

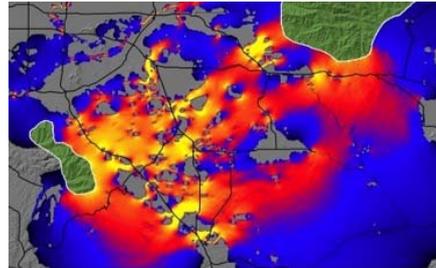
Landscape Ecology

Teacher: John Bissonette (Utah State University)
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Calendar: January 23-February 2, 2012

Duration: 36 hours

Schedule: 10h-12h and 14h-16h



SYNOPSIS

This course will explore the concepts and precepts that underlie landscape ecology and are arranged into modules of different length and difficulty. The modules each include an introduction, required readings that will give the necessary background to understand the material, optional readings that will enhance the student's knowledge of the subject matter, a discussion period to clarify important points, and usually one or two written exercises that illustrate specific concepts related to the material. Our focus will be on learning appropriate theory, making distinctions between important concepts, and trying to understand how the respective roles of equilibrium concepts, such as competition, predation, and parasitism vs. the stochastic forces of anthropogenic and 'natural' disturbance regimes structure landscapes and animal communities. We will try to do this in a spatially and temporally cognizant way. Below is a brief synopsis describing the modules.

Module 1 (Why Landscape Ecology?) explores the background and history of the field, explores briefly the nature of global resource conflict and the 'selective moral disengagement' of people that allows environmental degradation, and delves into the nature of causality with comparisons and contrasts at small vs. larger scale extents. If time permits, we cover some policy issues in ecology. For example, the current focus of several land management and research agencies is large scale extent trans-boundary work. I also ask the students to tie in current events in the world with natural resource use and scarcity by outside reading and discussion.

Module 2 (Things are not what They Seem) explores the idea of observation sets and the constraints they place on how we understand ecology. The module covers the ideas of strong inference, multiple working hypotheses, and hypothetico-deductive approaches vs. experimental model systems as ways of understanding ecological patterns and processes. The take home lesson is that large scale work requires different scale sensitive approaches to gain a reliable understanding of the processes at work.

Module 3 (Understanding at larger Spatial and Temporal Extents) considers hierarchy theory as an organizing principle that is relevant for ecologists and planners alike. In this module we also cover the ins and outs of scale considerations. We discuss the idea of transmutation (the reason why scale considerations have become so important), number systems (to understand the fundamental mismatch between the systems we study and the approaches we take to study them), and the idea of scale sensitive properties (not everything is scale sensitive). This module focuses on understanding that words and terms mean something and need to be used in a rigorous sense if ecologists are to avoid what has been termed "discordant discourse".

Module 4 (Viewing the World Fractally) considers the ideas of allometric scaling, power laws, and dimensions and brings them together to illustrate the principle of scale sensitivity. This is usually a mind twister for most students because most have considered only Euclidean geometry. Yet, a casual look at any satellite image, or looking at nature is the convincing activity that suggests that new ways are required if one is to more closely understand the nature of nature. I think the power of this module is that students will have a way to distinguish between how humans see the world and how animals perceive and respond to their environment.

Module 5 (Visualizing the Landscape) begins by asking the question “When are patterns real”? We discuss the difference between effective and non-effective patterns, the distinction being that there is pattern at every scale resolution and extent, but that depending on how organisms scale to their environment, only certain patterns (with their associated processes) may have relevance. In this module, we also cover the history of the evolving concepts of how ecologists have viewed (and used) different views of landscape pattern (from the binary island biogeographic view of habitat vs. non-habitat, to variegation, to the continuum model. In other words, we look at the nature of fragmentation and heterogeneity. This is a module that changes the fundamental assumptions of many students.

Module 6 (What Structures the World: From Equilibrium Theories to Disturbance Regimes) tries to put the concepts of competition, predation, disease, and anthropogenic and natural disturbance regimes into context as drivers of population and community change. We look at a revised concept for landscape ‘equilibrium’ and consider the nature of large impact events that result in altered ecosystem states.

Module 7 (Expanding the Idea of Habitat Fragmentation-Relating to Populations) looks at fragmentation as a disruption of continuity and relates patterned landscapes to the idea of complicated population dynamics, a key idea in scale sensitive issues, and a foundation for landscape ecology.

Module 8 (Ecological Laws: So What? Can We Put it Together?) is the last segment for the class. In this section we read broadly about the question: Are there general rules in ecology? And if so, what might they be? This is a segment that generates much discussion in class and brings the class full cycle.

Location: Departamento de Biologia Animal (FCUL), room 2.2.19

Nº (min, max) students: 5 – 20

Minimum formation: “Licenciatura” (bachelor) in Biology, Geography or related areas

Fee: free for PhD students in their 1st year of the Doctoral programme in Biology (FCUL), Biodiversity, Genetics and Evolution (UL; UP) and Biology and Ecology of Global Changes (UL; UA); 150 euros for FCUL master students; 200 euros for research technicians and other PhD students; 250 euros for others.

Deadline for applications: January 2, 2012

→ Candidates should send a short CV and motivation letter to Margarida Matos, (mmatos@fc.ul.pt)