriving to class late or leaving class early. If you must come late or leave early, please take a seat closest to the door and make your arrival or exit quietly. Please turn off cell phones and any other electronic devices that might decide to make noise during class.
- Please come to class prepared. Class time is your opportunity to discuss the assigned readings and ask questions. Also, the material will be more meaningful to you if you have read it prior to lectures and discussions.
- Class discussion is an essential part of this course. Your comments, questions, and insights contribute greatly to the classroom experience. Please participate freely, ask questions when materials are unclear, voice an opposing viewpoint when you disagree with presented or read materials, and augment discussions with your insights. All viewpoints are to be treated respectfully. If you do not participate in the class then it will turn into a “talking head” (me!).

GRADING:
- 3 exams (including final)= 21% each
- Assignments & quizzes = 10%
- Oral presentations = 5%
- Paper = 16%
- Class Participation = 6%
- 100%

I will employ the usual: 90%-100%=A, 80%-89%=B, etc...

- Final Exam - Thur, Dec. 15, 1:00-3:00p

- Absolutely NO make-up exams without one of the following:
  1. Made prior arrangements with me ATLEAST TWO WEEKS in advance.
  2. A legitimate excuse, where legitimate includes jury duty or a signed doctors note.
If you have any questions contact me.
• Late assignments will suffer a grade depreciation of 10% per day.

• I reserve the right to change the grade components and their weights, e.g., have two exams rather than three tests. The class will be consulted about any such change.

• I also reserve the right to modify the final grade in consideration of notable progress demonstrated by an individual, or unforeseen and extenuating circumstances. In such cases, extra credit assignments and/or makeup work may be used at the discretion of the instructors.

PLEASE NOTE:

Blackboard:
I will use the Blackboard site for this course to send emails and post readings, assignments and other materials. All registered students should have a Blackboard username and password. Blackboard can be accessed at http://classes.uaf.edu/?bbatt=Y and go to Login. Your Username and default Password should both be your UAF computing account name, fsxxx. You may change your password after your initial log-in. Blackboard will not work for a non-UAF email address. If you principally use a non-UAF email service (such as hotmail) then go to your Aurora account and forward your UAF email to that address. You are responsible for all emails sent to your UAF email account.

Blackboard resources, links and support information are available at the UAF Blackboard homepage.

Disability services:
If you have a disability that you believe will affect your performance in this course, please speak with me directly AND contact the Disability Services coordinator Mary Matthews (474-7043) at the Center for Health and Counseling. Every effort will be made to accommodate you in accordance with the Americans with Disabilities Act. Further information is available at their website at http://www.uaf.edu/cht/disability.html.

Plagiarism:
“Students will not collaborate on any quizzes, in-class exams, or take-home exams that will contribute to their grade in a course, unless the instructor of the course grants permission.... Students will not represent the work of others as their own. A student will attribute the source of information not original with himself or herself (direct quotes or paraphrases) in compositions, theses, and other reports.... No work submitted for one course may be submitted for credit in another course without the explicit approval of both instructors...... Students are encouraged to review the entire code at www.alaska.edu/bor/.” (UAF Student Code of Conduct)
TENTATIVE COURSE OUTLINE

➢ The presented course outline and readings is preliminary and will change as we go through the semester.
➢ Tietenberg is abbreviated in Readings as “Txt.”
➢ All non-text readings will be available on Blackboard
➢ An “*” indicates a reading is supplemental and not required.

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<th>Topic</th>
<th>Readings</th>
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<tr>
<td>Sep 01</td>
<td>1. Introduction to Course</td>
<td>None</td>
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<tr>
<td>Sep 06</td>
<td>2. Introduction to Economics</td>
<td>None</td>
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<td>Sep 08</td>
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<td>Sep 13</td>
<td>3. Visions of the Future</td>
<td>Txt, Ch1. (s), Tierney, Betting Planet Redux_NYT, Not End Oil Age; WaPost; Oil Breaking Point, NYT Magazine; Betting the Planet, NYT; * Oil Near Peak, Common Dreams; *Net Peaking of World Oil Production Impacts, EnergyBulletin</td>
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<td>Sep 15</td>
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<td>Sep 22</td>
<td>Cont.</td>
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<tr>
<td>Sep 27</td>
<td>• Costs/Supply</td>
<td>Fields, Ch4;</td>
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<td>Sep 29</td>
<td>5. Valuing the Environment</td>
<td>Text, Ch 2. (s)</td>
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<td>Oct 04</td>
<td>6. Valuing the Environment</td>
<td>Text, Ch 3</td>
</tr>
<tr>
<td>Oct 06</td>
<td>• Methods</td>
<td>Research question/issue for paper Due</td>
</tr>
<tr>
<td>Oct 11</td>
<td>&gt;&gt; Test 1</td>
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<tr>
<td>Oct 13</td>
<td>7. Property Rights, Externalities, and Environmental Problems</td>
<td>Text, Ch4</td>
</tr>
<tr>
<td>Oct 17</td>
<td></td>
<td>Last Day for student-initiated and faculty-initiated withdrawals (W appears on academic record)</td>
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<tr>
<td>Oct 18</td>
<td>• Externalities, Improperly Designed Property Rights Systems. Imperfect Market Structure</td>
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<tr>
<td>Oct 25</td>
<td>• Wrap-Up Ch4</td>
<td>Paper Outline Due.</td>
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<tr>
<td>Oct 27</td>
<td>8. Sustainable Development: Defining the Concept</td>
<td>Text, Ch 5</td>
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<tr>
<td></td>
<td>• A two period Models</td>
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<td></td>
<td>• Fairness</td>
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<tr>
<td>Date</td>
<td>Topics</td>
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<tr>
<td>Nov 01</td>
<td>• Sustainability Criterion.</td>
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<td></td>
<td>• Environmental Policy.</td>
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<td>Nov 03</td>
<td>Test 2</td>
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<tr>
<td>Nov 08</td>
<td><strong>10. Allocation of Depletable &amp; Renewable Resources Overview</strong></td>
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<td></td>
<td>• Resource Taxonomy.</td>
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<td></td>
<td>• Efficient Intertemporal Allocation.</td>
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<tr>
<td>Nov 10</td>
<td>• Intertemporal Allocation, cont.</td>
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<tr>
<td></td>
<td>• Market Allocations</td>
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<tr>
<td>Nov 15</td>
<td>• Cont</td>
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<tr>
<td>Nov 17</td>
<td><strong>11. Renewable Resources, Forests</strong></td>
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<td></td>
<td>• Efficient Management</td>
<td></td>
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<td></td>
<td>• Sources of Inefficiency</td>
<td></td>
</tr>
<tr>
<td>Nov 22</td>
<td>• Implementing Efficient Management</td>
<td></td>
</tr>
<tr>
<td>Nov 24</td>
<td>THANKSGIVING</td>
<td></td>
</tr>
<tr>
<td>Nov 29</td>
<td><strong>9. The Population Problem</strong></td>
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<tr>
<td></td>
<td>• Historical</td>
<td></td>
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<td></td>
<td>• Population Growth and Economic Development</td>
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<td></td>
<td>• Economic Approaches to Population Control</td>
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<tr>
<td>Dec 01</td>
<td>Cont or Paper Presentations</td>
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<tr>
<td>Dec 06</td>
<td>Paper Presentations</td>
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<tr>
<td>Dec 12</td>
<td>Paper Presentations</td>
<td></td>
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<tr>
<td>Dec 15</td>
<td>Final 1:00-3:00</td>
<td></td>
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<tr>
<td></td>
<td>All papers due</td>
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</tbody>
</table>
➢ **Paper Requirements:**
You are responsible for a paper on a natural resource or environmental topic. The paper can take one of the two forms presented below:

1. Choose a specific topic and develop a research question/issue to be addressed in your paper. The topics to be addressed must clearly and directly relate to a natural resource or environmental issue. The paper is to provide an economic analysis of the chosen topic.

2. Attend one (or more) public hearings (e.g., ADFG, DNR, USFWS, BLM, NPS, Borough Assembly, etc) or an on-campus lecture or seminar that addresses a natural resource or environmental management issue/topic. From this presentation develop a problem statement to be addressed in your paper.

♦ **Paper Outline**
The paper content requirements follow below. Any deviations from this format requires instructor approval.

1. Description of the issue
   - Background summary and/or synopsis of management history.
   - Current policy and problems with current policy, if any; or seminar/public meeting issue;
   - Who are the affected parties and stakeholders?

2. Policy options & vehicle for proposed policy (if one is proposed).
   - What policy options are being considered or are available?
   - Vehicle for implementing policy (regulatory, legislative, other command and control mechanisms, private market; status quo (leave as is)).

   - What are the gains and losses from current and proposed policy & who are the gainers and losers?

4. What role can economic analysis serve in this particular natural resource issue?

5. Conclusions and recommendations.

⚠️ All Submitted papers must be written specifically for this class and may not be submitted to other classes. Violation of this requirement will result in course failure.
Paper Structure:
1. The papers will have:
   a. title,
   b. abstract—200 word maximum,
   c. body, and
   d. references—5 required.

2. The title and abstract will be on a single page, followed by the body. The last page will be used for the references.

3. The paper will not exceed 5 pages not including title/abstract page and references, but including tables or illustrations. The instructor will stop reading at the end of 5th page. Use 8½" x 11" paper with a typeface of 10-12 point, 1" margins top, bottom, and sides. Handwritten papers will not be accepted.


5. There will be 5 references. At least 2 of the references must be from academic journals or publications of natural resource economics or natural resource management societies or natural resource agency publications. Chat groups and blogs are not acceptable sources. You are expected to be critical reviewers of any internet materials relied upon (please stay away from sites that feature alien conspiracies, Elvis sightings, JFK assassination theories or the equivalent thereof).

Evaluation Criteria:
The following criteria will be used to evaluate the written report.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Abstract</td>
<td>10</td>
</tr>
<tr>
<td>• Structure</td>
<td></td>
</tr>
<tr>
<td>• Length</td>
<td></td>
</tr>
<tr>
<td>2. Ideas and content and organization</td>
<td>50</td>
</tr>
<tr>
<td>• The exposition of the topic is clear and accurate.</td>
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<tr>
<td>• The paper is focused on the assigned topic.</td>
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<tr>
<td>• The logic used to reach the conclusion is evident and can be followed.</td>
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<tr>
<td>• The details given fit where they are used.</td>
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<tr>
<td>3. Support of the Case</td>
<td>20</td>
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<tr>
<td>• The references used are appropriate and credible.</td>
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<tr>
<td>• Arguments and statements are appropriately supported with citations.</td>
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<tr>
<td>5. Grammatical structure</td>
<td>10</td>
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<tr>
<td>• Accepted rules of grammar (including spelling) are followed.</td>
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<tr>
<td>• The words chosen are accurate and specific.</td>
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<tr>
<td>The readability level of the paper is appropriate.</td>
<td></td>
</tr>
</tbody>
</table>
Paper Dates
- October 4, Research question/issue for paper due.
- October 25, Paper outline due.
- December 6, Papers due

**What is an abstract:** The abstract is abstracted from the body of the paper. It contains the purpose of your paper, the approach to a conclusion that may include steps used, data, and reasoning. The conclusion must be stated. The abstract contains nothing that is not in the paper. The abstract cannot be referred to in the paper.

➢ Oral Presentations:
Students will be responsible for a brief oral presentation of their paper. The form and length of this presentation is to be determined and will depend in part on class size.
Web Links of Interest—please add to list

News & Info

http://www.washtimes.com/
http://www.latimes.com/
http://www.nytimes.com/
http://www.washingtonpost.com/
http://www.csmonitor.com/
http://www.economist.com/
http://www.adbusters.org/home/
http://www.alaskajournal.com/index.shtml
http://labor.state.ak.us/trends/ Ak Trends Monthly Pub, Ak Dept Labor
http://www.adn.com/
http://www.newsminer.com/
http://www.timesonline.co.uk/
http://www.theglobeandmail.com/
http://www.japantimes.com/news.htm

Economics

http://www.economagic.com/
http://www.rff.org/
http://www.rfe.org/

http://sun3.lib.uci.edu/~dtsang/econ.htm Econ resource link, from UC Irvine
http://www.socscciresearch.com/r13.html Great links to economics sources
http://www.inomics.com/cgi/show The internet site for economists
http://unstats.un.org/unsd/ UN stats dept
http://www.oecd.org/home/0,2987,en_2649_201185_1_1_1_1_1_00.html UN Organization for Economic Co-operation and Development
http://www.odci.gov/cia/publications/factbook/index.html World Fact Book, brought to you by the CIA

Economics Theory

Excellent economics instruction study guide
http://www.boisestate.edu/econ/lreyrol/web/PDF/short_8_Dem_supp.pdf Microeconomics, supply and demand
http://www.oswego.edu/~economic/newbooks.htm On-Line economics textbooks
http://www.fs.fed.us/eco/s21pre.htm Ecological economics explained
Welfare Economics theory
http://www.zmag.org/books/1/1.htm  Welfare Economic theory
http://econ10.bu.edu/economic_systems/Default.htm
World economic systems, presented history
http://www.phoenix.liu.edu/~uroy/eco54/histlist/hist.html  History econ thought
http://www.phoenix.liu.edu/~uroy/eco54/histlist/hist.html  History of neo-classical econ school of thought

🔺 Agencies
http://www.blm.gov/nhp/index.htm
http://www.fs.fed.us/
http://www.epa.gov/
http://www.nps.gov/
http://www.fws.gov/
http://www.adfg.state.ak.us/
http://www.dnr.state.ak.us/
http://www.labor.state.ak.us/  Ak Dept of Labor
http://w3.legis.state.ak.us/home.htm  Ak Legislature
http://www.dced.state.ak.us/
  Ak Dept of Commerce, Community Economic Development
http://www.dec.state.ak.us/index.htm  Ak Dept. Environmental Quality

🔺 Other
http://www.alaskasealife.org/New/research/roundisland.php  Walrus live cam
Economics 335
Intermediate Natural Resource and Environmental Economics
Spring 2006

Where: 307 O'Neil

When: M,W, 11:30-1:00

Instructor: Joshua Greenberg

Office: 372 O'Neil

Phone: 474-7189

Email: j.greenberg@uaf.edu

Office Hours: Tues. 10:00-1:00
(or by appointment)

Prerequisites: Econ 235 or Econ 200/201 (or equivalent introductory Microeconomics course)

Text: T. Tietenberg. Environmental and Natural Resource Economics, 7th ed
(earlier editions should be ok).
http://wps.aw.com/wps/media/access/Pearson_Default/431/441486/login.html

Additional readings assigned and placed on Blackboard.

Description: This class is the second half of a two-course resource economics sequence. It
is assumed that the student has had exposure to the fundamental concepts of
microeconomics. We will apply these concepts to the analysis of natural
resource and environmental problems; understanding the economic
perspective and its contribution to public discourse and policy.

Course Objectives:
• Develop an understanding of the basis for economic evaluation
• Explore the strengths and limitations of economics as it applies to natural resource and
  environmental analysis
• Apply economic paradigm to specific types of natural resources and environmental assets.

This is an oral intensive course and students will be expected to make several oral presentations.
ECON 335, Spr. 06

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Final Exam: Wed May 10, 10:15-12:15

Absolutely **NO** make-up exams without one of the following:

1. Made prior arrangements with me **AT LEAST TWO WEEKS** in advance.
2. A legitimate excuse, where legitimate includes jury duty or a signed doctors note.
   If you have any questions contact me.

**Grading:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>2 Exams</td>
<td>37.5%</td>
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<tr>
<td>Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Class Participation</td>
<td>5%</td>
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</tbody>
</table>

100%

I reserve the right to change the above from 2 exams to 3 exams

I will employ the usual: 90%-100% = A, 80%-89% = B, etc...

**Course Policies – Please review**

- Excessive Absences will lead to reductions in student grades.
  - 4-6 unexcused absences will result in one letter grade reduction.
  - 7-8 unexcused absences will result in an additional letter grade reduction.
  - > 8 unexcused absences will result in class failure.
- Absolutely **NO** make-up exams without one of the following:
  1. Made prior arrangements with me **AT LEAST TWO WEEKS** in advance.
  2. A legitimate excuse, where legitimate includes jury duty or a signed doctors note.
- Late assignments will suffer a grade depreciation of 10% per day.
- I reserve the right to change the grade components and their weights, e.g., have three exams rather than two exams. The class will be consulted about any such change.
- I also reserve the right to modify student final grades in consideration of notable progress demonstrated by an individual, or unforeseen and extenuating circumstances. In such cases, extra credit assignments and/or makeup work may be used at the discretion of the instructors.
- Cheating and plagiarism will not be tolerated. Anyone caught cheating or plagiarizing another person’s work will receive a failing grade. You are referred to the UAF Student’s Handbook for further information on the University’s policy with regard to plagiarism.
PLEASE NOTE:

Blackboard:
I will use the Blackboard site for this course to send emails and post readings, assignments and other materials. All registered students should have a Blackboard username and password. Blackboard can be accessed at http://classes.uaf.edu/?bbatt=Y and go to Login. If you are a first time user, your Username and default Password will both be your UAF computing account name, fsxxx. You may change your password after your initial log-in. Blackboard will not work for a non-UAF email address. If you principally use a non-UAF email service (such as hotmail) then go to your Aurora account and forward your UAF email to that address. You are responsible for all emails I send to your UAF email account.

Blackboard resources, links and support information are available at the UAF Blackboard homepage.

Disability services:
If you have a disability that you believe will affect your performance in this course, please speak with me directly AND contact the Disability Services coordinator Mary Matthews (474-7043) at the Center for Health and Counseling. Every effort will be made to accommodate you in accordance with the Americans with Disabilities Act. Further information is available at their website at http://www.uaf.edu/chc/disability.html

Plagiarism:
"Students will not collaborate on any quizzes, in-class exams, or take-home exams that will contribute to their grade in a course, unless the instructor of the course grants permission.... Students will not represent the work of others as their own. A student will attribute the source of information not original with himself or herself (direct quotes or paraphrases) in compositions, theses, and other reports.... No work submitted for one course may be submitted for credit in another course without the explicit approval of both instructors...... Students are encouraged to review the entire code at www.alaska.edu/bor/.” (UAF Student Code of Conduct)
ECON 335, Spr. 06

TENTATIVE COURSE OUTLINE

Note: The course outline presented below is preliminary. Topics and designated readings may be changed during the semester.

A. Introduction - Fundamental Concepts
   1. Background
      Readings: Text Ch. 1

2. Foundational Concepts—Welfare Economics & Economic Efficiency
   Background:
      Readings: Albert and Hahn Ch1: A Quiet Revolution in Welfare Economics.

   a. Pareto Optimality
      (1) Efficiency in Consumption/Exchange
         Readings: Gowdy, pp. 15-27 & 75-78,
         Gisser, pp. 566-67
         Randall Ch. 5, pp 92-94 and 98-105

      (2) Efficiency in Production
         Readings: Gowdy, pp. 33-47
         Gisser, pp. 568-71
         Randall, Ch. 5 pp. 94-98

      (3) Efficiency in Product Mix
         Readings: Gowdy, pp. 58-63
         Gisser, pp. 571-576
         Randall, Ch. 5, pp. 103-115

   b. Alternative Efficiency Criteria.
      Pareto Safety, Hicks, Kaldor
      Reading: Randall, Ch. 7 pp. 137-49

   c. Property Rights
      Randall Ch. 8
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B. Market Failure & Government Failure,
   1) Markets and externalities
      a. Bromely pp 37-51
      b. Kahn 14-27
      c. Pigovian View, Kahn 40-42
      d. Coase View, Kahn 42-49
      e. Types of Government Intervention, Kahn 49-51

   2) Government Failure
      a. Buchanan
      b. Anderson Ch2, Free Market Environmentalism

C. The Allocation of Depletable and Renewable Resource. Text Ch 7
   • Resource Taxonomy. pp. 127-132
   • Efficient Intertemporal Allocations. text pp133-139
   • Market Allocations. text 140-143.

D. Natural Resource Applications
   • Fisheries. Text. Ch 13
   • Storable Renewable Resources-Forests. Text Ch. 12
   • Depletable Non-recyclable Energy Resources.: Oil, Gas, Coal & Uranium.
     Text Ch.8
   • General Resource Scarcity. Text Ch.14
   • Pollution and Economics of Pollution Control.
     o Kahn pp 51-84
     o Text Ch. 15
   • Regional & Global Air Pollutants: Acid Rain and Atmospheric Modification.
     Text, Ch 17.

E. Visions of the World. TBA
PRINCIPLES OF ECOLOGY
BIOL F271
Fall 2005

Lecture Mon-Wed-Fri 9:15-10:15A Elvey Auditorium
Laboratory Sections
F01 Mon 2:15-5:15 P
F02 Tues 8:15-11:15A
F03 Tues 2:00-5:00 P
F04 Wed 2:15-5:15 P
F05 Fri 2:15-5:15 P
Irving 207
Irving 103
Irving 207
Irving 103
Irving 103

Course Description
The objective of this course is to provide an introduction to the basic principles and emergent conceptual trends in physiological, population, and ecosystem ecology. This course serves as a foundation course for upper level courses in ecology and wildlife biology.

Prerequisites: Biology 105X-106X. If you have not had these or equivalent courses you should not take Biology 271 now. If you believe there are special circumstances that should allow you to take Ecology without the prerequisites, let me know no later than September 12 with a written request (email or otherwise).

Instructor
Richard D. Boone, Ph.D.
Associate Professor of Ecosystem Ecology
Institute of Arctic Biology, and Dept. of Biology & Wildlife
236 Arctic Health Building
474-7682 (Office) / r.boone@uaf.edu
Research focus: ecosystem ecology, biogeochemistry, disturbance ecology, global change

Teaching Assistants
Jenny Rohrs
211 Irving I Building
474-7161 / fsjkr1@uaf.edu

Justine Sears
107 Irving I Building
474-5404 / ftjss1@uaf.edu

Hannah Clilverd
LTER Trailer (Atco T6)
454-1534 / fhhmcl@uaf.edu

Tumi Traustason
107 Irving I Building
474-5404 / fstm@uaf.edu

Rachel Lord
408 Irving I Building
474-7162 / ftre1@uaf.edu

Required Text
Attendance
Class attendance is expected. If you are not in class you won’t get my perspective and probably won’t do as well. I provide material beyond what is covered in the textbook. The lecture hour also provides an opportunity for announcements about upcoming labs.

Assessment
Test 1 50
Test 2 100
Test 3 100
Final exam (cumulative) 150
Laboratory 175
Total 575

Each test (except the final) will be given over a 1-hr class period. Please note that the laboratories represent a large portion (30%) of the final course grade.

Tests – philosophy and policies
The objective of the hourly exams and the final exam will be to determine understanding, application, and integration of basic principles. I favor short-answer essay questions that sometimes require integration of several topics. You will need to understand the concepts, rather than memorize facts, to do well. Make-up tests will be given only under extreme circumstances and only with prior permission. Tests and the final will not be given before their scheduled dates. Adjust any travel plans accordingly.

Challenges: If you believe your quiz have been incorrectly graded, submit to me your challenge (along with your test) within three (3) class days of your getting back your graded exam. Your challenge must be written and should include a logical, supported explanation describing how your response correctly answers the question. References to my PowerPoint files (see below) and our text as appropriate are encouraged. I will review all challenges will return them with a decision (change or no change) and written response no more than one week after the exams are returned. All decisions on challenges are final.

Final Exam
The Final Exam is comprehensive and will be given from 8-10 AM on Friday Dec. 16 (as listed in the UAF Class Schedule, Fall 2005). This is only day and time when the Final Exam will be given.

Laboratory
The laboratory is a required and important component of the course. The laboratory practicals are designed to illustrate and supplement lecture material and to introduce students to a variety of environments, tools, and empirical approaches. The labs include field exercises and indoor activities. Please dress appropriately when we go outdoors. Please note that the Winter Ecology lab will likely take place after snowfall and will be conducted unless the temperature is below –20°F.

All lab assessments will be weighted equally. The maximum possible number of lab points is 1200 (12 labs @100 points each). A student’s cumulative total for the lab portion of the course will be prorated on the basis that 1200 lab points = 175 course points. Assessments may include question sets and laboratory reports.
Missed labs

- You must contact your TA before a missed lab. Failure to do so will result in zero points for the lab.
- Attending another lab section is always the best option if you must miss lab on your scheduled day. Notify your regular TA that you will be missing your lab, and notify the TA of the lab section that you will attend.
- Make-up labs are given only under extreme circumstances and only with prior permission of the TA. It is the student’s responsibility to contact the TA before the missed lab and to obtain a make-up lab.

Late policy for laboratory assignments

- Lab assignments are due at the beginning of lab on the day the assignment is due.
- There will be a 10% point reduction for each class day that a lab assignment is late.

Blackboard

I will use the UAF Blackboard system to make class announcements and to post lecture files and grades. I will use PowerPoint for most of my lectures and will post my PowerPoint file for you after I give the lecture.

Blackboard access: Go to the web site http://classes.uaf.edu. If you are new to Blackboard all the required steps to obtain access are explained on the first web page. Note that you must have a UAF email address to get access to Blackboard. For first-time users your social security number is your password the first time you log in. You should change that once you’re in the Blackboard system. If you have used Blackboard before at UAF, type in your UAF username and Blackboard password upon login as you've done in the past. If you have forgotten your Blackboard password, there is a link to recover it. Once you have logged on to Blackboard you will be taken to a web page that lists “Principles of Ecology” under “My Courses”. I will post lecture and laboratory files in “Course Documents”.

How to Get Help

This can be a challenging course for some people. Stay up with the assigned readings and review your own notes after lectures. Don’t hesitate to contact your TA or me if you need help. We will meet with you as soon as possible. Contact information for all us is on the previous page. Generally the fastest way to reach us is via email.

Disabilities Services

The Office of Disability Services implements the Americans with Disabilities Act (ADA) and ensures that UAF students have equal access to the campus and course materials. I will work with the Office of Disabilities Services (474-7043) to provide reasonable accommodation to students with disabilities. Please let me know at the beginning of the course if accommodations should be provided.

My Philosophy

My commitment is to provide you with the best grounding in ecology possible within the confines and logistics of the course.
# LECTURE SCHEDULE

## SECTION I - Introduction

<table>
<thead>
<tr>
<th>September</th>
<th>Topic</th>
<th>Reading Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>F Course organization</td>
<td>CH 1</td>
</tr>
<tr>
<td>5</td>
<td>M No class (Labor Day holiday)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>W Scope of Ecology</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>F Earth's history</td>
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</tr>
</tbody>
</table>

## SECTION II - The Organism and Its Environment (Physiological Ecology)

<table>
<thead>
<tr>
<th></th>
<th>Topic</th>
<th>Reading Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>M Solar radiation and climate</td>
<td>CH 2</td>
</tr>
<tr>
<td>14</td>
<td>W Solar radiation and climate (cont.)</td>
<td>CH 3: 42-50</td>
</tr>
<tr>
<td>16</td>
<td>F Light and temperature</td>
<td>CH 3: 50-56</td>
</tr>
<tr>
<td>19</td>
<td>M Light and temperature (cont.)</td>
<td>CH 4: 57-69</td>
</tr>
<tr>
<td>21</td>
<td>W Water</td>
<td>CH 5</td>
</tr>
<tr>
<td>23</td>
<td>F Water (cont.)</td>
<td>CH 6</td>
</tr>
<tr>
<td>26</td>
<td>M Test #1</td>
<td>CH 7: 98-117</td>
</tr>
<tr>
<td>28</td>
<td>W Soils</td>
<td>CH 8: 146-156</td>
</tr>
<tr>
<td>30</td>
<td>F Soils (cont.)</td>
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</tbody>
</table>

## October

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<thead>
<tr>
<th></th>
<th>Topic</th>
<th>Reading Assignment</th>
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<tbody>
<tr>
<td>3</td>
<td>M Adaptation</td>
<td>CH 5</td>
</tr>
<tr>
<td>5</td>
<td>W Plant adaptations to environment</td>
<td>CH 6</td>
</tr>
<tr>
<td>7</td>
<td>F Plant adaptations to environment (cont.)</td>
<td>CH 7: 98-117</td>
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## SECTION IV - Population Ecology

<table>
<thead>
<tr>
<th></th>
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<tr>
<td>10</td>
<td>M Properties of populations</td>
<td>CH 10</td>
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<tr>
<td>12</td>
<td>W Properties of populations (cont.)</td>
<td>CH 11</td>
</tr>
<tr>
<td>14</td>
<td>F Population growth patterns</td>
<td></td>
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<tr>
<td>17</td>
<td>M Intraspecific competition</td>
<td>CH 12: 194-199</td>
</tr>
<tr>
<td>19</td>
<td>W Life History Patterns</td>
<td>CH 13: 214-236</td>
</tr>
<tr>
<td>21</td>
<td>F Test #2</td>
<td>CH 14</td>
</tr>
<tr>
<td>24</td>
<td>M Interspecific Competition</td>
<td>CH 15: 264-278</td>
</tr>
<tr>
<td>26</td>
<td>W Interspecific Competition (cont.)</td>
<td>CH 20: 382-399</td>
</tr>
<tr>
<td>28</td>
<td>F Predation</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>M Catch up lecture</td>
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## SECTION III – Community, Ecosystem, and Global Ecology

<table>
<thead>
<tr>
<th></th>
<th>Topic</th>
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<tbody>
<tr>
<td>2</td>
<td>W Community structure</td>
<td>CH 20: 382-399</td>
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<td>4</td>
<td>F Succession</td>
<td>CH 21: 403-414</td>
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<td>7</td>
<td>M Succession (cont.)</td>
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<tr>
<td>9</td>
<td>W Ecosystem concept</td>
<td>CH 24</td>
</tr>
<tr>
<td>Date</td>
<td>Day</td>
<td>Activity</td>
</tr>
<tr>
<td>------</td>
<td>-----</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>11</td>
<td>F</td>
<td>Ecosystem energetics</td>
</tr>
<tr>
<td>14</td>
<td>M</td>
<td>Ecosystem energetics (cont.)</td>
</tr>
<tr>
<td>16</td>
<td>W</td>
<td><strong>Test #3</strong></td>
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<tr>
<td>18</td>
<td>F</td>
<td>Biogeochemical cycles</td>
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<tr>
<td>21</td>
<td>M</td>
<td>Biogeochemical cycles (cont.)</td>
</tr>
<tr>
<td>23</td>
<td>W</td>
<td>Biogeochemical cycles (cont.)</td>
</tr>
<tr>
<td>25</td>
<td>F</td>
<td>No class – Thanksgiving break</td>
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<tr>
<td>28</td>
<td>M</td>
<td>Biogeography of ecosystems</td>
</tr>
<tr>
<td>30</td>
<td>W</td>
<td>Biogeography of ecosystems (cont.)</td>
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</table>

**December**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Activity</th>
<th>Chapter(s)</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>F</td>
<td>Human impacts on the land</td>
<td>CH 32</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>Global environmental change</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>W</td>
<td>Global environmental change (cont.)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>F</td>
<td>Global environmental change (cont.)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>M</td>
<td>Review</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>F</td>
<td><strong>Comprehensive Final Exam</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Please note: The Lecture Schedule is a guide and is subject to change.*
PRINCIPLES OF ECOLOGY
BIOL F271

Fall 2005

Lab Sections
F01 Hannah Clilverd   Monday 2:15P-5:15P   Irving 207
F02 Tumi Traustason  Tuesday 8:15A-11:15A   Irving 103
F03 Justine Sears    Tuesday 2:00P-5:00P   Irving 207
F04 Jenny Rohrs      Wednesday 2:15-5:15P  Irving 103
F05 Rachel Lord     Friday 2:15-5:15P    Irving 103

Laboratory Schedule

Week
1   Sept. 5-10   Calypso Trail and Botanical Garden
2   Sept. 12-16  Alpine Ecology (Murphy Dome)
3   Sept. 19-23  Forest Ecology
4   Sept. 26-30  Stream Lab
5   Oct. 3-7    Data Analysis & Discussion
6   Oct. 10-14  GPS Skills
7   Oct. 17-21  Large Animal Research Station
8   Oct. 24-28  Soils
9   Oct. 31-Nov. 4  Winter Ecology
10  Nov. 7-11  Population Ecology
11  Nov. 14-18  Stable Isotopes
12  Nov. 21-25  No lab (Thanksgiving week)
13  Nov. 28-Dec. 2 Permafrost Tunnel
Biology 239 Syllabus
Introduction to Plant Biology
Fall 2005

I. Background Information

Lecturers:
- Christa Mulder, office Irving 410A, phone 474–7152, email ffcpm2@uaf.edu, office hours M 2:30-3:30, R3-4, or by appointment.

Teaching Assistants:
- Nikki Grant-Hoffman (Irving 417, phone 474-7183, ftnng@uaf.edu)
- Amy Angell (Irving I rm 408, 474-7162, ftaal@uaf.edu)

Greenhouse manager: Heather McIntyre (finhcm@uaf.edu), phone 474-5792.

Lecture: MWF Irving 201, 11:45-12:45
Labs: R 2-5 or F 2:15-5:15 pm, BUNN 408 and 1AB greenhouse

Materials:
- J. King. 1997. Reaching for the Sun: How Plants Work. Cambridge University Press, Cambridge. Listed as “required” because you will be required to read a few chapters in it (see below), but a copy can be shared by several people.
- The video series used in class is: D. Attenborough, The Private Life of Plants, Vol I-VI, BBC.

II. Access to class materials and additional information

This course will use the “Blackboard” program to make additional information available. Access is restricted to students enrolled in the course. All information associated with the course will be available there, including lecture notes (usually available by the end of the week), slides or images used during class, study guides, copies of all handouts and labs, copies of old exams, keys to completed exams, links to relevant websites, and anything else that we can think of. Announcements and notes of interest (e.g. a change of lab location) will be posted there. You can also use this program to send questions to the instructors or the TA’s, or to discuss problems with your classmates. You can even check your grades and make sure that requested changes have been recorded. This is a great tool but in order for this system to be of use to you, you must check the site frequently!

How to get there: You need to provide me with your email account in order to get access. This must be an aurora account (ending in “uaf.edu”), because 1) Blackboard will no longer allow other accounts, and 2), Aurora accounts accept larger files than many popular free email accounts. Once we have set you up as a user (usually automatic once you have registered), go to classes.uaf.edu and log on. Your userid is the bit of your aurora address before the “@” (e.g. “ffcpm2”); your initial password is the same (please change it immediately!). If you have used Blackboard previously, your password is still the same as it was the last time you logged on. Remember to hit the “logout” icon (top of page) or you won’t be properly logged out!
II. **Course Outline**

We will cover four general areas of plant biology:

A. Plant form and function: we will follow the plant through its lifecycle, starting with germination from the seed and ending with death. At each stage we will look at how the plant is constructed, and what controls how it “behaves”. Reproduction will be covered in the next section, since it is intimately tied to pollinators and dispersers.

B. Interactions with other organisms: in this section we will look at the interactions with pollinators, dispersers, and plant diseases, all of which help determine how plants function.

C. Plant diversity: this is the “traditional botany” section, in which we make a very quick survey of major plant groups. Since most of the course focuses on angiosperms, we will here give the other groups their due.

D. Plant conservation: we will cover a few of the many issues in plant conservation, including invasive species and protection of rare species.

III. **Assessment**

<table>
<thead>
<tr>
<th>Test / Project</th>
<th>% of total grade</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lecture:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midterm I</td>
<td>15%</td>
<td>Monday, Oct. 10</td>
</tr>
<tr>
<td>Midterm II</td>
<td>15%</td>
<td>Monday, Nov 7</td>
</tr>
<tr>
<td>Final</td>
<td>15%</td>
<td>Monday, Dec 16, 10:15-12:15</td>
</tr>
<tr>
<td>Video questions</td>
<td>5%</td>
<td>Each class period</td>
</tr>
<tr>
<td><strong>Labs:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lab worksheets: 10 @ 1% each</td>
<td>10%</td>
<td>End of each lab period</td>
</tr>
<tr>
<td>Full lab reports: 2 @ 15% each</td>
<td>30%</td>
<td>28 October, 9 December</td>
</tr>
<tr>
<td>Debates</td>
<td>5%</td>
<td>Dec 1/2 and Dec 8/9</td>
</tr>
<tr>
<td>Participation</td>
<td>5%</td>
<td>Throughout</td>
</tr>
</tbody>
</table>

**Lecture tests:**
- These will include lecture material, readings, and lab material.
- The first midterm will cover only material from 5 September through 5 October. It will include one essay question based on King (1997). The second midterm will cover material from 12 October through 4 November. It will also include one essay question based on King (1997).
- The final will cover the material from 9 November to 11 December.

**Lab assignments:**
- You will write lab reports for two labs (see “Laboratory information” below and the lab manual). The projects will be done in groups but write-ups must be done individually.
- For all labs (including ones which you write up in full) you will turn in a worksheet at the end of the lab period. Your ten best scores will contribute to the assessment.
Debates:
Debates will be held during the last two lab periods. Topics will be focused on contemporary controversies involving plant biology. Debates will be between teams, two people per team. More information will be provided later in the semester.

Participation:
This will be based on participation throughout the course, including attendance and participation in class, laboratory participation, and performance in the discussions held in the last two weeks. Grades will be determined with input from the teaching assistants.

General comments:
- All assignments must be handed in by 5 pm on the due date, either to Christa Mulder’s mailbox (rm 311 Irving L) or to the TA’s mailbox (rm 211 Irving L). Late assignments will be penalized by 5% per day, unless arrangements are made before the due date (or exceptional conditions exist).
- Lab reports, lab worksheets and answers to video questions should be turned in to the TAs. All other material should be turned in to the lecturers.
- Submit HARD COPIES of your assignments. Do NOT submit work electronically.
- Labs and videos missed cannot be repeated.
- Bonus points may occasionally be awarded for exceptional performance (e.g. in the “Diversity: the lunch” lab).

Plagiarism:
Plagiarism is the overt or covert use of other people’s work or ideas without acknowledgement of the source. This includes using ideas or data from a classmate or colleague without permission and acknowledgement, including sentences from journal articles (either in their entirety or with minor changes) in your writing without citing the author, or copying parts of a website into your essay. You cannot use someone’s ideas without citing the originator; you cannot use someone’s words without quoting the writer. Any deviation from this will be regarded as plagiarism. Plagiarism regulations also apply to computer exercises and software used in laboratories in this course. This software is proprietary and copies were purchased from the producer / distributor for class use. It may not be copied by students without express permission from the instructor or copyright holder.

When you plagiarize you are stealing the currency which science (and many other endeavors) use: knowledge. Plagiarism and cheating are serious offenses that violate the student code of conduct may result in an “F” in the course and / or referral to the university disciplinary committee.

A few simple rules to prevent plagiarism:
1. When in doubt about whether you should cite or acknowledge someone, do so.
2. If you are unsure of how to cite someone’s writings or ideas, ask one of the instructors for help. Reference librarians are also a good source of information for help with citations.
V. Lecture Schedule

Note: The lecture schedule is subject to change. REE =Raven, Evert and Eichorn, “c” =chapter, “K” refers to chapters in the book by King.

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture Date</th>
<th>Topic</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>PART I: PLANT FORM AND FUNCTION</td>
<td></td>
<td></td>
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<tr>
<td>0</td>
<td>2 Sept</td>
<td>Introduction to course</td>
<td>none</td>
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<tr>
<td>1</td>
<td>5 Sept</td>
<td>[Labour day – no class!]</td>
<td></td>
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<tr>
<td>1</td>
<td>7 Sept</td>
<td>Background</td>
<td>REE c1; 219-224,231-237</td>
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<tr>
<td>2</td>
<td>9 Sept</td>
<td>Seed structure and function</td>
<td>REE c22</td>
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<tr>
<td>2</td>
<td>3</td>
<td>12 Sept</td>
<td>Dormancy and germination</td>
</tr>
<tr>
<td>4</td>
<td>14 Sept</td>
<td>Leaf form and function</td>
<td>REE 510-516; 558-569</td>
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<td>5</td>
<td>16 Sept</td>
<td>Photosynthesis I: light reactions</td>
<td>REE 115-127; K2</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>19 Sept</td>
<td>Photosynthesis II: carbon fixation</td>
</tr>
<tr>
<td>7</td>
<td>21 Sept</td>
<td>Water relations: properties/ movement</td>
<td>REE 71-77,576-579; K1</td>
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<tr>
<td>8</td>
<td>23 Sept</td>
<td>Water relations: ecological aspects</td>
<td>REE 667-680, 663</td>
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<td>4</td>
<td>9</td>
<td>26 Sept</td>
<td>Root form and function</td>
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<td>4</td>
<td>10</td>
<td>28 Sept</td>
<td>Nutrition I: nutrients and soils</td>
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<tr>
<td>4</td>
<td>11</td>
<td>30 Sept</td>
<td>Nutrition II: Mycorrhizae, N cycling</td>
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<tr>
<td>5</td>
<td>12</td>
<td>3 Oct</td>
<td>Primary growth: shoots</td>
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<tr>
<td>6</td>
<td>13</td>
<td>5 Oct</td>
<td>Secondary growth</td>
</tr>
<tr>
<td>14</td>
<td>7 Oct</td>
<td>Catch-up and Review</td>
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<tr>
<td>6</td>
<td>15</td>
<td>10 Oct</td>
<td>FIRST MIDTERM EXAM!!</td>
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<td>16</td>
<td>12 Oct</td>
<td>Hormones and tropisms</td>
<td>REE c27, c28</td>
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<tr>
<td>17</td>
<td>14 Oct</td>
<td>Senescence and decomposition</td>
<td>K17</td>
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<td>PART II: REPRODUCTION and INTERACTIONS WITH OTHER ORGANISMS</td>
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<tr>
<td>19</td>
<td>19 Oct</td>
<td>Reproduction II: breeding systems</td>
<td>TBA</td>
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<tr>
<td>20</td>
<td>21 Oct</td>
<td>Reproduction III: pollinators</td>
<td>K13,14</td>
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<td>21</td>
<td>24 Oct</td>
<td>Fruits</td>
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<td>22</td>
<td>26 Oct</td>
<td>Fruit dispersal</td>
<td>TBA</td>
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<tr>
<td>23</td>
<td>28 Oct</td>
<td>Herbivory I</td>
<td>TBA</td>
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<td>9</td>
<td>24</td>
<td>31 Oct</td>
<td>Herbivory II</td>
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<td>2 Nov</td>
<td>Plant disease I</td>
<td>TBA</td>
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<td>26</td>
<td>4 Nov</td>
<td>Plant disease II</td>
<td>TBA</td>
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<td>10</td>
<td>27</td>
<td>7 Nov</td>
<td>SECOND MIDTERM EXAM!!</td>
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PART III: SURVEY OF PLANT DIVERSITY

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<tbody>
<tr>
<td>10</td>
<td>28</td>
<td>9 Nov</td>
<td>Bryophytes I</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>11 Nov</td>
<td>Bryophytes II</td>
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<tbody>
<tr>
<td>11</td>
<td>28</td>
<td>14 Nov</td>
<td>Seedless vascular plants I</td>
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<tr>
<td></td>
<td>29</td>
<td>16 Nov</td>
<td>Seedless vascular II</td>
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<tr>
<td></td>
<td>30</td>
<td>18 Nov</td>
<td>Gymnosperms I</td>
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<tbody>
<tr>
<td>12</td>
<td>31</td>
<td>21 Nov</td>
<td>Gymnosperms II</td>
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<tr>
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<td>32</td>
<td>23 Nov</td>
<td>Angiosperms I</td>
</tr>
<tr>
<td></td>
<td>33</td>
<td>25 Nov</td>
<td>THANKSGIVING – NO CLASS!</td>
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<tbody>
<tr>
<td>13</td>
<td>34</td>
<td>28 Nov</td>
<td>Angiosperms II</td>
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PART VI: PLANT CONSERVATION

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</thead>
<tbody>
<tr>
<td>35</td>
<td>30</td>
<td>30 Nov</td>
<td>Invasive species: the invaders</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Dec</td>
<td>Invasive species: the invaded</td>
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<table>
<thead>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>36</td>
<td>5 Dec</td>
<td>Rare species: worldwide</td>
</tr>
<tr>
<td></td>
<td>38</td>
<td>9 Dec</td>
<td>Plant diversity and ecosystem function</td>
</tr>
</tbody>
</table>

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<thead>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>39</td>
<td>11 Dec</td>
<td>Wrap-up and review</td>
</tr>
</tbody>
</table>
VI. Laboratory information.

(see lab manual for more details)

Labs will usually be conducted in the IAB greenhouse (next to Butrovich, downhill from the museum), or Bunnell 408, but other locations will include the computer room on the 3rd floor of Irving, and outside. The greenhouse (ext. 5792) is run by Heather McIntyre and is generally open between 8 am and 5 pm. If you need access outside of these hours, please arrange this with your TA. The anticipated locations are listed on the schedule below, but some of these may change. Changes in location will always be listed in the announcements on Blackboard, so be sure to check! Up-to-date information on labs will also be listed there.

All lab worksheets are contained in the lab manual which will be handed out in the first lecture period. Any changes to the schedule or the labs themselves will be posted on Blackboard. Labs will consist of a mixture of experiments and demonstrations, and some work outside of scheduled periods will be required. You will work in small groups for all of the experiments, although write-ups will be done independently. Again, Blackboard is a very good way to coordinate activities with your group members.

At the end of each lab you will turn in the worksheet; the top 10 scores will count for your assessment. In addition you will write full laboratory reports (for which you will get further instructions) for two projects. For the first report (due 28 Oct.) you may choose from the mycorrhizae project and the leaf morphology project. For the second (due 9 Dec.), you may choose from the germination experiment and the pollination experiment.

<table>
<thead>
<tr>
<th>Lab #</th>
<th>Date</th>
<th>Topics</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8 &amp; 9 Sept</td>
<td>Botany treasure hunt</td>
<td>Outside</td>
</tr>
<tr>
<td>2</td>
<td>15 &amp; 16 Sept</td>
<td>Seeds and seedlings; leaf morphology I</td>
<td>BUNN 408</td>
</tr>
<tr>
<td>3</td>
<td>22 &amp; 23 Sept</td>
<td>Germination experiment set-up; leaf morphology II</td>
<td>BUNN 408</td>
</tr>
<tr>
<td>4</td>
<td>29 &amp; 30 Sept</td>
<td>Photosynthesis</td>
<td>BUNN 408</td>
</tr>
<tr>
<td>5</td>
<td>6 &amp; 7 Oct</td>
<td>Mycorrhizae and N-fixation</td>
<td>BUNN 408</td>
</tr>
<tr>
<td>6</td>
<td>13 &amp; 14 Oct</td>
<td>Data analysis for 1st lab report</td>
<td>Irving I rm 303</td>
</tr>
<tr>
<td>7</td>
<td>20 &amp; 21 Oct</td>
<td>Pollination experiment</td>
<td>Greenhouse</td>
</tr>
<tr>
<td>8</td>
<td>27 &amp; 28 Oct</td>
<td>Roots and shoots</td>
<td>Greenhouse</td>
</tr>
</tbody>
</table>

**FIRST FULL LABORATORY REPORT DUE: Friday, 28 October**

| 9     | 3 & 4 Nov  | Fruits and flowers                                  | Greenhouse    |
| 10    | 10 & 11 Nov | Data analysis for 2nd lab report                   | Irving I rm 303 |
| 11    | 17 & 18 Nov | Plant diversity: the lunch                          | Irving confirm |
| 12    | 1 & 2 Dec   | Debate Series I                                     | Bunn 408      |
| 13    | 8 & 9 Dec   | Debate Series II                                    | Bunn 408      |

**SECOND FULL LABORATORY REPORT DUE: Friday, 9 December**
NRM 211
INTRODUCTION TO APPLIED PLANT SCIENCE
Fall - 2005

Schedule:
Lectures  Monday, Wednesday  9:15AM - 10:15AM  AHRB 183
Labs  Monday  2:30PM - 5:30PM  AHRB 183

Course Objective:
To guide students to an understanding of the physiological processes controlling plant growth and development emphasizing the implications and applications for plant growth and production at high latitudes.

Expected Student Outcome:
Enable students to apply current scientific knowledge to effectively handle and understand plant growth under existing environmental conditions, management procedures and infrastructures. Provide students with the ability to recognize and appreciate opportunities and challenges for efficient plant and crop production under northern conditions.

Instructor:
Dr. Meriam Karlsson
Office: 240 Arctic Health Research Bldg, Phone: 474-7005, Email: ffmkg@uaf.edu
Office hours: Tuesday/Thursday 9-11 am or by appointment, 240 Arctic Health Research Bldg
Friday 9-11 am, Academic Advising Center, 509 Gruening Bldg

Lab Assistant:
Jeff Werner
Office: 115 Arctic Health Research Bldg, Phone: 474-6932, Email: fnjww@uaf.edu

WEB: Blackboard http://classes.uaf.edu

Recommended Text:
Introductory Plant Biology, 10th ed. by Stern, Bidlack, Jansky and Uno, 2006,
McGraw Hill. (new $121.50, used $91.25)

Supplemental Text:
Principles of Plant Science, Environmental Factors and Technology in Growing Plants by Decoteau, 2005, Pearson Prentice Hall.
Evaluation Policy:
Grades will be based on exams, plant identifications, several sets of lab questions, lab activities report, one literature review and class participation. The relative importance of each component for the final grade is indicated below:

- Exam I: 100 (10%)
- Exam II: 150 (15%)
- Final Exam: 250 (25%)
- Lab: 400 (40%)
  - Lab and Plant ID I: (150 or 15%)
  - Lab and Plant ID II: (150 or 15%)
  - Several sets of Lab Questions: (50 or 5%)
  - Lab Activity Report: (50 or 5%)
- Literature Review: 50 (5%)
- Class participation: 50 (5%)

1,000 points (= 100%)

Letter grades will be determined using the following scale:

- A: 90 to 100%
- B: 80 to 89%
- C: 70 to 79%
- D: 60 to 69%
- F: Below 59%

Borderline grades may be curved based on class participation, attendance and student progress during the semester. No make-up exams will be given unless there is a verifiable emergency or arrangements have been made with the instructor prior to the scheduled exam time.

Student Code of Conduct:
The UAF Student Code of Conduct includes

1. Students will not collaborate on any quizzes, in-class exams, or take home exams that will contribute to their grade in the course unless the instructor explicitly gives permission. Only those materials permitted by the instructor may be used to assist in quizzes and examinations.
2. Students will not represent the work of others as their own. A student will attribute the source of information not original with himself or herself (direct quotes or paraphrases) in compositions, theses, and other reports.
3. Work submitted for one course may not be submitted for credit in another course without the explicit approval of both instructors.

Violations of the Code of Conduct will result in a failing grade for the assignment, and ordinarily, for the course in which the violation occurred.

Student Disability Services:
In collaboration with UAF Office of Disability Services (203 Whit), 474-7043, reasonable accommodations will be made to assist students with documented disabilities.
Lab and Plant ID Tests:
The first part of the Lab and plant ID tests on October 10 and November 21 consists of questions on lab exercises. These questions will constitute 20% or 30 of the 150 possible points. The second part is plant identification of pressed samples, pictures or live plant material. Common names and scientific names (correctly spelled) are required. The plant ID includes 6 groups of plants (agronomy crops, native Alaska ornamental and revegetation plants, undesired plants in crop production commonly referred to as weeds, vegetables, herbaceous ornamentals, fruit and berry crops) for a total of 98 species.

Lab Questions:
In addition to the lab activity report (see below), there will be several sets of lab questions. These consist of a few questions related to the most important concepts covered in the lab. There will be questions for lab I, II, III, IV, VI, VII, VIII, IX, X and XII. The answered lab questions are due at the end of each lab period.

Lab Activity Report:
A lab activity report describing effects of temperature, light and mineral nutrition on plant growth is required. The report is due (at the latest) on November 16, 2005.

Format for Lab Report on temperature and light (see example)

Procedures:
- Describe equipment, materials, methods etc.
- Describe treatments.
- Describe how data were collected.

Results:
- Report your observations. The lab report must have actual plant measurements presented in tables and/or graphs.

Discussion and Conclusions:
- Summarize in words the data presented under the results.
- Discuss the obtained results. Do they differ from expected results?
- Make a few concluding remarks.

Literature Review:
One literature review based on a paper from a scientific horticulture or agronomy journal is required. (Papers to select from will be provided.) In addition to the written review, a short presentation (less than 10 minutes) is required. The literature review is due (at the latest) November 30 with the presentation during the lab period on December 5, 2005.

Format for Literature Review (see example)

Title of the article
Author(s)
Journal (name, year, page numbers)
Purpose of experiment
Procedures
Results and conclusions
Who would this information be of value to? What would you have done differently? Are the authors' conclusions valid? What additional work should be done? etc.
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<td>Control of plant growth and development</td>
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<td>M Oct.  3</td>
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<td>M Oct.  3</td>
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<td>Light quality and plant growth</td>
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<td>Plant response to photoperiod</td>
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<td>Mineral nutrition, macro-nutrients</td>
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<td><strong>Lab X: Mineral nutrition</strong></td>
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<td>W Nov. 16</td>
<td>Mineral nutrition, micro-nutrients</td>
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<td>Plant organs, roots, stems</td>
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<td>F Dec. 16</td>
<td><strong>FINAL EXAM 8-10 am</strong></td>
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SILVICS AND DENDROLOGY  
(NRM 251)  

CHARACTERISTICS OF TREES  
OF  
NORTH AMERICAN FORESTS  

---4 CREDITS---

COURSE DESCRIPTION

Examines the biological characteristics, habitat, range, and general features of tree species of the Northern Forest of North America and Eurasia and western North America as well as important trees of eastern North America. Course is designed for persons with interests in land management, trees, and/or the natural environment.

The course is designed for School of Agriculture and Land Resource Management majors as well for non-majors who have an interest in land resources, forests, trees, terrestrial wildlife management, and the environment. The course is open to non-college persons who have an interest in trees. The course addresses tree species of the Northern or Boreal Forest and Temperate Forests of North America. Content includes: 1) The botanical characteristics (twigs, leaves/needles, flowers, fruits, bark, wood, form, size) and range. 2) The use of keys for the identification of species. 3) The use and/or value (including economic, wildlife, watershed, aesthetic). 4) The ecological requirements (light, heat, water, nutrients) as reflected by climate, soils, and associated species. 5) The life history (flowering, seed production and dissemination, seedling development, and growth) of important and/or representative species. 6) A brief introduction to the major damaging agents (abiotic, insects, disease organisms, and animals).

PREREQUISITES

Sophomore standing; NRM 101, BIOL 105; or Permission of Instructor.

INSTRUCTOR

EDMOND C. PACKEE, Professor of Forest Management  
Agricultural and Forestry Experiment Station  
School of Agriculture and Land Resources Management  
College of Natural Resources Development and Management  
University of Alaska Fairbanks  
Fairbanks, AK 99775

Telephone: 474-5070  
e-mail: ffecp@uaf.edu

Office Hours: Monday: 1000 to 1300 hours; by appointment; never after 1530 hours any day of week; never immediately before class.
TENTATIVE CLASS SUBJECT OUTLINE/SCHEDULE

IF YOU HAVE A PHYSICAL OR LEARNING DISABILITY, PLEASE ADVISE ME OF ANY SPECIAL CONSIDERATION NECESSARY BY THE BEGINNING OF THE SECOND CLASS SO THAT I CAN ATTEMPT TO ACCOMMODATE YOU ACCORDING TO THE AMERICAN DISABILITIES ACT! I must be advised in writing from the proper authority.

CLASS PARTICIPATION IS ESSENTIAL FOR THE SUCCESSFUL COMPLETION OF THIS COURSE! A PORTION OF YOUR GRADE DEPENDS UPON CLASS PARTICIPATION INCLUDING ATTENDANCE, POP QUIZZES AND FIELD TRIPS. ALTHOUGH I PLAN TO HAVE COPIES OF MY LECTURE NOTES IN THE BIOSCIENCES LIBRARY, READING THEM INSTEAD OF COMING TO CLASS IS NOT SATISFACTORY (you don’t get to see actual specimens associated with the notes as well as additional information). IF THE NOTES ARE ABUSED IN THIS MANNER, I WILL PULL THEM FROM THE LIBRARY. HOWEVER, I ALSO RESERVE THE RIGHT TO ASSIGN PORTIONS OF THOSE NOTES AS READING ASSIGNMENTS IN ADDITION TO THOSE LISTED.

TWO MAJOR PAPERS ARE REQUIRED FOR THIS COURSE:
- ANNOTATED BIBLIOGRAPHY CONCERNING A NON-ALASKAN COVER TYPE IS DUE THE MONDAY BEFORE SPRING BREAK, 09 MARCH AT 1900 HR.
- TERM PAPER ON DENDROLOGY OR SILVICS SUBJECT IS DUE THE 30 APRIL, FRIDAY, AT 1700 HR.

Papers will be graded on content, grammar, spelling, punctuation, and format. Format of the annotated bibliography is critical. Format for the bibliography and cited literature of term paper is that of the CBE Style Manual.

LATE ASSIGNMENTS WILL RECEIVE A REDUCED GRADE; ANY WRITTEN ASSIGNMENTS, INCLUDING THE TERM PAPER, NOT SUBMITTED BEFORE 0900 HR., WEDNESDAY 05 MAY WILL NOT BE CONSIDERED AND A ZERO WILL BE THE GRADE AND THUS IMPACT YOUR FINAL GRADE DRASTICALLY! IF YOU HAVE A TRULY VALID REASON SUCH AS HOSPITALIZATION OR DEATH IN THE FAMILY, AN EXTENSION OF DEADLINES WILL BE CONSIDERED-BUT DON'T WAIT UNTIL THE LAST MINUTE!

IN THE PAST, I HAVE GIVEN INCOMPLETES FOR NOT KNOWING THE SPECIES (AT THE 60 PERCENT LEVEL) OR NOT HAVING ASSIGNMENTS COMPLETED WHEN DUE. MY CHARITY HAS BEEN ABUSED. NOW INCOMPLETES ARE RARE FOR ANY REASON. ANY INCOMPLETES WILL BE GIVEN WITH A FINAL DATE BEYOND WHICH I WILL CHANGE THE INCOMPLETE TO A FAILURE (F)!

THERE IS ONE PLANNED (REQUIRED) FIELD TRIP:
Three-day field trip: Susitna VALLEY, Kenai, Seward; DATES: Weekend of all campus day in APRIL (23,24, and 25 April) to cover meals (2 breakfasts, 2 lunches, snacks A collection of $10-20 dollars per person is required; charge will be to cover actual costs and you WILL help develop the menu. you are responsible for one sack lunch [Friday], one FAST Food DINNER [FRIDAY], AND one pizza dinner [SATURDAY]). departure is 0500 hr (that is 5:00 a.m.) on Friday and return is between 1830 and 2000 hrs on Sunday.


ASSIGNED READINGS:

From Hardin and others. (2001): Chapters 1-7; and information on each genus and species as listed in syllabus.

From EYRE (1980): Chapter 1 and your selection of cover types.

Other articles as assigned (will be on reserve in BIOSCIENCE LIBRARY or in serials/reference in Bioscience or Rasmuson).

LECTURES & LABS are combined (with the exception of the field trip) and will run from 1900 hr. to 2130 hr. more-or-less on Monday and Wednesday. Access to herbarium specimens is by arrangement; special arrangements will be made for class access prior to exams.

Because of budget constraints and legal stipulations regarding use of research funds, much of the lecture, lab, and field trip time is volunteered by me! I have a commitment to the students. I also have a commitment to the profession. In neither case will I accept substandard performance; a basic transfer and retention of knowledge is expected (extra credit is not an alternative or bail out) and an ethical performance is expected.
SPRING 2004 LECTURE/LAB SCHEDULE

21/1 Course introduction, concept of silvics, ANNOTATED BIBLIOGRAPHY ON COVER TYPE ASSIGNED. Concepts of Forestry and Silvics

26/1 Concepts of silvics and taxonomy; TERM PAPER TOPIC ASSIGNED.

28/1 The conifers; the genera Ginkgo, Pinus

18/2 The genus Abies
TERM PAPER OUTLINE DUE—NO EXCEPTIONS

20/2 The genera Abies, Picea,

25/2 The genera Picea, Larix, Pseudotsuga

01/3 The genera Pseudotsuga, Tsuga; Taxodium, Sequoia, Sequoiadendron, Calocedrus,

03/3 The genera Chamaecyparis, Cupressus, Thuja, Juniperus

08/3 TEST: PINACEAE, Silvics, Taxonomy

10/3 The genera Juniperus, Taxus, Torreya;
NOTE: ANNOTATED BIBLIOGRAPHY DUE ON FRIDAY 12 MARCH 1700 HRS

12/3 ANNOTATED BIBLIOGRAPHY DUE AT 1700 HRS

22/3 The hardwoods; the genera of Salicaceae

24/3 The genera of Salicaceae, Myricaceae;

29/3 TEST: ALL CONIFERS, Silvics, Taxonomy;

31/3 The genera of Betulaceae,

05/4 The genera of Betulaceae, Juglandaceae

07/4 The genera of Fagaceae

13/4 The genera of Fagaceae

14/4 The genera of Ulmaceae, Moraceae, Hamamelidaceae, Platanaceae, Lauraceae

19/4 TEST: Salicaceae, Myricaceae, Juglandaceae, Betulaceae; The genera Tiliaceae, Rosaceae, Araliaceae

21/4 The genera of Caespinaliaceae, Cornaceae, Eleagnaceae, Fabaceae, Meliaceae, Mimosaceae,

23/4 REQUIRED three day field trip: Susitna, Kenai Lake, Seward; DEPART WEST RIDGE at 0500 HR. RETURN FROM FIELD TRIP: ETA: 1930 HR SUNDAY 29/4.

26/4 The genera of Anacardiaceae, Aceraceae, Hippocastanaceae, Rhamnaceae, Simarobaceae,

28/4 The genera of Ericaceae, Magnoliaceae, Anonaceae, Oleaceae, Bignoniaceae

30/4 TERM PAPER DUE AT 1700 HRS—NO EXCEPTIONS

03/1 The genera of Bignoniaceae, Scrophulariaceae, Cactaceae, Agavaceae, Araceae
TEST: ALL HARDWOODS, CACTACEAE, AGAVACEAE, ARACEAE
GRADING POLICY

EVERYONE IN THIS CLASS STARTS OUT CARRYING AN A. You, and only you, are responsible for any changes to your initial grade! My grading criteria:

A  = 92.75 percent and higher
A- = 90.00 - 92.749 percent
B+ = 87.50 - 89.999 percent
B  = 82.50 - 87.49 percent
B- = 80.00 - 82.499 percent
C+ = 77.50 - 79.999 percent (see note below)
C  = 72.50 - 77.499 percent
C- = 70.00 - 72.499 percent (see note below)
D+ = 67.50 - 69.999 percent
D  = 62.50 - 67.499 percent
D- = 60.00 - 62.499 percent
F  = less than 60 percent

NOTE: TO GET A FINAL GRADE OF "C" OR BETTER, STUDENT MUST BE ABLE TO IDENTIFY BY SIGHT A MINIMUM OF 60 PERCENT OF THE SPECIMENS. THUS, YOU HAVE TO KNOW THE SPECIES!!!!

✓ Thus you need to attend class!
✓ Thus you need to study independently of instructor the herbarium specimens!
✓ Thus you need to study regularly (you can’t wait to the last minute)

IF YOU DON’T BELIEVE ME REGARDING WAITING TO THE LAST MINUTE, ASK SOMEONE WHO HAS TRIED! No longer will you be given incompletes if you do not meet this criteria by the end of the semester! Failure to meet this criteria will mean a grade of “D” or “F”!

THE ACADEMIC HONOR CODE of the University of Alaska Fairbanks is in effect IN this class. The Academic Honor Code:

"All students who have enrolled in the University will work in accordance with the Honor Code...

"1. Students will not collaborate on any quizzes, in-class exams, or take-home-exams which will contribute to their grade in a course, unless permission is granted by the instructor of the course. Only those materials permitted by the instructor may be used to assist in quizzes and examinations.

"2. Students will not represent the work of others as their own. A student will attribute the source of information not original with himself or herself (direct quotes or paraphrases) in compositions, theses, and other reports.

"3. No work submitted for one course may be submitted for credit in another course without the explicit approval of both instructors.

"Violations of the Honor Code will result in a failing grade for the assignment and, ordinarily, for the course in which the violation occurred. Moreover, violations of the Honor Code may result in suspension or expulsion of a student from the University."

----from THE A BOOK 1986-1987

If you are caught deliberately trying to keep library materials away from fellow students, you may receive a reduced grade or an "F." This includes stealing items, hiding them on shelves out
of order, or behind other books, or just plain holding them. Cutting pages out of library books is an automatic "F"; I will also fight to have such violators expelled from the University!

With reference to term papers and annotated bibliographies, the following are my terms:
- no work submitted in this course is to be used in another course in any other semester at the University of Alaska; THE EXCEPTION—ENGL 111X, 211X, 213X (SEE BELOW).
- no work submitted for a grade in this course will have been used previously for another course at the University of Alaska or any other University;
- exceptions to the above are courses in English writing, and in such cases, written approval must be obtained from me and from the other course instructor;
- violations of the above will result most likely and "F" for the assignment and the course;
- several of us are now keeping term paper titles, keywords, and copies on file—pretty sad.

The use of the Internet for your annotated bibliography is not allowed. The objective is to learn how to search the literature. Use of the internet as a valid, unbiased source is looked upon as a crap shoot at a casino. However, there are electronic journals, reports, and documents that are on the Internet and protected from change. I have ways to check on what you used and where it came from! Plagiarism from/via the Internet is easy to catch and will result in an "F" for the course!

In this class students may not collaborate on quizzes, tests, exams, or minor written assignments! There are no exceptions. Such collaboration means an "F." However, you are encouraged to study together.

In preparing term paper(s) you may seek help as follows:
- Utilize proofreader and/or appropriate English writing course in developing your paper.
- Spellchecker with your word processor is not failsafe.
- Note: you need explicit (written) permission if you are going to use the term paper in both this course and the English course—this means written permission with signatures of both instructors.
- You may review/practice any required oral presentation with others.
- You may use a professional typing service or other typist to prepare your final draft; however, your final draft layout, organization, and content are your effort.
- You may help one another in finding critical reference materials/library resources are limited; if you absolutely need to use inter-library loan, work together and whenever possible make a joint request as early as practicable.

2004 Grade is based on:
- major tests (4): conifers (2)/hardwoods (2) 50%
- quick quizzes (written or identification) 05%
- term paper: 25%
- annotated bibliography 15%
- class participation: 05%
  --class/lab/field discussion
  --oral quizzes
  --attendance
  --field trip absence will result in a full letter grade reduction

I reserve the right to utilize a curve. The associated criteria or methodology in determining individual test grade ranges is my responsibility. I establish the curve criteria. I use a variety of techniques. If I don't curve grades, you will be a lot worse off.

You can assume the following:
✓ You cannot get a C or higher grade in NRM 251 if you cannot identify specimens: herbarium, live samples, twigs (with or without leaves), fruits/seeds, actual tree.
✓ You are expected to know the scientific name (correctly spelled) and common name of all species discussed/identified in class or on species list and in the text.
✓ You must know the range of all species discussed/identified in class or on species list and in the text.
✓ You are expected to identify on sight all species presented in class.
✓ You should know the associates/forest cover types in which each species occurs.
✓ You must know the "shade tolerance" of each species.
✓ You are expected to know major silvical characteristics of the species.
✓ You must review constantly the specimens in class, after class, and you must use the class herbarium.

THIS MEANS YOU NEED TO ATTEND CLASS AND ALSO READ THE ASSIGNED READINGS! In order to be a good resource manager, forester, silviculturist, habitat manager, land manager, land planner, you have to be able to write prescriptions! If you want to have meaningful input at hearings you must know your subject. This means: you have to eat, sleep, breathe, dream, think the species and the sites on which they occur. This course lays the foundation for your knowledge of a species (any species, not just trees). If you are going to be working with any organism, this is the kind of information that you must know.

Term paper and written assignments (test, class exercises) are graded on content, spelling, organization, grammar, and appearance. This means that you should know how to use the library, dictionary/speller, style manual. This class assumes that you have some knowledge of the library. I will guide you to material and tools. You also need to have a reasonable command of the English language including grammar. You should know: what a style manual is, that there are more than one, and how to use them.

Oral presentations: Every class participant should expect to be called upon in oral quizzes; since it may not be possible to call on every person every day, a deck of cards may be used with each student being assigned two cards; cards will be drawn randomly to see who gets the question. Questions shall be asked before drawing the card.

"Quizzes" (oral or written) count toward your grade. Quizzes are designed to force the student to maintain currency with assignments.

An annotated bibliography will be prepared by each student on a selected forest cover type. Cover type selection will be made by me; the student will get a cover type drawn from my list. You will be given your cover type during the first class/lab. **NOTE: The annotated bibliography is due before spring break.**

A term paper on a subject related to dendrology or silvics is due the last day of classes for the semester. The subject (not the exact title) will be determined by the instructor and assigned to the student during the first full week of class. It is advisable to begin working on the term paper early in the semester. **The term paper outline is due for the instructor's review the first class after spring break.**

In the past, as a courtesy to students, most of my lecture notes have been placed on reserve in the library. They are not a substitute for class attendance; in fact, part of your grade is dependent upon class participation! Those notes are not a literature source for any term paper! They are not to be included as a footnote or a citation. They may have errors; they have typos; they may not be complete. No one has to use them for study, unless I make a specific assignment from them! They are not a substitute for class attendance/participation. Availability of those notes is a courtesy to the students in this class. In student comments from past years, I was severely and insultingly criticized for those notes (I was criticized for reading from them, for having errors
NRM 290: Resources Management Issues at High Latitudes
Field Course
2-credits, Letter Grade (A, B, C, D, or F)
May 16-25 2005

<table>
<thead>
<tr>
<th>Peter Fix</th>
<th>Dave Verbyla</th>
<th>Dave Valentine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant Professor of Outdoor Recreation</td>
<td>Professor of Geographic Info Systems</td>
<td>Associate Professor of Forest Soils</td>
</tr>
<tr>
<td>Telephone: 474-6926</td>
<td>Email: <a href="mailto:ffjif@uaf.edu">ffjif@uaf.edu</a></td>
<td>Telephone: 474-7614</td>
</tr>
<tr>
<td>Email: <a href="mailto:ffjif@uaf.edu">ffjif@uaf.edu</a></td>
<td></td>
<td>Email: <a href="mailto:ffdvv@uaf.edu">ffdvv@uaf.edu</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Norm Harris</th>
<th>Milan Shipka</th>
<th>Julie Lurman</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant Professor of Range Mgt.</td>
<td>Associate Professor of Animal Science</td>
<td>Assistant Professor of Policy and Law</td>
</tr>
<tr>
<td>Telephone: 746-9467</td>
<td>Telephone: 474-7429</td>
<td>Email: <a href="mailto:ffdn@uaf.edu">ffdn@uaf.edu</a></td>
</tr>
<tr>
<td>Email: <a href="mailto:pfnrh@uaa.alaska.edu">pfnrh@uaa.alaska.edu</a></td>
<td>Email: ffmbs@edu</td>
<td>Email: <a href="mailto:ffjil@uaf.edu">ffjil@uaf.edu</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deb Segla</th>
<th>Chanda Meek</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Trip Coordinator</td>
<td>Trip Expeditor</td>
</tr>
<tr>
<td>Telephone: 474-5550</td>
<td>Email: <a href="mailto:chanda.meek@uaf.edu">chanda.meek@uaf.edu</a></td>
</tr>
<tr>
<td>Email: <a href="mailto:deb.segla@uaf.edu">deb.segla@uaf.edu</a></td>
<td></td>
</tr>
</tbody>
</table>

The course is a 10-day field course starting in Fairbanks, traveling to Delta, Palmer and the Kenai Peninsula and returning through Anchorage via the Parks Highway to Fairbanks. Each day will focus on specific components of Alaska’s natural resources such as agriculture, recreation, forestry, and mining. This provides students with the opportunity to understand how resource management relates to environmental, social and economic issues in Alaska.

**Course Objective:**
"To provide a broad perspective on natural resource management issues, the practice of sustainable resource management, and resource-based economic development in Alaska."

**Course Requirements:**
Course evaluation will consist of:

1. A daily, legible, journal of the field trip discussing the resource management issues and related topics highlighted during the trip (40%).
   - Students may submit their journal entries to the course coordinators for review and suggestions at the close of the trip in Fairbanks.
   - The journal will be submitted by June 30, 2005.

2. A discussion paper (40%).
   - Paper must be typed on 8 ½ X 11 paper using 1-inch margins, no more than 1.5 line spacing, and no less than an 11-point font. There is a 5 pages minimum, 8 pages maximum. Grades will be based on content, organization, and grammar.
     - Topic should expand on one aspect of resource management discussed during the trip, or
     - Explore a common theme that ties together the different resource management issues discussed during the trip.
     - Due June 30, 2005 electronic submission using Blackboard drop box.

3. Instructor evaluation (20%).
   - Participation in all field stops and evening meetings.
   - Contribution to discussion at field stops and evening meetings.
   - Participation in shared duties.

**Grade Distribution:**
A = > 90%, B = > 80%, C = > 70%, D = > 60%, F = < 60%
<table>
<thead>
<tr>
<th>PERSONNEL</th>
<th>TOPICS OF DISCUSSION</th>
<th>AGENDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jodie Zihlman</td>
<td>Logantine Della School</td>
<td>9:30 am</td>
</tr>
<tr>
<td>Chenot</td>
<td>Direct: Rozanna</td>
<td>8:30-9:00 am</td>
</tr>
<tr>
<td>Alice Turner</td>
<td>Alternative Animal - York</td>
<td>9:00-10:00 am</td>
</tr>
<tr>
<td>Scott &amp; Ruby</td>
<td>Alternative Animal - Elk</td>
<td>10:00-11:00 am</td>
</tr>
<tr>
<td>Jeff Duffham</td>
<td>Food Control</td>
<td>11:15-12:00 am</td>
</tr>
<tr>
<td>Joe Chapman Overt</td>
<td>Alaska Lumber</td>
<td>12:15-12:45 pm</td>
</tr>
<tr>
<td>Betsy</td>
<td>Clearwater Creek Mill</td>
<td>12:45-1:15 pm</td>
</tr>
<tr>
<td>Tommy Parker</td>
<td>Aeta New</td>
<td>11:45-1:30 pm</td>
</tr>
<tr>
<td>Amanda Family</td>
<td>Daily Lumber and Manufacturing</td>
<td>1:30-2:45 pm</td>
</tr>
<tr>
<td>Victor</td>
<td>Myers' Roadhouse</td>
<td>2:45-3:15 pm</td>
</tr>
<tr>
<td>Julie Latham, Phylli Kaspar</td>
<td>BPI</td>
<td>3:15-3:45 pm</td>
</tr>
<tr>
<td>Dave Verdi</td>
<td>BPI</td>
<td>3:45-4:15 pm</td>
</tr>
<tr>
<td>Phylli Kaspar</td>
<td>BPI</td>
<td>4:15-4:45 pm</td>
</tr>
</tbody>
</table>

**NOTES**

- 16-Hour Monday
- Hallroom
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:00 pm</td>
<td>Dinner: Cook out at Clam Chukh</td>
<td>Lodge: Kerno Pen College</td>
</tr>
<tr>
<td></td>
<td><em>(Note: no make up)</em></td>
<td><strong>3 pm</strong></td>
</tr>
<tr>
<td></td>
<td><em>(Note: no make up)</em></td>
<td><strong>4:00 pm</strong></td>
</tr>
<tr>
<td></td>
<td><em>(Note: no make up)</em></td>
<td><strong>Dock, Ship</strong></td>
</tr>
<tr>
<td></td>
<td><em>(Note: no make up)</em></td>
<td><strong>10:30 or 2:30</strong></td>
</tr>
<tr>
<td></td>
<td><em>(Note: no make up)</em></td>
<td><strong>Captain Boat Captain</strong></td>
</tr>
<tr>
<td></td>
<td><em>(Note: no make up)</em></td>
<td><strong>12:00 noon</strong></td>
</tr>
<tr>
<td></td>
<td><em>(Note: no make up)</em></td>
<td><strong>Lunch at Kachemah Bay</strong></td>
</tr>
<tr>
<td></td>
<td><em>(Note: no make up)</em></td>
<td><strong>Reserve</strong></td>
</tr>
<tr>
<td></td>
<td><em>(Note: no make up)</em></td>
<td><strong>Kachemah Bay Nat'l Estuarian Reserve</strong></td>
</tr>
<tr>
<td></td>
<td><em>(Note: no make up)</em></td>
<td><strong>9:30 a.m.</strong></td>
</tr>
<tr>
<td></td>
<td><em>(Note: no make up)</em></td>
<td><strong>Dep't Kernals Peninsula College for Homer</strong></td>
</tr>
<tr>
<td>7:30 am</td>
<td><em>(Note: no make up)</em></td>
<td><strong>3:00 am.</strong></td>
</tr>
<tr>
<td></td>
<td><em>(Note: no make up)</em></td>
<td><strong>Depart Kernals Pensinsula College for Homer</strong></td>
</tr>
</tbody>
</table>

### NOTES

**PERSONNEL**

**TOPICS OF DISCUSSION**

**AGENDA**

**Thursday**

**May 19**
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:00 pm</td>
<td>Dinner at Exit Glacier Parking Lot</td>
</tr>
<tr>
<td>4:30 pm</td>
<td>seward Fish Camp see map</td>
</tr>
<tr>
<td>2:30 pm</td>
<td>downtown seward shielsh hatchery and of road in quickhatch shielsh hatchery</td>
</tr>
<tr>
<td>1:30 pm</td>
<td>Moose Excursions</td>
</tr>
<tr>
<td>noon</td>
<td>Lunch: Quinn Creek Campground</td>
</tr>
<tr>
<td>11:15 am</td>
<td>00:00 am</td>
</tr>
<tr>
<td>10:00 am</td>
<td>00:00 am</td>
</tr>
<tr>
<td>8:30 am</td>
<td>Russian River Campground</td>
</tr>
</tbody>
</table>

**Notes**

**Personnel**

**Topics of Discussion**

**Agenda**
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 am</td>
<td>Depart Delia School</td>
</tr>
<tr>
<td>8:15 - 10:00 am</td>
<td>DNR Headquarters/Port Greedy AK Fire</td>
</tr>
<tr>
<td>8:30 am</td>
<td>Service</td>
</tr>
<tr>
<td>10:30 am</td>
<td>Summit Lake II</td>
</tr>
<tr>
<td>12:00 pm</td>
<td>PWSCA - Gulkana River Hatchery</td>
</tr>
<tr>
<td>1:30 pm</td>
<td>Lunch/Tea/Lake Lunch at Soudough</td>
</tr>
<tr>
<td>3:00 pm</td>
<td>Chenaillian BLM Field office</td>
</tr>
</tbody>
</table>
| 3:30 pm  | Command                                  1

**Summary:**

- **Date:** May 17
- **Location:** Meier Lake
- **Meeting Time:** 8:00 am - 10:00 am
- **Agenda Topics:**
  - Personal
  - Discussion

**Notes:**

- Contact Gary at call 1-2 hrs.
- Be sure to call Julie Lutnum, Dave Vetby, Chad Meek.
- Refer:
- First name
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00</td>
<td>Department Meeting for Kauai Peninsula College</td>
</tr>
<tr>
<td>11:00</td>
<td>Wildlife Conservation Cn.</td>
</tr>
<tr>
<td>7:30 am</td>
<td>Wildlife Conservation Cn.</td>
</tr>
<tr>
<td></td>
<td>VK Wildfire Conservation Cn.</td>
</tr>
<tr>
<td></td>
<td>Mike Miller (Kauai)</td>
</tr>
<tr>
<td></td>
<td>Norm Harris</td>
</tr>
<tr>
<td></td>
<td>Julie Latham</td>
</tr>
<tr>
<td></td>
<td>Dave Vertepa</td>
</tr>
<tr>
<td></td>
<td>Chelsea Week</td>
</tr>
<tr>
<td></td>
<td>Peter Fick</td>
</tr>
<tr>
<td></td>
<td>Environmental Regulations</td>
</tr>
<tr>
<td></td>
<td>OK. Oa mel 9-10 pm in town</td>
</tr>
<tr>
<td></td>
<td>North Kauai Road (set at intersection) –</td>
</tr>
<tr>
<td></td>
<td>across the street from the arbor</td>
</tr>
<tr>
<td></td>
<td>across the street from the arbor</td>
</tr>
<tr>
<td></td>
<td>Lunch: Cooper Landing</td>
</tr>
<tr>
<td></td>
<td>Lunch: Cooperative Landings</td>
</tr>
<tr>
<td></td>
<td>Lunch: Cooperative Landings</td>
</tr>
<tr>
<td></td>
<td>Lunch: Cooperative Landings</td>
</tr>
<tr>
<td></td>
<td>Lunch: Cooperative Landings</td>
</tr>
<tr>
<td></td>
<td>Lunch: Cooperative Landings</td>
</tr>
</tbody>
</table>

**NOTES**

**PEOPLE**

**DISCUSSION TOPICS**

**AGENDA**

18 May

Kauai Peninsula College – See page 33. Follow signs on Kalohoni Beach Rd.

Follow signs on Kalohoni Beach Rd.
<table>
<thead>
<tr>
<th>Time</th>
<th>AGENDA</th>
<th>TOPICS OF DISCUSSION</th>
<th>PERSONNEL</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 p.m.</td>
<td>Arrive Birchwood Lodging: Birchwood Camp (cabins with bunks)</td>
<td>Dinner: fast food (on your own) in Seward</td>
<td>Dave Kobersmith</td>
<td>confirmed PO done for deposit. need to do PO for remainder.</td>
</tr>
<tr>
<td>10:30 a.m.</td>
<td>Depart for Anchorage/Birchwood Camp - Head south on Glenn Hwy, take 1st Birchwood exit.</td>
<td>Depart for Anchorage/Birchwood Camp - Head south on Glenn Hwy, take 1st Birchwood exit.</td>
<td></td>
<td>Confirmed: Peter, KNP asked that you aquire the boarding passes.</td>
</tr>
<tr>
<td>7:30 a.m.</td>
<td>Kena Fjords National Park boat tour</td>
<td></td>
<td>Peter Fix, David Valentine, Norm Harris</td>
<td></td>
</tr>
<tr>
<td>CONFIRMED</td>
<td>Chippewa</td>
<td>Cabins</td>
<td>Discussion Agenda</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>----------</td>
<td>--------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td>Dave Koberstein</td>
<td>Dinner: Birchwood Camp (Kitchen)</td>
<td>Birchwood Camp (Kitchens)</td>
<td>1:30 p.m.</td>
<td></td>
</tr>
<tr>
<td>email sent</td>
<td>DNR State Park Ranger</td>
<td>10:00 a.m.</td>
<td>9:00 a.m.</td>
<td></td>
</tr>
<tr>
<td>email received, need to call</td>
<td>Paul Bunkers</td>
<td>Commercial Greenhouse</td>
<td>10 a.m.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jett Skew</td>
<td></td>
<td>8 miles on Hwy 17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Norm Harris</td>
<td></td>
<td>on the right</td>
<td></td>
</tr>
<tr>
<td></td>
<td>David Valentine</td>
<td></td>
<td>Birch River Rd.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Claudia Mack</td>
<td></td>
<td>Birch River exit 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pete Fix</td>
<td></td>
<td>10:00 a.m.</td>
<td></td>
</tr>
<tr>
<td>NOTES</td>
<td>Faculty</td>
<td>Topics of</td>
<td>22 – May 11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PERSONNEL</td>
<td></td>
<td>Sunday</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Event</td>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>--------</td>
<td>-----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:00 am</td>
<td>Breakfast</td>
<td>Magee Hall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:00 am</td>
<td>Meeting</td>
<td>BUILDING 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00 am</td>
<td>Lunch</td>
<td>BUILDING 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:00 pm</td>
<td>Meeting</td>
<td>BUILDING 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:00 pm</td>
<td>Meeting</td>
<td>BUILDING 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:00 pm</td>
<td>Meeting</td>
<td>BUILDING 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4:00 pm</td>
<td>Meeting</td>
<td>BUILDING 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5:00 pm</td>
<td>Meeting</td>
<td>BUILDING 7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES**
- Personal
- Topics of Discussion
- Agenda

**Monday**
- 23 - May
<table>
<thead>
<tr>
<th>Notes</th>
<th>Personnel</th>
<th>Discussion Topics</th>
<th>Agenda</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mark Clark</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jeff Simeon</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Norm Harris</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Miracle</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>David Valentine</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Peter Fix</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chanda Meek</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soil Science</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>USDA Natural Resource Conservation Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PALMER Day</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Field Station</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Faculty and Small Palmet</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meeting Experiment Station</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Department of Environmental Science (AFES)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depart Month</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Breakfast at Mahanaka Farm (AFES)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Loa Drive:

- 6:30 pm
- 7:00 pm
- 7:30 am

Dinner: Denali View Morning Hostel
- 6:30 pm

Depart for Parks Highway north
- 1:30 pm

Vegetable Flower
- 1:00 - 1:30 pm

Lunch at Farm
- 1:00 pm

Palmer - Research & Farm
- 1:00 - 1:45 pm
<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 am</td>
<td>Depart Hotel for Denali National Park</td>
</tr>
<tr>
<td>8:20 am</td>
<td>Denali Np Headquarters and Visitor</td>
</tr>
<tr>
<td>1:30 pm</td>
<td>Lunch: Falls Church/Denali</td>
</tr>
<tr>
<td>5:45 pm</td>
<td>Arrive in Fairbanks</td>
</tr>
</tbody>
</table>

**Agenda Notes**

**Personal**

- Chad Hulse
- Charlie L e d
- Jeff S minek
- David V elehine
- Peter Fick
- Chanda Meek

**Faculty Discussion Topics of**
School of Agriculture and Land Resources Management
University of Alaska Fairbanks

NRM 451w/NRM 651
SILVICULTURE/ADVANCED SILVICULTURE

NRM 451: SILVICULTURE

Examines biological, environmental, and silvicultural considerations essential for successful regeneration and maintenance of boreal and western North American forests. For persons in land management, including timber, woodlot, wildlife habitat, streamside [riparian zone forest management], aesthetics. Provides intense look at science and art of forest stand management. Involves considerable critical writing. Field trips required.

NRM 651: ADVANCED SILVICULTURE

Examines biological and environmental aspects of silviculture; addresses manipulation from the "silvicultural system" approach and includes regeneration, vegetation management, stand tending, "harvest" with consideration for biodiversity, "old-growth," wildlife habitat, and timber production. Ecological classification, landscape management, preharvest silvicultural prescriptions, will be addressed. Must be able to participate in one weekend field trip.

Instructor: Edmond C. Packee, Ph.D.; C.P.F., C.P.S.S.
161n Arctic Health Research Building
University of Alaska Fairbanks
Fairbanks, ALASKA 99775
(907)-474-5070
School of Agriculture and Land Resources Management
University of Alaska Fairbanks

NRM 451w/NRM 651
SILVICULTURE/ADVANCED SILVICULTURE
SPRING 1997
SCHEDULE/SYLLABUS

GENERAL

CLASS MEETS: Tuesday and Thursday 1900 to 2100 Hours Room 183 Arctic Health Research Building (West Ridge), University of Alaska Fairbanks

FIELD TRIP: Required; 18-20 April; Depart Friday pm and return late Sunday pm; Tentatively Scheduled for Tok; Transportation and Bunk Space provided; meals at cost of students.

PROFESSIONAL REPORT: Assigned Topic; DUE 1900 hours (7:00 pm) 29 April 1997; grade reduction if late; paper to be typed, double spaced; two copies (one not stapled).

LECTURE SCHEDULE

INTRODUCTION

1. 16 1 SILVICULTURE
2. 21 1 STAND DYNAMICS
3. 23 1 LIMITING FACTORS
4. 28 1 SPECIES' SELECTION BASED ON SITE CHARACTERISTICS
5. 30 1 GROWTH AND MANAGEMENT IMPLICATIONS
6. 04 2 ECOLOGICAL FORESTRY
7. 06 2 EXAM ON INTRODUCTION

STAND MANIPULATION

8. 11 2 BASIS FOR GROWING STOCK ADJUSTMENT
9. 13 2 THINNING
10. 18/2 THINNING METHODS
11. 20/2 RELEASE CUTTINGS
12. 25/2 IMPROVEMENT RELEASE LOW M.A.I. SLAVAGE SANITATION
13. 27/2 FOREST HEALTH PROTECTION
14. 04/3 FOREST NUTRITION
15. 06/3 STAND PRESCRIPTIONS
16. 11/3 EXAM ON STAND MANIPULATION

REGENERATION
17. 13/3 TREE IMPROVEMENT
18. 25/3 SEED PRODUCTION, COLLECTION, CLEANING, STORAGE, AND GERMINATION
19. 27/3 NATURAL VERSUS ARTIFICIAL
20. 01/4 NURSERY PRACTICES
21. 03/4 SITE PREPARATION
22. 08/4 PLANTING: INITIAL SURVIVAL FREE TO GROW
23. 10/4 EXAM ON REGENERATION

SILVICULTURAL SYSTEMS
24. 15/4 CONCEPT OF SILVICULTURAL SYSTEMS
25. 17/4 CLEARCUT
26. 22/4 SEED TREE
27. 24/4 SHELTERWOOD
28. 29/4 SELECTION PARTIAL CUTTINGS
29. 01/5 COPPICE
30. 06/5 EXAM ON SILVICULTURAL SYSTEMS
READING ASSIGNMENTS

TEXTS: NRM 451

NRM 651

Text readings are assigned so that the next lecture is covered; there will be some supplemental readings. All readings are essential to understand silviculture.

PROFESSIONAL PAPER WITH ANNOTATED BIBLIOGRAPHY

Topic to be “assigned” at end of second lecture. Each paper is essentially a literature review addressing a problem or idea. Check with the instructor during the first two weeks of class to ensure there is a common understanding of the goals of each paper. If you look at these titles, each has the potential of being published—thus it is not a term paper, but a professional paper.

The format for each paper is:
Title Page
Executive Summary
Introduction
Problem Statement and Objective(s)
Literature Review
Summary of Findings (Results)
Discussion
Recommendations
Cited Literature

Note: paper to be typed and double-spaced; on 8.5 by 11 paper; with 1-inch margins (top, bottom, left and right) for text, tables, and figures; page numbers in upper right-hand corner starting with page 1 (not including Title page or Table of contents; Executive Summary is to be no more than three quarters of a page and on a separate page; grammar and spelling must be excellent. Since this is a professional report, a professional search of the literature is expected—this includes search of the internet, search of electronic data bases, and searches in various abstracts (e.g., Forestry Abstracts, Biological Abstracts); expected literature sources are to include a mixture of journal articles, agency reports, and textbooks.

Cited Literature format is to follow the AUTHOR, YEAR OF PUBLICATION, TITLE, SOURCE (City of Publication: Publisher or Journal or Report Series). Page numbers required only if a chapter in a book or report or if a journal article; format for Journal Article:
POSSIBLE PROFESSIONAL PAPER TOPICS 1997

1. Planting Stock-Type Guidelines for White Spruce
2. Thinning Guidelines for White Spruce
3. Genetics of the Genus *Betula* with Particular Reference to *Betula papyrifera* and *Betula populifolia*
4. Use of the Seed Tree Method for White Spruce
5. Regeneration of Western Redcedar—Implications of Early Espacement
7. Basic Considerations for Seed Transfer Guidelines
8. Role of Nitrogen-Fixing Plants in West Coast North American Forest Regeneration
9. Seed Collection Guidelines for Alaskan Conifer Trees
10. Silvicultural Practices to Increase Stand Structure Diversity in the Northern Forest
11. Pruning as a Silvicultural Tool in Multiple-Use Forestry
12. Silvicultural Practices to Improve Habitat for Ruffed-Grouse
14. Restoration Ecology—A Silvicultural Perspective
15. Historical Role of Bark Beetle Intestations—Silvicultural Implications

GRADING POLICY

GRADE BASIS:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>15.0%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>15.0%</td>
</tr>
<tr>
<td>Exam 3</td>
<td>15.0%</td>
</tr>
<tr>
<td>Exam 4</td>
<td>15.0%</td>
</tr>
<tr>
<td>Professional Paper</td>
<td>20.0%</td>
</tr>
<tr>
<td>Short Written Assignments</td>
<td>10.0%</td>
</tr>
<tr>
<td>Field Trip Participation</td>
<td>05.0%</td>
</tr>
<tr>
<td>General Participation</td>
<td>05.0%</td>
</tr>
</tbody>
</table>

NRM 451-651 is graded on a LETTER basis. The University of Alaska Fairbanks uses the following letter grades: A, B, C, D, & F.

I use the following and then convert to a University of Alaska Fairbanks letter grade.

<table>
<thead>
<tr>
<th>LETTER GRADE</th>
<th>PERCENTILE RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-</td>
<td>&gt; 97.5</td>
</tr>
<tr>
<td>A</td>
<td>92.5</td>
</tr>
<tr>
<td>B-</td>
<td>= 90.0</td>
</tr>
<tr>
<td>B</td>
<td>87.5</td>
</tr>
</tbody>
</table>
B  >82.5
B-  =80.0
C+  >77.5
C   >72.5
C-  =70.0
D   60.0 to 70.0
F   <70.0

I also reserve the right to grade on a curve; the basis for the curve is determined by me. It can be based on normal statistical distribution or by adding points to raw scores. Never has the curve-approach worked against students; some students have complained that I did not use a strong enough curve to get them into a higher grade. Always check your exams, if you genuinely feel like I mis-graded your effort, don’t be afraid to challenge me. We all make mistakes! However, if there is little basis for your argument, I may agree to looking at your entire exam and regrade the whole thing.

Because this is a “writing intensive course” (the “w” in NRM451w), I often can only provide a letter grade to your effort. In the case of exams, I grade on both content and relative to the rest of the persons in the class.

IF YOU HAVE EITHER A PHYSICAL DISABILITY OR LEARNING DISABILITY, I MUST BE NOTIFIED BY THE END OF THE SECOND LECTURE. IF SOMETHING DEVELOPS DURING THE SEMESTER, I MUST BE NOTIFIED IMMEDIATELY. IN ALL CASES, I NEED A SHORT WRITTEN MEMO. I DO NOT CATER TO EITHER TYPE OF DISABILITY AFTER THE FACT. I.E.. AFTER THE GRADE IS PROVIDED!

ABSENCES: IF YOU NEED TO BE ABSENT FOR A GENUINE REASON, PLEASE TRY TO LET ME KNOW PRIOR TO THE CLASS. Class participation enters into your grade. I accept and excuse absences such as: death in the family, marriage ceremony, in hospital, truly sick, genuine business endeavors (within reason). I do not accept excuses such as: had to study for other exams, had a term paper due in another course, was out drinking with the gang or was hung over, it was too cold. I have heard every excuse in the book. I believe I try hard to be reasonable.

ACADEMIC HONOR CODE

"THE UNIVERSITY IS AN ACADEMIC COMMUNITY OF SCHOLARS. ACADEMIC DISHONESTY IS A VERY SERIOUS OFFENSE AGAINST THE INTEGRITY OF THIS COMMUNITY, AND WILL NOT BE TOLERATED. ALL ACADEMIC WORK SUBMITTED BY STUDENT IS ASSUMED TO BE THE RESULT OF HIS/HER THOUGHT, RESEARCH, OR SELF-EXPRESSION. WORK WHICH BORROWS THE IDEAS, ORGANIZATION, OR WORDING FROM OTHERS MUST PROPERLY ACKNOWLEDGE THE SOURCE. PARAMETERS CONCERNING ACADEMIC DISHONESTY INCLUDE THE FOLLOWING:"
1. Students will not collaborate on any quizzes, in-class exams, or take-home exams which will contribute to their grade in a course, unless permission is granted by the instructor of the course. Only those materials permitted by the instructor may be used to assist in quizzes and examinations.

2. Students will not represent the work of others as their own. A student will attribute the source of information not original with himself or herself (direct quotes or paraphrases) in compositions, theses, and other reports.

3. No work submitted in one course may be submitted for credit in another without the explicit approval of both instructors.

Violations of the honor code will result in a failing grade for the assignment, and ordinarily, for the course in which the violation occurred. Moreover, violations of the honor code may result in the suspension or expulsion of a student from the University."

The above are from Student Handbook included in the University of Alaska Fairbanks 1997 Spring Semester Registration, Class Schedule, and Student Handbook (pages 95-96). The above rules are my rules for conduct in any class that I teach! Minimally, an F for the assignment is guaranteed by me. This means a minimum drop of a letter grade and one-half or more and usually another one-half of a letter grade since there are no points for general participation.

**COURSE FORMAT/RATIONALE**

If this course goes as planned, there is going to be opportunity for persons to participate at Tok and Delta Junction by teleconference. This is a first for me. This means that I have to have visuals available in advance to these sites. If I give a slide presentation, special arrangements will have to be made for the remote sites to get the presentation, i.e., I will have to go there. It may be possible to tie such presentations into the weekend. What I am trying to say is that there will be some bumps on the information highway. Some of these details are still to be finalized. This is a trial and I think it can work successfully.

The UAF catalog lists several prerequisites for the course. The course prerequisites are a course in DENDROLOGY and ECOLOGY OR CONSENT OF THE INSTRUCTOR. This means, every interested person has an opportunity to take the course but that either the course prerequisites are needed or I must be convinced that the student has the capability of getting at least a letter grade of a B. In the case of non-traditional students, if local knowledge and experience are adequate and appropriate. CONSENT OF INSTRUCTOR will be used. In the past, I have used this approach with good success—students have gotten good grades, but they all worked hard.

For professional foresters and technicians. There is a nationwide effort to Certify Foresters through the Society of American Foresters. There is also similar effort within Alaska being championed by the Alaska Society of American Foresters. The certification effort through 1 December 1997 is essentially a grand fathering procedure; it also allows recertification to use educational activities during a three-year period from both the three years following certification and the three years prior to certification in a period of six years. For recertification, a minimum of 60 Continuing Forestry Education credits, as defined by the Society of American Foresters, is
required during any continuous three-year period of the six. This course can be used for recertification and as I have been advised will result in 45 Continuing Forestry Education Credits (3 semester credit hours x 15 = 45).

There will be several short written assignments that address a specific problem or issue. These will be letter graded only and are part of your overall effort. They typically are to be one page or less. I have two basic rules for you to remember in your endeavors for my classes:

- **3BS**: Balderdash Baffles Brains
- **KISS**: Keep It Short and Sweet or Keep It Simple Stupid!

Note that the two courses run concurrently; the lectures are combined into one. The graduate level course requires everything required for the undergraduate course plus considerably more reading; the written assignments will be read more critically. However, undergraduates should at least make note of of the assigned graduate readings; reading them is supplemental and encouraged, but not required.

**OFFICE HOURS**

I am available at my office, Room 161, Arctic Health Research Building, from 10:00 am until 1:00 pm on Monday's and by appointment. I am also available after class. I AM NOT AVAILABLE FOR ANY REASON AFTER 4:00 PM ANY DAY OF THE WEEK, EXCEPT AS NOTED ABOVE.
NRM 380 - SOILS AND THE ENVIRONMENT
SYLLABUS

Fall - 2005

Objective: NRM 380 introduces the fundamentals of soil science. Most examples and applications will be targeted toward non-agricultural areas, but agricultural consequences also will be outlined in the text and in lecture.

Lecture: Monday and Wednesday 8:00-9:00 AM (Arctic Health Research Building Room 183)

Lab: Wednesday 2:00-5:00 PM (O'Neill Room 359)


Prerequisite: Chemistry 105

Instructor  
Office  
Phone  
E-mail  
Office hours

Dr. Mingchu Zhang  
O'Neill 321  
474-7004  
ffmz@uaf.edu  
MW 9:30-11:00 AM & by appointment

Mr. Bob Van Veldhuizen  
O'Neill 327  
474-5222  nrv@uaf.edu  
M-F 8:00-5:00

Students are expected to read, understand, and adhere to the academic honor code detailed in the UAF Catalog. The University of Alaska is committed to providing equal access for students with disabilities. If you have a disability requiring special accommodations, please notify me during the first two weeks of class.

In order to save copying costs, these handouts and all lecture materials will be available through the UAF Blackboard site at http://classes.uaf.edu. If you cannot access these notes, please let me know.
## NRM-380 SOILS GRADING POLICY

This is a "writing-intensive" course, meaning that a majority of the 768 total points available is based on written assignments and questions. One third of the grade for weekly lab reports and 20% of the final project grade will be determined by the student's ability to write in a clear, concise and correct manner. Each student will be responsible for scheduling at least one personal conference with the instructor concerning his/her writing ability and whether he/she should seek help from the Writing Center. Individual conferences should be scheduled following the first hour exam.

<table>
<thead>
<tr>
<th>Points</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>Hour Exams (3 @ 100 points). Questions will include true-false, multiple choice, problems, and short answer essay. Hour exams generally will not be graded for writing proficiency unless otherwise indicated.</td>
</tr>
<tr>
<td>40</td>
<td>Pop quizzes (4 @ 10 points). These unannounced quizzes are to provide an extra incentive to keep up with reading (text and lab) and class participation. Quizzes will not be graded for writing proficiency unless otherwise indicated.</td>
</tr>
<tr>
<td>30</td>
<td>Problem sets (3 @ 10 points). These are to give you familiarity with certain kinds of calculations.</td>
</tr>
<tr>
<td>198</td>
<td>Lab Reports (11 @ 18 points). Of the 14 labs, 11 will require written reports. Each will be due at the beginning of the next lab, and will be graded 67% on content and 33% on writing. After lab reports have been graded and returned, students will have one week in which they may correct errors in content and/or writing to earn credit for up to 50% of the lost points.</td>
</tr>
<tr>
<td>200</td>
<td>Final Problem (8-10 page written report in lieu of exam). The paper will be assigned and discussed in lab on November 5, and will be graded 80% on content and 20% on writing proficiency. See lab materials for details.</td>
</tr>
<tr>
<td>768</td>
<td>Total possible points</td>
</tr>
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</table>

### Course grade assignments

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Total points</th>
<th>Grade</th>
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<tbody>
<tr>
<td>90-100%</td>
<td>691-768</td>
<td>A</td>
</tr>
<tr>
<td>80-89%</td>
<td>614-690</td>
<td>B</td>
</tr>
<tr>
<td>70-79%</td>
<td>537-613</td>
<td>C</td>
</tr>
<tr>
<td>60-69%</td>
<td>461-536</td>
<td>D</td>
</tr>
<tr>
<td>Date</td>
<td>Lecture Topic</td>
<td>Brady &amp; Weil Chapter</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>07-Sep</td>
<td>1 Introduction to course and soils</td>
<td>1 The Soils Around Us</td>
</tr>
<tr>
<td>12-Sep</td>
<td>2 Soil Formation</td>
<td>2 Formation of Soils From Parent Materials</td>
</tr>
<tr>
<td>14-Sep</td>
<td>3 Soil Structure</td>
<td>4 Soil Architecture and Physical Properties</td>
</tr>
<tr>
<td>19-Sep</td>
<td>4 Soil Water</td>
<td>5 Soil Water: Characteristics and Behavior</td>
</tr>
<tr>
<td>21-Sep</td>
<td>5 Water Relations &amp; Hydrologic Cycle</td>
<td>6 Soil and the Hydrologic Cycle</td>
</tr>
<tr>
<td>26-Sep</td>
<td>6 Atmosphere &amp; Temperature</td>
<td>7 Soil Aeration and Temperature</td>
</tr>
<tr>
<td>28-Sep</td>
<td>7 Soil Classification</td>
<td>3 Soil Classification</td>
</tr>
<tr>
<td>03-Oct</td>
<td>Catch up and review</td>
<td></td>
</tr>
<tr>
<td>05-Oct</td>
<td>EXAM 1 Lectures 1-7, Chapters 1-7</td>
<td></td>
</tr>
<tr>
<td>10-Oct</td>
<td>8 Soil Colloids and Clay Minerals</td>
<td>8 Soil Colloids: Seat of Soil Chemical and Physical Activity</td>
</tr>
<tr>
<td>12-Oct</td>
<td>9 Soil Acidity</td>
<td>9 Soil Acidity</td>
</tr>
<tr>
<td>17-Oct</td>
<td>9 Soil Acidity</td>
<td>9/10 Soils of Dry Regions: Alkalinity, Salinity, and Sodicity</td>
</tr>
<tr>
<td>19-Oct</td>
<td>10 Soil Biology</td>
<td>10/11 Organisms and Ecology of the Soil</td>
</tr>
<tr>
<td>26-Oct</td>
<td>11 Soil Organic Matter</td>
<td></td>
</tr>
<tr>
<td>31-Oct</td>
<td>Catch up and review</td>
<td></td>
</tr>
<tr>
<td>02-Nov</td>
<td>EXAM 2 Lectures 7-11, Chapters 8-12</td>
<td></td>
</tr>
<tr>
<td>07-Nov</td>
<td>12 Nutrient Cycling--N &amp; S</td>
<td>12/13 Nitrogen and Sulfur Economy of Soils</td>
</tr>
<tr>
<td>09-Nov</td>
<td>13 Nutrient Cycling--P &amp; K</td>
<td>13/14 Soil Phosphorus and Potassium</td>
</tr>
<tr>
<td>14-Nov</td>
<td>14 Nutrient Cycling--Micronutrients</td>
<td>13/15 Micronutrients and Other Trace Elements</td>
</tr>
<tr>
<td>16-Nov</td>
<td>15 Nutrient management</td>
<td>14/16 Practical Nutrient Management</td>
</tr>
<tr>
<td>21-Nov</td>
<td>16 Soil Erosion</td>
<td>15/17 Soil Erosion and Its Control</td>
</tr>
<tr>
<td>23-Nov</td>
<td>17 Soils &amp; Pollution</td>
<td>18 Soils and Chemical Pollution</td>
</tr>
<tr>
<td>28-Nov</td>
<td>18 Mapping and global food supply</td>
<td>19 Geographic Soils Information</td>
</tr>
<tr>
<td>30-Nov</td>
<td>19 Permafrost</td>
<td>20 Global Soil Quality as Affected by Human Activities</td>
</tr>
<tr>
<td>05-Dec</td>
<td>Catch up and review, course evaluation</td>
<td>7 Soil Air and Soil Temperature</td>
</tr>
<tr>
<td>08-Dec</td>
<td>EXAM 3 Lectures 12-19, Chapters 13-20</td>
<td></td>
</tr>
<tr>
<td>13-Dec</td>
<td>Review Exam</td>
<td></td>
</tr>
</tbody>
</table>
NRM 380 - SOILS AND THE ENVIRONMENT

FALL 2005

LABORATORY GRADING POLICY & SCHEDULE

Lab Instructor - Bob Van Veldhuizen,
phone - 474-5222 , e-mail - fnrv@uaf.edu
Office Hours - 8:00 AM - 5:00 PM Monday - Friday; 327 O'Neill
Lab Period - 2:00 PM - 5:00 PM Wednesday

The laboratory portion of this course utilizes a handbook that consists of fourteen lab exercises, conversion formulas and references. Each exercise is a standard soils laboratory procedure that can be used for any soil test anywhere. Any modifications to the procedure, such as shortening the time frame due to the length of the lab period, will be noted. As such, it is a valuable resource for all future resource managers. It will be posted on the NRM 380 Blackboard site (http://courses.uaf.edu), and a copy will be on hand for your use in the lab instructors office.

The lab grade will be worth 198 points total. Points can be earned by handing in a completed lab report at the beginning of the next lab period. There will be eleven lab exercises during the semester that require written reports. Each lab exercise will consist of a Data Sheet for recording results and calculations followed by six questions. Each correct question on every lab report is worth three points for a total of 18 points/lab. This is a writing intensive course so each question will be graded 2/3 (67%) on content and 1/3 (33%) on writing. Sometimes there will be supplemental problems or questions to be used for your review and understanding of the material. These questions will not be graded, but they will be discussed at the beginning of the following lab period. (Note: You may find these questions or ones similar to them on lecture exams)

Submitted lab reports will be graded with comments, if any, and may be picked up at the beginning of the lab period one week after they are submitted. You may resubmit a corrected lab report to improve your grade one time only. For each corrected lab report, you will receive in addition to your original score, half (50%) of the total corrected points. Corrected lab reports will only be accepted up until the beginning of the next lab period. You can come and discuss any questions/corrections with me in my office between 8:00 AM and 5:00 PM Monday - Friday, (please call ahead to make an appointment). Please make an effort to do it sometime other than during the lab in which the corrected labs were handed back as there isn't always enough time to cover everything in lab in addition to correcting old labs.

(EXAMPLE: Completed lab reports for Lab Exercise # 2 should be handed in at the beginning of lab # 3. They will then be graded and may be picked up at the beginning of lab # 4 during which time you should also be handing in a completed report for lab # 3. Any corrections you may wish to make to lab # 2 to improve your grade can then be turned in at any time between lab # 4 and the next lab period, lab # 5.)
There will be no makeup labs for unexcused absences. If you have a university related activity such as athletics, field trips, etc., then see me well in advance to set up a time that will fit both our schedules. Otherwise, if you miss all or part of a lab, you are responsible for obtaining any information from your lab partner. **Unexcused late lab reports or late corrected labs will not be accepted and will receive 0 points.**

Please leave your work area and equipment clean. There are other classes that use this lab area. If any of your equipment or glassware is lost or broken, notify your lab instructor immediately. We will not charge anyone for broken equipment, but we must follow special safety procedures for disposal of broken glassware, and we will need to replace broken equipment.

**LABORATORY SCHEDULE**

<table>
<thead>
<tr>
<th>Date</th>
<th>Lab Exercise</th>
<th>Content</th>
<th># of Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 7</td>
<td>Lab # 1</td>
<td>Soil Texture by the Feel Method</td>
<td>*</td>
</tr>
<tr>
<td>September 14</td>
<td>Lab # 2</td>
<td>Determining Soil Texture by the Bouyoucos Hydrometer Method</td>
<td>18</td>
</tr>
<tr>
<td>September 21</td>
<td>Lab # 3</td>
<td>Soil Bulk Density, Particle Density &amp; Percent Pore Space</td>
<td>18</td>
</tr>
<tr>
<td>September 28</td>
<td>Lab # 4</td>
<td>Field Capacity, Wilting Point &amp; Permeability</td>
<td>18</td>
</tr>
<tr>
<td>October 5</td>
<td>Lab # 5</td>
<td>Determining Available Soil Moisture</td>
<td>18</td>
</tr>
<tr>
<td>October 12</td>
<td>Lab # 6</td>
<td>Cation Exchange Capacity</td>
<td>18</td>
</tr>
<tr>
<td>October 19</td>
<td>Lab # 7</td>
<td>Soil pH, Lime Requirements &amp; Conductivity</td>
<td>18</td>
</tr>
<tr>
<td>October 26</td>
<td>Lab # 8</td>
<td>Soil Organic Matter &amp; Color</td>
<td>18</td>
</tr>
<tr>
<td>November 2</td>
<td>Lab # 9</td>
<td>Information Retrieval from Soil Survey Reports &amp; Soil Taxonomy (Final Projects Handed Out)</td>
<td>*</td>
</tr>
<tr>
<td>November 9</td>
<td>Lab # 10</td>
<td>Nutrient Modeling (Soil Microbiology - week 1)</td>
<td>18</td>
</tr>
<tr>
<td>November 16</td>
<td>Lab # 11</td>
<td>Soil Microbiology - week 2</td>
<td>18</td>
</tr>
<tr>
<td>November 23</td>
<td>Lab # 12</td>
<td>Soil Fertility Tests - Phosphorus Fixation (1st Rough Draft Due)</td>
<td>18</td>
</tr>
<tr>
<td>November 30</td>
<td>Lab # 13</td>
<td>Soil Fertility Tests - Available Nitrogen</td>
<td>18</td>
</tr>
<tr>
<td>December 7</td>
<td>Lab # 14</td>
<td>Soil Sampling (Final Project Due)</td>
<td>*</td>
</tr>
</tbody>
</table>

**Total Number of Points for Lab = 198 points**

(* - Lab Report not required for grade)
NRM 370 WATERSHED MANAGEMENT Fall 2005


Class Meets Tue & Thur. 9:45-10:45 am. O’Neill 359; Lab Session: Mon. 2-5pm.

   Homework: Water units and solving problems Handout+Brks551-2

Sept.05 Labor Day -- No Class

06    Problem Solving -- Units in hydrology

08    The Watershed: Systems Thinking - Open Systems. Handout

Sept.12 Field Trip -- TBA: (Harding Lake or Cache Creek)


15    Radiation Balance

Sept.19 Field Trip -- Spinach Creek - Stream gauging- Handout + Brooks pp. 88-105

20    Energy Budget - Water Budget Interaction Brooks: pp.47-51

22    Watershed Input - Precipitation, Atmospheric Moisture. Brks Ch.2

Sept.26 Lab: Watershed Morphology/description/ maps Handout+Brks Chap.10

27    Catch Up

29    Snow -- Brooks: Chap. 15

Oct. 03 Lab: Lapse rate/precipitation problems

04    Review

06    EXAM #1

Oct. 10 Lab: Snowmelt: Brooks: Chap. 15


13    Infiltration / soil hydrologic properties Brooks: pp. 77-88

Oct. 17 Lab: Soil Moisture Handouts  ***Oct. 17 Last Day to apply for Fall Graduation

18    Evaporation and Transpiration Brooks: Chap. 3

20    Vegetation and the Hydrologic Cycle Brooks: Chap. 6

Oct. 24 Lab: Local Water Budget calculations Handout

25    Groundwater and Streamflow Brooks: Chap. 4 pp. 88-105; Chap. 5

27    Streamflow Production: some theories

Oct. 31 Lab: Groundwater & Groundwater Quality - DRASTIC Index

Nov. 01 Channel Dynamics -- Brooks: Chap. 9

03    Streamflow: the hydrograph


08    Review

10    EXAM #2

Nov. 14 Lab: Erosion and sedimentation Brooks: Chap. 7

15    Erosion - mass wasting/landslides Brooks: Chap. 8

17    Water Quality - Temperature & Dissolved Oxygen Brooks: Chap. 11

Nov. 21 Lab: Fish Habitat Considerations Handout


24    Thanksgiving Holiday

Nov. 28 Lab: Riparian Buffer design: Brooks: Chap. 13

29    Economics of Watershed Management Brooks: Chap. 19

Dec. 01 Ak State Forest Practices Act Handouts

Dec. 05 Lab: Cumulative Impacts Handouts

06    Planning and Appraisal/Watershed Analysis Brooks: Chap. 19 08    Review

Dec. 12 TBA

Dec. 17 Final Exam 8:00-10:00 a.m.
1. Develop appreciation and understanding of the linkage between the terrestrial and aquatic systems - between land and water.

2. Develop a working knowledge of hydrology.
   a. familiarization with terms and units of hydrology
   b. ability to calculate & understand the local water balance
   c. knowledge of major mechanisms of soil erosion (by water) and factors influencing non-point source water pollution.
   d. knowledge of what information is needed to solve watershed management problems and where to find it.

3. Develop ability to interpret land-use activities in terms of hydrologic processes -- Deduce or predict the nature and relative seriousness of impacts of land-use on hydrologic systems.

4. Develop appreciation of multidisciplinary nature of watershed management
   a. role of science & technology
   b. role of economics
   c. role of politics & law
   d. role of people
NRM 375 - Forest Ecology

Instructor - John Yarie
Lectures - M and W 11:45A-12:45P (301 Gruening)
Lab - TH 2:00-5:00P (359 O'Neill)
Office Hrs - 337 O'Neill, 8A – 11A MTWT.
Telephone No. - 474-5650
Email - jyarie@forest.liter.uaf.edu

Course Objectives

This course focuses on the processes and environmental factors that drive forest establishment, growth, and change. Lectures will provide students information and examples on these processes and factors. Examples from major forest ecosystem types including tropical, temperate, and boreal forest, will be presented. The lab provides students the opportunity to view, measure, and collect data from interior Alaska boreal forests and synthesize their observations.

Lectures will cover the basic concepts of forest ecology. Major areas of emphasis will be on: (a) community concepts, (b) ecosystem concepts, and (c) environmental factors and the effects they have on individual tree species and community structure and function. Each lecture will have corresponding reading assignments that should be completed prior to the lecture. Class discussions on selected reading assignments will occur periodically. Students are responsible for all information covered in lectures, reading assignments, and discussions. Students will also be assigned 3 response papers for discussion. Writing assignments will consist of 2-3 page papers responding to questions and/or discussion readings.

The lab will combine field measurement activities, field trips, and laboratory analysis. The first 6 weeks will take place in the field where groups will take various forest measurements and collect samples for laboratory analysis. During this period we will take one Saturday field trip, focusing on interior Alaska ecosystems and the factors and processes that control them. We will also tour the University Arboretum with Dr. John Alden, discussing other forest types and communities. Students should be prepared to work in inclement weather conditions (both rain and potentially snow). Data analysis will be performed during the remainder of the semester, concluding with the submission of a report by each student describing the ecology of his or her forest stand. The final lab will take place in the GIS lab where we will look at landscape ecology issues using landscape-level GIS data and remote sensing imagery.
# Forest Ecology (NRM375)

## Lecture Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Assignment</th>
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<tbody>
<tr>
<td>Sept. 10</td>
<td>Introduction – Concepts</td>
<td>Chapters 1 &amp; 2</td>
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<tr>
<td>Sept. 12</td>
<td>Ecology and the Ecosystem Concept</td>
<td>Barnes et al Chapter 1</td>
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<td>Kimmins Chapter 3</td>
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<tr>
<td>Sept. 17</td>
<td>Forest Trees, Structure and Growth</td>
<td>Barnes et al. Chapters 4 &amp; 6</td>
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<tr>
<td>Sept. 19</td>
<td>Light</td>
<td>Chapter 7</td>
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<tr>
<td>Sept. 24</td>
<td>Temperature</td>
<td>Chapter 8</td>
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<tr>
<td>Sept. 26</td>
<td>Wind, Physiography</td>
<td>Chapter 9</td>
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<tr>
<td>Oct. 1</td>
<td>Moisture / Water</td>
<td>Chapter 11</td>
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<td>Barnes et al Chapter 10</td>
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<tr>
<td>Oct. 3</td>
<td>Soil – part 1</td>
<td>Chapter 10</td>
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<tr>
<td>Oct. 8</td>
<td>Soil – part 2</td>
<td>Chapter 10</td>
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<tr>
<td>Oct. 10</td>
<td><strong>First Exam</strong></td>
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<tr>
<td>Oct. 15</td>
<td>Diversity</td>
<td>Barnes et al Chapter 20</td>
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<tr>
<td>Oct. 17</td>
<td>Disturbance</td>
<td>Chapter 12</td>
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<tr>
<td>Oct. 22</td>
<td>Regeneration</td>
<td>Barnes et al. Chapter 5</td>
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<tr>
<td>Oct. 24</td>
<td>Production Ecology</td>
<td>Chapter 4</td>
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<tr>
<td>Oct. 29</td>
<td>Population Ecology</td>
<td>Chapter 13</td>
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<tr>
<td>Oct. 31</td>
<td>Community Ecology</td>
<td>Chapter 14</td>
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<tr>
<td>Nov. 5</td>
<td>Climate &amp; Global Warming</td>
<td>Barnes et al. Chapter 18</td>
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<tr>
<td>Nov. 7</td>
<td>Review and Catch-up</td>
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<tr>
<td>Nov. 12</td>
<td><strong>Second Exam</strong></td>
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<tr>
<td>Nov. 14</td>
<td>Succession</td>
<td>Chapter 15</td>
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<tr>
<td>Nov. 19</td>
<td>Nutrient Cycling</td>
<td>Chapter 5</td>
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<tr>
<td>Date</td>
<td>Topic</td>
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<tr>
<td>Nov. 21</td>
<td>Nutrient Cycling</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Nov. 26</td>
<td>Ecosystem Classification</td>
<td>Chapter 16</td>
</tr>
<tr>
<td>Nov. 27</td>
<td>Ecological Modeling</td>
<td>Chapter 17</td>
</tr>
<tr>
<td>Dec. 3</td>
<td>Forest Management and Renewability</td>
<td>Chapter 18</td>
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<tr>
<td>Dec. 5</td>
<td>Landscape Ecology</td>
<td>Barnes et al. Chapter 21</td>
</tr>
<tr>
<td>Dec. 10</td>
<td>Ecosystem Project - <em>FORTOON Model</em></td>
<td>Assign. Readings</td>
</tr>
<tr>
<td>Dec. 12</td>
<td>Ecosystem Project - <em>FORTOON Model</em></td>
<td>Assign. Readings</td>
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<tr>
<td></td>
<td>- Lab Report Due</td>
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</tr>
<tr>
<td>Dec. 17</td>
<td>Final Exam 10:15AM-12:15PM</td>
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</table>
# Laboratory Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Sept. 6</td>
<td>Introduction - Field Methods and Equipment</td>
</tr>
<tr>
<td>Sept. 13</td>
<td>Field Measurements – Plot #1</td>
</tr>
<tr>
<td>Sept. 20</td>
<td>Field Measurements – Plot #1 Vegetation and Forest Floor Sampling</td>
</tr>
<tr>
<td>Sept. 27</td>
<td>Field Measurements – Plot #2</td>
</tr>
<tr>
<td>Sept. 29</td>
<td>Field Trip - Bonanza Creek Experimental Forest (8:00AM - 5:00PM)</td>
</tr>
<tr>
<td>Oct. 11</td>
<td>Field Measurements – Plot #2 Vegetation and Forest Floor Sampling</td>
</tr>
<tr>
<td>Oct. 18</td>
<td>Computer analysis of field data</td>
</tr>
<tr>
<td>Oct. 25</td>
<td>Laboratory Analysis - Soils and Start foliage analysis</td>
</tr>
<tr>
<td>Nov. 1</td>
<td>Tree Ring Measurements and Growth Analysis - Juday</td>
</tr>
<tr>
<td>Nov. 8</td>
<td>Laboratory Analysis – C and N concentrations in age sequence of foliage</td>
</tr>
<tr>
<td>Nov. 15</td>
<td>Computer Analysis based on Field Sampling</td>
</tr>
<tr>
<td>Nov. 29</td>
<td>Landscape Mapping - Verbyla</td>
</tr>
<tr>
<td>Dec. 6</td>
<td>FORTOON Model</td>
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<tr>
<td>Dec. 13</td>
<td>FORTOON Model</td>
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</tbody>
</table>
Grading

Your course grade consists of the following:

3 Exams (2 midterms and final) 50%
3 Response articles 15%
Lab report 35%
Total 100%

Grade Structure
A - 90 to 100
B - 80 to 89
C - 70 to 79
D - 60 to 69
F - ≤ 59
Attendance

The student is responsible for all material distributed and presented in lectures and laboratory. Lecture attendance is very important. You will not score well on the response papers or class project unless you consistently attend lectures. Laboratory attendance is mandatory; please plan on attending each laboratory session. You will be part of a group and your lack of participation not only reflects upon you, but your entire group.
Forest Ecology Assignment Schedule:

Assignment 1 due - 9/14/01
Assignment 2 due - 10/1/01
EXAM 1 on - 10/10/01
Assignment 3 due - 10/22/01
Exam 2 Review - 11/7/01
Assignment 4 due - 11/12/01
EXAM 2 - 11/12/01
Assignment 5 - due 12/3/01
Lab Report Due - 12/7/01 or sooner
Final Exam Review - 12/12/01
FINAL EXAM - 12/17/01
NRM 375 Lab Report

Each student will be required to complete a comprehensive lab report, discussing all aspects of the work conducted in the field and laboratory portions of this course. The report represents a substantial part of your course grade (35%), and its quality should reflect this. The report should present a complete picture of the ecology of your forest stand, presenting the results of your measurements and discussion of those results within the context of the topics covered in lecture throughout the semester.

The report should include an introduction, methods section, results, and discussion section. You will be expected to: (1) describe your plot from an ecosystem perspective, (2) compare your plot to the other plot(s) inventoried in lab, and (3) compare your plot to information available for forests of interior Alaska. The report should be approximately 8-10 pages in length, plus tables, figures, and literature cited. All units of measurement should be metric (i.e., hectares, cubic meters, etc.). The lab report is due December 7, 2001.

The introduction section of your report should provide a general description of the structure and function of the forest community type (from Viereck et al. 1992) you inventoried. Information you may want to include in the introduction section is:

- Species composition
- Disturbance regime
- Regional climate
- Successional pathway
- Important biotic controls

The methods section should provide a concise (but complete) description of what you measured and how you measured it. You should try and limit the length of the methods section to two or three pages. The methods section should be followed by your inventory results. The following information could be you included in the results section:

- Stem density
- Volume of merchantable timber
- Biomass of the vegetation
- HV-profile
- Downed wood information
- Diversity indices
- Stand age
- Growth rate of sampled trees
- Foliage chemistry
• Forest floor biomass
• Mineral soil chemistry

The results section could be the area in which a number of tables are referenced that will display your results.

Finally, the discussion section of your report should highlight the major results from your inventory analysis and compare these results to the results from the other site(s) inventoried in lab, and to information available for forests of interior Alaska.

Below you will find a list of selected references that may be useful:

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**References**


Fall 2005

NRM338, Geog338 Introduction To Geographic Information Systems

http://nrm.salm.uaf.edu/~dverbyla/nrm338/

3 credits: 2 lectures, 1 computer lab per week
Lectures: Tuesday/Thursday, 11:30-1 PM Natural Sciences Room 202
Lab: Tuesday 2-5PM or Tuesday 6-9PM O'Neill 359 or Wednesday 2-5PM
Instructor: Dave Verbyla, Professor, O'Neill Building, Room 366
Phone: 474-5553 (but Email is much preferred instead of telephone tag!)
Email: D.Verbyla@uaf.edu.

Dave's Office Hours: O'Neill 366 Thursday 1:30-2:30 PM or by email appointment.
Email: D.Verbyla@uaf.edu.

Teaching Assistant: Pete Hickman
Email: peter.hickman.ctr@eielson.af.mil

Course Description: This course is designed for geographers, wildlife biologists, fisheries biologists, ecologists, natural resource managers, geologists and field-oriented professionals who use spatial technologies in their jobs. Spatial technologies are especially important in Alaska, where road-access is typically limited. Our emphasis in this course is on obtaining and using Alaskan geographic data.

You should have basic computer skills and basic algebra (especially for conversion from English to metric units) before you take this course. The course is cross-listed as NRM/Geog, so if a Geog 338 lab that you want is full, it may have an opening in the NRM338 section at the same time.

Course Objectives:

1) To learn how spatial technologies such as Global Positioning Systems (GPS), Geographic Information Systems (GIS), and satellite imagery can be used in natural resources management.

2) To understand basic concepts independent of any particular software.

3) To learn ArcView3.3 GIS through hands-on computer lab exercises.

4) To learn how to obtain and process GIS data such as scanned topo maps, satellite images, GPS locations, and elevation data.

Grading: Late assignments will not be accepted!

Based on total points from the following:

• 6 Homework Assignments: 20 points each = 120 points
16 Reading Assignments (see below): 20 points each = 320 points
10 Open-note, open-book quizzes based on labs, lectures, readings: 20 points each = 200 points
On-line Final Exam: 100 points
Total points possible = 640 points

Final grades will be based on total points earned in the course as follows:

> 585 total points = A
545 to 585 total points = B
450 to 544 points = C
385 to 449 total points = D
< 385 total points = F

Disability Services: We will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide reasonable accommodation to any student with a disability.

Please inform us the first week of class if you have a disability that we should be aware of.

Textbook: Getting to Know Arcview GIS (ESRI Press), and web site readings
(Available from amazon.com, esri.com, and UAF bookstore)

Reading Assignments due noon of due date

You can email your completed reading assignments, but I must receive them before the due date.

Solutions to all reading assignments will be posted the day after due date.

Map Projections: Due by Tuesday September 6
GeoExplorer3: Due by Tuesday September 13
Arcview Book Chapters 4-6: Due by Tuesday September 20
Arcview Book Chapters 7-9: Due by Tuesday October 3
Digital Raster Graphic Maps: Due by Tuesday October 11

DEM's: Due by Tuesday October 18
Arcview Book Chapters 15-16: Due by Tuesday October 26
Digital Line Graphs: Due by Tuesday, November 1
Arcview Book Chapters 21-22: Due by Tuesday November 8
Arcview Book Chapters 23-25: Due by Tuesday November 15

GPS: Due by Thursday September 8
Arcview Book Chapters 1-3: Due by Thursday September 15
Remote Sensing: Due by Thursday September 22
Arcview Book Chapters 10-12: Due by Thursday October 5
Arcview Book Chapters 13-14: Due by Thursday October 14
Arcview Book Chapters 17-20: Due by Thursday, October 28
<table>
<thead>
<tr>
<th>Date</th>
<th>Lectures</th>
<th>Lab</th>
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<tbody>
<tr>
<td>Sept. 1</td>
<td>Introduction</td>
<td>Lab 1: Generating and projecting polygons</td>
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<td></td>
<td>Reading assignment due on Tuesday</td>
<td>Lab 2: GPS</td>
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<tr>
<td>Sept. 6-8</td>
<td>Tues Lecture: Map coords/projection</td>
<td>Lab 3: GPS to GIS</td>
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<td>Thurs Lecture/Quiz: Map Systems assignment</td>
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<tr>
<td>Sept. 13-15</td>
<td>Tuesday Lecture</td>
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<td>Thurs. Lecture/Quiz #2</td>
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<td>Sept. 20-22</td>
<td>Tuesday Lecture</td>
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<td>Thursday: Affine Transformation Assignment /Quiz #3</td>
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<td></td>
<td>Tuesday Lecture</td>
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<td>Sept. 27-29</td>
<td>Thursday Lecture, Landsat ETM+ Order Assignment /Quiz #4</td>
<td>Lab 4: Image Rectification</td>
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<tr>
<td>Oct. 4-6</td>
<td>Tuesday Lecture</td>
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<td>Thursday Lecture/Quiz #5</td>
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<td>Oct. 11-13</td>
<td>Tuesday Lecture</td>
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<td>DRGs, go over Lab 6</td>
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<td>Thursday Lecture/Quiz #6</td>
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<td>Oct. 18-20</td>
<td>Tuesday Lecture</td>
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<td></td>
<td>Digital Elevation Models</td>
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<td></td>
<td>Thursday Lecture /Quiz #7</td>
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<td>Oct. 25-27</td>
<td>Tuesday Lecture</td>
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<td></td>
<td>Grid Operations Assignment</td>
<td>Lab 7: Elevation Data</td>
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<td>Thursday Lecture/Quiz #8</td>
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<td>Nov. 1-3</td>
<td>Tuesday Lecture</td>
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<td></td>
<td>Feature Analysis Assignment</td>
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<td></td>
<td>Thursday Go over Quiz #8 /Quiz #9</td>
<td>Lab 8: Grid Analysis</td>
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<tr>
<td>Nov. 8-10</td>
<td>Tuesday Lecture</td>
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<td></td>
<td>Thursday Lecture/Quiz #10</td>
<td>Lab 9: DLGs, Building and Selecting Polygons</td>
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<td>Nov. 15-17</td>
<td>Tuesday Lecture</td>
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<tr>
<td></td>
<td>Go Over Quiz #10/Take Quiz 11</td>
<td>Lab 10: Heads-Up Digitizing Raster to Vector Conversion</td>
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<td>Nov. 22</td>
<td>Thanksgiving Week: No labs/lectures/quiz</td>
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<td>Tuesday Lecture</td>
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<td></td>
<td>Go over Quiz 11 solutions.</td>
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<tr>
<td>Nov. 29-</td>
<td>Thursday Lecture</td>
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<tr>
<td>Dec 1</td>
<td>Go over example final exams</td>
<td>Lab 11: ArcView:Feature Analysis</td>
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<td></td>
<td>Course Evaluation</td>
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<tr>
<td>Dec. 7-9</td>
<td>No lectures: Study and take exam in ONEILL 359</td>
<td>Lab 12: ArcView: Tabular Analysis</td>
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<tr>
<td></td>
<td>computer lab On-Line Exam By Dec. 16, 2005</td>
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</tbody>
</table>

Email: Dave Verbyla (D.Verbyla@uaf.edu).

Page last updated August 2005.
NRM 304 Course Syllabus

Perspectives in Natural Resources Management

Fall Semester 2005

AHRB 183

Instructors:

David Valentine (coordinator)  
Associate Professor of Forest Soils  
309 O’Neill Building  
Office hours: TBD (or by appointment)

Phone: 474-7614  
Email: ffdwv@uaf.edu

Steve Sparrow  
Professor of Agronomy and Assoc. Dean  
315 O’Neill Building

Phone: 474-7620  
Email: stephen.sparrow@uaf.edu

Julie Lurman  
Assistant Professor of Natural Resource Law  
364 O’Neill Building

Phone: 474-6794  
Email: ffjil@uaf.edu

If you have a physical or learning disability, please advise the course coordinator in writing of any necessary special consideration by the beginning of the 2nd week of class. We will do everything reasonable possible to accommodate you in accordance with the Americans with Disabilities Act and university policy.

NRM 304 is an upper division, capstone class. The emphasis is on discussion and active learning, not lecture and passive learning. Class participation is essential for the successful completion of this course. Your grade and success in the class depend on you and how well you participate. The instructors will do all they can to provide the atmosphere necessary for challenging discussions.

See “NRM 304 Course Schedule” for a daily schedule of events, assignments, etc. grading policy, descriptions of expectations for different components of the course, and general descriptions of the topics we will cover.
GENERAL COURSE INFORMATION

**Course goal:** Provide the student with the tools necessary to make natural resource management decisions in the face of complexity, uncertainty, and competing values and to enhance students' critical thinking skills.

**Course objective:** By the end of this course, you should be able to:

- Articulate and apply the foundations (science, economics, ethics/values, and policy) upon which natural resource management decisions are made.
- Apply critical thinking skills when evaluating information and be able to distinguish between fact, theory, and opinion.
- Independently find **reliable** sources of information to support positions in natural resource issues.
- Deliver clear analysis and persuasive presentations, both orally and in writing.
- Discuss and use a variety of techniques employed by resource managers in decision-making.
- Appreciate the broad array of perspectives on resource management issues.

**Blackboard:** This course will make extensive use of Blackboard (http://classes.uaf.edu) for archiving class notes and reading materials, submitting assignments (via drop box), retrieving grades, and updating your course progress. Please check it regularly for announcements and updates.

**E-mail:** We occasionally will need to contact you between class periods via e-mail. We will use your official UAF e-mail address to contact you. If you prefer to use a different e-mail address (such as @ Hotmail, Yahoo, etc.), you can set your UAF e-mail account to forward e-mail messages to the account through usermin (https://mail.uaf.edu:20000/). If you have not used your UAF e-mail account before, you need to have it set up by going to https://USERNAME.email.uaf.edu/webmail where USERNAME is the first part of your e-mail address (e.g. fxxyrz2 if your e-mail address is fxyyz2@uaf.edu). If you do not know your user name or run into trouble setting up the account, contact the UAF help desk at fxhrelp@uaf.edu or 907 474-6564.

**Issues:** The instructors and invited guests will present topical natural resource issues and cases that will highlight the foundations of decision-making in natural resources management.
Natural Resources Measurement and Inventory
NRM 340 – 3 credits
Fall Semester 2005

Course Information
Location: 359 O’Neill
Meeting Time: Lecture - WF 10:30-11:30; Lab - F 2:00-5:00
Prerequisites: Junior class standing or permission of the instructor.

Instructor
Dr. Scott Rupp, 368 O’Neill; x7535; ffsr@uaf.edu; office hrs WF 11:30-12:30 or by appointment

Course Materials
Textbook: There is NO required text for this course. Course material will be provided as handouts in class, links on the web, and/or on reserve in the library.
Website: http://www.faculty.uaf.edu/ffsr/Classes/nrm340.html

Course Description
This course is intended to familiarize students with terminology, tools, and techniques used in measuring and taking inventory of natural resources including land, timber and vegetation, and wildlife resources. The course has been designed to develop basic inventory field skills and student appreciation for the relationship between field measurements and resource management problem solving.

The lecture component of this course will focus on the theory and application of inventory techniques to assess natural resource availability and condition, and develop an understanding of their use to meet management objectives. The course will focus on the measurement and inventory of timber and associated vegetation, but will also introduce students to other resource inventory methods and techniques.

The lab component of this course will focus on traditional and state-of-the art equipment and methods used for inventory of timber and vegetation. In addition the students will learn how to utilize and synthesize measurement and inventory data to solve natural resource management problems.

Course Goals/Learning Objectives
- Learn how to measure various tree characteristics
- Learn how to use maps
- Learn how to use a compass and GPS
- Learn how to calculate tree volume, biomass and fuel loadings
- Provide introduction/overview of statistical and sampling theory
- Learn how to conduct basic forest inventories
- Provide introduction/overview of wildlife sampling theory
- Learn how to sample vegetation characteristics including diversity measures
- Learn how to use spreadsheets
- Learn how to calculate and project tree growth
**Instructional Methods**
The lab component of this course is best thought of as a block of time available, as needed, for demonstrations, fieldwork, guest speakers, student activities, problem solving, or lecture. If the lab session is used by the instructor for lecture, no longer than 1.5 hours will be involved.

Most labs and several lecture periods will be conducted outside regardless of weather conditions (within reason). Please be prepared for rain, snow, and/or cold temperatures.

Homework and reading assignments will be assigned in class.

**Course Schedule**
This schedule is subject to change based upon the progress and interests of the students.

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Lecture</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Sep 02</td>
<td>Introduction</td>
<td>Spreadsheets</td>
</tr>
<tr>
<td>W</td>
<td>Sep 07</td>
<td>Measurement Concepts</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Sep 09</td>
<td>Vegetation Sampling; Fuel Loads</td>
<td>Veg. Sampling; Fuel Loads</td>
</tr>
<tr>
<td>W</td>
<td>Sep 14</td>
<td>Measuring Trees</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Sep 16</td>
<td>Measuring Trees</td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>Sep 21</td>
<td>Forest Inventories</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Sep 23</td>
<td>Fixed Area Sampling</td>
<td>Fixed Area Sampling</td>
</tr>
<tr>
<td>W</td>
<td>Sep 28</td>
<td>Forest Inventories</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Sep 30</td>
<td>Point Sampling</td>
<td>Point Sampling</td>
</tr>
<tr>
<td>W</td>
<td>Oct 05</td>
<td>Forest Inventories</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Oct 07</td>
<td>GPS; Maps</td>
<td>GPS; Maps</td>
</tr>
<tr>
<td>W</td>
<td>Oct 12</td>
<td>Survey Systems</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Oct 14</td>
<td>Compass; Maps</td>
<td>Compass; Maps</td>
</tr>
<tr>
<td>W</td>
<td>Oct 19</td>
<td><strong>Midterm Exam</strong></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Oct 21</td>
<td>Statistics</td>
<td>Statistics</td>
</tr>
<tr>
<td>W</td>
<td>Oct 26</td>
<td>Statistics</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Oct 28</td>
<td>Statistics; Sampling</td>
<td>Statistics; Sampling</td>
</tr>
<tr>
<td>W</td>
<td>Nov 02</td>
<td>Sampling</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Nov 04</td>
<td>Sampling</td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>Nov 09</td>
<td>Calculating Tree Volume</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Nov 11</td>
<td>Calculating Tree Volume</td>
<td>Calculating Tree Volume</td>
</tr>
<tr>
<td>W</td>
<td>Nov 16</td>
<td>Measuring and Calculating Biomass</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Nov 18</td>
<td>Tree Growth</td>
<td>Tree Growth</td>
</tr>
<tr>
<td>W</td>
<td>Nov 22</td>
<td>Measuring and Calculating Diversity</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Nov 24</td>
<td><strong>THANKSGIVING BREAK</strong></td>
<td>NO LAB</td>
</tr>
<tr>
<td>W</td>
<td>Nov 30</td>
<td>Calculating Fuel Loads</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Dec 02</td>
<td>Wildlife Measurements</td>
<td>Wildlife Measurements</td>
</tr>
<tr>
<td>W</td>
<td>Dec 07</td>
<td>Wildlife Measurements</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Dec 09</td>
<td>Review</td>
<td>Advanced Spreadsheets</td>
</tr>
<tr>
<td>F</td>
<td>Dec 14</td>
<td><strong>Final Exam – 10:15-12:15</strong></td>
<td></td>
</tr>
</tbody>
</table>
Course Policies
The student is responsible for all material distributed and presented in lectures and laboratory. Lecture attendance is very important. You will not score well on homework assignments or exams unless you consistently attend lectures. Laboratory attendance is MANDATORY; please plan on attending each laboratory session.

Grading Policy
The grade received in this course will be based upon performance on exams, quizzes, homework and lab assignments, and attendance. The following weighting scale will apply:

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Homework</td>
<td>15%</td>
</tr>
<tr>
<td>Lab Assignments</td>
<td>35%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

The following grading scale will apply:

- A - 91 to 100
- B - 81 to 90
- C - 71 to 80
- D - 61 to 70
- F - ≤ 60

The instructor reserves the right to modify the final grade in consideration of notable progress demonstrated by an individual, or unforeseen and extenuating circumstances. In such cases, extra credit assignments and/or makeup work may be used at the discretion of the instructor. Homework and lab assignments handed in after the due dates will receive reduced credit.

Students are expected to read, understand, and adhere to the academic honor code detailed in the UAF Catalog.

Disabilities Services
The University of Alaska Fairbanks is committed to providing equal access for students with disabilities. The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. I will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide reasonable accommodation to students with disabilities. If you have a physical or learning disability, please advise me in writing of any special consideration necessary by the beginning of the second class. I will do everything possible to accommodate you in accordance with the Americans with Disabilities Act.
NRM 365 – Outdoor Recreation Management

Fall 2003 Course Syllabus

Instructor: Dr. Peter J. Fix
Time: 5:30 p.m. to 7:00 p.m. M&W
Location: 174 Arctic Health
Office: 323 O’Neill
Office hours: 2-4:30 p.m. M&W
Telephone: 474-6926
E-mail: fipjf@uaaf.edu

Course Goals and Objectives

The goal of this course is to have students become familiar with the concepts that form the contemporary foundation of outdoor recreation management. To achieve this goal, the course will discuss the theoretical background of the concepts, empirical findings related to the concepts, and the “on-the-ground” management implications. The concepts discussed will lead to an introduction to recreation planning frameworks. This course is a writing intensive course and, therefore, several papers will be required.

Readings


Supplemental readings will be assigned for some sessions. The readings will be made available before the relevant class periods.

Papers

There will be a series of short papers and a research project required.

*Personal perspectives papers / journal:* For the class periods noted in the syllabus, short papers are required regarding your perspective on the day’s topic. Ideally, these papers will be based on your personal experience with the topic. For example, if crowding is the topic, you can discuss an example of an experience in which you felt crowded. However, if unable to come up with a relevant past experience, an issue of interest to you currently in the news can be used. The minimum length for these papers is 500 words. However, there is no limit on the length. The papers are to be made into a journal over the course of the semester.

Since these papers are your personal perspectives, there is no “right” or “wrong” content (assuming it’s related to the topic). The personal perspective papers will be evaluated by the thought and effort put forth and writing quality.
Research paper: You will be allowed to work in a group of two on this project. The end result of this project is a 12-15 page paper (12 pt. font, double spaced, and one inch margins) that goes in depth into one topic / area. You are free to select your topic area, but choosing too broad of a topic will make this assignment difficult. The final paper should include references for facts cited in the text. A minimum of 10 references is expected. A thorough presentation (10 to 15 minutes) will be required. The presentations will take place during the last week of classes, and the research paper will be due during finals week. I will give feedback on your ideas for the paper – providing you start early!

Since this is a writing intensive course, the research paper will be graded on writing quality as well as content. The research paper should be in APA format, including references (see handout for example of APA format).

Leading Class Discussion

Each student will be expected to use the ideas put forth in their personal perspectives paper to lead a class discussion. When leading class discussion, it is expected that research will be conducted beyond the 500 word minimum required for the paper. The topics for the class discussion will be assigned early in the semester so the students can plan appropriately for their discussion.

Class Participation

It is expected that students not only attend class, but show up prepared and ready to participate in discussions. Class participation will be a component of the final grade.

Grading

The final grade will be based on a combination of the short papers, a take home exam, the research project, and class participation. The composition of the final grade is as follows:

<table>
<thead>
<tr>
<th>Components of grade</th>
<th>Requirements for letter grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Perspective papers</td>
<td>Grade</td>
</tr>
<tr>
<td>Leading class discussion</td>
<td>A</td>
</tr>
<tr>
<td>Midterm (take home)</td>
<td>B</td>
</tr>
<tr>
<td>Research paper</td>
<td>C</td>
</tr>
<tr>
<td>Presentation of research paper</td>
<td>D</td>
</tr>
<tr>
<td>Class participation</td>
<td>F</td>
</tr>
<tr>
<td>Total:</td>
<td></td>
</tr>
</tbody>
</table>

a. Most likely ½ points will not be awarded, but in such an event the point totals will be rounded to the nearest whole value, e.g., 449.5 would become 450.
Course schedule

September 8 – Introduction to course
- Discuss why are you taking / studying recreation management
- Look over topics in syllabus and choose a topic of interest for your class discussion
- \textit{Personal perspective paper due on 10\textsuperscript{th} \rightarrow example of need for recreation management}

September 10 – History / purpose of recreation field
- Manning Ch. 1
- Assign periods for students to lead class discussions

September 15 – Social aspects of outdoor recreation
- Manning Ch. 2

September 17 – Guest speaker: Randy Rodgers, Alaska Department of Fish and Game

September 22 – Guest speaker: Randy Goodwin, Bureau of Land Management (may be on the 24\textsuperscript{th} or 29\textsuperscript{th})
- \textit{Personal perspective paper due on 24\textsuperscript{th} \rightarrow example of how your preferences for outdoor recreation change across time, situation, activity, etc.}

September 24 – Descriptive aspects of outdoor recreation
- Manning Ch. 3
- \textit{Personal perspective paper due on 29\textsuperscript{th} \rightarrow carrying capacity}

September 29 – Carrying capacity / LAC
- Manning Ch. 4
- \textit{Personal perspective paper due on 1\textsuperscript{st} \rightarrow crowding}

October 1 – Crowding
- Manning Ch. 5

October 6 – Guest speaker: Michelle Roller, Alaska State Parks

October 8 – Indicators and standards of quality
- Manning Ch. 6
- \textit{Personal perspective paper due on 13\textsuperscript{th} \rightarrow motivations / benefits}

October 13 – Motivations and Benefits in Recreation
- Manning Ch. 7
- \textit{Personal perspective paper due on 15\textsuperscript{th} \rightarrow ROS}

October 15 – ROS
- Manning Ch. 8
- \textit{Personal perspective paper due on 20\textsuperscript{th} \rightarrow conflict / displacement}

October 20 – Conflict / displacement \textit{Midterm exam handed out!!}
- Manning Ch. 9
- \textit{Personal perspective paper due on 22\textsuperscript{nd} \rightarrow substitution}
October 22 – Substitutability
  • Manning Ch. 10

October 27 – Case Study *Midterm exam due!*
  • *Personal perspective paper due on 27th → specialization*

October 29 – Specialization
  • Manning Ch. 11

November 3 – Economic impacts to communities
    > Read pgs. 254-261 (up to “Benefits to the Recreationist”).

November 5 – Economic benefits to recreationists
    > Read pgs. 261-272 (“Benefits to the Recreationists” to “Using Economics to Determine the Optimal Price”).

November 10 – VIM / VERP / LAC
  • Manning Ch. 13

November 12 – VIM / VERP / LAC → Case study

November 17 – BBM
  • Reading by Bev Driver and / or Don Bruns, TBA

November 19 – EBM

November 24 – Guest Speaker TBA

November 26 – Group work day for final paper

December 1 – Case study

December 3 – Presentation workshop, *personal perspective journal due!*

December 8 – Presentation of final papers

December 10 – Presentation of final papers

December 18 – Final exam period → paper due
Make no little plans: they have no magic to stir men's blood, and probably will not be realized. Make big plans: aim high in hope and work, remembering that a noble, logical diagram, once recorded, will never die.

—Daniel Burnham, Father of American Planning, 1914

Public opinion is everything. With public sentiment, nothing can fail. Without it, nothing can succeed. Consequently, he who molds public opinion goes deeper than he who enacts statutes or pronounces decisions.

—Abraham Lincoln

Nothing remains special by accident.

—Charles Little, Greenspaces for America

Planning, by definition, means thinking about the future, and that is an exercise requiring intelligence, technical skill, imagination, and most of all vision. This kind of thinking is most difficult, and it is one reason why planning is indispensable to our culture, and always will be.


Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has.

—Margaret Mead, Anthropologist

The future is not a probable place we are being taken to, but a preferred place we are creating.

—Peter Ellyard, Urban Planner, 1993

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**Instructor:**

Dr. Susan Todd,
Associate Professor of Resource Planning
email: susan.todd@uaa.edu

**Office:** 349 O'Neill Bldg
**Office Hours:** Friday 1 - 3 p.m. (tentative until class schedules are firm)

**Course Description:**

The application of planning and conflict resolution principles to natural resource management. Examines plans prepared in response to current resource disputes, such as wolf, brown bear, boreal forest, and recreation river plans. Includes public involvement, consensus-building, the basic steps in the planning process, and resource dispute simulations.

Collaboration is one of the most important new concepts in planning, public policy, environmental studies, and management; many people have called it a new paradigm. This class will focus on environmental and natural resource examples. These collaborative approaches emphasize that many modern environmental problems are complex, multi-jurisdictional, dynamic and dispersed. They require a wide range of expertise to understand the problem, and an even wider range of stakeholder and public support to develop a solution and implement it.

**What is Resource Planning?**

Resource planning deals primarily with publicly-owned lands and resources. There are caribou plans, river plans, moose plans, park plans, forest plans, whale plans, wilderness plans, open space plans, trail plans, salmon plans, watershed plans, etc. While their subject matter differs considerably, the process of developing plans does not. So most of the semester is spent talking about this amazing process.

For me, planning is the process of bringing dreams to life. In our personal lives, we plan for vacations, for a new home, for a career—we plan for ways to make our dreams come true. In resource planning, the dreams are rarely our own; they are the goals of the people involved in writing the plan. It is our job to begin the process as neutral facilitators. We may not be neutral by the end (because the planner often has the best...
sense of what will succeed and what will not), but we need to start that way.
As a planner, you will have an opportunity to work with very diverse teams to help them decide where they are going and how they are going to get there. It will seem impossible to get them to agree on anything. But the planning process is truly amazing...
Planning seeks to help humans live in closer harmony with Nature — and with each other. It is predicated on a belief that science can help us avoid adverse impacts on the environment. And it has democratic, grassroots ideals at its core. Theoretically, federal land in the US is owned by every citizen and thus, every citizen should have a say in how it is managed.

Course Objectives:
Upon completion of this course, the student should:
- Understand what planning is and why it is being used so frequently in natural resource decision-making.
- Be prepared for the often confrontational nature of the land management process
- Be able to distinguish between process and substance and explain why this is important.
- Be able to offer guidelines that can improve the climate for a good settlement in a resource dispute.
- Master the basics of facilitating meetings and mediating disputes.
- Know the reasons for the basic steps in the planning process.
- Know the basic components of resource plans.
- Understand the basics of NEPA social, environmental, and economic impact assessment.
- Know the importance of maps in planning and decision-making.
- Consider both human needs and the needs of the ecosystem.
- Develop an appreciation and tolerance of diverse viewpoints.
- Develop an ability to remain neutral on resource issues and know when this is essential — and when it is not.

Disabilities
If you have a learning disability which may interfere with your ability to perform the work in this course, I am more than happy to work with you to see that your needs are met. However, you must obtain an Accommodation Letter from the Disabilities Office of the Health Center (ext 6158). Accommodations will NOT be made retroactively (i.e. if you have a spelling disability, you must present the letter before any points are deducted for spelling.)

Email
Like most professors, I get some 70 email messages every day. Because of this and the onslaught of spam and viruses, I delete as many unrecognized senders as possible. If you want your message read, please:
- Always include a clear and specific subject in the subject line.
- Always include your first and last name somewhere in the email.
- Please do not forward chain letters or any information that does not relate specifically to the class.
- You do not have to use your UAF email account, but if you do not expect to use it, please forward it to your other account so that I can still reach you via the UAF address.

Biographical Note
I grew up in Western Nebraska and Wyoming. I hold a BA in cellular biology from Bryn Mawr College, a small women's college in Philadelphia. I also hold a Masters in Regional Planning from the University of Michigan. My PhD — also from Michigan — is in Natural Resources, specializing in Environmental Mediaton.

I came to Alaska in 1975. Since then, I have worked as an employee and/or a consultant for the US Forest Service, the Fish and Wildlife Service, the National Marine Fisheries Service, the Alaska Dept. of Natural Resources and the Alaska Dept of Fish and Game, Chugach Natives Inc., Louis Berger Consulting, and the US Agency for International Development. My planning and mediation experience includes development of a management plan for 13 million acres of state land in Alaska's Tanana River Watershed and a plan to recover the Fortymile Caribou Herd in eastern Alaska. My research looks at ways to improve the public involvement and planning processes.
<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>22. 13-Apr-06</td>
<td>TH</td>
<td>Borough Plan, Bernardo Hernandez</td>
<td>Plan Review (choose one of these)</td>
</tr>
<tr>
<td>23. 18-Apr-06</td>
<td>TU</td>
<td>Moose and Wood Bison plans, Randy Rogers</td>
<td>Plan Review (choose one of these)</td>
</tr>
<tr>
<td>24. 20-Apr-06</td>
<td>TH</td>
<td>Fire Plan, Chris Maisch (or other speaker)</td>
<td>Plan Review (choose one of these)</td>
</tr>
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</table>

**PART 3. STUDENT PRESENTATIONS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>25. 25-Apr-06</td>
<td>TU</td>
<td>Case Study or Research Paper Presentations</td>
<td></td>
</tr>
<tr>
<td>26. 27-Apr-06</td>
<td>TH</td>
<td>Case Study or Research Paper Presentations</td>
<td>Public Meeting Critique #3 Due</td>
</tr>
<tr>
<td>27. 2-May-06</td>
<td>TU</td>
<td>Case Study or Research Paper Presentations</td>
<td></td>
</tr>
<tr>
<td>28. 4-May-06</td>
<td>TH</td>
<td>Case Study or Research Paper Presentations</td>
<td></td>
</tr>
<tr>
<td>11-May-06</td>
<td>TH</td>
<td></td>
<td>Final Papers Due</td>
</tr>
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</table>

Syllabus, NRM 430/630: Resource Management Planning
# NRM 450 Forest Management
## Fall 2004


**Some readings from:** a variety of sources provided by the instructor.

**Paper:** A 5-10 page Term Paper will be required, details given in class.

**Other:** Please obtain a computer account from UAF Computing in 233 Bunnell if you don't already have one.

<table>
<thead>
<tr>
<th>Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept. 3, week 1</td>
<td>Introduction - Objectives - Scope</td>
</tr>
<tr>
<td>08,10</td>
<td>Historical perspectives/Decision-Making/Forestry Issues</td>
</tr>
<tr>
<td></td>
<td>D&amp;J Chap. 1 &amp; 2 and article by Carroll (handout)</td>
</tr>
<tr>
<td>Sept. week 2</td>
<td>Biological &amp; Ecological Basis of Forest Management -</td>
</tr>
<tr>
<td>13,15,17</td>
<td>Ecosystem Management-Landscape Management</td>
</tr>
<tr>
<td></td>
<td>D&amp;J Chap. 3 &amp; Readings (handout)</td>
</tr>
<tr>
<td>Sept. week 3</td>
<td>Information Needs/Inventory / Predicting growth &amp; Yield -</td>
</tr>
<tr>
<td>20,22,24</td>
<td>D&amp;J Chap. 4 &amp; 5</td>
</tr>
<tr>
<td>Sept. week 4</td>
<td>Wildlife, fisheries, aesthetics and timber -</td>
</tr>
<tr>
<td>27,29,01</td>
<td>FORTOON</td>
</tr>
<tr>
<td>Oct. week 5</td>
<td>TBA (possible guest speakers) &amp; independent work on assignments</td>
</tr>
<tr>
<td>04,06,08</td>
<td>Take-Home Exam #1 Due: Oct. 8</td>
</tr>
<tr>
<td>Oct. week 6</td>
<td>Forestry as a Business/Decision Analysis</td>
</tr>
<tr>
<td>11,13,15</td>
<td>D&amp;J Chap. 6 &amp; 7</td>
</tr>
<tr>
<td>Oct. week 7</td>
<td>Financial Analysis/Planning</td>
</tr>
<tr>
<td>18,20,22</td>
<td>D&amp;J Chap. 7</td>
</tr>
<tr>
<td>Oct. week 8</td>
<td>Valuation/Taxes</td>
</tr>
<tr>
<td>25,27,29</td>
<td>D&amp;J Chap. 8 &amp; 9</td>
</tr>
<tr>
<td>Nov. week 9</td>
<td>Sustained Yield/Even-aged</td>
</tr>
<tr>
<td>01,03,05</td>
<td>D&amp;J Chap. 10 &amp; 11</td>
</tr>
<tr>
<td>Nov. week 10</td>
<td>Exam #2</td>
</tr>
<tr>
<td>08,10,12</td>
<td>Sustained Yield/Uneven-aged -- Readings (handouts)</td>
</tr>
<tr>
<td>Nov. week 11</td>
<td>Simulation - Can you make money while sustaining yield?</td>
</tr>
<tr>
<td>15,17,19</td>
<td>D&amp;J chap. 12 &amp; 13</td>
</tr>
<tr>
<td>Nov. week 12</td>
<td>Simulation - Can you sustain yield while making money?</td>
</tr>
<tr>
<td>22,24,--</td>
<td>Thanksgiving Holiday Nov. 25-28</td>
</tr>
<tr>
<td>Nov. 29, week 13</td>
<td>Multiple Use/Sustained Yield/Ecosystem</td>
</tr>
<tr>
<td>Dec. 01,03</td>
<td>D&amp;J chap. 14</td>
</tr>
<tr>
<td>Dec. week 14</td>
<td>Special Topics ---- Term Papers Due</td>
</tr>
<tr>
<td>06,08,10</td>
<td>open - Review</td>
</tr>
<tr>
<td>Dec. 13</td>
<td>Last Day of Class -- TBA</td>
</tr>
<tr>
<td>Dec. 15</td>
<td>Final Exam ---- Mon. 8:00-10:00 A.M.</td>
</tr>
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</table>
GRADING POLICY

<table>
<thead>
<tr>
<th>Pts</th>
<th>Assignment</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>Masahsi Simulation</td>
<td>Performance (10 pts) + Issues/Options Table (30 pts)</td>
</tr>
<tr>
<td>55</td>
<td>Menelune Simulation</td>
<td>Performance (10 pts) + Issues/Options Table (45 pts)</td>
</tr>
<tr>
<td>70</td>
<td>Wasota Simulation</td>
<td>Performance (10 pts) + Issues/Options Table (60 pts)</td>
</tr>
<tr>
<td>60</td>
<td>2 Plan Reviews</td>
<td>Use form provided. 30 pts each.</td>
</tr>
<tr>
<td>70</td>
<td>7 Reflections</td>
<td>10 pts each</td>
</tr>
<tr>
<td></td>
<td>3 Public Mtgs</td>
<td>30 pts each. (if you simply cannot do these due to scheduling problems, you can do a book review instead)</td>
</tr>
<tr>
<td>200</td>
<td>1 Case Study or Research Paper</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>Presentation or Poster on Case Study or Research Paper</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>Final Exam</td>
<td></td>
</tr>
<tr>
<td>835</td>
<td>Total for undergraduates, Subtotal for graduates</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>Graduate students (because you're special!) will also do 2 book reviews (50 pts each)</td>
<td></td>
</tr>
<tr>
<td>935</td>
<td>Total for Graduate Students</td>
<td></td>
</tr>
</tbody>
</table>

IS CONFLICT A "VITAL RESOURCE"?

A considerable body of research suggests that, where there is little conflict over issues, there is also likely to be poor decision making.... Constructive conflict is a vital resource for social and organizational learning. Orchestrating conflicting perspectives ensures that key information that might otherwise be lost to view is brought to the fore, so that factions might learn from one another. —R.F. Bowman, 2001. Temptation #4: Harmony versus productive conflict. The Educational Forum 65(Spring):221-226.

One of the most important things to do in negotiation and mediation is to surface conflict (including rage) and to face it without blinking." —Kenneth S. Gallant
### TENTATIVE SCHEDULE

**Collaborative Resource Management Planning**

<table>
<thead>
<tr>
<th>DATE</th>
<th>Day</th>
<th>TOPIC</th>
<th>Readings/Reflections &amp; other assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-Jan-06</td>
<td>TH</td>
<td>Begin Masabi Forest Planning Simulation</td>
<td>Reflection 1: BC</td>
</tr>
<tr>
<td>24-Jan-06</td>
<td>TU</td>
<td>Oranges Exercise, Interest, Position, Consensus, Compromise</td>
<td>Reflection 2: Getting to Yes Discussion</td>
</tr>
<tr>
<td>31-Jan-06</td>
<td>TU</td>
<td>Review Oranges Exercise</td>
<td>BC Wolf Working Group and Getting to Yes Discussion</td>
</tr>
<tr>
<td>2-Feb-06</td>
<td>TH</td>
<td>Running effective meetings: Recording and facilitation skills</td>
<td>Reflection 3: AK Wolf Mgt</td>
</tr>
<tr>
<td>7-Feb-06</td>
<td>TU</td>
<td>Issues and how to phrase them; Brainstorming options</td>
<td>Reflection 4: Yukon Wolf Mgt Plan</td>
</tr>
<tr>
<td>9-Feb-06</td>
<td>TH</td>
<td>Issues &amp; options tables + Stakeholders</td>
<td>Issues &amp; Options for Masabi Due</td>
</tr>
<tr>
<td>14-Feb-06</td>
<td>TU</td>
<td>Discuss what makes a successful collaboration. Teams work on Issues and Options Tables for Masabi</td>
<td>Reflection 5: High Country News Handout</td>
</tr>
<tr>
<td>16-Feb-06</td>
<td>TH</td>
<td>Finish and Discuss Masabi Forest Simulation</td>
<td>Public Meeting Critique #1 Due</td>
</tr>
<tr>
<td>21-Feb-06</td>
<td>TU</td>
<td>Discuss differences between planning &amp; collaboration. Discuss High Country News Readings</td>
<td>Reflection 6: Todd, Chap 1, 2, 8 (just 1 reflection on all) Grad Students, 1st Book Review Due</td>
</tr>
<tr>
<td>23-Feb-06</td>
<td>TH</td>
<td>Pass out roles for Menehune. Work on issues &amp; options tables.</td>
<td>Menehune Issues &amp; Options Table DUE</td>
</tr>
<tr>
<td>28-Feb-06</td>
<td>TU</td>
<td>Begin Menehune Simulation.</td>
<td></td>
</tr>
<tr>
<td>2-Mar-06</td>
<td>TH</td>
<td>Finish and discuss Menehune.</td>
<td></td>
</tr>
<tr>
<td>7-Mar-06</td>
<td>TU</td>
<td>What is resource mgmt planning? What types of plans are there? What role does the public play? What is the planner's role? Why Plan?</td>
<td>Reflection 7: Arnstein, Ladder of Citizen Participation</td>
</tr>
<tr>
<td>11-Mar-06</td>
<td>TH</td>
<td>Pass out Lake Wasota simulation instructions.</td>
<td>Due: Plan Review of the Fortymile Caribou Recovery Plan (use form from BB). Everyone will do this one.</td>
</tr>
<tr>
<td>11-Mar-06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-Mar-06</td>
<td>TU</td>
<td>Lake Wasota Simulation</td>
<td>Issues &amp; options for Wasota Due</td>
</tr>
<tr>
<td>23-Mar-06</td>
<td>TH</td>
<td>Lake Wasota Simulation</td>
<td></td>
</tr>
<tr>
<td>28-Mar-06</td>
<td>TU</td>
<td>Where are we going? Setting the Vision, Goals &amp; Objectives.</td>
<td></td>
</tr>
<tr>
<td>30-Mar-06</td>
<td>TH</td>
<td>How will we get there? Issues, Options, Alternatives</td>
<td>Public Meeting Critique #2 Due</td>
</tr>
<tr>
<td>4-Apr-06</td>
<td>TU</td>
<td>How will we get there? Use of overlays for spatial data. Evaluating Alternatives. Implementation.</td>
<td>Reflection 8: Grad Students, 2nd Book Review Due</td>
</tr>
<tr>
<td>6-Apr-06</td>
<td>TH</td>
<td>Early, but Final, Exam</td>
<td></td>
</tr>
<tr>
<td>11-Apr-06</td>
<td>TU</td>
<td>Chena Rec Area, Anna Flager</td>
<td>Plan Review (choose one of these) Grad Students, 2nd Book Review Due</td>
</tr>
</tbody>
</table>

**PART 1. CONFLICT RESOLUTION SKILLS**

Laza Consensus, Collaboration, Deliberative Democracy, Dispute Resolution, Mediation, etc.

**PART 2. THE PLANNING PROCESS**

11-Mar-06 thru 19-Mar-06 SPRING BREAK

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Syllabus, NRM 430/630: Resource Management Planning 4
Grading Policy: The grade received in this course will be based upon performance on exams, homework assignments, term paper & classroom activities.

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams (including final)</td>
<td>55 %</td>
</tr>
<tr>
<td>Homework &amp; Class Activities</td>
<td>30 %</td>
</tr>
<tr>
<td>Term Paper</td>
<td>15 %</td>
</tr>
</tbody>
</table>

The instructor reserves the right to modify the final grade in consideration of notable progress demonstrated by an individual, or unforeseen and extenuating circumstances. In such cases extra credit assignments and/or makeup work may be used at the discretion of the instructor.

NRM 450  Forest Management
Instructional Goals

1. Familiarize students with traditional methods of managing a forest property for the production of wood fiber from both even-aged and uneven-aged forests.

2. To integrate the management of forest lands for wood fiber production with the production of non-timber forest products and amenities. Explore the concepts of ecosystem management, multi-resource forest management, sustainable forest management, and landscape-level management.

3. Equip students with the essential aspects of financial analysis as applied to forestry.

4. Expose students to and discuss contemporary issues related to forest resources management.
Forest Health and Protection looks at biotic and abiotic agents that cause forest disturbance. Importance of these agents, in terms of forest health, is considered from an ecological perspective. There are four units in the course: 1) Forest Health—concept, importance of organisms and non-living factors to ecosystem process, role of disturbance in ecosystems, use of pesticides in forest ecosystems, and integrated pest management; 2) vertebrates, dwarf mistletoes, micro-organisms, and fungi—role in forest ecosystems, life cycles, identification, impacts, and control; 3) insects—role in forest ecosystems, anatomy, life cycles, identification, impacts, and control; 4) fire and abiotic factors—role in the forest ecosystem, basic fire concepts, fire behavior, control, prevention, and prescribed fire. With respect to living organisms, major groups (guilds) and key species or examples from across North America will be discussed. Emphasis will be on contemporary forests and their interactions and problems with specific agents of change.

Class meets in Room 183 Arctic Health Research Building on the University of Alaska Fairbanks campus (West Ridge) on Monday and Wednesday from 1900 to 2030 hours. There is the possibility of one or two field trips, no cost, to be arranged so as to not interfere with student schedules.

INSTRUCTOR: Edmond C. Packee, Ph.D.
Associate Professor of Forest Management
Office: 161 Arctic Health Research Building
Office Hours: 1000 to 1300 hours Monday or by appointment
Telephone: 474-5070
e-mail: ffepc@uaf.edu
UNIVERSITY OF ALASKA FAIRBANKS
SCHOOL OF NATURAL RESOURCES AND AGRICULTURAL SCIENCES
FALL 2004

FOREST HEALTH AND PROTECTION
NRM 452

COURSE OUTLINE/SYLLABUS

INTRODUCTORY COMMENTS

NOTE: FOR FALL 2004, CLASS TYPICALLY WILL MEET ONCE A WEEK

Forest Health and Protection addresses three major areas of forest management: Disease, insects, and fire. Elsewhere, these three areas are commonly taught as three separate courses. In addition, Forest Health and Protection also addresses wildlife damage, environmental damage, and negative human impacts.

There are four required texts: the basic text, disease, insects, and a text (provided) that covers diseases and insects as well as some of the other problems in Alaska.

There are major exams in this class; basically, one for each section; thus there is no final. Thus, there is no option to not taking the final exam.

This course requires four “professional reports” with the topic to be assigned.
  - Rust pathogen
  - Fungal or green plant parasite
  - Insect
  - Fire issue

These are not term papers. They are mini-papers, if you like. They consist of a title page, executive summary, problem statement, literature review, alternate solutions (listing advantages and disadvantages of each alternate), recommendation and why the recommendation was selected, and literature cited. I expect a separate title page, a separate page for the executive summary which can be no longer than 300 words, 3 to 6 pages of content, and a separate page(s) for literature cited. An example of the desired format will be provided; think of it as a report to your supervisor. Instructor will provide the titles/subjects; the students will randomly draw the titles/subject! Remember, you are to write this as if you worked in the private sector and I will grade the papers; think of me as your immediate supervisor.

DISABILITIES

IF YOU HAVE ANY KIND OF A DISABILITY (physical, mental, language) THAT MIGHT AFFECT YOUR PERFORMANCE IN THIS CLASS, PLEASE ADVISE ME IN WRITING WITH THE DOCUMENTATION BEFORE THE THIRD CLASS!

GRADING POLICY

The instructor reserves the right to grade on a curve and to select the curving procedure/method! Cheating on tests or plagiarism is grounds for an outright “F” and if sufficiently severe,
recommendation for dismissal from the University of Alaska Fairbanks. If you do not know what constitutes plagiarism, we can have a short workshop after class. The “A” Book is in force. I have no respect for persons who deliberately cheat. The profession has no place for people who cheat and lie! Because Society is full of people who cheat or lie, there is still no excuse for anyone in this class to do so! Spring of 1994 was the last semester that I was somewhat lenient—no more. Cheating or plagiarism is an outright “F.”

**GRADE ALLOCATION**

<table>
<thead>
<tr>
<th>Major Tests (3 or 4)</th>
<th>each worth</th>
<th>16 or 12 percent of final grade = 48%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reports</td>
<td>each worth</td>
<td>10 percent of final grade = 40%</td>
</tr>
<tr>
<td>Class Participation</td>
<td></td>
<td>10 percent of final grade = 10%</td>
</tr>
<tr>
<td>Instructor’s Discretion</td>
<td></td>
<td>02 percent of final grade = 02%</td>
</tr>
</tbody>
</table>

There is no final as such! There will be three or four tests—one for each section (Concepts, Wildlife Damage, Environmental Damage, Human Impacts, Fungi, Insects, Fire) of the course. Each test is subject specific and includes general principles and concepts. At least one test will be take home; any take home test will be graded on content and in relation to other results—in short, they are competitive.

**GRADES:**
- A = >90.00 percent
- B = 80.00 to 89.99 percent
- C = 70.00 to 79.99 percent
- D = 60.00 to 69.99 percent
- F = <60.00 percent

I = rare event; it is not an available option for late work. All work is to be submitted by the end of the semester and PREFERABLY ON TIME. There is no excuse for not meeting deadlines. You do not have that luxury in the private sector except in the case of emergencies (health or death in the family). Your work load is set out for you and you have a schedule. Changes to the schedule will generally benefit the student—essentially we all agree to a change. Similarly, I am prepared to address report deadlines—I recognize you have schedules and other courses.

**INSTRUCTOR’S DISCRETION**

This allows me to increase or decrease your letter grade when you are on the borderline. Class attendance, effort, neatness of assignments, meeting deadlines—all work in your favor. I encourage good questions. In some cases we will defer the question to another time—after class or an office meeting. Use of technical words in this course is essential. You are not only required to know definitions but also to understand the concepts. Thus if you don’t understand a concept, it is your responsibility to advise me.

Guest instructors will provide lectures on a regular basis.

**TEXT BOOKS**


SUPPLEMENTAL:


RESERVE ITEMS:

Will be on reserve in the Biosciences Library in the Arctic Health Research Building; most are on 2 hour and overnight. Some are my personal copies; I ask that you take care of them. My lecture notes will be on reserve in a separate notebook—you may copy these. A second notebook/file folder will contain some of the additional reading assignments.

SERIALS:

Will not be placed on reserve; they cannot be checked out of the library. You are expected to find these on the shelf. They can be found in either Rasmusson or Biosciences. Something will be worked out for the Tok students.

HOMEWORK: WRITTEN AND READING ASSIGNMENTS

Written: All written assignments are expected to be completed by the agreed upon deadline (this is the reality of the business world and the reality of governmental agency deadlines; I am willing to adjust deadlines if there is just cause. Make diskette copies of all efforts—the excuse, “my hard drive locked-up is no longer valid”? I still do all-nighters. If you have a problem with your assignment, let me know in advance. I expect good quality reports: content, organization, grammar, spelling, and neatness count.

Reading: Maintaining currency in the reading assignments is essential. I am more after concepts and general patterns than I am after great details; this is not Silvics and Dendro. I expect you to know life cycles, scientific names, definitions, and control options. I will let you know where I expect other detail.

OFFICE HOURS

Monday: 1000 to 1300 hrs
After class (not before class)
By appointment except on Thursdays and Fridays.
Never on afternoons after 1500 hrs or before any evening class!
2000 OUTLINE AND SCHEDULE

(NOTE: THIS SCHEDULE IS SOMEWHAT TENTATIVE & SUBJECT TO [MINOR] ADJUSTMENT)

(READING & WRITTEN ASSIGNMENTS ARE IN SEPARATE SECTION)

Ideally, I would like to see this class be once a week on Monday nights from 1900 to 2200 hours instead of twice a week from 1900 to 2030 hours since there is another required NRM course. However, there will be several evenings where this may not be possible. In addition, I must be out of town for the weeks of September 5 and 27 and October 4. Also, guest presenters must be accommodated—schedule wise and time wise. Hence the schedule below must be recognized as flexible.

First Class Meets on Thursday 2 September 2004 for approximately 3 hours; thereafter all classes meet on Monday evening with some possible on Wednesdays. Class begins at 1900 hours. Depending on weather conditions, a field class (one-day is possible in mid October.

Week/Date
30 Aug 3.0
INTRODUCTION
Course content and structure
The Syllabus/Schedule
Biodiversity
Sustainability
Ecosystem approach
Healthy forest
    Concept
    Condition of the North American Forest today
Management approach (integration of management and protection)
Major abiotic agents
Wildlife agents
Human activity
Examples of major North American Forest Insect and Disease Problems
    Insects
        Native
        Exotic
    Diseases
        Native
        Exotic

FOREST HEALTH
The concepts:
    Forest health
    Ecosystem health
    Sustainability
Historical perspective of forest/ecosystem health
Forest health and forest resources and use
Forest health monitoring
Silviculture and forest health
FOREST HEALTH CONCEPTS (conclusion)
INTEGRATED PEST MANAGEMENT
Integrated Pest Management
Definition
Components
Pesticides
   Insecticides
   Fungicides
   Soaps
   Adjuvants
   Inert ingredients
Biological Agents
   Parasites
   Predators
   Diseases
   Botanicals
   Pheromones
Fire
Mechanical
   Site manipulation (Site preparation, slash abatement)
   Cutting
   Removal of host material
   Trapping

SAFETY CONSIDERATIONS
PESTICIDES
Pesticides characteristics
Toxicity
   Lethal
   LD<sub>50</sub>
   LC<sub>50</sub>
Sublethal
Dermal
Abortagencity
Carcinogenicity
Embryotoxicity
Mutagenicity
Testing procedures
Safety Equipment
The Label
Liability
Where to find more information
Pesticide Families and Characteristics
Pesticide Application Techniques
BIOLOGICAL AGENTS
Associated risks

PHEROMONES
Associated risks
Specificity

PRESCRIBED FIRE SAFETY
MECHANICAL SAFETY CONSIDERATIONS
PUBLIC RELATIONS

27 Sep
3.0 guest lecturer
ABIOTIC AGENTS, HERBIVORY, AND GREEN PLANTS

Climate
Wind
Snow and ice
Red belt
Sunscald
Frost
Heat stress

Soil
Flooding/Drought
Compaction
Soil fill

Mechanical
Mammals
Moose
Elk
Deer
Livestock (cattle, sheep, goats, pigs)
Porcupines
Hares/rabbits
Squirrels/Rodents

Birds
Nematodes
Vines and Lianas

Allelopathy

Mistletoe & Dwarf Mistletoe
Plant description
Basic life cycle
Host/Species
Impacts/benefits
Control

FOLIAGE DISEASES

Types of Foliage Diseases
Conifer Diseases
Lophodermium needle cast
Brown spot
Dothistroma
Elytroderma
Rhabdocline
Tip blight
Snow molds
Brown felt blight
Hardwood Diseases
Powdery mildews
Leaf blisters
Tar spot of maple
Anthracnose

04 OCT 3.0 guest lecturer

**TEST #1 (IN CLASS) FROM 20:30; Class starts at 1900 hours**

**STEM DISEASES**

### Rusts
- Cronartium species and alternate hosts
- *Cronartium ribicola*
- Fusiform rust
- Commandra rust

11 Oct **STEM DISEASES** (continued)

### Rusts
- Spruce broom rust

### Cankers
- *Nectria* on aspen
- *Nectria* canker on beech
- Larch canker
- *Ceratocystis* on aspen
- *Eutypella* canker on maple
- *Hypoxylon* canker
- *Scleroderris* canker
- Pitch canker
- *Fusarium* canker

### VASCULAR WILT DISEASE
- Types of wilts
- Wilt disease characteristics
- Wilt diseases
  - Dutch elm disease
  - Oak wilt
  - Verticillium wilt

### ROOT AND SEEDLING DISEASES
- Root Diseases
  - Importance
Mode of action
Major pathogens
Phytophthora
Armillaria
Heterobasidion
Phellinus
Leptographium
SEEDLING DISEASES (especially those of the nursery)
Types of diseases
Damping-Off
Symptoms
Pathogens
Pythium
Phytophthora
Rhizoctonia
Fusarium
Sclerotium
Control
Root Diseases
Symptoms
Pathogens
Fusarium
Cylindrocladium
Sclerotium or Macrophomia
Control
Nematodes

18 Oct 3.0 guest lecturer
STEM DISEASES AND WOOD DECAY FUNGI
Stem Diseases (non-basidiomycetes)
Red heart of birch
Wetwood
Wood decays
Heart Rot
Butt Rot
Top Rot
The Rot Fungi
Wood decay process
Wood disease cycle
Effects of decay on wood
Wood properties
Product quality
Important Decay Fungi of Conifers
Important Decay Fungi of Hardwoods
Wood Decay in Building Products
25 Oct  3.0 guest lecturer
TEST #2 (IN CLASS) FROM 20:30; Class starts at 1900 hours
FOREST INSECTS
Insect Anatomy
Insect Classification
The Orders
APTERYGOTA (=AMETABOLA)
   Thysanura (silver-fish)
   Diplura (two-pronged bristle-tails)
   Protura
   Collembola (springtails)
EXOPTERYGOTA (HEMIMETABOLA)
   Ephemerida (mayflies)
   Odonata (dragonflies)
   Plecoptera (stoneflies)
   Orthoptera (grasshoppers & crickets)
   Phasmida (stick insects)
   Dictyoptera (cockroaches)
   Dermaptera (earwigs)
   Psocoptera (booklice)
   Mallophaga (biting & bird lice)
   Anoplura (sucking lice)
   Thysanoptera (thrips)
   Hemiptera (bugs, aphids, adelgids, leaf hoppers, cicadas, & plant hoppers)
ENDOPTERYGOTA (HOLOMETABOLA)
   Neuroptera (lacewings & snake flies)
   Mecoptera (scorpion flies)
   Lepidoptera (butterflies & moths)
   Trichoptera (caddis flies)
   Diptera (flies)
   Siphonaptera (fleas)
   Hymenoptera (bees, wasps, ants, sawflies, & ichneumon flies)
   Coleoptera (beetles & weevils)

01 Nov  3.0 guest lecturer
ECOLOGY OF FOREST INSECTS
Insects in the Forest Ecosystem
   Insects as part of the forest community
   Insects and the individual tree
      Nutritional requirements of insects
      Trees as a source of food (nutrition) for insects
      Tree defenses against insects
      Host stress favoring insects
Insects and forest stability
Insects and forest succession
Insects and forest productivity
Population Dynamics of Forest Insects
  Concept of population dynamics
  Patterns of population changes
  Characteristics of outbreaks
Enemies of Forest Insects
  Prey-enemy relationships (Population dynamics II)
  Predators
    Vertebrate
    Invertebrates
  Parasites
  Pathogens

INSECT CONTROL CONSIDERATIONS
Monitoring
Forecasting Outbreaks and Damage
Insects and Forest Values
Risk Assessment
Public

INSECT GUILDS AFFECTING FOREST TREES I
  The Concept
  Fruit and Seed Insects
    Seed weevils
    Seed chalcids
    Cone borers
  Nursery Insects
    Collembola
  Root and Root Collar Insects
    Weevils
    Borers

08 Nov 3.0 guest lecturer
INSECT GUILDS AFFECTING FOREST TREES II
  Bud and Shoot/Twig Insects
    Bud moth
    Terminal weevils
      Adelges/Pineus
  Defoliators
    Budworms
    Sawflies
    Pine butterfly
    Larch casebearer
      tussock moths (European and Douglas-fir
INSECT GUILDS AFFECTING FOREST TREES III
  Stem and Bole Insects
Horntails
Pitch moth
Bark beetles
  *Dendroctonus rufipennis*
  *Dendroctonus monticolae*
Southern pine beetle
Elm beetle
*Ips* spp.
Flat-headed borers
Rounded-headed borers
Horntails
Pitch moth

15 Nov  3.0 guest lecturer
MANAGEMENT OF INSECT PESTS
Basic considerations/concerns
  IPM realities
  Concept of Damage
Forest Practices
Sanitation
Trapping
Species Composition
Breeding/Selection of Trees for Resistance
Biological Control
  Predator Encouragement
Parasites
  Microbial Chemicals

22 Nov  3.0
**TEST #2 (IN CLASS) FROM 20:30; Class starts at 1900 hours**
FIRE IN THE FOREST ECOSYSTEM
Wildfire
  History of Fire Suppression
  Changing Policies
Prescribed Fire
  Use in Rocky Mountains
  Use in the Northern Forest
Removal of Fire from the Ecosystem
  Impacts on ecosystem structure and functions
  Impacts on fuel builds-up
  Impacts on wildlife
Broad picture of fire and the landscape
FIRE IN THE FOREST & FIRE TRIANGLE
Fire: What is it?
  The process
  Causes
Phases of combustion
Chemistry and physics of ignition and combustion
29 Nov 3.0 guest lecturer
Forest fuels
   Types
   Chemistry
   Moisture
   Fuel beds
   Classification
Fire weather
Fire behavior
   Kinds of fires
      Surface
      Ground
      Spot (includes snags)
      Crown
      Fire storm
Fire Behavior forecasts
   Season of fire occurrence
   Rules of thumb
Fire behavior (what you can expect)
   Surface fires
   Ground fires
   Spot fires
   Crown fires
   Fire storm
Transition to convection situations
Large fires
Fire Prediction/Behavior Models

06 Dec 3.0 guest lecturer
FIRE SUPPRESSION TACTICS Safety
Clothing
   Protective devices
   Hazards off the fire line
Fireline hazards
   ESCAPE ROUTE(S)
   Heat
   Carbon Monoxide
   Smoke
   Burns
   Aircraft
   Motorized Equipment
   Back-firing
Suppression Principles and Methods
Fire danger rating
   Systems and Procedures
   Value/Importance
Presuppression
Fire control
Suppression Methods
Initial Attack principles
Crew Organization
Line Construction
Backfiring
Forest Fire Equipment
Hand tools
Mechanized Ground Equipment
Water Handling Equipment
Explosives
Fire retardant chemicals (water and chemicals)
Aircraft/Operations
Paracargo
Smokejumpers
Airtankers
Helicopters
Fire monitoring
Fire suppression planning
Transport
Monsoon-buckets
Ignition Devices
Fire Mapping
Presuppression
Planning
Maps and records
Pre-attack planning
Detection
Methods
Public
Look-outs
Aerial
Visual
Infrared
Computerized Technology
GIS
Communications
Dispatch
FIRE PREVENTION, PRESUPPRESSION, & PREPAREDNESS
Strategy of Fire Prevention
Education and Public Relations
Fire Laws
Fire Hazard reduction
Urban Forests
Wildland
Methods
Fuel isolation
  Firebreaks
  Fuelbreaks
  Greenbelts
Fuel removal
  Prescribed burning
  Intensive utilization
  Vegetation removal
Species manipulation

13 Dec 3.0 guest lecturer
FIRE CONTROL POLICY AND ORGANIZATION
Fire Management Policy
Policy determination
  People
  Market values
  Non-market values
  Ecosystem maintenance/biodiversity/and forest health considerations
Fire Management Goals
  Area burned: how much acceptable? where acceptable?
  Considerations used in formulating goals
Policy formulation
  Protection forests
  Watershed
  Wildlife
  Parks, recreation areas, wilderness
  Plantations and intensively managed forests
  Extensively managed multiple use forests
  Urban-forest interface
  Public and professional concerns
Alaska Forest Fire Policy
Fire Management Agencies
  Federal agencies
  State agencies
  Private agencies
  International agencies
  Alaska model

1.5
PRESCRIBED FIRE
Role of prescribed fire
  Fuels Management: Slash/hazard reduction
  Type conversion
  Site preparation
  Wildlife habitat improvement
Insect control
Disease control
Prescribed fire in a historical context
Prescribed fire prescriptions
Prescribed Burning
  Techniques
  Planning
  THE PRESCRIPTION
  Preparation of Area
  Execution
  Follow-up
Public Relations

15 Dec  Starts at 1900 hrs
TEST #4
Final
All papers due at 1900 hrs or grade on paper is an F.
BIBLIOGRAPHIC FORMAT
FOR COURSES TAUGHT BY
Edmond C. Packee, Ph.D.
Associate Professor of Forest Management

In the past, I have allowed just about any format accepted by scientific professional organization, scientific journal, or science style manual for the courses that I teach. I have requested the style manual or journal or organization whose style was used to be reported. Rarely was that provided. The results ranged from excellent to unacceptable. In the latter case, the excuses were often more pathetic than the results. Hence, I have no choice but to tighten up. The format for citing to be followed is given below. I will allow exceptions, but only if cleared in writing by me well (weeks) in advance by me. The clearance then becomes part of the paper and is to be inserted immediately after the title page.

Except for initials of authors and the two letter abbreviations for the state in that part of the citation referring to where published, no other abbreviations are acceptable. The term "et al." is used only in the text (including tables) for three or more authors; it is never used in the "Cited Literature."

Citations in the text are to be author and date:

In 1987 Sinclair et al. stated that sulfur was an essential component of some amino acids. Sinclair et al. (1987) said "Sulfur is a constituent of certain amino acids."
"Sulfur is a constituent of certain amino acids" (Sinclair et al. 1987)

Davis (1954) said
(Davis 1954)

Alt and Hyndman (1986)
(Alt and Hyndman 1986)

There is no relationship among the three books (Davis 1954; Alt and Hyndman 1986; Sinclair et al. 1987).

In the report (Anonymous 1974)

The undated file report (Slick n.d.)

CITED LITERATURE


Slick, I.M. no date. How to cheat in Ed Packee's class and get an F. University of Alaska Fairbanks Student Complaint, File Report. 10 p.
HARVESTING AND UTILIZATION OF FOREST PRODUCTS
NRM 453

Lecture
Tuesday and Thursday 8:00pm - 9:00pm
Arctic Health Building Room 183

Lab
Tuesday 2:00pm - 5:00pm
Arctic Health Building Room 183

Instructor
Tom Malone
Research Assistant - Forestry
Office at Farm Visitor’s Center Room 5
Telephone:
Office 474-7079
Home 455-6769
e-mail fnrpm@uaf.edu

Course Description
Consideration of forest products including demand, sale, harvest, transportation, and manufacture of products.

Course Objectives
Upon completion of this course, students will be able to:

1. Describe the role forest products play in the world, US and state economies.

2. Discuss techniques and equipment used in harvesting and transporting roundwood and in the manufacturing of forest products.

3. Discuss the relationship between wood properties and uses.

4. Apply safety practices related to wood harvesting and processing.

5. Understand harvesting and wood processing terminology.

6. Apply wood identification techniques.

7. Describe sources of information about forest products and the forest products industry.
Course Material


3. Handouts and reserved materials.

4. Wood identification materials

Tests
This course will include two written exams and a final. Final is optional for students with an A, all assignments handed in, and permission of the instructor.

Field Trip Reports and Written Assignments

Reports are required for each field trip. These reports will be one page in length and will succinctly describe the important facts presented and/or learned during the trip.

Lab reports are due prior to the next week's lab (the next Tuesday at 2:00 pm).

Two reports on Journal articles are required. These two reports will be two pages in length and will describe the important points of the article. One article will be on some aspect of harvesting, processing, or transporting wood. The second article will be on forest products: type of product, processing, or use.

Journal article reports are due: October 26 and December 9

Late reports will not be accepted.

Students will make a five minute oral presentation regarding the article they choose at the lab on the week after the article is due (November 2 and December 7).

Grading Policy

Your final grade will be based on:

- 2 mid term tests and final: 50%
- 2 two page reports on Journal articles: 15%
- Oral presentation: 5%
- Approximately 10 one page lab reports: 25%
- Instructor discretion: 5%

Instructor's judgment based on such elements as attendance, participation, and improvement during the semester.
<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept 2</td>
<td>Introduction</td>
</tr>
<tr>
<td></td>
<td>Supply and Demand</td>
</tr>
<tr>
<td></td>
<td>Global, National, State Perspective</td>
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<tr>
<td>Sept 7</td>
<td>Lab. Timber Sale Layout and Administration</td>
</tr>
<tr>
<td></td>
<td>Marc Lee, State DOF</td>
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<tr>
<td>Sept 7</td>
<td>Supply and Demand</td>
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<td></td>
<td>Global, National, and State perspective</td>
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<tr>
<td>Sept 9</td>
<td>Pre-harvest Silvicultural Prescriptions and Pre-harvest Planning</td>
</tr>
<tr>
<td>Sept 14</td>
<td>Lab. Visit active logging operation in Standard Creek</td>
</tr>
<tr>
<td>Sept 16</td>
<td>Pre-harvest Planning</td>
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<tr>
<td></td>
<td>(video management planning)</td>
</tr>
<tr>
<td>Sept 21</td>
<td>Harvesting Forest Products</td>
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<tr>
<td>Sept 21</td>
<td>Lab OK Lumber forest product retailer</td>
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<tr>
<td></td>
<td>(video designated skid trails)</td>
</tr>
<tr>
<td>Sept 23</td>
<td>Harvesting Forest Products</td>
</tr>
<tr>
<td>Sept 28</td>
<td>Harvesting Forest Products</td>
</tr>
<tr>
<td></td>
<td>Lab Chain Saw: operation, maintenance, safety</td>
</tr>
<tr>
<td>Sept 30</td>
<td>Cable yarding and Landings</td>
</tr>
<tr>
<td>Oct. 5</td>
<td>Transportation of Forest Products</td>
</tr>
<tr>
<td></td>
<td>(video log road construction)</td>
</tr>
<tr>
<td>Oct. 5</td>
<td>Lab Visit Forest Product Supplier Northland Wood</td>
</tr>
<tr>
<td>Oct. 7</td>
<td>Anatomy and Chemistry of Wood</td>
</tr>
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<td></td>
<td>(video wood structure)</td>
</tr>
<tr>
<td>Oct. 12</td>
<td>Physical Properties of Wood</td>
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<tr>
<td>Oct. 12</td>
<td>EXAM</td>
</tr>
<tr>
<td>Oct. 14</td>
<td>Lumber Process</td>
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<tr>
<td>Oct. 19</td>
<td>Lumber Process</td>
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<tr>
<td></td>
<td>Report Due</td>
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<tr>
<td>Oct. 19</td>
<td>Lab Visit Sawmills Goldstream Valley</td>
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<tr>
<td>Oct. 21</td>
<td>Wood Drying</td>
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<td></td>
<td>Ak Birch Works</td>
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<td></td>
<td>(video wood drying)</td>
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<tr>
<td>Oct. 26</td>
<td>Engineered Wood Products</td>
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<td></td>
<td>(slides Gluing wood composites)</td>
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<tr>
<td>Oct. 26</td>
<td>Lab Wood identification</td>
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<tr>
<td>Oct. 28</td>
<td>Engineered Wood Products</td>
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<tr>
<td>Nov. 2</td>
<td>Panel Products plywood</td>
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<tr>
<td></td>
<td>(slides Making plywood)</td>
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<tr>
<td>Nov. 2</td>
<td>Lab Visit Superior Hardwoods exotic wood supplier(video gluing wood)</td>
</tr>
<tr>
<td>Nov. 4</td>
<td>Panel Products composition boards</td>
</tr>
<tr>
<td>Nov. 9</td>
<td>Pulp and Paper Dr. Ed Packee</td>
</tr>
<tr>
<td>Nov. 9</td>
<td>Lab Wood identification</td>
</tr>
<tr>
<td>Nov. 11</td>
<td>Pulp and Paper Dr. Ed Packee</td>
</tr>
</tbody>
</table>
Nov. 16  Wood based chemicals  (video penetrations of liquid)
Nov. 16  Lab  House under construction
Nov. 18  Wood Preservation  (video Pressure wood preserving)
Nov. 23  Use of Wood Residues
Nov. 23  Lab  Alaska Bowl Company  speciality Forest Products

THANKSGIVING  November 27

Nov. 30  Wood for energy  Report Due
Nov. 30  Lab  TBA
Dec.  2  Secondary manufacturing of wood products
Dec.  7  Wood product demand and the environment
Dec.  7  EXAM
Dec.  9  Minor Forest Products AND oral presentations on articles

FINAL EXAM  Tuesday  Dec. 14  8:00pm - 10:00pm
Syllabus


Instructor: Kris Hundertmark
Office: 412 Irving I
Office hours: MW 8:00-10:00, TR immediately after lecture
Office phone: 474-7159
Email: ffkh@uaf.edu

Teaching assistant: Torsten Bentzen
Office: 102 Irving I
Office hours: TR 9:00-11:00
Office phone: 474-7006
Email: fstwb@uaf.edu

Classrooms: Lecture—201 Irving I, TR 11:30-12:30
Lab—303 Irving I, T 2:00-5:00

Required text:

On Ereserve at Rasmussen Library (http://eres.uaf.edu/courseindex.asp):
and landscape ecology. Sinauer.

Course description:
WLF 201 is an introductory course to the field of wildlife management. It provides
students with a basic understanding of the practice of wildlife management, including
biological principles important to the understanding of wildlife populations and their
habitats as well as strategies implemented by resource managers to achieve specific
outcomes. The course will also introduce students to species of wildlife of management
interest in Alaska. Instructional methods will include lecture, computer simulations and
demonstrations.

This course requires students to have taken introductory biology courses as well as
ecology. It is recommended that students have microcomputer experience because
laboratory exercises will require use of a computer for much of the semester.

Course goals:
- Provide students with an understanding of a) the ecological principles governing
  wildlife populations and their habitats, and b) principles underpinning
  management of wildlife populations and their habitats for societal goals.
- Introduce students to aspects of the biology and management of different types of
  wildlife, and current wildlife management issues in Alaska.
Examples of student learning outcomes:
Students will:

- Understand how the history of wildlife management in the United States has led to the current system of management
- Apply principles underpinning population growth and regulation to address wildlife management problems
- Differentiate among management strategies for decreasing and increasing wildlife populations
- Understand the effects of external influences on wildlife populations, such as predation, disease, parasites, weather, human disturbance and loss of habitat
- Identify Alaskan wildlife species of management interest and know their habitat affinities and life-history characteristics
- Understand and implement strategies for sampling wildlife populations
- Be able to analyze vital rates of wildlife populations with life-table analysis
- Construct simple population models using computer spreadsheets

Academic dishonesty: The UAF Student Code of Conduct is presented on page 73 of the 2005-06 UAF Catalog. You will be expected to abide by that code. No collaboration among students will be allowed on exams, quizzes or assignments unless expressly permitted by me. Copying or paraphrasing another student's writing is a violation of the Student Code. Copying or paraphrasing published material without proper attribution is plagiarism and is a serious academic offense. If you are unsure what constitutes plagiarism, see the following web page or see me.

www.uaf.edu/library/instruction/handouts/Plagiarism.html

Evidence of academic dishonesty will be presented to the UAF Director of Judicial Services and may result in an F for the course and/or expulsion from the University.

Disabilities: If you have a learning disability, please inform me before the end of the second week of class. If you have not already contacted the UAF Center for Health and Counseling (474-7043; TTY 474-7045) to document your disability, please do so at your earliest opportunity. They will work with me to provide reasonable and appropriate accommodations for persons with documented disabilities.

Grading:
Grades will be assigned based on your performance on the 3 exams, laboratory exercises and exam, and an in-class presentation. Late assignments will not be accepted.
Regardless of the point value of any item, each will be weighted to account for the following percentages of the final grade.

Exam 1 20%
Exam 2 20%
Final exam 20%
Laboratory exercises 20%
Wildlife species exam 10%
Wildlife species presentation 10%
Grading scheme

A  ≥90%
B  80-89%
C  70-79%
D  60-69%
F  <60%

Attendance: You are expected to attend all lecture and laboratory activities. I will not accept laboratory assignments from students who did not attend the laboratory from which the assignment was derived unless a waiver from me is obtained in advance. Waivers will be granted only in unusual circumstances.

Schedule: The accompanying lecture schedule is tentative and is meant to give you a general idea of the topics we will cover in class and lab and the order in which they will be presented. There may be times when it is necessary to stray from this schedule but I will make every effort to inform you ahead of time if that happens.

Final exam: 11 May, 10:15-12:15
The final exam will be comprehensive. More than half of the questions will cover the final third of the course with the remainder of the questions covering the first two-thirds of the course.

Wildlife species presentations:

At the end of the semester we will have student presentations on various wildlife species in lab. Students will check with me to select species and dates for their presentation. You must choose from the attached list of either a mammal or bird (or species group). You will research the species and prepare a PowerPoint presentation of 10 minutes in length summarizing aspects of the species’ life history and management. We will focus on Alaskan species.

Presentations should include at least one good picture of the species along with a range map. They should include life-history information such as life-span, productivity, breeding season, migration characteristics (if any), preferred habitats, food habits, management status in Alaska (harvested for sport and/or subsistence, protected, etc.), government agency with management authority, and any other pertinent information you care to include. You should also include a discussion of key characters for distinguishing this species in the field from similar species, or among the species if you are discussing a group. Finally, the presentation should include a brief summary of one research article concerning your species. You must cite at least 3 sources for your information, only one of which can be Internet-based. Be sure to properly cite any images you use from publications or the Internet. PowerPoint presentations will be turned in for grading after the presentations.
Presentations will be graded on organization and clarity of presentation, quality of visual aids, accuracy and completeness of information, conformity to time limit, and ability to answer questions from the class.

Species list for presentations:

Mammals:

- Moose
- Wolf
- Caribou
- Dall sheep
- Mountain goat
- Sitka black-tailed deer
- Elk
- Black bear
- Brown bear
- Wolverine
- Marten and mink
- Arctic fox and red fox
- Beaver and muskrat
- Land otter and sea otter
- Beluga
- Walrus
- Stellar's sea lion

Birds:

- Canada goose (as a group)
- Other geese (emperor, white-fronted, brant, snow)
- Dabbling ducks (mallard, pintail, teal, etc.)
- Diving ducks (harlequin, scaup, goldeneyes, eiders, etc.)
- Mergansers (hooded, common, red-breasted)
- Swans (trumpeter, tundra)
- Loons (common, pacific, red-throated, yellow-billed, arctic)
- Grouse (ruffed, blue, spruce, sharp-tailed)
- Ptarmigan (willow, rock, white-tailed)
- Sandhill crane

Ereserve:
Supplemental materials are placed on Ereserv, which means they are accessible over the Internet from Rasmussen library’s website. The site is password-protected to conform to copyright restrictions. You are free to read those materials and print them for personal use. Go to the site http://eres.uaf.edu/courseindex.asp and search for courses with Kris Hundertmark as instructor (beware, there are some old materials from WLF 201 from previous years that haven’t been removed yet so don’t search by course title). This will take you to a screen where you can click on a link for WLF201, which will take you to a page that asks for a password. The password is WLF201. Click on the “accept” radio button and you will then see the reserve materials.
## Tentative lecture schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture topics</th>
<th>Reading assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (19 Jan)</td>
<td>Introduction</td>
<td>Text Ch. 1 &amp; 10 Bolen &amp; Robinson* Ch. 1-3</td>
</tr>
<tr>
<td>2 (24 &amp; 26 Jan)</td>
<td>History of wildlife management</td>
<td></td>
</tr>
<tr>
<td>3 (31 Jan &amp; 2 Feb)</td>
<td>Basics of populations</td>
<td>Text Ch. 2, 3, &amp; 5 Krausman* Ch. 7</td>
</tr>
<tr>
<td>4 (7 &amp; 9 Feb)</td>
<td>Populations (cont.)</td>
<td></td>
</tr>
<tr>
<td>5 (14 &amp; 16 Feb)</td>
<td>Population Estimation</td>
<td>Text Ch. 4; Krausman Ch. 15</td>
</tr>
<tr>
<td>6 (21 &amp; 23 Feb)</td>
<td>Catch-up and review; <strong>Exam 1</strong></td>
<td></td>
</tr>
<tr>
<td>7 (28 Feb &amp; 2 Mar)</td>
<td>Habitat, nutrition &amp; animal condition</td>
<td>Text Ch. 6 Krausman Ch. 13</td>
</tr>
<tr>
<td>8 (7 &amp; 9 Mar)</td>
<td>Habitats &amp; habitat management</td>
<td>Text Ch. 7 &amp; 8</td>
</tr>
<tr>
<td>9 (14 &amp; 16 Mar)</td>
<td>----SPRING BREAK----</td>
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<tr>
<td>10 (21 &amp; 23 Mar)</td>
<td>Harvest management</td>
<td>Bolen &amp; Robinson Ch. 10 Krausman Ch. 10</td>
</tr>
<tr>
<td>11 (28 &amp; 30 Mar)</td>
<td>Predation, disease, parasites, weather</td>
<td>Krausman Ch. 9 &amp; 11</td>
</tr>
<tr>
<td>12 (4 &amp; 6 Apr)</td>
<td>Catch-up and review; <strong>Exam 2</strong></td>
<td></td>
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<tr>
<td>13 (11 &amp; 13 Apr)</td>
<td>Big game &amp; furbearers</td>
<td>Text Ch. 15 &amp; 16</td>
</tr>
<tr>
<td>14 (18 &amp; 20 Apr)</td>
<td>Waterfowl &amp; upland birds</td>
<td>Text Ch. 17 &amp; 18</td>
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<tr>
<td>15 (25 &amp; 27 Apr)</td>
<td>Non-game &amp; endangered species</td>
<td>Text Ch. 20 &amp; 21</td>
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<tr>
<td>16 (2 &amp; 4 May)</td>
<td>Nuisance wildlife, exotics &amp; other contemporary issues</td>
<td>Text Ch. 22</td>
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<tr>
<td>17 (11 May)</td>
<td><strong>Final exam (comprehensive)</strong></td>
<td></td>
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</tbody>
</table>

*on Ereserve
**Tentative lab schedule**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Background reading</th>
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</thead>
<tbody>
<tr>
<td>2 (24 Jan)</td>
<td>Basics of data, statistics and sampling</td>
<td>Donovan &amp; Welden* Ch. 6</td>
</tr>
<tr>
<td>3 (31 Jan)</td>
<td>Sampling</td>
<td>Donovan &amp; Welden Ch. 7, 8</td>
</tr>
<tr>
<td>4 (7 Feb)</td>
<td>Population analysis: growth models</td>
<td>Donovan &amp; Welden Ch. 10</td>
</tr>
<tr>
<td>5 (14 Feb)</td>
<td>Population analysis: life tables</td>
<td>Donovan &amp; Welden Ch. 18</td>
</tr>
<tr>
<td>6 (21 Feb)</td>
<td>Population estimation</td>
<td>Donovan &amp; Welden Ch. 27, 28</td>
</tr>
<tr>
<td>7 (28 Feb)</td>
<td>Demographic stochasticity &amp; PVA</td>
<td>Donovan &amp; Welden Ch. 29</td>
</tr>
<tr>
<td>8 (7 Mar)</td>
<td>Harvest models</td>
<td></td>
</tr>
<tr>
<td>9 (14 Mar)</td>
<td>---SPRING BREAK----</td>
<td></td>
</tr>
<tr>
<td>10 (21 Mar)</td>
<td>Squirrel index (depending on snow conditions)</td>
<td></td>
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<tr>
<td>11 (28 Mar)</td>
<td>Moose browse lab</td>
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<tr>
<td>12 (4 Apr)</td>
<td>Cemetery demography</td>
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<tr>
<td>13 (11 Apr)</td>
<td>Mock Game Board Meeting</td>
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<tr>
<td>14 (18 Apr)</td>
<td>Big game species</td>
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<tr>
<td>15 (25 Apr)</td>
<td>Game bird species</td>
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<tr>
<td>16 (2 May)</td>
<td>Wildlife species exam</td>
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</tr>
</tbody>
</table>

*On Ereserve*
# FISHERIES MANAGEMENT FISH 401
2006 Spring Semester Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
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</thead>
<tbody>
<tr>
<td>Jan 23</td>
<td>Introduction to Fisheries Management</td>
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<tr>
<td></td>
<td>Introduction</td>
<td>Ross Chap 1</td>
</tr>
<tr>
<td></td>
<td>History of Fisheries Management</td>
<td>Stephenson &amp; Lane</td>
</tr>
<tr>
<td></td>
<td>Management Science</td>
<td>Malvestuto &amp; Hudgins</td>
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<tr>
<td></td>
<td>Theory of Fishing</td>
<td>Larkin</td>
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<tr>
<td>Jan 25-Feb 6</td>
<td>Fisheries Management Framework</td>
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<td></td>
<td>Fisheries Decision-Making Boards/Councils/Agencies</td>
<td>Ross Chap 6</td>
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<tr>
<td></td>
<td>Roles of Economics, Politics, Science in Decision Making</td>
<td>handouts</td>
</tr>
<tr>
<td></td>
<td>Decision Techniques &amp; Strategic Planning</td>
<td>Merritt &amp; Criddle</td>
</tr>
<tr>
<td>Feb 8</td>
<td>1st paper due (3 pages)</td>
<td></td>
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<tr>
<td>Feb 8-22</td>
<td>Managing For Objectives Set Forth by Law and Policy</td>
<td>Ross Chap 7</td>
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<tr>
<td></td>
<td>Fishery Objectives-Setting the Objective Function</td>
<td>Francis &amp; Shotton</td>
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<tr>
<td></td>
<td>Harvest Strategies</td>
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<td></td>
<td>Harvest Tactics (Regulations)</td>
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<td></td>
<td>Implementation of Harvest Tactics</td>
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<td></td>
<td>Risk and Uncertainty</td>
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<tr>
<td></td>
<td>Aquatic Education/Information &amp; Education</td>
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<tr>
<td>Feb 20</td>
<td>Term paper topic due: 1 page draft</td>
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<tr>
<td>Feb 27-Mar 1</td>
<td>Human Dimensions</td>
<td>Ross Chap 4</td>
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<td></td>
<td>Public surveys</td>
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<td></td>
<td>Fisher use and harvest patterns</td>
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<tr>
<td>Mar 6</td>
<td>Review for midterm</td>
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<tr>
<td>Mar 8</td>
<td>Midterm Exam</td>
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<tr>
<td>Mar 13-17</td>
<td>Spring Break</td>
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<tr>
<td>Mar 20-Apr 5</td>
<td>Exploited Fish Populations</td>
<td>Ross p 56-68</td>
</tr>
<tr>
<td></td>
<td>Impacts of Harvest on Population Dynamics/Evolution</td>
<td>Ross Chap 8</td>
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<tr>
<td></td>
<td>Stocking and Management of Introduced Fishes</td>
<td>Ross p 297-305</td>
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<tr>
<td></td>
<td>Conservation of endangered species</td>
<td>Ross 312-317</td>
</tr>
<tr>
<td>Mar 27</td>
<td>Project Paper Draft Due (5 pages)</td>
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<tr>
<td>Apr 10-12</td>
<td>Aquatic Habitat</td>
<td>Ross Chap 2</td>
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<tr>
<td></td>
<td>Basic Aquatic Habitat Overview</td>
<td>Ross Chap 9</td>
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<tr>
<td></td>
<td>Aquatic Habitat Deterioration and Loss – issues</td>
<td></td>
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<tr>
<td>Apr 17-19</td>
<td>Oral Presentations &amp; Final paper due (10 pages)</td>
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<tr>
<td>Apr 24-26</td>
<td>Aquatic Habitat Manipulation</td>
<td>Ross Chap 10</td>
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<tr>
<td></td>
<td>Structure (artificial reefs, large woody debris)</td>
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<td>Chemistry (lake fertilization)</td>
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<td></td>
<td>Stream restoration techniques</td>
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<tr>
<td>May 1</td>
<td>The Fishery Manager and Professionalism</td>
<td>AFS handouts</td>
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<td></td>
<td>Career/Leadership Development</td>
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<td>Role of Advocacy</td>
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<td>Codes of Ethics</td>
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<tr>
<td>May 3</td>
<td>Review for final</td>
<td></td>
</tr>
<tr>
<td>May 10</td>
<td>Final Exam</td>
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</tbody>
</table>
Course Approach and Grade Determination for Fisheries Management FISH 401

The course grade will be determined by exam (40%), the development of papers (55%), and an oral presentation of your final project paper to the class (5%); class participation is extra credit.

Exams will consist of a varying number of questions including those requiring short 2-3 written sentences and 1 or 2 essay questions. The midterm exam is a written exam that will be given in class on March 8. The exam will be on lectures, videos and reading assignments from January 23 through March 1, and covers four sub-units: Introduction to Fisheries Management, Fisheries Management Framework, Managing for Objectives and Human Dimensions. The Final Exam is a written exam that will be given in class on May 10. The Final Exam will be on lectures, videos and reading assignments from the entire course, from January 23 through May 1, although emphasis will be placed on sub-units following the midterm exam. Missed exams must be made up within one week; a missed final will need to be discussed with the professor. Reading assignments will come from the course textbook, Fisheries Conservation and Management by M. R. Ross, and photocopied articles.

Papers make up the majority of the grade. The first paper is on comparing and contrasting two fishery management plans, from the National Marine Fisheries Service, and the Alaska Department of Fish and Game. This 3-page paper is due February 8. The second paper is on a fisheries management issue, selected by the student in collaboration with and approval by the professor. Students can select the same issue, however they must take differing viewpoints. Students must research their chosen issue, using newspaper or magazine articles, journal articles and other reference material, internet “fish talk” servers, and/or interviews with experts. Students will provide a critique of the issue and a perspective on proposals or actions to resolve the issue, with the following in mind:

1) Clearly describe the issue and the fish stock or fishery affected.
2) What is the history of the issue and why do you think it became a problem or has the potential for becoming a problem?
3) What special interest groups have a stake in the issue and its resolution?
4) What fisheries decision-making board/council/commission and/or what agencies are responsible for deliberating and addressing the issue?
5) Does politics (legislation urged by special interests), economics of the users, ecology/environmental conditions, or human philosophy play any role in the issue?
6) How is the fishery (or fisheries) affected by the issue currently being managed? If applicable, what is the harvest strategy, harvest tactics (regulations), and status of their implementation/enforcement?
7) How certain is the stock assessment information? Is the question of risk to the resource a component of the issue? If not, should it be?
8) What decisions have been made or are proposed and what management actions have occurred?
9) Do you agree with the proposals/decisions by governing bodies or management actions taken by agencies? Do you agree with any of the stakeholders? Explain your position.
10) If you were in a position to have complete authority for the resolution of the issue, what would you recommend?

The paper will be evaluated on clarity in writing style, completeness of content, logic of flow from point to point (organization), grammar, punctuation, the incorporation of editorial
comments, etc. Students can use the following as style guides: Guide for Authors, North American Journal of Fisheries Management, Guide for Authors, Canadian Journal of Fisheries and Aquatic Sciences, and Robert Day's How to Write and Publish a Scientific Paper. Drafts #1 and 2 will be edited and returned to the student to assist the student in developing their writing ability. It is expected that editorial comments will be incorporated into successive revisions. Draft #1 will consist of 1 type written page, double spaced, and will clearly and briefly describe the issue; it is due **February 20**. Draft #2 will consist of 5 type written pages, double spaced, and will address at least 5 of the questions outlined above; this draft is due **March 27**. The final paper will consist of 10 type written pages, double spaced, and will address, at minimum, all of the pertinent questions outlined above; the final term paper will be due **April 17**. For every day an assignment is late, 5 points will be subtracted, up to 60% of the total grade.

Each student will be asked to give a 10 minute oral presentation of their paper to the class. This presentation makes up 5% of the grade.

Participation in class discussions is extra credit of up to 10 points.

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm Exam</td>
<td>100</td>
<td>(50%)</td>
</tr>
<tr>
<td>Final Exam</td>
<td>100</td>
<td>(50%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>200</td>
<td>(100%)</td>
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<tr>
<td>Management plan paper</td>
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<td>(30%)</td>
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<tr>
<td>Draft Paper # 1</td>
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<td>(15%)</td>
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<tr>
<td>Draft Paper # 2</td>
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<td>(45%)</td>
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<tr>
<td>Final Paper</td>
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<td>(75%)</td>
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<tr>
<td><strong>Total</strong></td>
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<tr>
<td>Oral Presentation</td>
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<td>(5%)</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td>500</td>
<td>(100%)</td>
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</tbody>
</table>

**Policies**

Students are expected to attend class regularly and on time; please let the instructor know if you will be absent for an extended period so that coursework can be assigned in advance and arrangements made for make up work. Students are expected to submit assignments on time. Plagiarism of the project paper will result in a loss of 100 points. Assistance in organizing, researching and writing the project paper can be obtained from the Student Writing Center. The Office of Disability Services (203 WHIT 474-7043) insures that UAF students have equal access to the campus and course materials. Students with disabilities can be assured that they will be provided with reasonable accommodation.
COURSE SYLLABII
FOR
RESTRICTED ELECTIVE COURSES
Biology 331 Systematic Botany (Plant Taxonomy)  
Spring 2005  
Course Description and Expectations

Instructors: Peter M. Ray and Carolyn Parker  
Ofices: PMR: Trailer “Bldg T-6”, between Arctic Health & UAF Museum  
Phone: 474-5434  
email: pray@stanford.edu  
CP: UAF Museum Herbarium, phone or e-mail for appointment.  
Phone: 474-7109.  
email: fnclp1@uaf.edu

Teaching Assistant: Amy Carroll  
Office: 120 Arctic Health Bldg  
Phone: 474-7929 (ofc), 474-6053 (lab)  
email: ftabc@uaf.edu

Course goals:  
A general introduction to vascular plant identification and classification, including  
the biological principles, practices, and philosophies involved in the study of vascular  
plant taxonomy.  
An appreciation for the morphological and ecological variation found in plants,  
the ways in which this variation might be generated and maintained in plant populations,  
and how it is evaluated, classified and (when appropriate) named by botanists.  
An introduction to mechanisms of plant evolution and an overview of current  
concepts of vascular plant (especially angiosperm) evolutionary history.  
Training in effective and efficient use of botanical manuals, and their technical  
keys, for plant identification. Familiarization with the major vascular plant families found  
in Alaska and other northern regions. Ability to ‘sight recognize’ several important seed  
plant genera.  
An appreciation and basic understanding of the potential contributions to  
systematics offered by biogeography, floristic studies, and ecological research.  
Acquaintance with the kinds of botanical resources available for you to use, when  
questions about the identities of plants arise in your future occupation (or in your  
recreation!).

Course expectations:  
**We expect you to attend classes and labs, and to arrive on time!** (MW 1:00,  
TuTh 2:00) If you have to miss any presentation, try to arrange for a friend to take  
notes for you. Remember to check if you have missed any handouts.  
Systematics includes many different topics and sometimes different points of  
view. We are lucky to be having several guest lecturers joining us during the semester.  
**Please** give them your full attention, take the opportunity to **ask** them questions, and,  
yes....the material and insight they bring to the class lectures will be included in the  
exams!

Grading and late policies

Grading will be on a curve, at the discretion of the instructors.  
Assignments will be accepted late only by prior arrangement with the teaching  
assistant.  
For quizzes and exams the staff will often provide special, non-repeatable  
materials. Exams and quizzes will therefore be administered only on the announced
day and time, and cannot be taken late. Failure to take one will result in no credit for it, unless an exception for a crisis beyond the student's control has been arranged in advance with the instructors (coincidence of exam dates or assignments in different courses is not such a crisis!). Exam dates are given in the course schedule. Quizzes will be announced in advance, as the course progresses.

Grading points will be partitioned as follows:

**Lecture**
- Exam 1 Feb 28: 12%
- Exam 2 Apr 12: 13%
- Final exam May 11: 25%
- Assigned homework: 5%

**Laboratory**
- Quizzes: 20%
- Final lab practical: 20%
- Student plant collection: 5%

**Laboratory requirements and procedures**

The main goal of the laboratory periods is to acquaint you, gradually and progressively, with the characteristics of important vascular plant groups, using representative samples both of live material (insofar as possible) and herbarium specimens. You will be expected to identify many of these to genus or to species, by making appropriate observations or dissections of the plant organs that are pertinent to deciding between morphological alternatives spelled out in botanical keys. This will train you in the skills and knowledge of morphology and terminology that one needs in order to become competent in plant identification.

Each student will be assigned a specific dissecting microscope (and separate illumination source, if the scope does not have internal illumination), and a specific, departmental copy of one of the Alaska-relevant botanical manuals listed in the book list below. You will be responsible for the proper handling and care of these materials throughout the semester. They must be returned to their assigned storage lockers before you leave the lab for the day, and must not be taken out of the lab. Notations, highlighting, or other disfigurement must not be made in the departmental volume that is assigned to you. As noted below, you will have the option of purchasing your own copies of one or another of these books at the bookstore. You must do so, and bring that copy to the lab, if you wish to make notes in the book while using it. (If you think you have found an actual error in a departmental copy you can correct this if one of the instructors approves doing so.)

In order to perform the dissections necessary for plant identification, each student must purchase from the bookstore a kit of high-quality dissecting instruments specially ordered for this course, and bring it to each lab (you may keep it in your microscope locker if you wish). As your personal property, you are responsible for the proper care of these instruments (which are easily damaged and rendered useless by mis-handling).

At the beginning of most lab periods we will hand out a work sheet on which to record the results of your observations and identifications. This must be handed in at the end of the lab period.
Near the end of the semester the lab will provide training in the preparation of herbarium specimens, and students will be expected to prepare and identify a limited specimen collection to be handed in and graded for specimen quality and for accuracy of identification.

Materials to bring to lab:

Bring your copy of Walters & Keil, your own personal set of dissecting instruments (see above), and, if you purchase one and want to write notes in it, your own copy of Hultén's or Cody's flora. If making sketches of plant parts or dissections helps you understand and learn morphological characteristics (it does help many people), bring a notebook (or paper) and suitable pencils.

If you have a 5X, 10X, or 15X hand lens, you will find it useful in lab. These can be purchased at Alaska Prospector's Supply, 504 College Road (very nice selection, but funny winter hours. Call first – 452-7398). If you will be doing botany field work in the future, you will want one! Prices range from $5 – 50, depending on what you want.

Organization of the lab periods

The laboratory periods will begin on time (2:00 P.M.). Presentations on new families or larger groups will be made at the beginning of the lab period. This time will also be used to cover any extra class business, pass out handouts, give quizzes, etc. It is essential that you not miss the first half hour or more of lab, because that would put you at a great disadvantage. The remaining lab time will be for you to study and identify representatives of the new families covered that period.

Books and supplies

Required for the course:
- Walters, D.R. and Keil, D.J. Vascular Plant Taxonomy. 4th edition. We shall make extensive use of its text, keys, and illustrations in both lecture and in lab, and you will need to refer to these so you should always bring your copy of this book with you.
The chapter assignments from this book are listed in parentheses in the course schedule.
- Biol 331 dissecting instruments kit, specially ordered by the UAF bookstore from Carolina Biological Supply Co. The set includes high-quality, finely pointed forceps and dissecting needles much superior to those in general biology dissecting kits, and much more effective for the dissection of the tiny flowers and other structures that one needs to do to identify many plants. If you take good care of these instruments they will valuably serve you for many future biological purposes besides plant identification, and they are a real bargain at the price at which we have obtained them.

Recommended:
Several copies of the following books have been ordered by the bookstore to be available to you if you wish to have your own personal copy.
- Harris, J.G., and M.W. Harris. Plant Identification Terminology. $15-20. An illustrated glossary that you may want to have on hand in the lab. Also contains an illustrated, systematic overview of morphological variations in stems, leaves, roots, inflorescences, flowers, and fruits, with the terminology that is applied to these and used in plant identification keys. This is similar to, but more extensive than, the treatment of these topics by Walters and Keil.
- Hultén, E. *Flora of Alaska and Neighboring Territories*. ca. $120-130! This flora is still the 'bible' for Alaskan botany, but a now somewhat imperfect one, since it was published in 1968 and much has changed in Alaskan plant taxonomy since then. If you will be doing botany in Alaska, you may consider buying your own copy.

- Cody, W.J. *Flora of the Yukon Territory*. Much newer (therefore taxonomically much more up to date), and cheaper, than Hultén (ca. $60). Useful for interior, alpine, or arctic Alaska, since most of the species that occur in these areas also occur in Canada's Yukon Terr. Like Hultén, it is completely illustrated, many of its drawings actually being borrowed from those in Hultén. Keys are often improved over Hultén's, and based on more recent taxonomic treatments, as is the species nomenclature which therefore sometimes differs from Hultén's. However, the species distribution maps, unlike Hultén's, cover only Yukon Terr.


**Other books** to be placed **on reserve for Biol 331** in the Biology Library, to provide optional, supplementary reading for students interested in this.

- Judd, W.S., et al. *Plant Systematics, a Phylogenetic Approach*. An excellent general and up to date (1999) text on plant systematics that emphasizes evolutionary issues rather than plant identification, but includes family descriptions with a world wide perspective, and beautifully executed illustrations of representative plants and plant parts. This book provides valuable detailed information on current interpretations of vascular plant phylogenies, for those who want more on this than the limited exposure to it that we shall give in this course.

- Briggs, D. and Walters, S.M. *Plant variation and evolution*. 3rd edition (1997). The standard for the topic; to be studied carefully by anyone interested in going on in the field of plant evolution.

- Hickey, M. and C. King, *Common families of flowering plants*. Illustrations of plants and plant parts from important North Temperate angiosperm families, including most of those considered in this course; extensively illustrated introductory material on the vegetative and floral morphology needed for plant identification and classification.

- Zomlefer, W.B. *Guide to Flowering Plant Families*. A similar book whose author is both a taxonomist and an artist; the drawings are excellent. A copy of this book from the UAF Herbarium will be available during labs, but the Bioscience Library appears not to have a copy.

Reading assignments in Walters & Keil are listed by chapter numbers in the course schedule. Separate assignments are shown for lab periods and lectures. To be able to benefit fully from the lab work and complete it expeditiously within the lab period **you must read the assignment for each lab prior to that lab period**.

We may also occasionally give you reading 'suggestions', mostly from the books listed as on reserve for the course. These would be supplementary and/or complimentary to the lectures and labs. The reserve books are also sources for additional reading, of your own choice, on a topic if you missed the lecture or lab that covered it, or feel that you need or want more than Walters & Keil give on that topic.
Lectures: Irving 201, 1:00-2:00 PM Mon., Wed.

Labs: Irving 103, 2:00-5:00 Tue., Thu.

Jan 24  Introduction. Purposes of plant systematics (1).
Quick "tour" of Alaska’s vegetation & flora.
Basic technique of plant species identification. (4)

Jan 26 Gymnosperms, basic reproductive features (9)

Jan 31 Vegetative morphology of Angiosperms (3)
Feb 2 Angiosperm sexual repro., flower, inflorescences (10)

Feb 7 Fruit & seed morphol. (10); woody Ranales
Feb 9 Plant names (2)

Feb 14 “cont.; vegetative (asexual) reproduction (3+)
Feb 16 Pollination mechanisms; breeding systems (+)

Feb 21 Variation among & within species (24+)
Feb 23 Biochemical variation & defenses (part of 25)

Feb 28 EXAM 1, through last lecture

Mar 2 Speciation (part of 25)

Mar 7 Species concept and criteria in plants (part of 25)
Mar 9 Evolution of genus & family concepts, & of “natural” classification (21, 22)

Mar 14-20 Spring break

Mar 21 Bot. nomenclature; International Code (2). Carolyn Parker
Mar 23 Taxonomic literature; herbaria (5, 6, 26). Carolyn Parker

Mar 28 Cladistics, I. (23) Kent Schwaegerle
Mar 29* Systematic uses of greenhouses, botanical gardens & "common" gardens. (+) Heather McIntyre
Mar 30 Cladistics, II. (23) Kent Schwaegerle

Apr 4 Molecular methods for relationships, I. (25) Diana Wolf
Apr 6 Molecular methods, II. (+) Diana Wolf

Apr 11 Plant evolution as revealed by fossils. (+) Sarah Fowell
Apr 13 EXAM 2, through last lecture

Apr 18 Current interpretations of angiosperm evolution (+)
Apr 20 Environmental specialization; functional group classification.

Apr 25 Origins of the Alaskan and northern flora, I. Dave Murray “Amentiferae” (parts of 16, 18)
Apr 27 Origins of the Alaskan flora, II. Dave Murray Prep. of herbarium specimens (6)

May 2 Floristic inventories: purposes, techniques. Carl Roland
May 4 Review

* To be held in Biology & Wildlife Greenhouse, near Butrovitch parking lot, during regular Tuesday lab period.
UNIVERSITY OF ALASKA- FAIRBANKS
TANANA VALLEY CAMPUS
EMERGENCY SERVICES PROGRAM
National Wildfire Coordinating Group (NWCG) Suppression Skills (S), Incident Command System (I), Leadership (L), Prevention (P), and Fire Investigation (FI) Training List

FIRE 151 WILDLAND FIRE CONTROL I
S-110, S-130, S-190 Emergency Fire Fighter (EFF)
L-180 Human Factors on the Fireline
I-100 ICS Orientation
I-200 Basic ICS
F-531 Emergency Response to Terrorism

FIRE 153 ADVANCED WILDLAND FIREFIGHTER (NEW)
S-211 Portable Pumps and Water Use
S-212 Wildfire Power Saws
S-131 Advanced Firefighter Training
FI-110 Wildland Fire Cause Determination for First Responders

FIRE 155 WILDLAND FIRE BEHAVIOR
S-290 Intermediate Wildland Fire Behavior
S-390 Introduction to Wildland Fire Behavior Calculations

FIRE 157 WILDLAND AIR OPERATIONS AND SAFETY
S-270 Basic Air Operations
S-271 Helicopter Crewmember

FIRE 159 WILDLAND FIRE OPERATIONS FUNCTION
S-230 Crewboss (Single Resource)
S-215 Fire Operations- Urban Interface

FIRE 161 WILDLAND FIRE LOGISTICS FUNCTION
J-158 Radio Operator
J-252 Ordering Manager
J-253 Receiving and Distribution Manager
J-254 Base/Camp Manager
J-255 Equipment Manager
J-259 Security Manager

FIRE 165 WILDLAND FIRE PLANNING FUNCTION
S-245 Display Processor
S-248 Check-in/ Status Recorder
J-342 Documentation Leader
S-348 Resource Unit Leader

FIRE 252 WILDLAND FIRE PREVENTION
P-101 Introduction to Wildfire Prevention
P-301 Wildland Fire Prevention Planning
FI-210 Wildland Fire Origin and Cause Determination
Wildfire Law Enforcement Procedures

FIRE 254 WILDLAND FIRE FINANCE FUNCTION
S-261 Applied Interagency Incident Business Management
S-360 Finance-Administration Unit Leader

FIRE 262 WILDLAND FIRE CONTROL II
S-234 Ignition Operations
S-336 Fire Suppression Tactics

FIRE 270 WILDLAND FIRE COMMAND FUNCTION
S-200 First Attack Incident Commander/ Single Resource
S-203 Introduction to Incident Information
L-280 Followership to Leadership

Revised February 2006
Emergency Services

College of Rural Alaska
Tanana Valley Campus
(907) 455-2823
www.tvcc.uaf.edu/programs/info/emerg-info.html

A.A.S. Degree

Minimum Requirements for Degree: 68-73 credits

The UAF emergency services program provides classroom education, hands-on training and practical vocational experience through 10 local SAR and rescue organizations. The program offers students a fundamental working knowledge of the various aspects of municipal, wildland, emergency medical services and hazardous materials related instruction.

Instructors provide a high level of technical expertise on a variety of specialty emergency services. The primary goal of this program is to make our students the most attractive candidates for job openings and promotions within SAR and other emergency services fields.

Associate degrees in municipal SAR, wildlands SAR, public safety and hazardous materials, emergency medical services and public safety are offered.

Major—A.A.S. Degree

Concentrations: Emergency Medical Services, Hazardous Materials

Emergency Medical Services

1. Complete the general university requirements (page 76).
2. Complete the A.A.S. degree requirements (page 79).
3. Complete the following program (major) requirements:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>EMS 170</td>
<td>EMT: Emergency Medical Technician I</td>
</tr>
<tr>
<td>EMS 180</td>
<td>Paramedicine I</td>
</tr>
<tr>
<td>EMS 182</td>
<td>Paramedicine II</td>
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<tr>
<td>EMS 186</td>
<td>Clinical Rotation I</td>
</tr>
<tr>
<td>EMS 271</td>
<td>Paramedicine III</td>
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<tr>
<td>EMS 275</td>
<td>Clinical Rotation II</td>
</tr>
<tr>
<td>EMS 277</td>
<td>Clinical Rotation III</td>
</tr>
<tr>
<td>EMS 283</td>
<td>Paramedic Internship</td>
</tr>
<tr>
<td>HLTH 114</td>
<td>Fundamentals of Anatomy and Physiology</td>
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</table>

4. Minimum credits required: 73

* Students must earn a C grade or better in each course.

Hazardous Materials

1. Complete the general university requirements (page 76).
2. Complete the A.A.S. degree requirements (page 79).
3. Complete the following program (major) requirements:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
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<tbody>
<tr>
<td>EMS 170</td>
<td>EMT: Emergency Medical Technician I</td>
</tr>
<tr>
<td>MTH 1110</td>
<td>Introduction to Hazardous Waste Operations and</td>
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<tr>
<td></td>
<td>Emergency Response</td>
</tr>
<tr>
<td>AERO 121</td>
<td>Behavior and Combustion</td>
</tr>
<tr>
<td>AERO 131</td>
<td>Fighter I Series I</td>
</tr>
</tbody>
</table>
b. Complete 9 credits from the following major elective courses:
- 212—Building and Fire Codes
- 215—Advanced Hazardous Materials Technician
- 216—Methods of Instruction for Emergency Services Training
- 293—Special Topics
- 294—Emergency Operations
- 295—Computer Aided Management of Emergency Operations

4. General electives

5. Minimum credits required: 69

*Student must earn a C grade or better in each course.

Note: Major electives and general electives must be approved by the student’s advisor.

**Municipal**

1. Complete the general university requirements (page 76).
2. Complete the A.A.S. degree requirements (page 79).
3. Complete the following program (major) requirements:
   a. Complete the following:
      - EMS 170—EMT: Emergency Medical Technician I
      - 101—Principles of Emergency Services
      - 102—Prevention
      - 107—Strategy and Tactics
      - 117—Rescue Practices
      - 121—Behavior and Combustion
      - 125—Fighter I Series I
      - 133—Fighter I Series II
      - 135—Fighter I Series III
      - 137—Fighter I Series IV
      - 202—Protection Hydraulics and Water Supply
      - 203—Hazardous Materials Chemistry I
      - 206—Building Construction for Fire Protection
      - 210—Administration I
      - 214—Protection Systems
   b. Complete 6 credits from the following major specialty electives:
      - 115—Apparatus and Equipment
      - 123—Investigations I
      - 151—Wildland Firefighting I
      - 205—Hazardous Materials Chemistry II
      - 212—Building and Fire Codes
      - 216—Methods of Instruction for Emergency Services Training

3. Complete the following:
   - 218—Advanced Rescue Practices
   - 232—Fighter II
   - EMS 261—EMT: Emergency Medical Technician II

4. Minimum credits required: 69

*Student must earn a C grade or better in each course.

Note: Major electives must be approved by the student’s advisor.
FAIRBANKS
Admissions • P.O. Box 757480 • Fairbanks, AK 99775-7480 • admissions@uaf.edu • www.uaf.edu
The University of Alaska Fairbanks is accredited by the Northwest Commission on Colleges and Universities. UAF is an affirmative action/equal opportunity employer and educational institution. E.O.E.

Public Safety
1. Complete the general university requirements (page 76).
2. Complete the A.A.S. degree requirements (page 79).
3. Complete the following program (major) requirements*:
   a. Complete the following:
      AVTV 231/EMS 257—Arctic Survival........................................3
      EMS 170—EMT: Emergency Medical Technician I..........................6
      EMS 176—Aeromedical Evacuations in Alaska............................1
      101—Principles of Emergency Services....................................3
      105—Prevention...............................................................3
      117—Rescue Practices .....................................................3
      127—Vessel Safety: Emergency Equipment and Procedures ..........3
      131—Firefighter I, Series I..............................................3
      133—Firefighter I, Series II...........................................3
      135—Firefighter I, Series III.........................................3
      137—Firefighter I, Series IV...........................................3
      216—Advanced Rescue Practices......................................3
      JUST 110—Introduction to Justice .....................................3
      JUST 340—Rural Justice in Alaska..................................3
      JUST 358—Juvenile Delinquency......................................3
   b. Complete 9 credits from the following major electives:
      EMS 261—EMT: Emergency Medical Technician II.......................3
      123—Wildland Investigations I........................................3
      151—Wildland Behavior..................................................3
      212—Building and Fire Codes.........................................3
      216—Methods of Instruction for Emergency Services Training......3
      JUST 345W—Police Problems............................................3
      JUST 352—Criminal Law..................................................3
      JUST 354—Procedural Law..............................................3
4. Minimum credits required....................................................68
* Student must earn a C grade or better in each course.

Wildland
1. Complete the general university requirements (page 76).
2. Complete the A.A.S. degree requirements (page 79).
3. Complete the following program (major) requirements*:
   a. Complete the following:
      EMS 170—EMT: Emergency Medical Technician I......................6
      131—Firefighter I, Series I..........................................3
      133—Firefighter I, Series II........................................3
      135—Firefighter I, Series III....................................3
      137—Firefighter I, Series IV....................................3
      151—Wildland Behavior..............................................3
      157—Wildland Air Operations and Safety..............................3
      159—Wildland Air Operations Function................................3
      252—Wildland Air Prevention......................................3
      254—Wildland Air Finance Function..................................3
      252—Wildland Air II....................................................3
   b. Complete 9 credits from the following major elective courses:
      161—Wildland Air Logistics Function..................................3
      165—Wildland Air Planning Function..................................3
      216—Methods of Instruction for Emergency Services Training......3
      256—Wildland Air Planning and Multiple
      Use Management.........................................................3
      258—Wildland Air Fuels Management..................................3
      270—Wildland Air Command Function..................................3
4. Complete general electives....................................................6
5. Minimum credits required....................................................69
* Student must earn a C grade or better in each course.
Note: Major electives and general electives must be approved by the student’s advisor.

Minor

1. Complete the following:
   - 131—Firefighter I, Series I .................................................. 3
   - 133—Firefighter I, Series II .................................................. 3
   - 135—Firefighter I, Series III .................................................. 3
   - 137—Firefighter I, Series IV .................................................. 3
   - EMS 170—Emergency Medical Technician I ............................. 6

2. Minimum credits required ..................................................... 18

Note: Page numbers refer to the UAF 2005-2006 academic catalog, which can be viewed online at www.uaf.edu/catalog.
Fire Science

A $75 per semester fee for turnout cleaning will be assessed for one or more FIRE courses. A $75 per semester fee for the upgrade of equipment will also be assessed for one or more ARSK, EMS and FIRE courses. These fees are in addition to any lab/materials fees.

FIRE 103 3 Credits
Principles of Emergency Services
Overview of fire protection, career opportunities in fire protection and related fields, philosophy and history of fire protection/service, fire loss analysis, organization and function of public and private protection services, fire departments as part of local government, laws and regulations affecting fire services, fire service nomenclature, specific fire protection functions, basic fire chemistry and physics, introduction to fire protection systems and introduction to fire strategy and tactics. (3+0) Offered Fall

FIRE 105 3 Credits
Fire Prevention
Fundamental information regarding the history and philosophy of fire prevention, organization and operation of a fire prevention bureau, use of fire codes, identification and correction of fire hazards, and the relationships of fire prevention with built-in fire protection systems, fire investigation, and fire and life-safety education. (Prerequisite: FIRE 101 or permission of instructor.) (3+0) Offered Fall

FIRE 107 3 Credits
Strategy and Tactics
In-depth analysis of the principles of fire control through utilization of personnel, equipment and extinguishing agents on the fire ground. (Prerequisite: FIRE 101 or permission of instructor.) (3+0) Offered Spring

FIRE 110 3 Credits
Introduction to Hazardous Waste Operations and Emergency Response
Review of federal and state hazardous materials laws and regulations. Career opportunities related to the field of Hazardous Materials including transportation, emergency response and site clean up, and Incident Command System (ICS). (3+0) Offered As Demand Warrants

FIRE 115 3 Credits
Fire Apparatus and Equipment
Fire apparatus design, specifications and performance capabilities, effective utilization of apparatus in fire emergencies. (Prerequisite: FIRE 101 or permission of instructor. Next offered: 2005-06.) (3+0) Offered Alternate Spring

FIRE 117 3 Credits
Rescue Practices
Rescue situations and techniques including vehicle extrication, rescue carries, ventilation principles, structural rescue, use of portable hand and power tools, wildland/canine search and rescue, ice and water rescue and emergency life saving principles. Materials fee: $150 plus $13 for additional mandatory insurance plus $75 turnout cleaning/repair fee. (Prerequisites: EMS 170, or permission of instructor. All students are required to wear a complete set of fire department approved protective clothing (turnout gear). Limited quantities are available for loan through the Emergency Services program coordinator. An 8 hour Personal Protective equipment (PPE) and Self-Contained Breathing Apparatus (SCBA) safety orientation offered each semester must be completed in order to participate in live fire exercises.) (3+0) Offered Spring

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FIRE 121 3 Credits
Fire Behavior and Combustion
Exploration of theories and fundamentals of how and why fires start, spread, and how they are controlled. (3+0) Offered Fall

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FIRE 123 3 Credits
Fire Investigations I
Fundamentals and technical knowledge needed for proper fire scene interpretations, including recognizing and conducting origin and cause, preservation of evidence and documentation, scene security, motives of the firesetter, and types of fire causes. (Prerequisite: FIRE 101 or permission of instructor. Next offered: 2005–06.) (3+0) Offered Alternate Spring

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FIRE 127 1 Credit
Vessel Safety: Emergency Equipment and Procedures
Introduction to safe boating practices and skills including boat handling, rules of navigation, proper safety equipment, weather, boat trailering, lines and knots, first aid and emergency procedures. (1+0) Offered Fall

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FIRE 131 3 Credits
Firefighter I, Series I
The initial phase in a four phase process for achieving state of Alaska Fire Fighter I certification. Fundamental knowledge of fire behavior, fire organizations, types of fire equipment emergency response services possess and methods of their use. Successful completion of all four phases will qualify the student for Alaska State Fire Fighter I certification. Materials fee: $150; mandatory insurance: $13; turnout cleaning/repair fee: $75. (Prerequisite: All students are required to wear a complete set of fire department approved protective clothing (turnout gear). Limited quantities are available for loan through the Emergency Services Program Coordinator.) (3+0) Offered Spring, As Demand Warrants

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FIRE 133 3 Credits
Firefighter I, Series II
The second phase in a four phase process for achieving state of Alaska Fire Fighter I certification. Fundamental knowledge of fire behavior, fire organizations, types of fire equipment emergency response services possess and methods of their use. Successful completion of all four phases will qualify the student for Alaska State Fire Fighter I certification. Materials fee: $150; mandatory insurance: $13; turnout cleaning/repair fee: $75. (Prerequisite: All students are required to wear a complete set of fire department approved protective clothing (turnout gear). Limited quantities are available for loan through the Emergency Services program coordinator. An 8 hour Personal Protective equipment (PPE) and Self-Contained Breathing Apparatus (SCBA) safety orientation offered each semester must be completed in order to participate in live fire exercises.) (2+2) Offered Fall, As Demand Warrants

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FIRE 135 3 Credits
Firefighter I, Series III
The third phase in a four phase process for achieving state of Alaska Fire Fighter I certification. Fundamental knowledge of fire behavior, fire organizations, types of fire equipment emergency response services possess and methods of their use. Successful completion of all four phases will qualify the student for Alaska State Fire Fighter I certification. Materials fee: $150; mandatory insurance: $13; turnout cleaning/repair fee: $75. (Prerequisite: All students are required to wear a
complete set of fire department approved protective clothing (turnout gear). Limited quantities are available for loan through the Emergency Services program coordinator. An 8 hour Personal Protective equipment (PPE) and Self-Contained Breathing Apparatus (SCBA) safety orientation offered each semester must be completed in order to participate in live fire exercises.) (2+2) Offered Fall, As Demand Warrants

FIRE 137 3 Credits
Firefighter I, Series IV
The fourth phase in a four phase process for achieving state of Alaska Fire Fighter I certification. Fundamental knowledge of fire behavior, fire organizations, types of fire equipment emergency response services possess and methods of their use. Successful completion of all four phases will qualify the student for Alaska State Fire Fighter I certification. Materials fee: $150. (3+0) Offered Spring, As Demand Warrants

FIRE 143 1 Credit
Firefighter Internship, Series 1
Practical experience in fire operations and training by arrangement through local fire departments. (0+2) Offered Fall

FIRE 145 1 Credit
Firefighter Internship, Series 2
Practical experience in fire operations and training by arrangement through local fire departments. (Prerequisite: FIRE 143.) (0+2) Offered Spring, As Demand Warrants

FIRE 147 1 Credit
Firefighter Internship, Series 3
Practical experience in fire operations and training by arrangement through local fire departments. (Prerequisite: FIRE 145.) (0+2) Offered Summer, As Demand Warrants

FIRE 151 3 Credits
Wildland Fire Control I
Designed to provide national certification for both entry-level and experienced fire fighters with fundamental knowledge of wildland fire organization, fire behavior, air operations, suppression methods, safety, the incident command system, portable pumps, water use and chain saws. (3+0) Offered Spring

FIRE 155 3 Credits
Wildland Fire Behavior
Provides fire behavior knowledge to determine basic input data for fire behavior calculations such as rate of spread, fire line intensity, flame length and area/perimeter growth using fire behavior prediction systems. Prepare fire perimeter maps, assess and predict chances of extreme fire behavior conditions, assess fire line data and fire behavior estimations, identify fire suppression limitations, and make recommendations for fire line location and safe control tactics. (Prerequisite: FIRE 151 or permission of instructor. Next offered: 2006–07.) (3+0) Offered Alternate Spring

FIRE 157 3 Credits
Wildland Air Operations and Safety
Basic use of aircraft in wildland fire operations including helicopter operations, types and capacities, helibase/helispot construction, logistics support and specialized missions. Fixed wing operations include establishment of air bases, retardant operations, aircraft fueling and paracargo support. Emphasis on aviation safety. (Prerequisite: FIRE 151 or permission of instructor. Next offered: 2005–06.) (3+0) Offered Alternate Fall

FIRE 159 3 Credits
Wildland Fire Operations Function
Overview of the operations function including organization; implementation of the incident action plan; tactical use of
crews, engines, bulldozers; appointment of supervisors in accordance with span of control; utilization of fixed wing and rotor wing aircraft and fire operations in the urban interface. Functional position of single resource boss/crew covered. (Prerequisites: FIRE 151, 155, 157 and 254, or permission of instructor. Next offered: 2005–06.) (3+0) Offered Alternate Fall

FIRE 161 3 Credits
Wildland Fire Logistics Function
Overview of the support and service branches of the logistics function within the incident command system. Emphasis on entry-level positions of ordering manager, receiving and distribution manager, base camp manager, equipment manager and medical unit leader. (Prerequisite: FIRE 151 or permission of instructor. Next offered: 2005–06.) (3+0) Offered Alternate Fall

FIRE 165 3 Credits
Wildland Fire Planning Function
Provides an overview of the planning process, organizational relationships with other functions, use of planning matrix board, check-in and resource status procedures, evaluation, analysis and display of incident information, documentation, demobilization, use of technical specialist and components of an incident action plan. (Prerequisite: FIRE 151 or permission of instructor. Next offered: 2006–07.) (3+0) Offered Alternate Fall

FIRE 202 3 Credits
Fire Protection Hydraulics and Water Supply
Foundation of theoretical knowledge in order to understand the principles of the use of fire in fire protection and to apply hydraulic principles and analyze and to solve water supply problems. (Prerequisites: FIRE 101 and satisfactory demonstration of basic math skills (pretest), or permission of instructor.) (3+0) Offered Spring

FIRE 203 3 Credits
Hazardous Materials Chemistry I
Basic fire chemistry relating to most categories of hazardous materials including problems of recognition, reactivity and health encountered by fire fighters. (Prerequisite: Satisfactory demonstration of basic chemistry knowledge (pretest) or permission of instructor.) (3+0) Offered Fall

FIRE 205 3 Credits
Hazardous Materials Chemistry II
Chemistry review of common hazardous materials control, confinement and containment operations with an emphasis on decontamination procedures. Meets the requirements of the 24 hour Operations Level, First Responder to hazardous materials incidents. (Prerequisite: FIRE 203 or permission of instructor. Next offered: 2006–07.) (3+0) Offered Alternate Spring

FIRE 206 3 Credits
Building Construction for Fire Protection
Components of building construction that relate to fire and life safety. Focus on fire fighter safety. Includes elements of construction and design of structures shown to be key factors when inspecting buildings, preplanning fire operations and operating emergencies. (Prerequisite: FIRE 101 or employment or experience in related field, such as fire protection, insurance, construction architecture or engineering.) (3+0) Offered Spring

FIRE 207 3 Credits
Hazardous Materials Technician
Advanced information for protection and safety of personnel engaged in response and field cleanup of hazardous materials and substances at the Hazardous Materials Technician level (EPA course #165.15). Materials fee: $150. (Prerequisite: FIRE 205 or permission of instructor. (3+0) Offered As Demand Warrants
FIRE 209 3 Credits
Hazardous Materials Command/Safety Officer
Preparation for Incident Commander and the Safety Officer positions on complex hazardous materials incidents or large site cleanup operations. (Prerequisite: FIRE 207 or permission of instructor.) (3+0) Offered As Demand Warrants

FIRE 210 3 Credits
Fire Administration I
Introduction to the organization and management of a fire department and the relationship of government agencies to the fire service. Emphasis on fire service leadership from the perspective of the company officer. (Prerequisite: FIRE 101 or permission of instructor.) (3+0) Offered Fall

FIRE 212 3 Credits
Building and Fire Codes
Introduction to life safety aspects of Uniform Building Code. Emphasis on Uniform Fire Code for fire inspections on existing buildings, flammable liquids, hazardous materials and special processes. Preparation for the Uniform Fire Code Exam administered by International Conference of Building Officials. (Prerequisites: FIRE 101 and 206, or permission of instructor. Next offered: 2005–06.) (3+0) Offered Alternate Spring

FIRE 214 3 Credits
Fire Protection Systems
Features of design and operation of fire detection and alarm systems, heat and smoke control systems, special protection and sprinkler systems, water supply for fire protection and portable fire extinguishers. (Prerequisite: FIRE 101 or permission of instructor.) (3+0) Offered Fall

FIRE 215 3 Credits
Advanced Hazardous Materials Technician
Provides increased hands-on skills for personnel who have obtained their Hazardous Materials Technician rating. Emphasis will be placed on task proficiency in spill containment, plugging, patching, diking and valve shut-offs on large commercial transporters. Stabilization of large and small chlorine leaks and decontamination will also be covered. Materials fee: $150. (Prerequisites: FIRE 207 or permission of instructor.) (2+2) Offered As Demand Warrants

FIRE 216 3 Credits
Methods of Instruction for Emergency Services Training
Skills necessary to instruct emergency service courses including adult education techniques, classroom setup, use of audiovisual equipment, presentation and evaluation methods of students and instruction. (Next offered: 2006–07.) (3+0) Offered Alternate Spring

FIRE 217 1 Credit
Hazardous Materials Technician Refresher
Review of information and skills required for protection and safety of personnel engaged in response and field cleanup of hazardous materials and substances at the Hazardous Materials Technician level. Materials fee: $50. (Prerequisites: Fire 206 or equivalent with certification that may not be expired for more than one calendar year.) (1+0) Offered Alternate Spring

FIRE 218 3 Credits
Advanced Rescue Practices
Provides instruction in four of the most common rescue situations that fire departments encounter in the Interior of Alaska rescue: vehicular extrication, rope rescue, confined space rescue and ice/water rescue. Class stresses basic knowledge and hands-on experience. All students are required to wear a complete set of fire department approved protective clothing (turnout gear). Limited quantities are available for loan through the Emergency Services program coordinator. Materials fee: $150 plus $15.60 mandatory insurance plus $75 turnout cleaning/repair fee. (Prerequisites: FIRE 117 and
EMS 170; or permission of instructor. (3+0) Offered Fall

FIRE 231 3 Credits
Hazardous Materials Tactical Operations
Prepares students to handle tactical operations involving hazardous materials at fixed facilities as well as transportation incidents involving flammable and combustible liquids, corrosives, poisons, cryogenics, oxidizers, LPG, etiological materials, etc. (Prerequisite: FIRE 207 or permission of instructor.) (3+0) Offered As Demand Warrants

FIRE 232 3 Credits
Fire Fighter II
Advanced technical knowledge of fire alarms, communications, fire behavior, self contained breathing apparatus, rescue, safety, ladders, fire hose, nozzles and appliances, fire streams, water supplies, sprinklers, overhaul and inspections. All students are required to wear a complete set of fire department approved protective clothing (turnout gear). Limited quantities are available for loan through the Emergency Services Program Coordinator. Materials fee: $150 plus $75 turnout cleaning/repair fee. (Prerequisites: FIRE 131, 133, 135 and 137, or permission of instructor. An eight hour Personal Protective Equipment (PPE) and self-contained breathing apparatus (SCBA) safety orientation, that is offered each semester, must be completed in order to participate in live fire exercises.) (2+2) Offered Summer, As Demand Warrants

FIRE 244 1 Credit
Firefighter Internship, Series 4
Practical experience in fire operations and training by arrangement through local fire departments. (Prerequisite: FIRE 145 or 147.) (0+2) Offered Fall

FIRE 246 1 Credit
Firefighter Internship, Series 5
Practical experience in fire operations and training by arrangement through local fire departments. (Prerequisite: FIRE 244.) (0+2) Offered Spring

FIRE 248 1 Credit
Firefighter Internship, Series 6
Practical experience in fire operations and training by arrangement through local fire departments. (Prerequisite: FIRE 246.) (0+2) Offered Summer, As Demand Warrants

FIRE 249 3 Credits
Computer Aided Management of Emergency Operations
Assistance to emergency planners and first responders to plan for and safely handle chemical accidents through the use of a computer. CAMEO contains chemical nomenclature and response information for 3,311 commonly transported chemicals. (2.5+1) Offered As Demand Warrants

FIRE 252 3 Credits
Wildland Fire Prevention
Overview of wildland fire prevention including data collection, problem identification, problem analysis, action planning, fire reporting, fire cause determination, enforcement of laws and ordinances, public fire education and the economics of fire prevention. (Prerequisite: FIRE 151 or permission of instructor. Next offered: 2005–06.) (3+0) Offered Alternate Spring

FIRE 254 3 Credits
Wildland Fire Finance Function
Fire business management objectives, including duties and responsibilities of fire finance section relating to management
practices and programs. Procedures required in various finance positions including financial management of a large complex wildland fire. (Prerequisite: FIRE 151 or permission of instructor.) (3+0) Offered Fall

FIRE 258 3 Credits
Wildland Fuels Management
Fire management and its role in a multiple use resource program. Includes prescribed and wild fire practices, environmental concerns, management goals and objectives and pre-fire planning. (Prerequisite: FIRE 151, FIRE 155, or permission of instructor. Next offered: 2005–06.) (3+0) Offered Alternate Fall

FIRE 262 3 Credits
Wildland Fire Control II
Instruction in tactical operations of fire line construction, use of hand crews, heavy equipment, water and engines, firing operations, wildland/urban interface and using combinations of resources. Advanced level course for trained and experienced wildland fire fighters. (Prerequisites: FIRE 151, 155, 157, 159 and 254 or permission of instructor. Next offered: 2006–07.) (3+0) Offered Alternate Fall

FIRE 270 3 Credits
Wildland Fire Command Function
An overview of the command function including use of single and unified command, roles and responsibilities of the incident commander and staff, development and implementation of strategic decision, providing information to the media and managing the incident from initial attack of small, non-complex fires to larger, more complex initial attack suppression organizations dealing with escape attack situations. (Prerequisites: FIRE 151, 155, 252 or permission of instructor. Next offered: 2006–07.) (3+0) Offered Alternate Spring
PHOTOGEOLOGY:
Geomorphologic Interpretation and Geologic Mapping using air photos

COURSE INFORMATION
ROOM: NSF 233
TIME: Tues Lecture 5:20-6:20
Tuesday Lab 6:30-9:30

PROFESSOR
NAME: Dr. Jim Beget
OFFICE: NSF 334
PHONE: 474-5301
OFFICE HOURS: MON-WED. 9-11:30 or by appt.

TEACHING ASSISTANT
NAME: Erin Hess
OFFICE:
PHONE & EMAIL: x7585 (Fteeh@uaf.edu)
OFFICE HOURS: to be announced at first class

TEXTBOOKS

PREREQUISITES:
You will find it helpful if you have completed GEOS 304 Geomorphology and GEOS 314 Structural Geology before taking this class. It is possible to be successful in this class if you have not taken these courses, but it is highly recommended that you familiarize yourself with appropriate texts from these courses and use them as needed during the laboratory exercises. Some students find it helpful to buy an inexpensive geologic glossary or dictionary. A working knowledge of geometry and algebra are also important. If you are color-blind, or unable to view objects stereoscopically, you will have difficulties with some of the laboratory exercises. In our first week’s laboratory we will test ourselves for color blindness, and practice viewing objects in stereo (i.e. in three dimensions). If you have any problems with color blindness or ability to visualize in 3-D during the first laboratory session, please discuss this with me.

COURSE OBJECTIVES
1. You will gain experience in recognizing and interpreting geomorphic features and landforms on aerial photos.

2. This course will train you to recognize different lithologies and geologic structures on aerial photographs. You will learn about the influence of vegetation and weathering in different climatic zones on aerial photo mapping.

3. You will learn to make geologic maps from aerial photographs. The laboratory sections will cover the selection of units, the essential elements of all geologic maps. You will also learn about the mechanics of aerial photography and stereoscopy. There will be a brief introduction to methods for quantitative analyses of maps.

4. We will briefly survey the use of different types of satellite imagery for geomorphic studies and regional photogeologic mapping.

5. We will introduce the use of aerial photographs in field mapping.

COURSE DESCRIPTION

This course is divided into two parts. The first few weeks will be devoted to introductory lectures and exercises which will introduce you to aerial photos and geologic maps. We will cover the mechanics of aerial photography and stereoscopic viewing.

The laboratory will move to a series of exercises that involve mapping of progressively more complex structures and geomorphic features. Some laboratory exercises will involve completing mapping problems of various types and scales, and answering questions about geologic relations and history you interpret from your photo interpretations. The aerial photos will usually be from your text. In some cases you will map structural geology, while other exercises will emphasize interpretations of natural processes and geomorphology.

The second part of the class will concentrate on photogeologic mapping of complex areas and the use of photogeologic methods on special topics. We will do 1-2 lab exercises on difficult photo problems, including remotely sensed imagery. Students will then spend several weeks working on an independent mapping project using either their own photos, on a project provided by the instructor, or on a problem of their choice using photos available at the GEODATA CENTER in the GI. Students may work singly or in groups with groups required to map a larger area. Upon completion of the maps, students will make oral presentations describing the regional geology of the area they have mapped at the next to last class meeting. Short written reports will also be completed on the final mapping problems.

COURSE FORMAT

LECTURE: Each class session will begin with a lecture covering technical aspects of photogeologic mapping.

LABORATORY: Labs will deal with progressively more difficult photogeologic mapping problems.

READINGS: Readings from the text will be assigned weekly, and will contain information relating to the lecture and the lab work. Some additional, supplemental readings
may also be assigned.

EXAMINATIONS: Only one examination will be held, in the middle of the term. The exam will be based on lectures and lab exercises, and will include photo interpretation of a series of images.

GRADES: The examination will be worth 33% of the grade. The final project (map & report) will be worth an additional 33% and lab exercises during the term will make up the final 33%.

DUE DATES: In general, it will be possible to complete work during the weekly labs. However, if a mapping exercise takes you a bit longer, or if you have a conflict with the lab, exercises will be accepted up to the end of the next class. No weekly labs will be accepted after this deadline.

FINAL PROJECT: All final project topics must be cleared in advance with me.

The final project is an important part of this class. You are responsible for picking an interesting area and problem to map. There is complete photo coverage of Alaska in the Gl, so you can work on just about any Alaskan problem you want. Its a good idea to start thinking and planning your project before the end of the term.

In past classes people have selected areas that they mapped or visited during geologic work the previous summer. Some students map a family cabin or a mineral claim. Some students work on extraterrestrial imagery, or photos or archeologic sites, or homesteads. Any problem in any area where you can find photos is ok.

You can work alone, but groups of 2-3 are also acceptable. Groups must map proportionally larger areas. Sean or I will happily suggest some possible final projects to you if you need an idea. Each project should have a theme... (i.e. glacial geology, or active fault scarps, o jointing patterns, etc.) but all geology in the photos you select must be mapped.

FOOD:* It can be nice to have an evening class...
However there is a small problem with missing dinner.* If you want to eat during the lecture portion of the class it is ok with me. Please feel free to bring food to class, and to eat it during the first hour of the class. I’d don’t want food around the lab materials, so if you want to eat during
the last 3 hours of the class, please leave classroom during the lab period and go upstairs and use the microwave and have a bite there.

*I'll bet this is the first syllabus you've ever seen with a section on food.

Speaking of food......

WARNING: PHOTO GEOL OGY CAN MAKE YOU SICK! -- see next page...

Every year some students become nauseous during the lab portion of this class. This occurs because of
eyestrain.

This illustration shows typical GEOS 408 mapping group trying to decide what they should do on their final project. Note how cross-eyed everyone has become from looking down stereoscopos too long!!!!!!

It's true.....you can make yourself a little bit sick in the lab from crossing and uncrossing your eyes to look down the scopes, particularly if the original flight lines weren't parallel or the photo pairs aren't aligned properly. If you begin to feel nauseous, just stop working, get up, walk around and get some fresh air. Don't let yourself get even close to feeling like the people in the above illustration look...take a break, drink a coke, go for a walk outside.

*Please note that the nausea warning refers to the labs only....there is no escape if my lectures make you sick.

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**DATE (WEEK OF) **  **LAB/LECTURE**

1-25  Introduction/aerial photos/stereoscopes & stereovision

1-28  Beginning photo analysis/drainage patterns

2-4  Geologic maps /volcanic landforms

2-11  Tectonism/active faulting/folds

2-18  Simple structure

2-25  ..........Glacial Geology/Surfical geologic mapping

3-4  Fluvial/Desert/ Periglacial surficial features

3-11  ..........Mapping complex structure (practice project)

===============spring break=======================================

3-25  ..........Midterm examination
4-1    Remote sensing/Landsat/Radar

4-8    MEET AT GI PHOTO ARCHIVES--begin work on projects

4-15   work on final projects

4-22   FINAL PROJECTS DUE----in class reports given

4-29   Field mapping with aerial photos (field trip...wear mud boots)

This schedule is preliminary and may be modified.
NRM/BIOL 277: INTRODUCTION TO CONSERVATION BIOLOGY  
Spring Semester 2006

Meeting Time:  Tuesday-Thursday  11:30 AM -1:00 PM

Classroom:  Arctic Health Research Building (AHRB) Room 183 on the UAF Fairbanks campus, and distance-delivered by the Polycom video and audio system to the library of the UAF Agricultural and Forestry Experiment Station in Palmer, Alaska

Instructor  Dr. Glenn Patrick Juday, Professor of Forest Ecology, School of Agriculture and Land Resources Management, Forest Sciences Department

Office:  Room 232, Arctic Health Research Building (West Ridge), 474-6717 (W); 474-7188 (department) 474-7439 FAX; 479-3765 (H).  e-mail = g.juday@uaf.edu
Office Hours  - (arrange in advance to confirm) Tuesday & Thursday 1:00-3:00 pm

Course Text


Endangered Species Recovery Plan report
The U.S. Endangered Species program website (http://endangered.fws.gov/index.html) contains a great deal of information about the provisions, history, and operation of the Endangered Species Act (ESA). Students will select a listed species for which an approved recovery plan (http://endangered.fws.gov/recovery/Index.html#plans) has been adopted and prepare a 15-minute presentation to the class. Questions from these reports will be the subject matter for a quiz. The class will consider and develop an evaluation of the operation of the ESA and other approaches to endangered species conservation.

Optional Supplemental Readings

2. Topic outlines provided by the instructor.

3. Articles from the journals such as Conservation Biology, Biological Conservation, Nature, Science, Natural Areas Journal, and the Nature Conservancy Magazine.


Course Description
This course will provide an overview of:

(1) the principles of the science of conservation biology and the contributions of several different integrative levels (molecular, physiology, genetic, population, ecology, earth
system science) of biology to problems in conservation biology.
(2) the framework of organizations, laws, programs, and land management systems that are specifically focused on identifying, protecting, and maintaining natural diversity in the U.S., in selected other nations, and in international programs.

(3) case studies of specific threatened, endangered, or declining plants and animals, including the ecology and biology of the organisms, factors leading to their decline, and management and recovery methods and strategies.

(4) an overview of the conservation status of some major habitat regions of the world with an emphasis on northern hemisphere and high latitude areas but including ecosystems of particular interest from the tropics, oceans and elsewhere.

**Course Structure**
The first part of the course is primarily lecture format. The goal is to cover the scientific principles of conservation biology and the main values-based rationales that drive conservation biology. Early in the course, students will choose and download an endangered species recovery plan from the U.S. Fish and Wildlife Service website. In the second half of the class students will be involved in analysis and presentation, applying the principles covered in the first part. Students will present their species recovery plan and analyze the effectiveness of the Endangered Species Act based on the sample of plans presented in class. In general students will be expected to analyze institutions and programs that work to maintain natural diversity in the second part of the course. Focus will be balanced between the U.S and Canada, northern regions, and global situations.

**TOPIC OUTLINE (Spring Semester 2006)**

**Section I Principles**
- A. Concepts of natural diversity (genetic, species, ecological)
- B. The practical significance of natural diversity
- C. Ethical/moral issues in natural diversity conservation and management
- D. Fragmentation and edge effects
- E. Genetics – heterozygosity, independent assortment, inbreeding depression, genetic bottleneck, genetic drift and founder effect, dwarfism
- F. Minimum Viable Population (MVP); population biology of small populations, rescue effect
- G. Patterns of diversity and landscape ecology, centers of diversity
- H. Environmental variability and natural diversity, environmental stochasticity
- I. Island biogeography
- J. Management interventions to promote natural diversity – in situ vs. ex situ conservation, reintroduction, corridors, compensating factors, approaches to sustainability
- K. Human demography, resource consumption, conservation and resource management

**Section II Programs, Policies, and Laws**
- A. The focused search for diversity: The history and programs of The Nature Conservancy, “Conservation by Design” State Natural Heritage Programs
- B. Landscape-scale preservation: The National Park System and the National Wilderness Preservation System
- C. Natural diversity goals in multiple use management in the U.S.: National Forest
Management Act, Federal Land Management and Policy Act
Section III Conservation Biology Threatened or Endangered Species across Taxonomic Groups
   A. Features and provisions of the U.S. Endangered Species Act (criteria for listing and the listing process, critical habitat and Section 7 sanctions, multi-species listings, Habitat Conservation Plans, Recovery Plans and goals, de-listing)
   B. Case studies of endangered animals (Whooping Crane, Black-footed ferrets, large cats, primates)
   B. Case studies of endangered plants
   C. Ecosystem Level Projects
      1. Conservation biology of old-growth forest ecosystem of the Pacific Northwest

Section IV Conservation Biology at the Ecosystem Level

   A. Landscape connectivity and viability (restoration,
   B. Aquatic and Marine conservation (large-scale marine ecosystem function, conservation of wetlands, river management and conservation biology)

Section IV Conservation Biology in Northern Regions

   A. Swedish and Canadian boreal forest diversity and conservation
   B. Conservation Biology of the greater Prince William Sound ecosystem and the Exxon Valdez Oil Spill
   C. Conservation biology challenges from climate change, especially in northern regions
Grading Policy

I. Quizzes, Midterm, and Final Exam - 60% of Course Grade
Students will be examined on material from lecture handouts, the text, assigned documents downloaded from the Internet, and copies of articles distributed in class. There will be regular short quizzes on the basic factual content of the material assign for the course. Quizzes will total 20% of the overall grade. A midterm exam will include both short answer questions and short explanation or problem type questions. The midterm exam will total 20% of the overall grade. The final exam will total 20% of the overall grade.

The goals are to:
1. Give the students an incentive to complete their reading assignments in pace with the presentation of lecture material, and to review in greater depth the topics that are introduced in lectures.
2. Highlight common knowledge that all student completing the course can be expected to know.
3. Provide the opportunity to review and retain factual information in a written form.
4. Provide a forum for responses that demonstrate integrative thinking, deductive reasoning, and well-developed and more extended responses.

II. Student Presentation - 30% of Course Grade
Students will be called upon to give 1 time-limited oral report on an official Endangered Species Recovery Plan. Recovery Plans selected for the presentation must be approved in advance by the instructor. Students are encouraged to select a topic for which they have some special background because of work or life experience, special interest, or curriculum background. Reports will be in the form of briefings, such as an employee of a private or public resource agency might be called upon to give to explain a recommended conservation policy. Students will be evaluated by the instructor on both the content and effectiveness of the presentation, including responses to critical questions following the presentation.

The goals are to:
1. Make students aware of a substantial body of conservation biology literature, some of it quite recent, that includes popular, semi-technical, and technical information, and to promote good reading habits.
2. Give students experience in summarizing a specific topic within a strictly limited time for presentation, making sense of it and identifying the most relevant points to reach conclusions.
3. Give students experience in speaking before their peers, with special emphasis on speaking cogently and fluently.

III. Class Response - 10% of Course Grade
Students will be asked questions in class concerning the content of assigned readings and handouts. Familiarity with this material will be expected. Students will also be asked to make critical inferences in class once basic definitions and lectures have been delivered.

Rationale:
1. Higher concepts cannot be developed if students are not familiar with basic assigned readings.
2. Interaction between the instructor and the students (questions from and to students, ability of
students to respond when challenged) is an important aspect of education within the course.
3. Attendance is a tangible demonstration of the seriousness of the student toward the course.
NRM/BIOL 277 Instructions for
Endangered Species Recovery Plan presentation

1. Address and summarize each of the sections of the recovery plan; the required sections are the same in all plans and we want to compare them.

2. Do not overemphasize the biology of the species to the exclusion of all else; include budgetary and management issues as well.

3. Use visual aids where they are the most effective way of conveying the information (e.g. charts of numbers, distribution maps).

4. Get to the main point quickly; there is no time for “warm up” or digressions.

5. Summarize and synthesize; present the most interesting or critical facts, don’t get lost in long lists of details.

6. Evaluate the material you have encountered. Is it reliable, complete, reasonable, do the plans correspond to the facts, etc?

7. Give your overall critique – will the implementation of this plan lead to recovery or not, and why? Address the hard questions and make a unique contribution of your own, don’t just regurgitate

8. Budget time for your talk at 17 minutes and 3 minutes of focused questions. Adhere to the time limit, it will be strictly enforced.
Evaluation of Student Presentations
NRM/BIOL 277 Introduction to Conservation Biology

Presenter

Assigned Paper/Topic

Evaluation of:
Format

EVALUATION CRITERIA (positive and negative)

ability to gain and hold audience attention
effectiveness of introduction
tone of voice verbal non-fluencies
eye contact manners in delivery
smoothness in topic transition
clarity and directness of expression

Content

EVALUATION CRITERIA (positive and negative)

organization within available time
focus on the most relevant information
effectiveness of examples or illustrations
review of relevant background concepts

adherence to time limits
use of gestures
run-on sentences
grammar
comprehension of material
effectiveness of summarization
appropriateness of facts

Grade - _/20 (times expansion factor)
NRM/BIO 277: INTRODUCTION TO CONSERVATION BIOLOGY
Class schedule, Spring Semester 2006

Class 1. Thurs. January 19
Introduction to course, grading policy, background, scope of conservation biology; definitions and concepts of biological diversity; integrative levels of biology as a factor in conservation. (reading assignment, text Meffe Chapter 1)*.

Class 2. Tue. January 24
Definitions and concepts of biological diversity; arguments and reasons for conserving; management actions to maintain biological diversity; (reading assignment, text Meffe Chapter 4)*.

Class 3. Thurs. January 26
students select Endangered Species Recovery Plan.

Class 4. Tue. February 2
Quiz; Patterns of species diversity and endangerment

Class 5. Thurs. February 2
Speciation; tropics vs. temperate (text Meffe Chapter 3)*

Class 6. Tue. February 7
Genetics, inbreeding, and MVP (text Meffe Chapters 6&7)*

Class 7. Thurs. February 9
Quiz; Island biogeography (text Meffe Chapter 5)*

Class 8. Tue. February 14
Fragmentation and edge effects (text Meffe Chapter 9)*

Class 9. Thurs. February 16
Quiz; The Nature Conservancy (text Meffe Chapter 16)*

Class 10. Tue. February 21
The Nature Conservancy

Class 11. Thurs. February 23
The Endangered Species Act (text Meffe Chapter 11)*

Class 12. Tue. February 28
The Endangered Species Act

Class 13. Thurs. March 2
Quiz; Human demography, resource consumption, and conservation (text Meffe Chapter 19)*

Class 14. Tue. March 7
Case studies of endangered animals (text Meffe Chapter 13)*

Class 15. Thurs. March 9
Midterm test; Case studies of endangered plants & animals

Spring Break Tue. March 14

Spring Break Thurs. March 16
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<td>16</td>
<td>Tue. March 21</td>
<td>4 Presentations or Guest lecture</td>
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<td>17</td>
<td>Thurs. March 23</td>
<td>4 Presentations or Guest lecture</td>
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NRM/BIO 277: INTRODUCTION TO CONSERVATION BIOLOGY
Class schedule, Spring Semester 2005

Class 18. Tue. March 28  Quiz A on presentations
Class 20. Tue. April 4  U.S. and world public land management systems
Class 21. Thurs. April 6  3 Presentations
Class 22. Tue. April 11  4 Presentations
Class 23. Thurs. April 14  4 Presentations
Class 24. Tue. April 18  2 Presentations; Class analysis of recovery plans
Class 25. Thurs. April 20  Quiz B on presentations
Class 26. Tue. April 25  Pacific Northwest Old-growth Forest conservation
Class 27. Thurs. April 27  Nordic forests, Marine biodiversity, oil spill recovery
Class 28. Thurs. May 2  Quiz; Climate change and biodiversity
Class 29. Thurs. May 4  Arctic climate change

Final Exam Period  Final test

NRM 300
THE INTERNSHIP:
A SUPERVISED OCCUPATIONAL
EXPERIENCE

BRIDGING THE GAP BETWEEN THE
CLASSROOM AND THE REAL
WORLD
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Updated December 2001
Introduction

NRM 300, Internship in Natural Resources Management, is an opportunity for students of Natural Resources Management to gain the practical experience, professional skills and concepts not necessarily addressed in traditional learning settings. It is an apprentice-type experience, much like a structured, supervised occupational experience for which academic credit may be earned. A well conceived and designed internship provides the student intern with opportunities to apply concepts and techniques learned in previously completed coursework to a professional setting.

Many students, having completed an internship, have found it to be a valuable, practical experience. It is an opportunity to apply theories and principles, become aware of possible disparities between theory and practice, observe procedures and operations of agencies or private enterprises and become better prepared for professional employment. Fundamentally, internships provide pre-employment occupational experience which many employers require as a prerequisite to permanent hiring.

Becoming actively involved in the internship program is an excellent opportunity for prospective employers to screen the abilities and potential of students within the Natural Resources Management program. After sponsoring several internships, the sponsoring organization gains perspective into the general quality and capability of NRM graduates as it pertains to the function of that particular agency or business. Likewise, SALRM faculty can gain from maintaining direct contact with the agencies and businesses by updating the curricula to contain the most recent and relevant information in the field.
The objectives of the internship are designed specifically for each student intern, depending upon the topic of the internship and the occupational goals and particular interests of the student. The topic varies with the individual intern and may involve any aspect of Natural Resources Management.

The internship is designed similar to an independent study course. Instruction is individualized and aimed at accomplishing established objectives written specifically for that internship experience. The intern is supervised throughout the duration of the internship by a cooperating supervisor (an appropriate representative of the sponsoring agency or business) and a faculty supervisor (a faculty member of SALRM with expertise related to the specific topic of the internship). Experiences gained during the internship should be practical, emphasizing hands-on and involvement oriented learning.

Internships are structured just like a formal course, with objectives written prior to the experience and the student intern evaluated on how well the objectives were accomplished. Thus, the intern should approach the internship with the same responsible attitude with which any other course is approached. In reality, more individual motivation on the part of the student may be advantageous. Self-discipline and the ability to work independently are prerequisites to experiencing success in the internship.

NRM 300 is a variable credit course. The number of credit hours that will be earned by the student intern is established prior to the initiation of the internship. Normally, this number ranges from 1-3 credits per semester. Several considerations enter into establishing credit for the internship: current credit hour load, number of contact hours per week the student can realistically complete, amount of time the cooperating supervisor can spend with the intern, and the objectives the student intern desires to achieve during the internship.

A minimum of four contact hours per week is required per credit hour of internship. Thus, for a three credit hour internship, the student intern should arrange for 12 clock hours per week to be spent working on the internship. A student may take as many as 6 credit hours of internship, but no
more than 3 credit hours during any given semester. Internships are usually graded on a pass/fail basis.

Some internships are paid positions, while others are unpaid. All internships within the University (with one exception) are unpaid. Otherwise, these arrangements are made depending on the sponsor's willingness and ability to pay for the services to be rendered by the student intern. The depth of previous experience the student intern brings to the situation may affect whether the position is paid or unpaid. Regardless of whether pay is received or not, the standard fee per credit hour is charged to the student intern by the University.

An internship can be a rewarding and beneficial experience for Natural Resources Management students. Over the last several years the internship program has grown with the opportunity for an eligible student to participate greatly has expanded. For example, sponsors have included the following:

- U.S. Department of Interior Bureau of Land Management, National Park Service
- U.S. Department of Agriculture Soil Conservation Service, U.S. Forest Service
- Alaska Department of Natural Resources Division of Land and Water Management, Division of Forestry, Division of Mining, Division of Parks and Outdoor Recreation
- Alaska Department of Fish and Game Game Division, Habitat Division
- University of Alaska Agriculture and Forestry Experiment Station, Cooperative Extension Service, Office of Land Management
- Toghotthele Native Corporation
- City of Fairbanks
- North Star Borough
Along with the variety of sponsors, topics of internships have varied as well. The following are some examples:

- a wildlife profile of the Wood River Lands,
- development of the Central Yukon Plan and the Tanana Basin Area Plan,
- preparation of timber sales,
- soils research,
- soil conservation planning,
- extension forestry,
- preparation of mining permits, and
- preparation and analysis of public information.

If you think you are eligible for an internship, talk to your academic advisor. Also, it may be worth your while to talk to a fellow student who has completed an internship.
Who is Eligible for an Internship?

- NRM 300, Internship in Natural Resource Management, is open to students pursuing either a major or minor degree in Natural Resource Management.

- The prospective intern must be at least a junior (60 credit hours toward the degree already completed). Graduate students are also eligible.

- A prospective intern should have at least a 3.00 GPA and/or be a student in good standing with qualities indicative of the ability to work independently and with self-discipline.

- The prospective intern must have career goals and a particular interest associated with the topic of the proposed internship.

- The student must be able to perform well in and benefit from the internship program and fulfill the sponsor's needs.

What's The First Step?

Entrance into an internship is by permission of the instructor only. The Application for Enrollment must be completed prior to registering. Students who have not completed this form and attained all necessary signatures will not be allowed to register. A copy of the form must be presented upon registering for classes and a copy provided for the Natural Resource department.

Permission to enroll is required because the success of the program depends on the careful selection of qualified students, quality internship experiences and faculty supervisors with adequate time and expertise to effectively coordinate the internship.
Student Intern Responsibilities

The primary responsibility of the student is to maintain communication with both the cooperating supervisor and faculty supervisor to ensure a successful and beneficial internship experience.

◊ Submit a Program Plan for the internship. A Program Plan is a statement of objectives or job responsibilities that are mutually agreed upon by the cooperating supervisor and the faculty supervisor. In some cases this may involve acquiring a statement from the cooperating supervisor indicating a commitment to the objectives or responsibilities of the proposed internship. For example, some agencies, such as the Soil Conservation Service (USDA), require an official agreement to be signed which specifically defines the relationship between the agency and the University.

Guidelines for developing objectives and job responsibilities

◊ The objectives and responsibilities must be realistic and within the ability of the intern. They should be challenging but not overwhelming.

◊ The objectives and responsibilities should be sequential, with the knowledge and skills learned in one objective applied and built upon the pursuit of subsequent objectives.

◊ Objectives should contain three components to be an effective evaluation factor at the end of the semester. The three components are
  1) task--what is to be accomplished by the intern,
  2) condition--the circumstances under which the objective will be met, and
  3) outcome--the quality or degree of competency to be attained by having accomplished the objective.

◊ Each objective specifies the condition under which the activity or skill is to be accomplished (with or without supervision), the specific task to be done, and the degree of competence expected.
The following is an example used in previously completed internships:

Assist Forester I or Technician IV in laying out timber sale boundaries and road locations in the field including the measurement and recording of bearings and distances. Perform these skills to the satisfaction of the Forester I or Technician IV in charge.

◊ Design a specific, non-conflicting, schedule for working with the cooperating supervisor and meeting periodically with faculty supervisor. This should be agreed upon before the internship starts. The number of hours worked per week is determined by the number of credit hours the student is registered for.

A minimum of 4 clock hours/week/credit hour is required. For example, a 3 credit internship = 12 clock hours/week for 15 weeks to meet the minimum requirements.

◊ Arrange a schedule to meet periodically with the faculty supervisor for an approximately one hour meeting. These meetings are to determine the progress of the internship and for making any necessary revisions. If deemed appropriate by the supervisors, hours used to conference with the faculty supervisor may be included in the total hours worked for the internship.

◊ Maintain an accurate record of the tasks completed and competencies acquired throughout the internship. This record should coincide with projected goals and benchmarks outlined in the internship Program Plan.

This information is recorded on the Competency Checklist included in this handbook to provide a method of identifying major tasks performed. The Benchmark ledger is more useful for chronologically designating tasks accomplished. Upon conclusion of the internship, these records may be used to aid in the preparation of the final report.

◊ A final written report, summarizing what was accomplished, is to be submitted to the faculty advisor prior to the final exam period for the semester. An outline of topics to be addressed in the final report are included in the Appendix (ppxx)
Cooperating Supervisors Responsibilities

The primary responsibility of the cooperating supervisor is to provide a structured, supervised occupational experience for the student intern.

◊ Develop objectives and job responsibilities for each individual intern prior to the beginning of the internship.

◊ Supervision of the student intern. The intern is a student and not an employee in the traditional sense. Thus, specific instruction and direction may be required beyond that which is normally given to regular employees. The sponsor should strive to provide a meaningful learning situation. If possible, an opportunity for the intern to become acquainted with the overall function of the agency or business should be arranged. Individual skills and knowledge brought to the internship will vary from intern to intern. This is particularly important to consider if a sponsor regularly offers services for an internship over several semesters.

◊ Revise original objectives and job responsibilities to ensure the job does not become mundane or repetitive. Ensure that the experiences appropriately address the needs and goals of the student and the business or agency. The faculty supervisor will be available to offer assistance if so desired.

◊ Review as necessary the progress reports submitted by the intern for evaluating their own progress toward attaining the established objectives or job responsibilities. The faculty supervisor will be available as a consultant in the event that the cooperating supervisor identifies concerns with which they are unfamiliar or uncertain.

◊ Prior to the internship, the cooperating supervisor should notify the intern and the faculty supervisor if it is necessary to complete a formal agreement for the internship. This should be drawn up and mutually acceptable to all parties involved and then channeled through the appropriate authorities for approval. This usually involves the Director of Instruction for SALRM and the sponsor's designee.

Faculty Supervisor Responsibilities
The faculty supervisor provides the overall coordination for the internship. This involves providing the necessary leadership to promote the instructional aspects of the internship, providing the linkage between SALRM and the sponsor and making the job of the cooperating supervisor as easy as possible.

◊ Initially, the faculty supervisor contacts the sponsor during the semester prior to the internship, approves the Permission to Enroll statement and coordinates all other activities as deemed appropriate.

◊ Assist the cooperating supervisor and student in the development and writing realistic objectives and job responsibilities.

◊ Assist the intern in translating the objectives and job responsibilities into measurable benchmarks to help facilitate the evaluation process.

◊ Arrange for periodic meetings with the student to determine the progress of the student.

◊ Arrange periodic contact with the cooperating supervisor to determine their perspective on the intern's progress. A committee meeting involving the intern, cooperating supervisor and faculty supervisor may be arranged. Especially if a mid-course change in direction of the internship appears necessary.

◊ The faculty supervisor is ultimately responsible for awarding the final grade for the internship.

**Procedures for evaluating an internship**

Evaluation will be on how well the intern met the objectives and responsibilities specified for the internship. The evaluation is completed during the final exam period for the semester.

◊ A committee meeting with both supervisors and the intern regarding a final evaluation should be arranged. The outcome of this meeting is specified on the internship Evaluation Report.
Once the intern's benchmark ledger, final report, and evaluation have been completed and submitted to the cooperating supervisor, the internship is completed.

Given the recommendation of the cooperating supervisor, the faculty supervisor will award the final grade for the internship.

Initiating An Internship And Completing The Application For Enrollment

Student-initiated: The student may consult with their academic advisor or other member of the teaching faculty and request that an internship be created in a given discipline. The student and faculty then may work together to contact a given agency or business and investigate the possibility of creating an internship.

Faculty-initiated: A faculty member in SALRM may arrange an internship through an agency or business. Specifications for the internship are drawn up and an announcement for application is circulated to students.

Sponsor-initiated: An agency or business which has expressed an interest in providing an internship may contact faculty members. A job description is prepared, approved for its instructional value, and circulated for application by students.
Process of Enrollment

1. Determine eligibility

2. Identify the type of internship preferred

3. Secure permission to enroll from the instructor

4. Submit a copy of the Application for Enrollment statement to the NRM Department

5. Register for class

All of these steps are completed during the semester prior to the start of the internship. All planning must be completed before Registration for the semester in which the internship will take place.

Procedures for conducting an internship after being accepted and enrolled.

1. Submit Internship Program Plan (the specific objectives and responsibilities for the internship are specified) by the end of the first week of the semester enrolled.

2. Arrange a work schedule for the intern.

3. Arrange a schedule for meetings with the faculty supervisor.

4. Report to work at the scheduled time and pursue objectives.

5. Maintain communication with both supervisors to promote continuous feedback and more comprehensive evaluations.
Application for Enrollment
NRM 300 Internship in Natural Resource Management

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<tr>
<th>Student Name</th>
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<td>Mailing Address</td>
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(JR. SR. GRAD.) circle Semester Enrolled

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<tr>
<th>Faculty Supervisor Name</th>
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<td>Office Location</td>
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<table>
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<th>Internship Supervisor Name</th>
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<td>Agency/Business</td>
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Internship Title
Description of Internship (attach a copy of statement of objectives)

Permission to Enroll (completed by Department Head)

Student is Eligible  _Y   _N  Topic is Approved  _Y   _N

Grading Policy (circle one)  Pass/Fail  Letter Grade

Other Comments

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<th>Student Signature</th>
<th>Date</th>
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| Faculty Supervisor Signature | Date |

| Department Head Signature | Date |

| Instructor of Record | Date |

This form must be returned to Deb Segla, Administrative Assistant, who will forward it to Registrar. This form must be on file with the Registrar before you register for this course. If you have any questions please contact her at 474-5550 or fndls1@uaf.edu.
Benchmark Ledger

Use this ledger to succinctly list skills and activities performed towards attaining the desired benchmark.

Name ____________________________

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<tr>
<th>Benchmark</th>
<th>Skills and Activities Performed</th>
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Internship Evaluation Report

Intern ___________________________ Date ________________________

Internship Title ___________________________

Degree to which benchmarks were completed:
(O-Outstanding  S-Satisfactory  P-Poor)

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<tr>
<th>Benchmarks</th>
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<td>Intern’s Ratings</td>
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Updated December 2001
Intern's comments and self-evaluation (see attached checklist):

1. Review of objectives/responsibilities.

2. Strengths and weaknesses of performance:

3. Strengths and weaknesses of the internship as designed:

4. Value of the experience

Cooperating supervisor's comments and evaluation:

1. Strengths and weaknesses of performance:

2. Strengths and weaknesses of the internship as designed:

Faculty supervisor's comments and evaluation:

1. Strengths and weaknesses of performance:

2. Strengths and weaknesses of performance:

Signatures:

Intern

Cooperating Supervisor

Faculty Supervisor

Date

Date

Date
Checklist

The following are provided as a guide for the intern to use in preparing the final report. Items may be deleted or added.

1. Review of Objectives and Responsibilities
   a. Degree of competency attained
   b. Degree to which they were realistic
   c. Impending constraints
   d. Modifications applied during the internship
   e. other comments

2. Strengths of the internship experience
   a. Depth and breadth
   b. Degree of difficulty
   c. Structure
   d. Supervision
   e. other comments

3. Weaknesses of the internship experience
   a. Depth and breadth
   b. Degree of difficulty
   c. Structure
   d. Supervision
   e. Suggestions for improvement
   f. other comments

4. Relationship of the internship experience
   a. To previous course work and experience
   b. To potential future course work
   c. To personal career goals
NRM312 Introduction to Range Management
Fall 2004
3 Credits

Instructor: Norman R. Harris
UAF, AFES, Palmer Research Center

Prerequisites: BIOL F105X, F106X, BIOL F239 or permission of instructor. Recommended: NRM F320, F321

Text: Range Management Principles and Practices, Holechek et al. (Version 4 or 5)

Course Objectives:

1) Introduce students to range management as an applied ecological treatment of soil, plant and grazing animal relationships on uncultivated lands.

2) Describe the origin of the discipline, management practices, important rangelands of North America, with emphasis on Alaska’s rangelands and grazers.

3) Develop web-based content for a future Alaska’s rangelands web site.

Class Format:

This class consists of 42 sessions of 1 hour each. These sessions are a combination of instructor lectures and student-led discussions. The class will be offered at both the Palmer Research Center and the Fairbanks campus via a real-time video link with the instructor occasionally switching to teach from both ends. This is pushing the technology to its maximum and there may (will?) be trying and frustrating periods involved. Please be patient. Four short assignments will be given during the term which will be due approximately two weeks after they are assigned. A 1-hour mid-term will be given approximately half-way through the term and a 2-hour final exam is required at the end of the term.

Testing and grading:

One 1-hour midterm exam 100 points
One 2-hour final exam 200 points
Homework Assignments (4) 160 points
Class Participation 40 points

The instructor will award 10 points for each student-led discussion based on attendance and class participation. Your attendance at all lectures is expected and would be a great ego boost. So remember,

AN INSTRUCTOR WITH AN INFLATED EGO IS AN EASY GRADER!!!
Grading Scale: Percentage (rounded to nearest integer)

A      100 – 90
B      89 – 80
C      79 – 70
D      69 – 60
F      <60
I      Incomplete, missing assignments or tests

Academic Integrity – UA Policy

Students are expected to be honest and ethical in their academic work. Academic dishonesty is defined as and intentional act of deception in one of the following areas:

- Cheating – use or attempted use of unauthorized materials, information or study aids
- Fabrication – falsification or invention of any information
- Tampering – altering or interfering with evaluation instruments and documents
- Plagiarism – representing the words or ideas of another person as one’s own
- Assisting – helping another commit an act of academic dishonesty

Contact Information

Office Hours: 1:00 to 3:00 PM Mondays or by appointment. I maintain an open-door policy, if I’m in I can usually talk.

E-mail: pfnrh@uaa.alaska.edu Always include “Range Class” in the subject line, so you do not get buried in my email!

Phone: (907) 746-9467

SnailMail: Norm Harris
Palmer Research Center
533 E. Fireweed Ave.
Palmer, AK 99645-6629
### Session Schedule and Content

**NRM312  Introduction to Range Management**

10:30 – 11:30 MWF, Room 183 AHRB and Palmer Research Center Library

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Date</th>
<th>Topic</th>
<th>Readings/Assign</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sept. 3</td>
<td>What is range? Introduction</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>2</td>
<td>Sept. 8</td>
<td>Physical Characteristics of Rangelands</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>3</td>
<td>Sept. 10</td>
<td>Physical Characteristics of Rangelands</td>
<td>Assign. 1</td>
</tr>
<tr>
<td>4</td>
<td>Sept. 13</td>
<td>Rangeland Types</td>
<td>Chapter 4</td>
</tr>
<tr>
<td>5</td>
<td>Sept. 15</td>
<td>History of Range Management</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>6</td>
<td>Sept. 17</td>
<td>History of Range Management</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Sept. 20</td>
<td>Student Discussion (Climate, Topo and Soils)</td>
<td>Assign. 1 Due</td>
</tr>
<tr>
<td>8</td>
<td>Sept. 22</td>
<td>Characteristics of Rangeland Plants</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>9</td>
<td>Sept. 24</td>
<td>Range Plant Physiology</td>
<td>Assign. 1 Due</td>
</tr>
<tr>
<td>10</td>
<td>Sept. 27</td>
<td>Vegetation Sampling Techniques</td>
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</tr>
<tr>
<td>11</td>
<td>Sept. 29</td>
<td>Identification of Alaska Forage Plants</td>
<td>Chapter 7</td>
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<td>12</td>
<td>Oct. 1</td>
<td>Identification of Alaska Forage Plants</td>
<td>Assign. 2 Due</td>
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<tr>
<td>13</td>
<td>Oct. 4</td>
<td>Range Ecology</td>
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</tr>
<tr>
<td>14</td>
<td>Oct. 6</td>
<td>Range Ecology</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>15</td>
<td>Oct. 8</td>
<td>Range Inventory and Monitoring</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>16</td>
<td>Oct. 11</td>
<td>Range Inventory and Monitoring</td>
<td></td>
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<tr>
<td>17</td>
<td>Oct. 13</td>
<td>Student Discussion (Vegetation)</td>
<td></td>
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<tr>
<td>18</td>
<td>Oct. 15</td>
<td>Manipulation of Vegetation</td>
<td>Chapter 15</td>
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<td>19</td>
<td>Oct. 18</td>
<td>Manipulation of Vegetation</td>
<td>Assign. 2 Due</td>
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<td>20</td>
<td>Oct. 20</td>
<td>Review for exam</td>
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<td>21</td>
<td>Oct. 22</td>
<td>Mid-term Exam</td>
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<td>Oct. 25</td>
<td>Range Herbivores</td>
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<td>23</td>
<td>Oct. 27</td>
<td>Stocking Rates</td>
<td>Chapter 8</td>
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<td>24</td>
<td>Oct. 29</td>
<td>Animal Nutrition</td>
<td>Chapter 11</td>
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<td>25</td>
<td>Nov. 1</td>
<td>Animal Nutrition</td>
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<tr>
<td>26</td>
<td>Nov. 3</td>
<td>Grazing Methods</td>
<td>Chapter 9</td>
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<td>27</td>
<td>Nov. 5</td>
<td>Grazing Methods</td>
<td>Assign. 3</td>
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<tr>
<td>28</td>
<td>Nov. 8</td>
<td>Improving Animal Distribution</td>
<td>Chapter 10</td>
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<tr>
<td>29</td>
<td>Nov. 10</td>
<td>Improving Animal Distribution</td>
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<tr>
<td>30</td>
<td>Nov. 12</td>
<td>Animal Production</td>
<td>Chapter 13</td>
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<td>31</td>
<td>Nov. 15</td>
<td>Animal Production</td>
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<td>32</td>
<td>Nov. 17</td>
<td>Student Discussion (Animals)</td>
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<td>33</td>
<td>Nov. 19</td>
<td>Wildlife Management</td>
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<td>34</td>
<td>Nov. 22</td>
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<td>Assign. 3 Due</td>
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<tr>
<td>35</td>
<td>Nov. 24</td>
<td>Management for Multiple Use</td>
<td>Chapter 12</td>
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<td>36</td>
<td>Nov. 29</td>
<td>Management for Multiple Use</td>
<td>Assign. 4</td>
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<tr>
<td>37</td>
<td>Dec. 1</td>
<td>Range Improvements and Restoration Ecology</td>
<td>Assign. 4 Due</td>
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<td>38</td>
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<td>Range Improvements and Restoration Ecology</td>
<td>Assign. 4 Due</td>
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<td>39</td>
<td>Dec. 6</td>
<td>Student Discussion (Management)</td>
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<tr>
<td>40</td>
<td>Dec. 8</td>
<td>New Technologies and Range Management</td>
<td>Chapter 17</td>
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<td>41</td>
<td>Dec. 10</td>
<td>New Technologies and Range Management</td>
<td>Assign. 4 Due</td>
</tr>
<tr>
<td>42</td>
<td>Dec. 13</td>
<td>Review for exam</td>
<td></td>
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<tr>
<td>43</td>
<td>Dec. 17</td>
<td><strong>Final Exam</strong> 10:15 – 12 :15</td>
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</tbody>
</table>
NRM 303X Environmental Ethics and Actions

Spring 2005    T, Th 9:45-11:15 am    NSCI 136
               T, Th 2:00- 3:30 pm    NSCI 203

Instructor: John D. Fox

[370 O'Neill -- 474-7084]      ffjdf@uaf.edu
                              or john.fox@uaf.edu

Course Description

An introduction to the variety of thought involved in what has come to be known as "environmental ethics". After reviewing and discussing the nature of "ethics", the origins of ethics, and major traditional approaches to ethics, we will explore the question "why environmental ethics?". We will consider the question of "scope" or "who/what should be morally considerable?", and "focus" ie., the hierarchical level of concern such as anthropocentric, biocentric, ecocentric, etc.. We will also look at the ethical dimension of such general issues as: the environment and economic development; the environment and the poor; and the environment, population and individual freedom, as well as specific issues such as hunting, fishing and trapping; habitat destruction; species extinction; water, air and soil pollution; resource depletion; and waste. The connection, if any, between environmental ethics and Deep Ecology, Eco-feminism, Biodiversity, and Eco-terrorism, and other "isms", will be addressed. Finally, we will look at how different cultural and religious traditions approach issues of environmental ethics.
NRM 303X  Environmental Ethics and Action

Instructional Objectives for Students

1. to appreciate the theoretical / historical background of "ethics" as a field of philosophy and a dimension of the human condition.

2. to identify and be able to describe the major principles, values, and assumptions underlying alternative positions on environmental issues and ethical approaches.

3. to consider / develop / and present arguments for one's own view of environmental ethics and engage in ethical analysis of public and private issues.

4. to explore the relationship between ethical theory and ethical action: as a basis for individual behavior, public policy and professional codes for environmental and resource managers.

Instructional Objectives as part of the Core Curriculum

1. develop understanding of how individuals come to hold the values they proclaim

2. appreciation of the method by which these values influence practical activity of different peoples.

3. understanding of the differences in value systems, both within the Western tradition and between it and non-Western cultures.
4. understanding the dilemmas of moral choice affecting individuals in complex societies.
NRM 303X Environmental Ethics and Actions

GRADING POLICY

The grade each student receives in this class will be the result of the following criteria:

10 % Attendance
30 % Class Participation and Evidence of timely completion of assignments
40 % Performance on Tests
   Mid-Term Exam  15 %
   Final Exam     15 %
   Quizzes        10 %
20 % Term Paper

I intend for class sessions to involve informed, thoughtful discussion on the part of students (and instructor too!). It is only through such dialogue that ideas can be fruitfully explored. The terms "informed" and "thoughtful" are emphasized. To this end it will be imperative that students read and, equally important, ponder the assigned reading material prior to the class for the week. To guide (coerce) you to do this, I will assign a few study questions to go along with the reading materials and/or provide a quiz on content. It will be expected that each student, after (or while) reading the assignment, will write brief answers to these study questions and hand them in on Tue. or Thur. at the beginning of class. These may be handwritten or typed and will be recorded and returned promptly. These weekly written responses to study questions will contribute to assessing "timely completion of assignments" along with timely completion of quizzes posted on the BlackBoard website. Also, I will stress certain discussion questions prior to the reading that will be the initial focus of the subsequent classroom discussions. I may assign one or two particular students the responsibility to initiate the discussion of a specific question. Finally, we may periodically assign individual students or small groups of students to explore some particular topic/issue and report their findings to the class.

The instructor reserve the right to exercise judgement in final grading in light of individual student circumstances and notable changes in progress and performance. Students will be penalized for late assignments, late term paper, or missed exams. Students dissatisfied with their progress or performance should initiate contact with the instructor.

TERM PAPER

Option 1: Toward a Personal Environmental Ethic

The purpose of this paper is to have you examine your own attitudes about the environment and develop and defend your personal environmental ethic. The word "personal" is emphasized because this paper is to reflect your deepest thought and feelings about your relationship with the environment.

Option 2: Ethical Analysis of a Specific Environmental Issue
Although the instructor is not looking for agreement with his personal views, he does expect the development of your paper to deal with the knowledge gained and the issues raised in this course and reflect clear thinking.

The paper will be due on April 14, 2005. It should not be less than five typewritten pages nor more than ten. Proper grammar, spelling, and format are expected.
NRM 303X Environmental Ethics and Actions

**Topical Outline:**

### I. What is "Environmental Ethics"?
- A. What is (are) Ethics?
- B. Changing Worldviews
- C. Why "Environmental" ethics?
- D. Environmental Crisis -- or not?

### II. Traditional (western) Ethical Approaches and Applications to Issues of Environmental Ethics
- Natural Law -
- Judeo-Christian morality -
- Natural Rights theory -- Immanuel Kant
- Utilitarianism -- Bentham, Mill, neo-classic
- Virtue ethics / Ethics of care

### III. Broad Issues of Conflict / Concern
- A. Environment vs Economic Development
- B. Environment vs Poor
- C. Environment, Population, and Individual Freedom

### IV. Specific Issues of Conflict / Concern
- A. Hunting, fishing, trapping
- B. Habitat destruction, modification
- C. Species extinction / biodiversity
- D. Environmental Degradation
- E. Resource depletion
- F. Waste/Consumption

### V. Fundamental Issues of Environmental Ethics -- Who or What Should be Morally Considerable? A Moral Agent? How are conflicts resolved? Ethics made operational?
- A. Humans
- B. Sentient Beings -- Animals
- C. Objects of nature: living beings, species, non-living entities
- D. Systems, communities, ecosystems

### VI. Non-Western, Non-Traditional Approaches to Issues of Environmental Ethics
- Deep Ecology
- Spiritual Ecology
- Social Ecology
- Native American and Non-Western Traditions

### VII. Movements
- A. Green Politics
- B. Eco-feminism
- C. Bio-Regionalism
- D. Eco-terrorism
- E. other

### VIII. Ethics and Professional Ethics for Environmental and Resource Managers
- A. Codes of Ethics
- B. Conscience

### IX. Environmental Ethics as a basis for individual and collective action.
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 20</td>
<td>Introduction / Scope / Mechanics</td>
<td></td>
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<tr>
<td>Jan. 25</td>
<td>What is Ethics?</td>
<td>KFM: Chap.1 &amp; notes; BRN: Chap. 1&amp;2</td>
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<tr>
<td>Jan. 27</td>
<td>Relativism / Sciences &amp; Ethics</td>
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<tr>
<td>Feb. 01</td>
<td>Ethics &amp; Clear Thinking</td>
<td>KFM: Chap.2; BRN: appendix 1</td>
</tr>
<tr>
<td>Feb. 03</td>
<td>Moral Reasoning, Dialogue</td>
<td>Reading: Regan; BRN: chap.3</td>
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<td>Feb. 10</td>
<td>Ethics: Origins and Perspectives</td>
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<td>Feb. 15</td>
<td>Humans &amp; Nature</td>
<td>KFM: Chap.3</td>
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<tr>
<td>Feb. 17</td>
<td>Different worldviews</td>
<td>BRN: Chap. 4</td>
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<td>Feb. 22</td>
<td>Why Environmental Ethics?</td>
<td>KFM: Chap. 4</td>
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<td>Feb. 24</td>
<td></td>
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<td>Mar. 01</td>
<td>Expanding the Circle: Moral Standing-Moral agents, patients; Star Trek Video</td>
<td>BRN: Chap. 5</td>
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<tr>
<td>Mar. 03</td>
<td></td>
<td>TBA</td>
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<tr>
<td>Mar. 08</td>
<td>Review</td>
<td></td>
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<tr>
<td>Mar. 10</td>
<td>Mid-Term Exam</td>
<td></td>
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<tr>
<td>Mar. 15</td>
<td>SPRING BREAK</td>
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<tr>
<td>Mar. 17</td>
<td>SPRING BREAK</td>
<td></td>
</tr>
<tr>
<td>Mar. 22</td>
<td>The Moral Status of Animals</td>
<td>KFM: Chap. 5</td>
</tr>
<tr>
<td>Mar. 24</td>
<td>(animal rights / animal welfare)</td>
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<td>Mar. 29</td>
<td>Biocentric Ethics</td>
<td>KFM: Chap. 6</td>
</tr>
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<td>Mar. 31</td>
<td>Respect for Nature; Respect for Life</td>
<td></td>
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<tr>
<td>Apr. 05</td>
<td>Ecocentric Ethics</td>
<td>Reading: Pickett &amp; Ostfeld; Callicott</td>
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<td>Apr. 07</td>
<td>The Land Ethic</td>
<td>KFM: Chap. 7</td>
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<tr>
<td>Apr. 12</td>
<td>Cultural &amp; Religious Traditions: Spirit &amp; Nature</td>
<td></td>
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<tr>
<td>Apr. 14</td>
<td></td>
<td>KFM: Chap.8</td>
</tr>
<tr>
<td>Apr. 19</td>
<td>The Perspective from Poverty: Guest Speaker</td>
<td>TERM PAPERS DUE</td>
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<tr>
<td>Apr. 21</td>
<td>Affluenza &amp; Greed vs Jobs &amp; Need</td>
<td>Reading: Singer; other TBA</td>
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<td>Apr. 26</td>
<td>Contemporary Movements: Deep Ecology, EcoFeminism; Radical Ecology</td>
<td>KFM: Chap. 10</td>
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<td>Apr. 28</td>
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<tr>
<td>May. 03</td>
<td>Professional Codes of Ethics</td>
<td>Readings: TBA</td>
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<tr>
<td>May. 05</td>
<td>Spill-over, questions, wrap-up.</td>
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</table>

**May 12**  **Final Exam**  **Section F01** – **Thur. 8:00-10:00 am**

**May 10**  **Final Exam**  **Section F02** – **Thur. 1:00-3:00 pm**

**Important Dates:**
- **Feb. 15**  Last Day to Apply for Spring Graduation
- **Mar. 21**  Last Day for Student Initiated Withdrawal
Other Readings: will be available as BlackBoard PDF documents or as handouts. (TBA above means "To Be Announced").
NRM341 GIS Analysis  Spring 2006

Objectives:

- To teach you conceptual tools independent of GIS software.
- To apply conceptual tools using ArcGIS software.
- To maximize hands-on experience in using GIS to solve spatial problems.

Instructors:

Dave Verbyla, Professor,
Dept. of Forest Sciences, O'Neill Bldg 366
Email: D.Verbyla@uaf.edu
Office Hours: Thursday 2-3:30, or by email appointment

Teaching Assistant: Pete Hickman
Email: peter.hickman ctr@eielson.af.mil

Grading will be based on 600 total possible points from

- Fourteen On-line quizzes (@ 20 pts each) = 280 points
- Ten reading assignments or exercise (@20 pts each) = 200 points
- Lab and lecture participation = 120 points

Late assignments will not be accepted after the key is posted on this website.

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<tr>
<th>Final Grade</th>
<th>Total Points:</th>
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<tbody>
<tr>
<td>A</td>
<td>&gt;540</td>
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<tr>
<td>B</td>
<td>510 - 540</td>
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<tr>
<td>C</td>
<td>450 - 509</td>
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<tr>
<td>D</td>
<td>400- 449</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 400</td>
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</table>
Lectures: Tuesday/Thursday, 9:45-11:15 ONEILL 359

Lab: Tuesday 2-5PM or Wednesday 2-5PM ONEILL 359

Reading Assignments:

NO REQUIRED TEXTBOOK!: Chang chapter readings will be available to be downloaded from the UAF Electronic Reserve

1. KEY: Getting Started with ArcGIS tutorial Chapters 1-2: Due Thursday Jan 26, 2006 5pm
2. Getting Started with ArcGIS tutorial Chapters 3-4: Due Thursday Feb 2, 2006 5pm
3. Getting Started with ArcGIS tutorial Chapters 5-6: Due Thursday Feb 9, 2006 5pm
4. Getting Started with ArcGIS tutorial Chapters 7-8: Due Thursday Feb 16, 2006 5pm
5. Chang, Chapters 1, 2 Introduction / Map Projection and Coordinate Systems: Due Thursday Feb 23, 2006 5pm
6. Chang, Chapters 3,4 Vector Data Model / Vector Data Input: Due Thursday Mar 2, 2006 5pm
7. Chang, Chapters 5,6 Spatial Data Editing/ Attributes: Due Thursday Mar 9, 2006 5pm
8. Chapter 16 Network and Dynamic Segmentation: Due Thursday Mar 23, 2006 5pm
9. Chang, Chapter 10 Vector Data Analysis: Due Tuesday Mar 28, 2006 5pm
10. Chang, Chapter 15 Regions: Due Thursday Mar 30, 2006 5pm
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<thead>
<tr>
<th>Tuesday Lecture</th>
<th>Thursday Lecture/Quiz</th>
<th>Tues or Weds. Weekly Lab</th>
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<tr>
<td>Geoprocessing Models</td>
<td>Course Overview</td>
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<tr>
<td>Documenting Models</td>
<td>ArcGIS Geoprocessing Toolboxes, ToolSets, Tools</td>
<td>Building ArcGIS Models</td>
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<td>Point Analysis Tools</td>
<td>1) ArcGIS Model Builder Quiz</td>
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<td>Line Analysis Tools</td>
<td>2) Point Analysis Quiz</td>
<td>Animal Habitat Analysis</td>
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<td>Dynamic Segmentation</td>
<td>3) Line Analysis Quiz</td>
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<td>Network Analysis</td>
<td>4) Dynamic Segmentation Quiz</td>
<td>Dynamic Segmentation Lab</td>
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<td>Polygon Analysis Tools</td>
<td>5) Network Quiz</td>
<td>Network Analysis Lab</td>
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<td>Regions Model</td>
<td>6) Polygon Quiz</td>
<td>Polygon Analysis Lab</td>
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<td>SPRING BREAK</td>
<td>7) Regions Quiz</td>
<td>Regions Analysis Lab</td>
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<td>Animal Movement Mid-Semester Course Evaluation</td>
<td>8) Animal Movement Quiz</td>
<td>Animal Movement Lab</td>
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<td>Grid Analysis: Query, Calculate, Reclassify, Distance, Regiongroup</td>
<td>9) Grid Quiz</td>
<td>Grid Analysis Lab</td>
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<td>Grid Analysis: Optimal Paths</td>
<td>10) Optimal Path Quiz</td>
<td>Optimal Path Lab</td>
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<td>Grid Analysis: Elevation</td>
<td>11) Elevation Quiz</td>
<td>Elevation Lab</td>
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<td>Grid Analysis: Watershed Delineation</td>
<td>12) Watershed Quiz</td>
<td>ArcGIS9 Watershed Analysis Lab</td>
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<td>Grid Analysis: Viewshed Delineation</td>
<td>13) Viewshed Quiz</td>
<td>Viewshed Analysis Lab</td>
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<td>3-D Analysis</td>
<td>14) 3-D Quiz</td>
<td>3-D Analysis Lab</td>
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*Page last update January 2006*

*D.Verbyla@uaf.edu*
Regression and Analysis of Variance
STAT F401-F01, Spring 2006
Lecture: MWF 10:30 – 11:30 Chapman 104
Lab: T 2 – 5 Chapman 103

Instructor: Dr. Julie McIntyre, 306B Chapman Hall

Contact: phone: 474-7222, email: fjpm@uaf.edu, mailbox: Chapman 101

Office Hours: Tues 1 – 2; Wed 9 – 10; Fri 9 – 10


Prerequisites: STAT 200, STAT 300 or an equivalent course is adequate preparation; a grade of B or better in the previous course is recommended. If you have not had an introductory statistics course, it is strongly recommended that you take STAT 200 or STAT 300 before attempting this course.

Course Goals: Students will gain an understanding of linear models and how to use the SAS statistical software to analyze these models. Students will learn simple regression, multiple regression and analysis of variance. They will use diagnostics and graphical tools to determine if model assumptions are met.

Computation: You will use the SAS computing package for labs and homework. This is a very powerful and widely-used program for statistical analyses. Instruction and practice using SAS will be provided in the required lab component of the course. The computing fee for this course gives you access to the machines and software in the Chapman 103 lab. It is also available in the Irving computing labs. For exams you will need a calculator that can perform basic statistical computations (sample means, variances, etc.).

Grading: Semester grades will be determined by your performance on homework and lab assignments, two in-class exams, and a final exam. These components will be weighted as follows.

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework and Labs</td>
<td>25%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>25%</td>
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<tr>
<td>Exam 2</td>
<td>25%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
</tr>
</tbody>
</table>

I will assign letter grades according to the following grading scale, A: 90-100, B: 80-89, C: 70-79, D: 60-69, F: 0-59. Incompletes are given at the instructor's discretion; please contact me as soon as possible if you will have trouble finishing the course.
Blackboard: We will use Blackboard in this course. I will post all course materials here, including homework assignments, lab exercises and supplementary materials. Please check the course site frequently.

Homework: Reading assignments and exercises from the text will be posted on the blackboard website. Homework will generally be assigned on Fridays, and will be due the following Friday. I do not accept late homework without documentation of special circumstances (e.g., illness or university-sponsored activity).

Each homework assignment will be worth 10 points. Please write neatly, keep the solutions in the order assigned and staple pages together. I won't grade sloppy homework. Include only relevant computer output in your solutions (a good approach is to cut and paste the relevant output for each problem into an editor such as MS Word). Homework scores are based on clarity of work, logical progression toward the solution, completeness of interpretation and summaries, and whether a correct solution was obtained. I encourage you to discuss homework problems with other students, however the work you turn in must be your own.

Labs: The SAS statistical package will be used in the lab. Lab exercises will be designed to illustrate techniques discussed in lecture, and help you complete your homework assignments. You should attend the full lab; you will typically be asked to turn in some results from the exercise. Either a teaching assistant or I will work with you in the lab. Additional SAS resources include:

* The Little SAS Book by Lorna D. Delwiche and Susan J. Slaughter, SAS Institute, Inc.
* SAS System for Regression, 3rd edition by Rudolf J. Freund and Ramon C. Littel, SAS Institute, Inc.

Exams: Please contact me in advance if you need to reschedule an exam. Exams are closed book, but you may bring one 8.5 by 11 sheet with notes and formulas. Any statistical tables will be provided with the exam.

Final: 10:15 – 12:15 Monday, May 8

Review Quiz: A short (10 min.) quiz will be given at the beginning of the first lab session, and will cover a few basic statistical concepts. More details will be given in class; see also Appendix A in your text. The quiz is worth 5 extra-credit points that you can use toward your homework grade.

Disability Services: UAF’s Office of Disability Services implements the Americans with Disabilities Act. I will work with this office to provide reasonable accommodation to students with disabilities.

Policies: The Department of Mathematical Sciences has specific policies on early finals and incomplete grades. These are online at http://www.dms.uaf.edu/dms/Policies.html. Please become familiar with them. I expect all students to abide by the UAF Student Code of Conduct regarding academic integrity, see http://www.uafl.edu/catalog/current/academics/regs3.html.
<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>1/20</td>
<td>Introduction; Chapter 1: Simple Linear Regression</td>
</tr>
<tr>
<td>M</td>
<td>1/23</td>
<td>Chapter 2: Inference for Regression</td>
</tr>
<tr>
<td>W</td>
<td>1/25</td>
<td>Chapter 3: Diagnostics and Transformations</td>
</tr>
<tr>
<td>F</td>
<td>1/27</td>
<td>Chapter 4: Simultaneous Inference</td>
</tr>
<tr>
<td>M</td>
<td>1/30</td>
<td>Chapter 5: Matrices</td>
</tr>
<tr>
<td>W</td>
<td>2/1</td>
<td>Exam 1</td>
</tr>
<tr>
<td>F</td>
<td>2/3</td>
<td>Chapter 6: Multiple Regression I</td>
</tr>
<tr>
<td>M</td>
<td>2/6</td>
<td>Chapter 7: Multiple Regression II</td>
</tr>
<tr>
<td>W</td>
<td>2/8</td>
<td>Chapter 8: Quantitative and Qualitative Variables</td>
</tr>
<tr>
<td>F</td>
<td>2/10</td>
<td>Spring Break!</td>
</tr>
<tr>
<td>M</td>
<td>2/13</td>
<td>Chapter 9: Model Selection and Validation</td>
</tr>
<tr>
<td>W</td>
<td>2/15</td>
<td>Exam 2</td>
</tr>
<tr>
<td>F</td>
<td>2/17</td>
<td>Chapter 16: Single Factor ANOVA</td>
</tr>
<tr>
<td>M</td>
<td>2/20</td>
<td>Chapter 17: Factor Effects</td>
</tr>
<tr>
<td>W</td>
<td>2/22</td>
<td>Chapter 18: Diagnostics</td>
</tr>
<tr>
<td>F</td>
<td>2/24</td>
<td>Chapter 19: Two Factor ANOVA</td>
</tr>
<tr>
<td>M</td>
<td>2/27</td>
<td>Chapter 23: Two Factor ANOVA (unequal sample sizes)</td>
</tr>
<tr>
<td>W</td>
<td>3/1</td>
<td>Spring Fest (no class)</td>
</tr>
<tr>
<td>F</td>
<td>3/3</td>
<td>Chapter 24: Multi-Factor ANOVA and Design of Experiments</td>
</tr>
<tr>
<td>M</td>
<td>3/6</td>
<td>Review</td>
</tr>
<tr>
<td>W</td>
<td>3/8</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>3/10</td>
<td></td>
</tr>
<tr>
<td>MWF</td>
<td>3/13 – 3/17</td>
<td></td>
</tr>
</tbody>
</table>
Instructor and how to contact him:

What's the text?

Course Content

What's the grading policy?

Details about exams

Instructor: Dana L. Thomas, Ph.D., Professor of Statistics
Office: 105 Chapman Hall
Mailbox: Chapman 101 Phone: 474-1110
Office Hours: 11-12 Tues & Thurs & others by appt.


Handsouts will be used to supplement the text. In addition, reading will be assigned.

Sampling Design for Environmental Data Collection will be used. See Appendix A.


Course Content: Sampling methods, including simple random, stratified, and systematic procedures; ordnance allocation; sample size determination.

Chapters 1-12 of text and selected topics, e.g., sample size required to detect change.

-line transect sampling, point intercept sampling, additional material on mark-recapture.

Chapters 2, 3, and 11: I will not discuss these in class. I will instead discuss Sections 6.7.

Prerequisites: STAT 200 or STAT 300 or written permission of the instructor.

Calculator and Computer Use: You are required to use a calculator for computations.

The computers in Irving and Chapman for homework computations. I will provide for me.

I will also provide a brief introduction to Visual Sampling Plan and how to use.

The topics include sampling methods, including simple random, stratified, and systematic procedures; ordnance allocation; sample size determination.

Grading Policy: Semester letter grades will be determined by weighted scores for each.

Two in class exams 20% each

Final Exam

Home work

Participation in Sampling Projects

Always show all your work for full or partial credit.

See also the math department policies on early final, late withdrawal, and the Student Conduct Code on page 73 of the UAF catalog.

Homework: Each homework will be worth a maximum of 10 points. Late homework will not be accepted. It is very difficult to pass this course without completing the homework.

The homework is designed to help you understand the concepts. Homework will be due on the day of the exam. Homework will be graded on the clarity of your work. In general, you will receive partial credit on homework problems if you provide a partial solution or answer. You are also encouraged to ask the instructor questions about homework problems prior to the exam.

Participation: Participation will be considered in your final grade. Participation will be considered in your final grade. Participation will be considered in your final grade. Participation will be considered in your final grade.

Exams: You are responsible for all the material covered in class on exam day. You are allowed to bring one exam sheet (both sides) with pertinent formulas, definitions, etc. for your use during the exam.

STAT 402 Tentative Schedule

<table>
<thead>
<tr>
<th>Day &amp; Date</th>
<th>Test Chapter or Topic to Be Discussed</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 1</td>
<td>Chapter 1 &amp; 2</td>
</tr>
<tr>
<td>September 5</td>
<td>Chapter 3 &amp; 4</td>
</tr>
<tr>
<td>September 12</td>
<td>Chapter 5 &amp; 6</td>
</tr>
<tr>
<td>September 19</td>
<td>Chapter 7 &amp; 8</td>
</tr>
<tr>
<td>September 25</td>
<td>Chapter 9 &amp; 10</td>
</tr>
</tbody>
</table>

STAT 402 Tentative Schedule

<table>
<thead>
<tr>
<th>Day &amp; Date</th>
<th>Test Chapter or Topic to Be Discussed</th>
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</thead>
<tbody>
<tr>
<td>September 1</td>
<td>Chapter 1 &amp; 2</td>
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<tr>
<td>September 5</td>
<td>Chapter 3 &amp; 4</td>
</tr>
<tr>
<td>September 12</td>
<td>Chapter 5 &amp; 6</td>
</tr>
<tr>
<td>September 19</td>
<td>Chapter 7 &amp; 8</td>
</tr>
<tr>
<td>September 25</td>
<td>Chapter 9 &amp; 10</td>
</tr>
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</table>

STAT 402 Tentative Schedule
<table>
<thead>
<tr>
<th>Date</th>
<th>Chapter(s)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 9</td>
<td>Chapter 3 - EPA pages 17 - 25</td>
<td>Show me you can calculate mean and variance (or standard deviation) on your calculator.</td>
</tr>
<tr>
<td>September 12 M</td>
<td></td>
<td>2.1, 2.2, 2.12, 2.14, 2.25, 2.27</td>
</tr>
<tr>
<td>September 14 W</td>
<td></td>
<td>For 2.2 suggest a plot size and shape and describe a sampling frame.</td>
</tr>
<tr>
<td>September 16 F</td>
<td>Chapter 4 - EPA pages 56 - 59</td>
<td>Simple Random Sampling 3.2, 3.3, 3.4, 3.6, 3.7, 3.8, 3.16, 3.23</td>
</tr>
<tr>
<td>September 19 M</td>
<td></td>
<td>Read sections 3.2.2 &amp; 3.2.3 in EM &amp; Section 2.3 in EPA (see external links on blackboard).</td>
</tr>
<tr>
<td>September 21 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>September 23 F</td>
<td>Chapter 5 - EM pages 60-65 - 67</td>
<td>Stratified Random Sampling 4.1, 4.2, 4.3, 4.13 For 4.13 physics say the random number table page you used and highlight the random numbers you used or computer output to select your sample, and list the states selected.</td>
</tr>
<tr>
<td>September 26 M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>September 28 W</td>
<td></td>
<td>4.20, 4.21, 4.27, 4.28, 4.34</td>
</tr>
<tr>
<td>September 30 F</td>
<td></td>
<td>5.10 has plot for each reason, 5.11 (give a and b), 5.15 (use optimal allocation), 5.14 (check your answer to 5.13 first), 5.15</td>
</tr>
<tr>
<td>October 3 M</td>
<td></td>
<td>5.21 (2.21b is post stratification use w2 = (ni / np)(ni / np - 1); also note that N and the Ni are unknown), 5.22, 5.28 (double sampling; use equation 5.23)</td>
</tr>
<tr>
<td>October 5 W</td>
<td></td>
<td></td>
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<tr>
<td>October 7 F</td>
<td></td>
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<tr>
<td>October 10 M</td>
<td></td>
<td></td>
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<tr>
<td>October 12 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>October 14 F</td>
<td>EXAM #1</td>
<td></td>
</tr>
<tr>
<td>October 17 M</td>
<td>Chapter 6 (not section 6.7) = section 11.9</td>
<td></td>
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<tr>
<td>October 19 W</td>
<td></td>
<td></td>
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<tr>
<td>October 21 F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>October 24 M</td>
<td>Chapter 7 - EM page 65 - EPA pages 62-76</td>
<td></td>
</tr>
<tr>
<td>October 26 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>October 28 F</td>
<td>Last day to withdraw</td>
<td></td>
</tr>
<tr>
<td>October 31 M</td>
<td>Chapter 8 - EM page 606</td>
<td></td>
</tr>
<tr>
<td>November 2 W</td>
<td></td>
<td></td>
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<tr>
<td>November 4 F</td>
<td></td>
<td></td>
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<tr>
<td>November 7 M</td>
<td></td>
<td></td>
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<tr>
<td>November 9 W</td>
<td></td>
<td>8.16, 8.17, 8.21 (assume N large), 8.24, 8.25, 8.31, 8.35</td>
</tr>
<tr>
<td>November 11 F</td>
<td></td>
<td>Sampling example 9.4.4.4 color proportions</td>
</tr>
<tr>
<td>Date</td>
<td>Event</td>
<td>Notes</td>
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<tr>
<td>November 14 M</td>
<td>EXAM #2</td>
<td></td>
</tr>
<tr>
<td>November 16 W</td>
<td>Chapter 9 + ENS page 66</td>
<td>Two-stage Cluster Sampling</td>
</tr>
<tr>
<td>November 18 P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>November 21 M</td>
<td></td>
<td>9.2 (use ratio estimation), 9.3 (use unbiased mean), 9.7, 9.19 (describe a sampling method for 9.19 also)</td>
</tr>
<tr>
<td>November 23 W</td>
<td></td>
<td>Sampling project - estimate the average number of pages per volume in the reference sections of library.</td>
</tr>
<tr>
<td>November 24 &amp; 25</td>
<td>Thanksgiving Holiday</td>
<td>no class</td>
</tr>
<tr>
<td>November 26 M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>November 28 W</td>
<td></td>
<td>Estimating Population Size - Adaptive Sampling</td>
</tr>
<tr>
<td>November 30 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 1 P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 4 M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 5 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December 12 M</td>
<td>Last day of class</td>
<td></td>
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<tr>
<td>December 14 W</td>
<td></td>
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<tr>
<td>8:00 - 10:00am</td>
<td>Comprehensive</td>
<td></td>
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<td></td>
<td>Final Exam</td>
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<tr>
<td>Day</td>
<td>Topic</td>
<td>Date</td>
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<td>-----------------------------------------------------------------------</td>
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<tr>
<td>Monday</td>
<td>Read Chp 5. pp. 192-205 (for lec 13)</td>
<td>Sep-10-05</td>
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<tr>
<td>Monday</td>
<td>Discuss your ideas</td>
<td>Sep-12-05</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Read Chp 6. pp. 397-405 (for lec 5 &amp; HW1)</td>
<td>Sep-13-05</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Read Chp 1. pp. 1-23 (for lec 2)</td>
<td>Sep-19-05</td>
</tr>
<tr>
<td>Thursday</td>
<td>Open book quiz</td>
<td>Sep-20-05</td>
</tr>
<tr>
<td>Tuesday</td>
<td>More Practice with Software Interface</td>
<td>Sep-27-05</td>
</tr>
<tr>
<td>Monday</td>
<td>HW Assignment 2. Satellites and sensors</td>
<td>Sep-29-05</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Digital Image Processing 2.</td>
<td>Sep-30-05</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Reading Chp. 6. (for lec 8)</td>
<td>Oct-01-05</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Elements of Visual Image Information (chap 4 for help)</td>
<td>Oct-02-05</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Read Chp 7.</td>
<td>Oct-05-05</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Read Chp 8.</td>
<td>Oct-06-05</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Reading Chp. 8. (for lec 9)</td>
<td>Oct-07-05</td>
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<tr>
<td>Wednesday</td>
<td>Reading Chp. 9. (for lec 10)</td>
<td>Oct-12-05</td>
</tr>
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<td>Wednesday</td>
<td>Reading Chp. 10.</td>
<td>Oct-13-05</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Reading Chp. 11.</td>
<td>Oct-15-05</td>
</tr>
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<td>Wednesday</td>
<td>Reading Chp. 12.</td>
<td>Oct-16-05</td>
</tr>
<tr>
<td>Thursday</td>
<td>Reading Chp. 13.</td>
<td>Oct-17-05</td>
</tr>
<tr>
<td>Thursday</td>
<td>Reading Chp. 15.</td>
<td>Oct-19-05</td>
</tr>
<tr>
<td>Thursday</td>
<td>Reading Chp. 16.</td>
<td>Oct-22-05</td>
</tr>
<tr>
<td>Thursday</td>
<td>Reading Chp. 17.</td>
<td>Oct-23-05</td>
</tr>
<tr>
<td>Thursday</td>
<td>Reading Chp. 18.</td>
<td>Oct-24-05</td>
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**Comments**

In this course, students will learn the fundamental concepts of geoscientific applications of remote sensing and will apply these concepts through hands-on lab experiences. This course is designed to provide a comprehensive understanding of the principles and techniques used in remote sensing. The course will cover topics such as satellite imagery, aerial photography, and other forms of remote sensing data. Students will also learn how to use software tools to analyze and interpret remote sensing data.

**Class Schedule:** Fall 2005 (Version: August 27, 2005)

GEOS 422: Geoscience Applications of Remote Sensing (Instructor: Amrita Prakash)

DEPARTMENT OF GEOLOGY AND GEOPHYSICS, UAF

**Leaves:** 1:00 - 2:00 PM NSF 204, 3:00 - 4:00 PM NSF 216

**Notes:**

- Regular attendance is expected.
- All assignments must be submitted on time.
- Late assignments will be accepted with a penalty.
- Makeup exams will not be given.

**Course Objectives:**

- Understand the principles of remote sensing.
- Learn how to interpret and analyze remote sensing data.
- Develop skills in using software tools for remote sensing data analysis.

**Course Requirements:**

- Weekly assignments.
- Mid-term and final exams.
- Lab reports.

**Grading Policy:**

- 40% homework and assignments
- 40% mid-term exam
- 20% final exam

**Textbooks:**


**Lab Equipment:**

- Digital cameras
- Computer workstations
- GIS software

**Lab Equipment:**

- Remote sensing data sets
- Software for data analysis

**Lab Equipment:**

- Remote sensing data sets
- Software for data analysis
<table>
<thead>
<tr>
<th>Time and Schedule TBA</th>
<th>Final Exam</th>
<th>Time and Schedule TBA</th>
<th>Final Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present at AGU 1A. Will be supported available</td>
<td>Recite 26/25 &amp; discussion. Any other concerns</td>
<td>Recite 26</td>
<td>TBA</td>
</tr>
<tr>
<td>Present at AGU</td>
<td>Make project presentation and defend</td>
<td>Lab 13</td>
<td>TBA</td>
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<tr>
<td>Present at AGU</td>
<td>Free teacher preparation</td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td>Present at AGU, lecture by Prof. Wirth</td>
<td>Final project preparation</td>
<td>TBA</td>
<td>TBA</td>
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<tr>
<td>Instructor support available</td>
<td>Final project preparation</td>
<td>TBA</td>
<td>TBA</td>
</tr>
<tr>
<td>Guest: Robby Henner</td>
<td>Final project preparation</td>
<td>TBA</td>
<td>TBA</td>
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<tr>
<td>NSF = National Science Facility; HW = Homework; AGU = American Geophysical Union.</td>
<td>Final project preparation</td>
<td>TBA</td>
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</table>

**Digital Image Processing**

**Basic Principles**
<table>
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<tr>
<th>Evidence</th>
<th>Improvement</th>
<th>Needs much</th>
<th>Satisfactory</th>
<th>Average</th>
<th>Above expectation</th>
<th>Professio-</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>2.5</td>
<td>3.5</td>
<td>4</td>
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<td>40</td>
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</table>

Grading criteria for GEOS 422 Final Project (40 points):

- Overall: Demonstrates a rigorous approach and systematic work, Presentation.
- In defining and implementing the project:
- Background Reference: Demonstrates an effort to consult work of other researchers.
- Research to complete, literature, logical, neatness, spelling, grammar, references, etc.
- Specific to report: Prepare a final report that was progression to follow with.
- Conveyed important information and connected to the guidelines provided.
- Specific to presentation: Deliver a presentation that was well structured, well timed, and audience.
- Specific to presentation: Successfully respond to the questions from peers and discussion: Discuss the advantages, limitations, future directions of the work.
- Graphs, and or explanation (text).
- Analyzed with the help of processed images (appropriately labeled), tables.
- Specific to presentation: analyze the results and present the results data processing. Can all the processing successful? If not, the student was able to demonstrate where and why the proposed strategy did not work and adopted an alternative.
- Methodology: Given the available data as data acquisition: Identify the data needed to address the problem and acquire.
- Relevance/accuracy: data (e.g., data points, personal, context, library, etc.).
- Problem definition: State an approach/problem/application where remote sensing can be put to use.
### Grading Criteria for GEOS 422 Test 2 / Home Work (25 points)

<table>
<thead>
<tr>
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<th>Excellent</th>
<th>Good</th>
<th>Average</th>
<th>Poor</th>
<th>V. Poor</th>
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<tbody>
<tr>
<td>Lab exercises</td>
<td></td>
<td></td>
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<tr>
<td>Participation in class discussions</td>
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<tr>
<td>Revision of what has been taught</td>
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<tr>
<td>Attendance in lectures and labs</td>
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<tr>
<td>Systematic study work on project</td>
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### Grading Criteria for Quiz (15 points)

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### Grading Criteria for Lecture and Lab Participation (20 points)

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<th>Good</th>
<th>Average</th>
<th>Poor</th>
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