

UNIVERSITY OF VERMONT -- RUBENSTEIN SCHOOL OF  
ENVIRONMENT AND NATURAL RESOURCES

**NR 205 -- Ecosystem Management: Integrating Science,  
Society and Policy**

Course Syllabus, Fall 2007

**Instructor:** Dr. Bill Keeton  
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Office Hours: By appointment arranged by email. Please feel free to contact me.

**Teaching Assistants:**

Karen Nordstrom  
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Aiken (to be arranged)  
Office Hours: Tuesdays 2:00-4:00 pm

Corinne Novetti  
Email: [cnovetti@uvm.edu](mailto:cnovetti@uvm.edu)  
Aiken 211  
Office Hours: Thursdays 9:00 – 10:30 am

**Meeting Time and Place:** Living Learning CM 315  
TTH 11:00 am - 12:15 pm

**Class Web Site:** <http://www.uvm.edu/envnr/nr205>

**Required password for accessing readings:** NR205

**Required Materials:**

There is no textbook for this course. Course readings will be made available on the course web site. Additional materials will be distributed in class.

**Course Description and Objectives:**

This course builds upon the knowledge of natural and social sciences gained in the previous four core courses and challenges you to begin integrating information, concepts and tools to address natural resource and environmental issues from an ecosystem perspective. Through lectures, readings, class discussions, case studies, and problem solving exercises, you will learn more about ecosystem science and management policies and approaches, and then apply your

knowledge to identify management principles that are consistent with a more holistic ecosystem approach.

We begin by reviewing ecosystem science and exploring how to recognize degraded and healthy ecosystems. We will discuss the notion of managing for ecosystem integrity and how system integrity can be defined and measured. Approaches that consider people as integral parts of the ecosystem and the role of ecosystems in providing goods and services for people will be explicitly addressed. We will review classic approaches to natural resource management and consider the ways in which environmental policies can facilitate or discourage integration. Finally, we will explore how an adaptive management plan that is consistent with an integrated, ecosystem perspective might be developed and applied. In this unit we will examine in detail an assessment, planning, and implementation framework for ecosystem management.

Upon successful completion of this course, you should be able to:

1. Describe the concept of "ecosystem" and the advantages and constraints of using ecosystems as a management unit.
2. Identify characteristics that might indicate a healthy ecosystem.
3. Recognize traits that might indicate a degraded ecosystem or an ecosystem potentially at risk.
4. Describe some traditional environmental management approaches and their strengths and weaknesses.
5. Develop management goals and objectives that consider sustainability as the core objective of ecosystem management.
6. Recognize the constraints and opportunities for ecosystem management within current U.S. environmental management policy.
7. Apply natural science and social science knowledge and analytical tools in an adaptive management framework to address environmental issues.

### **Attendance**

I encourage all students to discuss course content on an individual basis with me during office hours. Class attendance and participation are essential for mastering the material. It is not realistic to expect to do well in this class without attending and participating in the classroom activities.

We will be taking attendance this term. You are allowed two unexcused absences. You are allowed unlimited absences with prior (48 hour) approval. Each unexcused absence after the first two will result in a one percentage point decrease in your final grade. Your participation score will also be adjusted accordingly.

## Course Requirements

There will be one mid-term exam, a comprehensive final examination, and three homework/writing assignments at regular intervals over the course of the semester. In addition, there will be regular but brief in-classes quizzes on the reading assignments.

Grading will be as follows:

Mid-term Exam	27.5 %
Final Exam	27.5 %
Homework Assignments	30 %
Reading quizzes	10%
In class activities, and participation	5 %

There will be no make-up exams except by advance arrangement. A score of zero points will be given for exams missed without prior notification. You must arrive at the exam at the scheduled time. You are allowed a 15 minute grace period. Late arrivals after the grace period will not be able to take the exam.

Additional information about each homework assignment will be provided in class. Assignments submitted after the due date will be penalized 0.5 letter grade per day except in extremely unusual circumstances (advanced arrangement required).

### Academic Integrity:

I expect students to adhere to UVM's code on academic honesty. Although I encourage all students to discuss material and ideas freely among yourselves, all work submitted for grading must be strictly your own.

### Course Outline and Schedule:

<u>Topics</u>	<u>Dates Covered</u>
1. Introduction to Ecosystem Management  - what is ecosystem management? - the evolution of ecosystem management in the US - case studies of ecosystem management	Aug. 28 – Sept. 4
2. The ecosystem as a basis for management 20  - ecosystem structure, function, and composition - issues of context and scale in ecology - hierarchy of biological organization - succession, disturbance and the mosaic of patches - ecosystem stability and resilience - diversity and complexity	Sept. 6 – Sept.

3. Degraded and healthy ecosystems Sept. 25 – Oct. 4

Degraded ecosystems

- characteristics of degraded ecosystems
- factors that influence the magnitude of human stresses - type, intensity, duration, frequency, timing, and scale of impacts
- stressor-response relationships, criteria for evaluating causal relationships

Healthy ecosystems - how do we know one when we see it?

- natural variation, ecosystems as dynamic entities
- ecosystem health as a metaphor
- the notion of sustainability
- characteristics of good ecological indicators
- selecting indicators for use in management

4. Traditional environmental management policies and approaches Oct.9 – Oct. 23

- history of land tenure in the U.S.
- statutory and regulatory framework for ecosystem management
- managing ecosystems in national forests, parks, and wilderness
- managing populations of fish and wildlife, including Endangered Species
- air and water quality standards as a basis of management
- National Environmental Policy Act (NEPA)
- federal agency mandates: constraints and opportunities for ecosystem management

**Mid-term Examination** **Oct. 25**

5. Moving towards ecosystem management Oct. 30 – Nov. 13

Defining the management unit

- ecoregions, watersheds, and human communities
- issues of scale - do political and natural boundaries coincide?
- managing across air, land, and water

Human perspectives

- determining natural resource values: valuation of market and non-market ecosystem values
- community stability vs. resiliency
- balancing human needs and desires with ecosystem capacities
- community involvement in management decision-making
- reconciliation approaches
- environmental justice and intergenerational equity

## Management challenges

- NEPA planning process
- strategic planning for complex systems
- multiple objectives, stakeholders and advocacy
- understanding uncertainty

## The “Functional Landscapes” approach

- protected areas systems, land allocations, and zoning systems
- management of riparian and aquatic systems
- matrix management
- connectivity: corridor and non-corridor approaches
- ecological restoration
- site-suitability standards
- standards and guidelines for resource use activities
- strategies for private land-dominated landscapes

## 6. A goal-based, adaptive management approach

Nov. 17 – Nov. 27

### Goals and objectives for management

- formulating goals around the concept of sustainability
- writing measurable objectives

### Adaptive Management

- management as experimentation
- the iterative approach: monitor, reassess and reformulate
- learning as you go
- monitoring

## 7. The future of Ecosystem Management

Nov. 29 – Dec. 6

- a better legal and policy framework for management
- transboundary cooperation and global learning

## **Final Examination (Monday, 8:00 am, LL CM 315)**

**Dec. 10**