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# NRSM 265: Elements of Ecological Restoration

**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.

**Moodle for calendar, readings, assignments, and assignment submission**

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

## INSTRUCTORS

Diana Six, Professor

Office: BRB 104

Office Hrs: Mon & Tues 10:30-11:30 am or by appointment

E-mail: [diana.six@umontana.edu](mailto:diana.six@umontana.edu)

Lisa Eby, Professor

Office: BRB 103

Office Hrs: Mon & Wed 1:00-2:00 pm or by appointment

E-mail: [lisa.eby@umontana.edu](mailto:lisa.eby@umontana.edu)

Zoom personal meeting link: <https://umontana.zoom.us/my/lisa.eby>

## TEACHING ASSISTANT

Rebecca Durham, Graduate Student

Office Hrs: Thurs 11-12 BRB 104

E-mail: [rebecca.durham@umontana.edu](mailto:rebecca.durham@umontana.edu)

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**COVID – Class will meet in person. Masks are required. We will follow Franke College of Forestry and Conservation and UM guidelines which may shift over time, so please check your email often for guidance. If you are sick, quarantining, and/or have been exposed to COVID, contact the TA via email at least 1 hour prior to missed classes and let us know so we can keep you up to date with course material.**

## General:

- Mask use is required within the classroom or laboratory.
- If you feel sick and/or are exhibiting COVID-19 symptoms, please don't come to class and contact the Curry Health Center at (406) 243-4330.
- If you are required to isolate or quarantine, you will receive support in the class to ensure continued academic progress. (Add specific information about how you, as the instructor, will continue providing course materials to students in quarantine or isolation.)
- (If instructors are comfortable sharing or including this) UM recommends students get the COVID-19 vaccine. Please direct your questions or concerns about vaccines to Curry Health Center.

- Where social distancing (maintaining consistent 6 feet between individuals) is not possible, specific seating arrangements will be used to support contact tracing efforts.
- Class attendance and seating will be recorded to support contact tracing efforts.
- Drinking liquids and eating food is discouraged within the classroom.
- (If applicable) Mask use is required in vehicles when traveling to field sites as part of class/fieldwork.
- (If applicable) Please note this class is being recorded. Notifying students is a requirement if this is the case.

## 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 concepts of ecological restoration in verbal and written formats.

## Textbook and Readings

The assigned readings are from the scientific literature and book chapters. 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](https://islandpress.org/books/science-and-practice-ecological-restoration-series), published by Island Press. (<https://islandpress.org/books/science-and-practice-ecological-restoration-series>)

## 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.

### **Quizzes and in-class questions**

To assist students with staying current with reading materials, there will be quizzes on the reading assignments in class. Each student gets 1 point for attendance and up to 4 points for questions on each quiz.

### **Exams**

Each section will conclude with an exam, which will be conducted in-class and will include: definitions and fill-in-the-blank-style questions (approximately 25% of points); short answer questions (approximately 50% of points); and questions that requires critical thinking and/or application (approximately 25% of points). Students should review all the lectures and readings for each section. In addition, a study guide reflecting potential questions will be provided to help students focus their studying near the end of each section.

### **Field trips**

The course includes at least two field trips, one associated with forest restoration and one with stream and river restoration. 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. Detailed information on each assignment will be posted on Moodle. All assignments must be submitted via Moodle.

1. **Field Trip 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.
2. **Seminar Report:** At the end of the semester, students will participate in an in-class discussion of assigned readings from Federici (2006) and a reflection piece linking class concepts to the readings. Instructions on how to write this assignment and participate effectively in the seminar discussion will be posted on Moodle.

## 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 25% 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. The first page should include the title of your paper, the course number, your student ID number [790\*], and the date. Each additional page should include your student ID number, the date, and the page number. Students who

do not include all 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 scientific journal form (APA style).
- 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), quizzes and participation in classroom activities, and the field trip reports. The course is scored on a total of 650 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	Exam	100
Throughout the course	Quizzes, attendance, classroom activities	100
Throughout the course	Field Trip Report	50
End of course	Seminar Report	100
	<b>TOTAL:</b>	<b>650</b>

***\*NOTE: The fourth exam is during finals week but is not cumulative! (it is like a midterm and similar in length)***

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 computers***

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

#### ***Attendance***

In-person 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 (48 hours).

#### ***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.

We are here to help you succeed. If you have questions or have extenuating circumstances, please reach out to the instructor of the section. We encourage you to do this sooner than you think necessary, as it provides more options. If you have extenuating circumstances (e.g., health, educational conflicts, family, etc.) and contact your instructor at least 48 hours in advance of a due date, we have more options to accommodate student needs.

#### ***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 standing in the course, please meet with an instructor during office hours.

Coming to office hours is a great way get questions answered. E-mail can be an effective way to communicate for immediate issues. If you 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. Please contact the instructor in charge of the section being covered in the course.

### Classroom environment

Students at the 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.

### Accessibility

- The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and the Office for Disability Equity (ODE). If you anticipate or experience barriers based on disability, please contact the ODE at: (406) 243-2243, [ode@umontana.edu](mailto:ode@umontana.edu), or visit [www.umt.edu/disability](http://www.umt.edu/disability) for more information. Retroactive accommodation requests will not be honored, so please, do not

delay. As your instructor, I will work with you and the ODE to implement an effective accommodation, and you are welcome to contact me privately if you wish.

## 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 (copying materials from other sources without citing the source or copying 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 incident 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 (and other) deadlines

- See calendar <https://www.umt.edu/registrar/calendar/autumn-2021.php>

### Lecture schedule

<i>Week</i>	<i>Date</i>	<i>Topic</i>	<i>Readings</i>	<i>Speaker</i>
<b>Section 1: Restoration Theory</b>				
1	8/31	Course overview and introductions	Syllabus	Six, Durham
1	9/2	What is ecological restoration?	SER Primer	Durham
2	9/7	Ecological foundations of restoration	Kimmins (1997), SER Primer	Six
2	9/9	Historical ecology and reference sites	Swetnam et al. (1999)	Six
3	9/14	<b>Exam I</b>		
<b>Section 2: Forest Ecosystem Restoration</b>				
3	9/16	Disturbance and fire in forest ecosystems	TBA	Larson
4	9/21	Old growth and 'wild' forests	Thorn et al. (2020), Lindemayer (2019)	Six
4	9/23	Fire and restoration	TBA	Hood
5	9/28	The roles of insects and diseases in forests	Federici	Six
5	9/30	Restoration considering insects and disease	R.Mtns at Risk	Six
6	10/5	Class activity – review for exam 2	Study guide	Six
6	10/7	<b>Exam II</b>		
<b>Section 3: River Restoration and Human Dimensions</b>				
7	10/12	River ecosystems from local to landscape scales	Hauer et al. (2016)	Eby
7	10/14	Ecological restoration of streams and rivers	Palmer et al. (2005)	Eby

8	10/19	Clark Fork River restoration case study	Brooks (2015)	Eby
8	10/21	Assessing Success in River Restoration		
9	10/26	Attitudes and values – what are they?	Metcalf video 2020	Eby
9	10/28	How attitudes influence restoration success	Metcalf et al. (2015)	Eby
10	11/2	Activity: what is successful restoration? Integrating across scales and fields	TBA	Eby
10	11/4	Activity: what is successful restoration? Integrating across scales and fields	Study guide	Eby
11	11/9	<b>Exam III</b>		
11	11/11	No class--Veterans Day		

#### Section 4: Grassland restoration

12	11/16	What is a grassland? Grassland ecology and biocrusts	TBA	Durham
12	11/18	Invasion biology and invasive plants	TBA	Pearson
13	11/23	Missoula's grassland restoration program	TBA	Valiant
13	11/25	No class--Thanksgiving		
14	11/30	Soil biota and restoration	Wuba et al. (2016)	Lekberg
14	12/2	No class – Field trip make up time		
15	12/7	Genetics and restoration	TBA	Six
15	12/9	Seminar – class discussion	Study guide	Six, Durham
16	TBA	<b>Finals week – Exam IV</b>		