
ENV 217

Restoration Ecology: Theory and Applications

Fall 2013: 104 Gross Hall
MW 10:05-11:20

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appt.

Course Overview

In the 1930s, Aldo Leopold initiated the first recognized restoration project in North America at the Curtis Prairie in Wisconsin. Since then, ecological restoration has increasingly become an important management tool. The academic discipline of restoration ecology has distinguished itself from theoretical ecology, conservation biology, and ecosystem management by translating science into restoration recommendations and is thus at the crossroads of science and practice.

The practice of ecological restoration encompasses a wide range of projects, from reclamation of abandoned mines to recreation of wetlands on former agricultural fields. Botanists, hydrologists, soil scientists, wildlife managers, citizen volunteers, and bulldozer operators continue to be challenged to create conditions where natural ecological processes ensure recovery of not only the ecosystem but ecosystem dynamics as well. Legislative requirements, financial constraints, and stakeholder values also lead to different criteria for success, resulting in a wide range of projects that can be considered “ecological restoration”.

In this course, we will address fundamental principles of ecological restoration. We will begin with an overview of the discipline and ground ourselves in fundamental principles of ecosystem ecology. We will then work through the three major steps to the restoration process: site assessment, restoration planning, and monitoring. For each step, we will couple in-class discussion with field work at a local site in Duke Forest. We will then investigate the ethical and philosophical underpinnings, community engagement, and the legislative framework that guides much of the restoration work in the United States. These course elements will come together in a series of final presentations on restoration efforts, successes, and challenges in ecosystems across the world.

Your Instructor

Rebecca Vidra is on the faculty of the Nicholas School of the Environment and serves as the Director of Undergraduate Studies in environmental sciences and policy at Duke University. She is trained as a restoration ecologist, receiving her PhD in Forestry from North Carolina State University and her MS in Ecology from the University of North Carolina at Chapel Hill. Her background and interests in environmental communications lead her to Duke in 2004 as a Mellon Postdoctoral Fellow where she taught environmental writing seminars in the Thompson Writing Program. She currently is working on a series of essays that examine the ethical questions of restoration and reclaiming native grounds. She also serves as the faculty advisor to the new literary journal, the *eno*. Rebecca teaches courses in *Environmental Program Management*, *Restoration Ecology*, and *Environmental Ethics* for undergraduate, graduate, and DEL students.

Course Materials

Our course WordPress site hosts the full course schedule, including links to readings and descriptions of assignments. We will be building this site as we move through the semester. There are no textbooks for this course.

You will upload your Assignments in .docx format to our Sakai site. I will also record your grades using the Sakai gradebook.

Course Structure

The structure of this course will likely be quite different from others you have taken at Duke. We will use the method of Team-Based Learning, which transforms a lecture-style class into a student-led hands-on experience. The general framework for this course will be the following:

- The majority of “lecture” material will be delivered outside of class. Collections of videos, readings, websites, and more will be available to you via our Sakai site for each major course topic. Students will prepare for class by reading this material carefully. Reading guides may be available for certain units.
- We will spend our time together working in teams, groups of 4-5 students that will stay together for the entire semester. In teams, students will work on problem sets, discuss the readings, and clarify any confusing material. Rebecca will provide mini-lectures on issues that students identify as confusing or to provide more depth on course materials.
- We will learn the steps of the restoration process (site assessment, planning, and monitoring) by going through each one with an actual site. Teams will develop full restoration plans for a particular local site, with guidance from local experts and Duke faculty.
- Students will write 3 short essays, to be graded individually, and will have the opportunity to workshop some of their writing in class. These will allow us to focus on the conventions of academic writing within this specific discipline. As a reminder, this course has a “W” designation.
- Students will have the opportunity to participate in the *Duke Reader Project*, an innovative effort led by Cary Moskowitz at the Thompson Writing Program to engage outside readers in reading and commenting on student work. At three key points in the semester, you will share your work with an outside reader and integrate his/her feedback into your revision process.

Learning Objectives

By the end of this course, students will be able to:

1. Explain the philosophy, scientific foundation, and challenge of restoration ecology.
2. Apply the principles of restoration ecology through the development of a detailed restoration plan.
3. Analyze habitat requirements, ecosystem function, and anthropocentric influences to determine the restoration approach for a species or population.
4. Assess the various scales of restoration (organism to landscape) to develop a holistic approach to ecosystem restoration and management.
5. Identify the role that legislation, finances, and politics play in designing successful restoration projects.
6. Acknowledge the challenge of global climate change, invasive species, and population pressure on restoration planning and outcomes.

Course Requirements

To successfully complete this course, the following requirements must be met:

1. Faithfully **attend** class and **participate** in your team. Prepare by doing all of the assigned reading and coming to class ready to work.
2. Take in-class individual and team **quizzes**, usually no more than 7 questions. Then, take the same quiz as a team. Complete in-class **application exercises** as a team.
3. **Craft** three short (500 word) **essays** on:
 - Visualizing ecological restoration (due September 13)
 - Restoration case study (due October 18)
 - Ethical implications of restoration (due December 6)
4. Prepare a short (no more than 20 pages, double-spaced) **restoration plan** for a specific site, chosen in consultation with Rebecca, that includes the three major restoration plan elements (due November 25). Design and give a **30 minute presentation** (November 18 and 20) on your restoration plan.

Our first team assignment will be to create a grade distribution for our class. We will decide, as a class, how to distribute 100 points among the assignments outlined above (peer evaluation of participation, individual quizzes, team quizzes, 3 short essays, restoration plan and restoration plan presentation).