WILDLIFE & ECOSYSTEM CONSERVATION IN NORTHERN FORESTS: THE BOUNDARY WATERS PROJECT

August 1-15, 2012
Meeting Place: **Duluth, MN**
4 semester system units (equivalent to 6 quarter system units)
Program Fee $1550 plus $150 Application Fee

Join us this summer as we explore the lakes and forests of the Boundary Waters Canoe Area Wilderness and the Chippewa National Forest, a region supporting extensive road-less areas and an unparalleled wolf population. This expansive northern forest and lake environment provides us with an excellent opportunity for studying the interactions between wildlife, plant communities and aquatic ecosystems.

This region serves as a great natural laboratory for field investigations of wildlife and their interactions with their environment, as well as the importance of fire, wind, and introduced insects on forest ecosystems. In addition to our focus on the cascading effects of large mammals on ecosystem dynamics, our explorations across northeastern Minnesota will allow us to examine a wide range of issues including sustainable forestry, water resources management and climate change. Team members will take part in ecological investigations of the northern forest, lake and stream ecosystems of the Minnesota Boundary Waters Canoe Area Wilderness (BWCA) and surrounding forest with a focus on wildlife-environment interactions.

We believe this is a special area of the US for an environmental field study. The BWCA and Superior National Forest area contains the largest contiguous track of wilderness remaining in the Midwestern United States and the largest population of wolves in the lower 48 states. The north shore of Lake Superior contains some of the steepest streams in the Midwest, with numerous waterfalls tumbling over boulder/bedrock streambeds. The area offers excellent backpacking trails on the Superior Hiking Trail atop a ridge overlooking Lake Superior and the remote Border Route Trail along the Canadian boundary. The geology of the region is unique with some of the oldest exposed bedrock in the world, part of the Canadian Shield. Inland from Lake Superior, the area contains a mosaic of northern conifer and hardwood forest interspersed with thousands of lakes supporting some of the best wilderness canoeing in the U.S.

This project will begin along the Lake Superior shore and then move to inland to the Superior and Chippewa National Forests. In our first segment, our team will use National Forest campgrounds as a home base, conducting day trips for our investigations, with canoe travel across lakes to reach more distant locations. In the program's next section, our team will stop at the International Wolf Center to learn about wolf ecology, particularly predator-prey interactions with deer and moose. From here we will head to the Chippewa National Forest to investigate forestry management and the impending threat of the invasive Emerald Ash Borer, which threatens to kill millions of acres of black ash forest. Team members will help collect key data for an ongoing University of Minnesota and US Forest Service research project on the impact of the Emerald Ash Borer. We will finish the program in the Cloquet Forestry Center where we will learn first hand about climate change impacts on the northern forest ecosystem and possible adaptation strategies.

PROJECT GOALS & ACTIVITIES

The goal of this project is to provide students with a background in northern forest ecology, training in quantitative field methods and examples in applying that training to specific research questions and management issues. There is a strong need for research to improve our understanding of how deer, moose, wolf and beaver interact with plant communities and effect forest growth and composition, particularly with ongoing changes involving climate, fire frequency, land-use and invasive species. There are many pressing concerns in the northern forest ecosystems which threaten the health of the northern forest landscape: increased deer density impacts on ecosystems, climate change impacts on wildlife and the environment, the looming threat of the invasive Emerald Ash Borer, increased large fires, and expansion of vacation homes. We need a better understanding of the interactions between the biotic and abiotic components as well as human impacts to protect and manage this remarkable northern forest and lakes region into future decades.

Several research questions will be addressed in this project including, "What are the differences in plant community composition in areas with abundant deer but few wolves and no moose (as in the Chippewa National Forest), as compared to areas with few deer but many wolves and moose (the BWCA)? Other research questions raised in the project will examine the influence of beaver impoundments on the structure and function of northern streams and riparian plant communities, and the potential impact of Emerald Ash Borer invasion on the northern ash forests. Finally we will discuss how northern forest ecosystems respond to climate and fire regime change and the implications of that on wildlife. We will examine how the response may differ in the Chippewa vs. Superior National Forests due to differences in wildlife populations, flora, geology and climate.

We will begin our project with a 'big picture' overview of northern forest and lake ecosystems on the north Shore of Lake Superior, becoming familiar with the complex geography, geology, human history, wildlife and habitat types of the region. At our field sites students will be introduced to key ecological principles relevant to the project, such as plant succession, competition and trophic levels in aquatic systems as well as the pressing conservation & management issues facing the region and its wildlife species today.

In order to address the above research questions, the group will: 1) measure plant community characteristics; 2) assess differences in plant community structure and function in relation to physical and biological influences; 3) examine existing data on wolf, moose and deer populations in relation to other ecological variables; 4) collect water quality and hydrology data in lake, streams and forests 4) learn to take detailed field notes, make maps and keep organized field notebooks.

We will start off by comparing and contrasting the characteristics of old growth forest to more recently harvested aspen - birch forests that cover much of the region Then we will travel to the BWCA campground on the border of the wilderness area in order to conduct our field studies. We will spend the last part of the program in the Chippewa National Forest for the Emerald Ash Borer study, and a look at sustainable forestry issues and impacts of deer on forest community composition.

Our primary focus will be on the interactions of larger mammals (primarily moose, wolves, deer, and beaver) with plant communities and in turn how the environment shapes the distribution and abundance of these species. A major component of our investigations and field studies will be hands-on surveys of northern forest plant communities and aquatic ecosystems (lakes and streams). Our plant community surveys will look at diversity and abundance of different species as indicators of ecosystem processes, which may help us to understand major management issues in the northern forest region.

To address pressing research questions, team members will learn about the ecology and life histories of wolf, deer, moose, bear, and beaver in the region. In order to understand how these animals effect their environment we will learn about grazing patterns of the herbivores and the influence of wolves on herbivore populations. We will investigate data on population size, distribution and history of these mammals, and visit the International Wolf Center in Ely, where students will learn more about wolf behavior and feeding habits. Identification of plant species will be learned, and vegetative sampling techniques such as quadrat and point-intercept sampling along with walk-through surveys will be employed to compare the forest composition under different grazing pressures. Students will also have the opportunity to measure percentage cover of forest understory species, tree stand density and take tree diameter measurements.

We will use a variety of sampling techniques to characterize stream and lake ecosystems, focusing on how beaver ponds effect aquatic and upland ecosystems. Hand-held water chemistry and turbidity probes will be used to measure pH, dissolved oxygen, temperature, conductivity and oxidation-reduction potential in various water bodies and at various depths in several lakes and streams. This will include sampling in lakes via canoes, walking in wetlands and wading in streams.

As we move into the Chippewa National Forest, forest hydrological research techniques will be added to our toolbelt to understand how the Emerald Ash Borer may impact runoff and water levels in nearby lakes and streams. We are testing the hypothesis that ash die-off-will lead to increased water level in adjacent lakes & wetlands. We will also examine the potential consequences of forest cover change for wildlife.

By the end of the program each of us will gain an increasing understanding of northern forest ecological interactions, and firsthand knowledge of field ecology techniques and how they may be applied to important natural resource and wildlife management issues. Please note that previous field experience is not required. All necessary skills to conduct our forest, stream and wetland ecological studies will be taught onsite during the program.

ACADEMIC CREDIT

Students will receive 4 semester units (6 quarter units) awarded through California State University Monterey Bay Extended Education. While students usually encounter no difficulties in transferring credit to their home campus, applicants should check with their advisors prior to enrolling. Our staff will be happy to explain the program in further detail to the applicant's advisor, if necessary. The Boundary Waters field studies program gives credit in one course:

ENVS 370, Environmental Wildlands Studies (4 semester system units).

Team members wishing academic credit will be evaluated on the quality of fieldwork; discussion participation; a written analysis of field work; a brief test; and field notebooks. Team members are expected to conduct themselves in a mature and responsible manner. Wildlands Studies reserves the right to require any student to withdraw from the program if their conduct is detrimental to or incompatible with the interests, safety, or welfare of any course participants.

TEAM LOGISTICS

Our team will meet in Duluth, along the Lake Superior Shore. Located approximately 130 miles northeast of Minneapolis, Duluth is accessible by air, bus and car. We encourage you to carpool to Duluth if you are coming from Minnesota or nearby locations. Students from the west coast will likely fly to the Duluth International Airport. Travel to the BWCA and surroundings will be by van and rental car from the airport with costs shared equally.

We will buy all our food as a group and share the expense on the first day. Do not buy food ahead of time unless you have special dietary needs. (While vegetarian food is not considered a special need, it can be difficult to find in much of northern Minnesota.) You should plan on spending about $150 for food. NOTE: there are few stores beyond Duluth and access to 'shopping' for 'basic' items is extremely limited (and expensive). We purchase the bulk of food in Duluth before heading into the BWCA and other natural areas.

Hiking on parts of the Border Route and Superior Hiking Trails can be strenuous. Moderate hiking will be required to get to our campsites, and to access research sites. We will embark on short canoe trips across lakes to access trails. These will require moderate effort levels and basic swimming ability. In the Chippewa National Forest, walking through some of the peatlands and black ash forest will require walking through ankle-deep water so muck boots or waders are needed. You should be able to carry a 35 lb backpack for 8 miles over varying terrain as a measure of fitness for this project.

We will be camping during the program at National Forest campsites and state parks. In the backcountry areas, there are no laundry facilities, so participants are encouraged to plan accordingly with regard to clothes. We *may* have a chance to do a small laundry load halfway through the project.

Northern Minnesota is warm to hot in the day during August and cool at night. Temperatures in the summer can range from 90 degrees F in the day to the low 50s at night. Mosquitoes can be a nuisance particularly in the black ash forests and tend to be worse at night. Team members should be prepared for hot humid weather and mosquitos, but have cool weather clothes, raingear and lightweight, non-cotton long-sleeve pants and a jacket. Lightweight, quick-drying clothing will repel mosquitoes and protect legs from scraping or scratching by understory vegetation.

EQUIPMENT

All participants are required to bring binoculars, calculator, and a waterproof field notebook (*Write-in-the-Rain* type are good for field work in streams and wet weather). Mud boots (*Muck* brand) and waders or hip waders are needed for stream and wetland work. The photographic opportunities are excellent on this program and we recommend you bring a camera. Dry bags or Duluth packs are handy for keeping items dry in the canoe, but not necessary.

PROJECT COSTS

Program Fee:	$1550 plus $150 Application Fee. Program fee due May 15, 2012 Enrollment on a space-available basis after the fee due date until the program is full.
Field supply and camping costs:	$150 per person (plus approximately $18.00 book cost)
Food for trip:	Approximately $150
Money for hip boots or waders:	Approximately $50
Personal Spending Money:	$150 (including carpool costs, this varies according to taste - but don't be caught short)

Students should inquire at the financial aid office of their home campus regarding the use of their loans or grants for this course. CSU Monterey Bay Extended Education/ Wildlands Studies are not responsible for non-refundable airline or other tickets or payments or any similar penalties that may be incurred as a result of any course cancellation or changes.

PRE-TRIP PLANNING

Detailed information regarding gear/food, meeting plans, and academic preparations will be sent to all team members in a subsequent logistics letter about 8-10 weeks before the project initiates. In this logistics letter, we will communicate with you to plan for sharing camping equipment, transportation to the site, how to order books, and planning any last minute logistics. Between now and summer, plan to stay in good shape and prepare for an outstanding field experience in one of the outstanding wilderness areas in the U.S.

PROJECT LEADER

CHRISTIAN LENHART has conducted ecological research and taught university courses since 1997, focusing on ecological facets of hydrology. He is currently a research professor with the University of Minnesota, leading various research projects in and around the state.

FOR MORE INFORMATION

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