

# Conservation Biology

University of Colorado  
Mountain Research Station  
Summer 2004      June 7 - 24  
Dr. Bruce Byers, Visiting Professor

## About This Course

*The formal, catalogue description of this course says:* This course will introduce students to the ecological concepts and management issues that underlie modern conservation biology. Through lectures, discussions, readings, and fieldwork the class will learn about biological diversity at various levels, including the diversity of genes, species, communities, landscapes, and ecological processes and functions. We will look at ways in which human activities influence biodiversity, and learn about strategies for managing and reducing these impacts. Case studies of domestic and international conservation problems and approaches will be discussed and compared. Field trips and field research projects will give students hands-on experience applying fundamental concepts to contemporary conservation problems in the diverse landscapes within a day's drive of the Mountain Research Station.

*A more informal description of the course might say:* This course will present a kaleidoscope-view of conservation biology. It will expose you to the “waterfront” of a new and dynamic field. Conservation is full of controversy, and also plenty of challenging, unsolved problems for both natural and social scientists. We will explore some of the controversies and challenges in this course. There is too much material to learn much of it in depth, and too much reading to cover thoroughly together in class. I want to individualize the course for each of you so that it meets your needs as much as possible, and allows for an individual exploration of interests and possible career paths. I hope the course will give you a sense of excitement about the field, and motivate you to want to learn more later.

## Course Objectives

- 1) Learn and/or review the major ecological concepts underlying modern conservation biology;
- 2) Learn and/or review some key management issues and debates in modern conservation;
- 3) Develop an appreciation of the state of current knowledge in the field, and of the limitations that lack of knowledge places on conservation managers;
- 4) Get some hands-on experience with field methods in conservation biology;
- 5) Develop familiarity with some illustrative conservation situations in the Colorado Front Range area through field visits.

## Course Format

Class will begin every morning at 8:00 AM unless notified otherwise. Class will be a mix of lecture-style presentations, slide shows, class discussion, field exercises near the MRS, field trips away from the station, individual and small group work, and tutorials.

This is an *intensive* course: we will cover the equivalent of a semester-long, 3 credit hour course in three weeks! In order to do this, we will spend about 6-8 hours per day together for 12 days. In addition, you will be reading a 280 page text and carrying out a short field research project.

## Tentative Schedule

### Week 1

### Topic/Activity

Mon., June 7	AM – Course introduction, begin field exercise near MRS	
Tues., June 8	AM – Field exercise continued	PM – Lecture/Discussion
Wed., June 9	AM – Discussion of Ch. 1	PM – Project topics brainstorming
Thurs., June 10	AM – Project pre-proposal due, individual consultations on projects	PM – Field trip to Boulder (to be confirmed)

### Week 2

### Topic/Activity

Mon., June 14	All Day – Field Trip to Ft. Collins	
Tues., June 15	AM -- Discussion of Ch. 2	PM – Discussion of Ch. 3 Introductory Field Exercise Report Due
Wed., June 16	All Day – Field Trip to Rocky Mountain NP	
Thurs., June 17	AM – Discussion of Ch. 4 & 5	PM – Individual projects field work & site visits

### Week 3

### Topic/Activity

Mon., June 21	AM -- Q&A Review Session over entire textbook	PM – Individual projects field work & site visits
Tues., June 22	AM -- Exam over reading	PM – Individual projects field work
Wed., June 23	All Day – Projects consultations & finalization of project reports; all field trip reports/essays due	
Thurs., June 24	All Day – Individual projects oral reports; written reports due	

## **Textbook & Reading**

**\*\* To Be Decided\*\***

## **Field Trips**

Fort Collins: Visit applied research labs and programs that underpin government and private conservation efforts throughout Colorado and beyond, e.g., U.S. Forest Service Rocky Mountain Research Station; Colorado Natural Heritage Program

Boulder: CU Museum & Herbarium; The Nature Conservancy, Colorado Field Office

Rocky Mountain National Park: meet with park ecologist to discuss conservation and management issues; field study

## **Field Trip Reports/Essays**

For two class field trips, write a short report or essay that completes the following sentence: “The most interesting (e.g., useful, thought-provoking, new, mind-expanding, challenging, controversial) things I learned on this field trip were....” The maximum length is two pages; these should be word-processed/printed, double-spaced, with one-inch margins on all sides.

## **Introductory Field Exercise Near MRS**

This multi-part exercise will be carried out near the Mountain Research Station on July 22 & 23. It will involve:

- observing & trying to quantify local species diversity of major groups of organisms (e.g. plants, birds, mammals, insects, fungi) in two adjacent ecological communities
- trying to identify ecological roles & functions of selected species (e.g. keystone species)
- developing a conservation strategy for the site that reflects the landscape dynamics that can be inferred from your observations

You may work in pairs to make your observations. Your written report, due Tuesday, July 30, should be your own individual analysis and writing. Written reports will be limited to a maximum of 10 pages, some of which can be lists, maps, sketches, graphs, etc. Your written report should be word-processed/printed, double-spaced, with one-inch margins on all sides. More detailed information will be given in class as we organize for this exercise.

## **Individual Research Project – Possible/Illustrative Project Topics**

- √ Anything to do with the conservation of a rare, threatened & endangered species found in the Front Range area
- √ Conservation of ecological processes & ecological “services” of value to humans (e.g. watersheds, nutrient cycling, pest & pathogen control, pollination)
- √ Examples of landscape dynamics and their conservation or conservation impact
- √ Invasive species, including introduced diseases of plants, animals, or humans
- √ Reintroduction of locally-extinct species
- √ Restoration of species, communities, or ecological processes
- √ Conservation education & communication
- √ Keystone species and their conservation or conservation impact
- √ “Indicator” species and conservation
- √ Long-term ecological research and its relation to conservation
- √ Forest management and its relation to conservation
- √ Range management and its relation to conservation; grazing issues
- √ Pollution of air or water and its relation to conservation (e.g. acid deposition, acid mine drainage, heavy metal pollution)
- √ Mountain “island” species and their conservation (e.g. in relation to global warming)

Notes: All projects require:

- a background search/review of the primary scientific literature
- a hands-on, field component involving observation, description, measurement, and/or experimentation at a nearby site in the Colorado Front Range

Detailed expectations and guidelines for the oral and written reports on your individual field research project will be given in class.

## **Slide Shows/Vicarious “Field Trips”**

To broaden our view of conservation biology and conservation beyond the horizons of the MRS and Colorado Front Range, I will take you on as many vicarious field trips to other parts of the country and world through slide shows from my work in other places, for example:

Mai Po Mangrove Conservation Area, Hong Kong  
Miombo Ecoregion, Southern Africa  
Ngorongoro Crater Conservation Area, Tanzania  
Amboseli National Park, Kenya  
Lake Nakuru National Park, Kenya  
Namib Desert, Namibia  
Spiny Forest & Rainforest, Madagascar  
Garden of the Gods Park Restoration, Colorado Springs  
Yellowstone National Park  
Everglades National Park  
Migratory Shorebirds, Delaware Bay  
Virginia Coast Reserve  
Sacred Forests, Zimbabwe  
Borivli National Park, India

## **Assignments, Evaluation, & Grading**

Students will be expected to:

- 1) attend all classes and field trips
- 2) actively participate in discussions and field activities
- 3) read the assigned reading on time, and in an active, engaged, and critical way
- 4) complete all short written assignments
- 5) select a "do-able" topic for a brief field project on a conservation question, situation or problem;
- 6) investigate the primary literature on the field project topic
- 7) gather and analyze information in the field, and
- 8) communicate findings of fieldwork in written and oral reports

Your grade in this course will be based on the following:

- Participation (engagement, contribution to class, motivation, enthusiasm, “stretch”) 25%
- Short Assignments 24%
  - Field activity near MRS – 12 %
  - 2 Field trip reports/essays – 6% each
- Exam (will cover entire course, including reading, lectures, slide shows, and class discussions) 25%
- Individual Field Research Project 26%
  - Oral report – 10%
  - Written report – 16%