
NRSM 265: Elements of Ecological Restoration

LOGISTICS

Time: Tuesday, Thursday, 12:30 – 1:50 pm

Location: Phyllis J. Washington College of Education 312

Required Field Trip: Students must attend at least one field trip, TBD for Sep. and Oct.

Web Site: [For class website please visit Moodle](#)

INSTRUCTORS

This course is team taught by faculty within the Ecosystem Science and Restoration program, and it is supported by a teaching assistant. Please stop by their office hours or email them (with “NRSM 265” in the subject line) to ask questions or make an appointment.

Philip Higuera, Associate Professor

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Office Hrs: Tues & Wed 2:00-3:30 pm

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Teaching Assistant

Celina Gray, Graduate Student

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Lisa Eby, Professor

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COURSE OVERVIEW

The complex challenges involved with restoring degraded ecosystems requires an understanding not only of the science of restoration ecology, but also the management practices and social factors that lead to successful project implementation. This interdisciplinary course is designed to give students an overview of the natural and social elements of ecological restoration. Topics covered include the ecological foundations of restoration, restoration goals and practices in terrestrial and aquatic habitats, social perspectives on restoration, restoration policies and planning, and restoration initiatives in Montana and the United States.

Learning Objectives

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

1. Communicate the definition of ecological restoration and its relationship with other disciplines.

2. Describe the scientific principles and management practices used to assist in the repair of forest, grassland, and aquatic systems.
3. Describe some of the human dimensions of restoration.
4. Express ideas in verbal and written formats and follow directions associated with assignments.

Course Organization

The course is taught in discreet sections, each with a different set of instructors. A variety of teaching approaches will be used, including lectures, group activities, and fieldtrips.

Section	Weeks of the Sem.	Dates
Restoration Theory	Weeks 1-3	8/27 - 9/10
Forest Ecosystem Restoration	Weeks 3-6	9/12 - 10/3
River Restoration and Human Dimensions	Weeks 6-11	10/8 - 11/5
Grassland Restoration, course wrap up	Weeks 11-15	11/7 - 12/5

Textbook and Readings

The readings have been assigned from the contemporary scientific literature, chapters from books, and chapters from *Nature's Restoration* by Peter Friederici (Island Press, 2006). All reading materials will be available through Moodle.

Reference reading: Students interested in delving more deeply into aspects of restoration can find reference information within [The Science and Practice of Ecological Restoration book series](#), published by Island Press.

Moodle and Computer Access

You need reliable internet access to keep up to date with course materials, to successfully access and hand in assignments, and to access course readings via Moodle. All course communications outside of class will be sent to students' University of Montana email accounts. It is your responsibility to regularly check your University account.

Assignments and Assessments

Reading assignments

Each section and class period has associated reading material that should be read *before* class. Please download all reading materials at the beginning of each course section to ensure that you have access to the documents when you need them.

Pop quizzes and in-class questions

To assist students with staying current with reading materials, there will be pop quizzes on the reading assignments in class. You will get partial credit for attendance and full credit for the correct answers which indicate that you have read the materials. We will waive one of these scores for each student over the course of the semester.

Exams

Most section will conclude with an exam, which will be conducted in-class and will include: definitions and fill-in-the-blank-style questions (approximately 20-25% of points); short answer questions (approximately 40-45% of points); and questions that requires critical thinking and/or application (approximately 35% of points). Students should review all of the lectures and readings for each section. In

addition, a study guide reflecting potential questions will be provided to help students focus their studying just after the last class session of the section.

Field trips

The course includes at least two field trips, one will be associated with forest restoration (led by Dr. Higuera) and one will be associated with river restoration (led by Dr. Eby). Field trip details and dates will be provided in the first two weeks of the semester. You are required to attend *at least* one of these trips and to submit a field trip report. Details will be provided in a field trip folder on Moodle. You only need to complete one field trip assignment but you are welcome to attend both field trips.

Writing assignments

There will be written assignments (not including quizzes and exams). Detailed information on each assignment will be posted on Moodle. All assignments must be submitted via Moodle.

1. **Invasive Plant Report:** Each student will write a short report on the ecology and management of an invasive plant. This report is the assessment for Grassland Restoration Section of the course (i.e. in lieu of an exam).
2. **Fieldtrip Report:** Each student is required to submit a report from one of the field trips. Please read through the assignment BEFORE the field trip, so that you maximize learning while on the trip and are fully prepared for to write the field trip report.
3. **Seminar Report:** At the end of the semester, students will participate in an in-class discussion of their case study assessment. Each student is required to write a 4-6 page paper on a case study of their interest, which is due on the class period of the semester. Instructions on how to write this assignment and participate effectively in discussion will be posted on Moodle. This report is the final assessment for the course.

Format and grading for writing assignments:

- All assignments must be typed (except for in-class work).
- Assignments will be graded for both substance and writing; approximately 20% of the grade for each writing assignment will be based on grammar and clarity of writing.
- For every written assignment that you submit, include an appropriately formatted header with the title of your paper, the course number, and your student ID number [790*], and the date on the first page and the following information on each additional page: your student ID number, the date, and the page number. Students who do not include all of the required header information will be docked one grammar grade (e.g., 3% of total grammar points).
- Use your word processing software's header feature to create the header; do not simply type the header at the top of the page, as it will float to undesired locations. If you do not know how to use this feature, stop by the writing center or ask the course TA for help.
- Please do NOT write your name on any assignments that you turn in, but be certain your **correct** student identification number is on it.
- In-text citations and bibliographies must follow the "Author-Date" format. For example, the in-text reference would be: (Jones 2016) if it is a single author, (Jones and Brown 2016) if there are two authors, or (Jones et al. 2016) if there are three or more authors. These references are then listed in a bibliography at the end of the paper in APA format.

- Before submitting assignments via Moodle, save your document with the following file naming format: “NRSM265_AssignmentName_StudentID#”. For example, the seminar paper should be saved as, “NRSM265_SeminarPaper_790123456”

Course Grade

Student grades will be determined based on scores received for the assessment of each section (exam or report), pop quizzes and participation in classroom activities, and the field trip reports. The course is scored on a total of 600 points.

Section	Assignment	Points
Section 1: Restoration Theory	Exam	100
Section 2: Forest Restoration	Exam	100
Section 3: River Restoration and Human Dimensions	Exam	100
Section 4: Grassland Restoration	Invasive Species Report	100
Throughout the course	Quizzes on reading assignments and classroom activities	75
Throughout the course	Seminar Report	60
Throughout the course	Field Trip Report	65
TOTAL:		600

***NOTE: There is no final exam for this course.**

Letter grades will be assigned bases on students’ numeric scores as follows:

A = $\geq 94\%$	A- = 90-93%	
B+ = 87-89%	B = 84-86%	B- = 80-83%
C+ = 77-79%	C = 74-76%	C- = 70-73%
D + = 67-69%	D = 64-66%	D- = 60-63%
		F = <60%

COURSE POLICIES

Class expectations

Cell phones and mini-computers

Please turn off electronic devices during class, unless they are being used for an in-class exercise. We expect you NOT to be texting, browsing, or checking e-mail during class. *If you feel you need to engage with your electronic device, please leave the classroom.*

Attendance

Attendance is expected and contributes to the “Class participation” portion of your course grade. Absences are not excused unless you have extenuating circumstances and have contacted an instructor in advance of the class.

Assignment due dates

Due dates are firm. Late assignments will not be accepted unless you have unusually extenuating circumstances *and* have made arrangements prior to the due date. This includes missing an exam: *there are no make-up exams* without prior arrangement.

Communication

We encourage you to communicate with the instructor and/or the TA if you have questions about course material or assignments. If you have questions about your grade or your standing in the course, please

meet with an instructor during office hours. We are happy to help outside of class, but we ask that you follow these guidelines:

Coming to office hours is the best way to get questions answered. E-mail can be a less effective way to communicate for immediate issues. If you do e-mail an instructor or TA, please do the following so that the e-mail is read and understood: (a) include "NRSM 265" in the subject line, (b) write in complete sentences, with proper grammar, and (c) sign the e-mail with your full name. Even though we work to reply promptly, sometimes we are in meetings, classes, and in the field all day and try to catch up on email at night. Reply times will vary and may be up to 48 hours.

Classroom environment

Students at University of Montana are diverse in many ways, including race, gender, age, religion, preparedness, and mobility. Please help create a respectful learning environment by honoring all student contributions and expressing your views in ways that do not diminish other students' perspectives.

Disability modification

- Students with disabilities may request reasonable modifications by contacting me. The University of Montana assures equal access to instruction for students with disabilities in collaboration with instructors and [UM's Disability Services for Students Office](#), which is located in Lommasson Center 154 (406.243.2243). The University does not permit fundamental alterations of academic standards or retroactive modifications. We will work with you and Disability Services to provide an appropriate and reasonable modification.

Academic honesty, plagiarism, and student conduct

- All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the [Student Conduct Code](#).
- Academic dishonesty of any form is unacceptable and will be taken seriously by the instructor, the College of Forestry and Conservation, and the University of Montana. This includes plagiarism, when you copy materials from other sources without citing the source or copy someone's work, and cheating, copying material from other students during tests or quizzes. In both cases, you will fail the assignment/exam and the information will be passed on to the Dean and the Vice Provost of Academic Affairs. It is your responsibility to be familiar with, and adhere to, the [University's definition of plagiarism](#).

Course withdrawal deadlines

- See [Fall 2019 Official Dates and Deadlines](#) calendar

Important Dates Restricting Opportunities to Drop a Course Fall 2019:

Deadline	Description	Date
To 15 th instructional day	Students can drop classes on CyberBear with refund & no "W" on Transcript	September 16, @5 PM
16 th to 45 th instructional day	A class drop requires a form with instructor and advisor signature, a \$10 fee from registrar's office, student will receive a 'W' on transcript, no refund.	September 17 – October 28 @5 PM

Deadline	Description	Date
Beginning 46 th instructional day	<p><u><i>Students are only allowed to drop a class under very limited and unusual circumstances.</i></u> Not doing well in the class, deciding you are concerned about how the class grade might affect your GPA, deciding you did not want to take the class after all, switching majors, and similar reasons are not among those limited and unusual circumstances. If you want to drop the class for these sorts of reasons, make sure you do so by the end of the 45th instructional day of the semester. Requests to drop must be signed by the instructor, advisor, and Associate Dean (in that order) so if you pursue this request, <i>leave sufficient time to schedule meetings with each of these individuals</i> (generally this will take at least 3-5 working days). A \$10 fee applies if approved. Instructors must indicate whether the individual is Passing or Failing the class at the time of request.</p>	October 28 – December 6 @5 PM

Wk	Date	Topic	Readings for Day (complete before class)
Section 1: Restoration Theory			
1	Aug-27	Course Overview & Introductions	Syllabus
1	Aug-29	What is Ecological Restoration?	Sections 1 and 2 in Society for Ecological Restoration Standards. McDonald et al. (2016) pages 7-24
2	Sep-3	Ecological Foundations of Restoration	Kimmins (1997)
2	Sep-5	Historical Ecology and Reference Sites	Swetnam et al. (1999)
3	Sep-10	Exam 1	
Section 2: Forest Ecosystem Restoration			
3	Sep-12	Fire as a Biophysical Process in Forest Ecosystems	Friederici (2006), Chapter 3
4	Sep-17	The Ecological Role of Fire in North American Forest Ecosystems	Keeley et al. (2009)
4	Sep-19	Forest Restoration in the Western U.S.	Optional/recommended: Churchill et al. (2013)
5	Sep-24	Challenges of ecological restoration considering insects and disease in the face of a changing world	Funk et al. (2014)
5	Sep-26	The Roles of Insects and Diseases in Forest Ecosystems	Friederici (2006), Chapter 1
6	Oct-1	Class Activity - Review for Exam 2	Study Guide
6	Oct-3	Exam 2	
Section 3: River Restoration and Human Dimensions			
7	Oct-8	River ecosystems from local to landscape scales and factors that lead to degradation	Hauer et al. (2016)
7	Oct-10	Introduction to River Restoration and Assessment	Palmer et al. (2005)
8	Oct-15	Science and practice of the Elwha Dam Removal	TBD

8	Oct-17	Local Case Study Introduction -- Clark Fork Restoration: Coming together for a better river.	Chapter 4; Watch: Superfund Recap and the 3 R's of the Mill Town Clean-up
9	Oct-22	Monitoring and Assessment of the Clark Fork Restoration	TBD
9	Oct-24	Attitudes and Values	Heberlein (2012), Chapter 2
10	Oct-29	Clark Fork Case Study: Considering the human dimension in the assessment of restoration	Metcalf et al. (2015)
10	Oct-31	Class Activity: What is successful restoration? (integrating across scales and fields)	
11	Nov-5	Exam 3	
Section 4: Grassland Restoration			
11	Nov-7	Invasion Biology and Invasive Plant Management	vanKleunen et al. (2010)
12	Nov-12	No Class: Field Trip make-up day	
12	Nov-14	Missoula's Grassland Restoration Program	Friederici (2006), Chapter 2
13	Nov-19	Soil Biota and Restoration	Wuba et al. (2016)
13	Nov-21	Biological Control Pros and Cons	TBD
14	Nov-26	Genetics and Restoration	Falk et al. (2001)
14	Nov-28	Thanksgiving	
15	Dec-3	Class Activity -- Jeopardy	Invasive Species Assignment
15	Dec-5	Discussion, class wrap-up, student evaluations	Final Seminar Report Assignment