



## ***LAND 444*** ***Course syllabus 2007***

**Text books:** (1) Land Mosaics: the ecology of landscapes and regions (Forman)  
(2) Landscape Ecology Principles in Landscape Architecture and Land-Use Planning (Dramstad)

**Course Description:** LAND444 will explore the principles of landscape ecology as a framework for landscape research, analysis and management. This course will: 1) synthesize the dominant themes of landscape ecology; 2) familiarize students with current trends in the field; and 3) explore applications of the landscape approach.

Landscape architects and land-use managers generally, influence the natural world and its landscape context in many ways. They design change and modifications, whether on the scale of a small exotic garden to a strategy for fire management in a national forest.

What do landscape architects and land-use managers change?  
Why might such change(s) be desired?  
Do such changes improve the landscape?  
How do we measure “improvement”?

### **What is landscape ecology?**

Landscape ecology is an emerging discipline that recognizes that many systems - both natural and human - cannot be fully understood outside of their geographic context. It stresses that spatial patterns and heterogeneous environments are critical factors in understanding how systems work across a range of scales.

Landscape ecology provides concepts and theory that incorporate spatial patterning and spatial interactions into the dynamics of complex systems, and it has developed methods for characterizing spatial patterns and estimating how they might change through time.

Fundamental concepts of landscape ecology serve as foundations for decision-making and problem solving in applied fields such as conservation biology, land-use management, and urban planning and development.

### **COURSE GRADING:**

- 2 Midterms (100 points each)

- Miscellaneous “homeworks” (25 points each)
- 1 Case Study Report (100 points)
- Design Presentation (200 points)
- TOTAL = 500 points (+ the number of “homeworks”)

### **CASE STUDY ON LANDSCAPE ECOLOGY ISSUES & CHALLENGES**

This assignment is meant to give you a deeper understanding of the landscape ecology implications and challenges of many environmental issues.

**Objectives:** To analyze a relevant topic in landscape ecology of your interest, using the concepts, principles and approaches developed in this course. Preferably, this will also provide an opportunity for students to augment their current coursework (e.g., design projects). Students will also gain experience with the primary phases of conducting a research study: preparation of a proposal; execution of the study; preparation of a paper based on the study; and oral presentation of the results in the format suitable for a scientific meeting.

**Method:** I do not expect an analysis of data or an original topic. This assignment will be focused on an in-depth literature synthesis on the landscape ecology topic you select. Additional approaches (but not required) can include talking to experts, providing spatial analysis in a program like ArcGIS on your topic, and conducting an on-the-ground assessment of an issue.

**Topics:** The topic of the project is up to you. However, I need to approve your choice, via a proposal, to make sure your topic is sufficiently robust. In general, a good topic will tackle a complex issue and its broader implications (especially that has a good based of literature to draw from), and apply it specifically in a local or narrower context, like in the Front Range region, Rocky Mountain National Park or even the City of Fort Collins. Examples of thematic topics:

- (1) Analyses of spatial pattern of vegetation or land use in a study landscape;
- (2) Synthesis on how an organism (plant, animal, etc.) responds to changes in habitat heterogeneity, with recommendations for conservation or reserve design;
- (3) Preparation of a management plan for a large heterogeneous landscape;
- (4) Human land-use impacts on fresh water quality;
- (5) Landscape scale agricultural impacts on the environment, especially fertilizer pollution, water use and topsoil erosion.

**Project Proposals:** Proposals must be typewritten, double spaced with one-inch margins, with a 2-page maximum length excluding references (less length is acceptable and encouraged if well presented). The following should be clearly covered: Introduction/Background; Objectives/Questions; Methods; and Expected Results. Proposals are **due Sept. 20th**.

**Format for Project Reports:** Reports must be typewritten, double spaced with one-inch margins, and are **due Nov. 30th**. Projects should not exceed 10 pages of text excluding references and other information formats (photos, designs, figures, tables, etc.). The format should follow that of a journal, with an Introduction (including a problem statement, its importance, and your objectives), Methods and Results/Findings (in this case, primarily a literature review), a Discussion of your findings and your Conclusions. In the Discussion, an emphasis on the management implications and recommendations of your findings is essential.

### **DESIGN PRESENTATION**

Pretend you are an ecologically-savvy landscape architect consultant. You have been asked to pitch a design and conservation plan for a given issue to a review team. You will have 30 minutes

to present your knowledge and ideas, and win the contract. Get ready to combine your newly won knowledge of landscape ecology with your skills in landscape architecture.

Each consulting “firm” will consist of 8 groups, of 4-5 students. Each firm will develop a management plan which addresses a landscape ecology specific topic (topics to be developed).

The best way to pitch an excellent bid (*translation*= get an excellent grade) consists of the following: (1) teams will divide the presentation responsibilities equally amongst the group; (2) lots of impressive figures, maps, pictures and diagrams will impress, but only if they are relevant and well-explained; (3) a thorough overview of the problem will help frame the issue and show off your expertise of the *overall* topic *and* the project *specifics*. (4) No matter how slick your sales pitch, you will not win the contract without a detailed and impressive set of plans, implementation methods, and “deliverables”.

In sum, here’s the problem, here’s why it matters, here’s what’s causing it, and here’s how were going to “fix” it.

Additional guidelines for presentations: Presentations will be 30 minutes in length, to be followed by a 5-10 minutes of questions. Plan your talk in advance. You may use Powerpoint. Make your presentation as you would for a conference or meeting; that is, provide general context, clearly state the question, describe your methods, present results, and draw conclusions. Presentations will be done in class during the final two weeks of the semester. The ‘audience’ will also provide feedback to each presenter.

**Dates of Poster Presentations (to be assigned at random):** 11/27, 11/29, 12/4, and 12/6

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## LECTURE OUTLINE & READINGS

### Introduction and Concepts

**Aug. 21<sup>st</sup>:** *Introduction to Landscape Ecology* **Aug. 23<sup>rd</sup>:** *Defining Landscapes: pattern, resolution, extent, etc.:*  
Reading: Forman Ch. 1 & emailed PDFs

**Aug 28<sup>th</sup>:**

**Aug 30<sup>th</sup>:** *Scale and Hierarchy*

Reading: Forman Ch. 2, Dramstad Intro & Ch. 1

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### Causes and Consequences of Landscape Pattern

**Sept. 4<sup>th</sup>:** *Abiotic constraints to landscape pattern and processes*

**Sept. 6<sup>th</sup>:** *Social and cultural processes*

**Sept. 11<sup>th</sup>:** *Disturbances*

**Sept. 13<sup>th</sup>:** *Historic landscapes and legacies*

**Sept. 18<sup>th</sup>:** *Introduction to land use change*

**Sept. 20<sup>th</sup>:** *Communities and the landscape*

Sept. 25<sup>th</sup>: *Ecosystem Processes & Land/water interactions*

Sept. 27<sup>th</sup>: *MIDTERM I*

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**Landscape Data and Analysis**

Oct. 2<sup>nd</sup>: *Quantifying scale and patterns*

Oct. 4<sup>th</sup>: *GIS*

Oct. 9<sup>th</sup>: *Remote sensing*

Oct. 11<sup>th</sup>: *Introduction to models*

Oct. 16<sup>th</sup>: *Models II: Projective models*

Oct. 18<sup>th</sup>: *Models III*

Oct. 23<sup>rd</sup>: *Analyzing landscape patterns, composition and configuration*

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**Prediction and Management**

Oct. 25<sup>th</sup>: *Landscape equilibrium and management*

Oct. 30<sup>th</sup>: *Biodiversity and landscape management*

Nov. 1<sup>st</sup>: *Fragmentation, roads, edges*

Nov. 6<sup>th</sup>: *Landscape restoration*

Nov. 8<sup>th</sup>: *Global change and landscapes*

Nov. 13<sup>th</sup>: *Landscape ecology of streams and stream fish (Dr. Kurt Fausch)*

Nov. 15<sup>th</sup>: *MIDTERM II*

Nov. 20<sup>th</sup> & 22<sup>nd</sup>: *Thanksgiving Break, No Class (Work on your Case Studies)*

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**Design Presentations**

Nov. 27<sup>th</sup>: *Design Presentations*

Nov. 29<sup>th</sup>: *Design Presentations*

Dec. 4<sup>th</sup>: *Design Presentations*

Dec. 6<sup>th</sup>: *Design Presentations*

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