

Foundations of Ecology and Management (BIOE 554)

"The last word in ignorance is the man who says of an animal or plant, "What good is it?" If the land mechanism as a whole is good, then every part is good, whether we understand it or not. If the biota, in the course of aeons, has built something we like but do not understand, then who but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering."

— Aldo Leopold, Round River: From the Journals of Aldo Leopold —

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Course Hours and Location: Mondays, 11-noon, Lewis Hall 407

Office Hours: Thursday 930-1130 or by appointment

Course Objectives

The management of ocean, freshwater and terrestrial ecosystems is becoming increasingly critical as pressures from a growing human population lead to fragmentation, pollution, overharvesting, invasive species, and climate change. How ecosystems are managed, however, is also becoming increasingly complex, requiring integration between theoretical, observational, experimental and modeling fields to provide a basis for assessing our current state of knowledge and applying this to management issues. The goals of BIOE 554 are to provide an overview of research principles and applications covering three major themes in ecology; population, community and ecosystem ecology. The course will provide students with an overview of how ecological concepts have evolved over time and identify gaps in where advances are needed to better inform our understanding of populations, communities, and ecosystems, for monitoring and management purposes.

Format

During the semester, the course is split into the three themes of population, community and ecosystem ecology. The course is mainly lecture format and will meet once a week in Lewis Hall 407. During this time, guest lecturers will make 45-minute presentations with 10 minutes for questions. At the end of each theme, a 45-minute coffee-hour discussion will be scheduled with the lecturers and students to discuss more broadly what has been learned.

Grading

Grades will be based on participation during the class (22.5%), weekly online quizzes based on readings (37.5%), and two writing assignment (40%). The readings (i.e., 1-3 journal articles) will be provided in advance of the lecture and the

writing assignment consists of a 2 page, 12-font reflective essay related to a ecological theme selected by the student.

Policies

Participation and attendance in class is mandatory and if you miss a class due to illness or a scheduled event, you must notify me in advance. Office hours are Thursdays 930-1130 and also by appointment. Plagiarism is not tolerated and consequences follow Montana State University's Code of Conduct http://www.montana.edu/policy/student_conduct/

Class Schedule

| Week | Date | Theme | Lecturer | Topic |
|-------------|-----------------------------|---------------------------------|--|---------------------------------------|
| 1 | August 24 | Cross-cutting issues in ecology | Ben Poulter | Overview |
| 2 | August 31 | Land management and Policy | Pete Nelson (Director of Federal Lands Program, Defenders of Wildlife) | Federal land policy and science needs |
| 3 | September 8 (note: Tuesday) | Population Ecology | Jay Rotella (MSU Dept. Ecology) | Population modeling |
| 4 | September 14 | | Tom McMahon (MSU Dept. Ecology) | Movement ecology |
| 5 | September 21 | | Scott Creel (MSU Dept. Ecology) | Predation |
| 6 | September 28 | | Al Zale (MSU Dept. Ecology) | Fisheries |
| 7 | October 5 | | Paul Cross (USGS NOROCK) | Disease |
| 8 | October 12 | Community Ecology | Laura Burkle (MSU Dept. Ecology) | Biodiversity |
| 9 | October 19 | | Dave Roberts (MSU Dept. Ecology) | Classification |
| 10 | October 26 | | Andrea Litt (MSU Dept. Ecology) | Fauna |
| 11 | November 2 | | Andy Hansen (MSU Dept. Ecology) | Landscapes |
| 12 | November 9 | Ecosystem Ecology | Lindsey Albertson (MSU Dept. Ecology) | Stream mechanics |
| 13 | November 16 | | Wyatt Cross (MSU Dept. Ecology) | Trophic webs |
| 14 | November 23 | | Jia Hu (MSU Dept. Ecology) | Hydrology |
| 15 | November 30 | | Ben Poulter (MSU Dept. Ecology) | Biogeochemistry |
| 16 | December 7 | Presentation and discussion | Students | |