

Restoration Ecology - BIOL 5170 CSU Stanislaus, Spring 2015

Instructor: Dr. Matthew R. Cover, Associate Professor, Department of Biological Sciences

Office Hours: Monday 9:00-10:30, Wednesday 9:00-10:30 (my office, N273), or by appointment

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Personal Website: <http://www.matthewrcover.com> (my research etc.)

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Class Time: Monday 12:30-4:00, Wednesday 3:00-4:30

Location: BioAg Dome, or Library Room, or ?

“Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed.” – Restoration Primer, Society for Ecological Restoration

“To keep every cog and wheel is the first precaution of intelligent tinkering.” – Aldo Leopold

“Here is the means to end the great extinction spasm. The next century will, I believe, be the era of restoration in ecology.” – E.O. Wilson

“The mainstream environment movement’s... historical roots in and elevation of conservation, preservation, and wilderness protection... were promoted at the expense of other, perhaps more popular, motivators such as health ecology and environmental justice [and]... have not taken seriously the deleterious effects of environmental contamination on women, the poor, people of color, and residents of urban areas... [T]he mainstream movement could be reinvigorated by contemporaneous attention to health ecology, environmental justice, and ecological restoration, all of which remain on the borders of the movement, and all of which have ample precedent within the sidelined history of American environmentalism.”

– C.R. Palamar

Course Description

Human activities have greatly altered natural landscapes and ecosystem processes in virtually every landscape on earth. These anthropogenic alterations include hydrologic modification of streams and rivers, urbanization and suburban sprawl, fire suppression and logging of forests, draining and filling of wetlands, and livestock grazing and agriculture. Through the disruption of natural processes we have also impacted critical ecosystem services that promote clean water, soil fertility, a stable climate, etc. Restoration ecology is a relatively young academic discipline (although people have been “restoring” ecosystems for millennia), and as such there are many theoretical and philosophical differences among its practitioners. Additionally, there are no easy answers to many of the most pressing threats to ecosystems, including invasive species, climate change, biodiversity loss, habitat fragmentation, etc.

This course provides an introduction to the principles of ecological restoration, a field that aims to assist in the recovery of altered or degraded ecosystems. Course readings and discussions will relate ecological restoration to a wide range of potential applications and ecosystem types, with a focus on issues relevant to the Central Valley in particular and California in general. We will take a critical look at current ideas and theory through readings and discussion. We will engage in hands-on work, including field trips, post-project monitoring of a large-scale floodplain and riparian restoration project at the San Joaquin River National Wildlife Refuge, and an on-campus (restoration?) project. Additionally, students will write a critical essay that reflects their own interest in the field of restoration ecology.

Readings/Texts

There is a required course reader, to be made available for purchase from the instructor.

Student Learning Objectives

After successfully completing this course, students will be able to:

1. Describe the major theories, philosophies, and terminology at the core of the discipline of restoration ecology.
2. Describe how the field of restoration ecology relates to other fields such as ecology, environmental science, conservation, and the environmental movement.
3. Critically analyze the philosophical and theoretical underpinnings of specific ecological restoration projects and goals.
4. Describe some potential considerations for post-project monitoring.
5. Clearly and articulately write an informed argument about a burning environmental problem.

Activities and Evaluation

1. Reading, Discussion, and "Idea Book" (30% of grade)

Essential to this course is the critical and deep reading of texts and articles. It is of the utmost importance that each student engages deeply with the readings. This means not just reading for conceptual understanding, but asking the tough questions, making connections, and synthesizing information. Our goal is to push each other to develop a holistic understanding of the field of restoration ecology, and to learn from as many voices and practitioners as we can in order to develop a range of "toolkits" for designing solutions to environmental problems.

I would like you to keep all of your notes from readings and discussion in one place—preferably a notebook, although a binder could work as well. While reading, I want you to make notes on your own conceptual, big-picture understanding of the reading. This might take the form of an outline, a list of main points, or even a diagram. The idea is to go beyond simply highlighting and underlining important points by putting the reading down for a minute, reflecting on the ideas, and putting those ideas in your own words and/or a format that makes sense to you. Also, this is a place to write down questions, contradictions, and connections to other readings. Your notes should have plenty of ideas to get our discussion going, and should show your thought process, ideas, interpretations, and analyses as you gain a greater understanding of restoration ecology and as you figure out your own essay

topic. I will be periodically asking to take a look at your “idea book” as a measure of your deep engagement with the readings and your preparation for class.

2. Reflection Papers (15% of grade)

You will write three short (<2 pages) reflection papers on the readings. The emphasis will be on making connections between readings, identifying contradictions, and posing questions? Your papers do not need to be fully thought-out essays with a thesis statement, etc. Instead, you may want to start with a question and compare/contrast some different approaches to the problem. Your paper should present your own view on the topic, even if it is still evolving.

3. Restoration Success? Project (20% of grade)

Working in a small group (2-3), you will design and carry out a post-project analysis of restoration at the SJRNWR. In a series of field trips you will identify an aspect of the project/ecosystem to investigate and collect data. You will then share your findings to the class in an oral presentation.

4. Essay (20% of grade)

Each student will develop their own idea for an argumentative essay related to restoration ecology. The goal of this project is to delve deeply into a topic or question in order to help you better understand your own views about nature and our place in the world. The essay should utilize some of the assigned readings, as well as outside sources. It should critically analyze arguments about: the reasons for doing restoration, the goals of restoration, the value of restoration vs. other approaches,... the possibilities are nearly endless. Hopefully the readings will help you identify a problem that you are especially concerned about that can serve as your starting point.

5. Participation (15% of grade)

Missing more than one class session, field trip, etc., without prior notice will affect your grade. Your participation and leadership will be important to the success of the class, so please let me know as soon as possible if you will miss class.

Schedule (subject to change)

W 1/28	Welcome and Introduction to the Course
M 2/2	Discuss “definitions” readings (SER, Higgs, Shackelford)
W 2/4	Campus (restoration?) project: site visit, observations, and discussion
M 2/9	Discuss crisis readings 1 (Barnosky1, Estes, Gore, Raby)
W 2/11	Idea Paper #1 (3 copies), and discussion
M 2/16	Discuss crisis readings 2 (Fishman, Barnosky2)
W 2/18	Campus project work day

- M 2/23 Discuss intrinsic/extrinsic readings
(Muir, Leopold, Nijhuis, Douglas, Sowards, Berry)
- W 2/25 campus project work day
- M 3/2 Discuss human/nature readings
(Kareiva, Miller, Tallis, Amos, Minter, Snyder)
- W 3/4 Idea Paper #2 (3 copies) and discussion
- M 3/9 Discuss EJ Readings (Palamar, Harper, LaDuke, Shiva, Guha)
- W 3/11 Campus project work day
- M 3/16 Field Trip: SJRNWR
- W 3/18 Discuss Central Valley restoration readings
(Golet, Swenson, Pitzer, SJRRP)
- M 3/23 Brainstorm research projects
- W 3/25 Discuss Goal Readings 1 (White, Palmer, Cole)
- M 3/30 Discuss Goal Readings 2 (Hobbs, Funk)- Idea Paper #3 (3 copies)
- W 4/1 Brainstorm essay topics

Spring Break!

- M 4/13 Outlines of essays due. Present and discuss outlines.
Discuss social-ecological systems readings (McKinney, Garibaldi, Chazdon)
- W 4/15 Research proposals and discussion
- M 4/20 Field Trip to SJRNWR. Data collection 1.
- W 4/22 Field trip recap, planning.
Discuss "bad science" readings (Lave, Middleton, Higgs)
- M 4/27 Field Trip to SJRNWR. Data collection 2.
- W 4/29 Rough drafts of essays due, bring 10 copies;
Discuss education readings (Urry, Armstrong, Taylor)
- M 5/4 Discussion and feedback on essay rough drafts
- W 5/6 Work day- group projects
- M 5/11 Group Research Project Presentations
- W 5/13 Final essays due. Party!