



**THE YELLOWSTONE PROJECT:
THREATENED AND SENSITIVE SPECIES
SUMMER 2017
June 27 - July 11**

ACADEMIC SYLLABUS

Faculty:

Lead instructor: Jeff Gailus, MSc

Asst. instructor: Veronica Yovovich, PhD, UC Santa Cruz

Contact Hours:

We will all be together all day, every day throughout the course. There will be a “check-in day” where we will schedule student-instructor meetings. If you would like to have a meeting outside of those times, you can certainly make an appointment or find an appropriate available time, and we are happy to oblige.

Class Meetings:

This Wildlands Studies Project involves seven days per week of instruction and field activities, with one day off during the program for resupplying and doing laundry. Faculty and staff work directly with students 10+ hours a day and are available for tutorials and coursework discussion before and after scheduled activities. Typically, we begin each day at 6 am, with breaks for meals, rest and study time. Most evenings include scheduled activities, including guest lectures, structured study time, and workshops. When in the backcountry, our activities may end as late as 10 pm (e.g., for wildlife observation). It is necessary to be flexible and able to accommodate a variety of class times.

Course Credit:

Wildlands Studies students receive credit for one undergraduate course:

ESCI 437A, Environmental Wildlands Studies (5 quarter / 3.35 semester credits)

Field-based course studying the environmental problems affecting the natural and human-impacted ecosystems of our study region, including the role of human interactions.

This course has distinct objectives, and we integrate teaching and learning through both formal learning situations (i.e., lectures and seminars) and field surveys. Academic credit is provided by Western Washington University with support from the Environmental Science Department in WWU’s Huxley College of the Environment. An extended description follows in the course description section of this syllabus.

Readings:

A Course Reader has been established for this project, a digital version of which will be provided to students in advance of the project. Students are responsible for bringing a printed and bound copy with them. Another alternative is to use a small tablet computer as your Reader, with a way to recharge (such as a solar charger). Readings include selections from academic primary literature, technical reports, book chapters, and environmental impact assessments and planning documents. Field guides and textbooks supplement our field activities and are an integral part of our project. We will carry a shared reference library of these on all activities and backcountry trips.

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I. Project Overview

Wildlands Studies' Yellowstone Project allows participants to observe, study and learn about some of the most magnificent wildlife species in North America. This American wilderness course enables students to see wildlife species – grey wolves, grizzly bears and bison – rarely seen in the coterminous United States, and to reflect on the perspectives – local vs. regional, scientific vs. cultural, etc. – by which they, and the ecosystems on which they depend, are defined and managed.

We spend the first week of the course at a base camp in Yellowstone National Park. Each morning we'll visit the Lamar Valley (aka "the Northern Range") to find, observe, explore and study a variety of habitats and wildlife species. In the afternoons and evenings we'll learn about various aspects of biology, ecology, conservation biology, and wildlife management as they relate to our focal species (particularly the grey wolf, bison and elk), and discuss the implications as they relate to Yellowstone National Park and the Greater Yellowstone Ecosystem.

In the process, students will acquire skills in making wildlife observations, locating and tracking animals, understanding wildlife behavior, and identifying a variety of native flora and fauna. Our hands-on field activities will be augmented by information exchanges with local community members, wildlife management experts, and conservation leaders as we explore the ecology of our study species and the complex management issues and controversies surrounding them.

Halfway through the course we leave the front-country behind and head into the spectacular Absaroka-Beartooth Wilderness for a six-day backpacking trip. During the backpacking segment, students continue their studies of wildlife habitat and ecology, with an emphasis on grizzly bear biology and recovery in the Yellowstone Ecosystem, and go deeper into the principles of conservation biology and reserve design. Participants will also acquire basic backcountry skills that emphasize bear safety techniques, field navigation, and group management.

Although the course is not taught in a classroom, the academic expectations are high. There will likely be additional challenges posed by factors such as long days, inclement weather, logistical changes, and physically demanding conditions. As such, we will get the most out of our experiences together if we bring along flexibility, ample patience, a sense of humor, self-motivation, and perhaps most importantly, the desire to work as a team towards a common goal.

II. Learning Objectives

Following this project, students should have working knowledge of and experience in:

1. ***Ecosystems and natural history of the Greater Yellowstone Ecosystem.*** Species identification is essential to managing and understanding the communities in this region and for identifying change over time. Through readings, lectures, workshops, and journal assignments, students will learn to identify plant and animal species using field guides and taxonomic keys. In a series of field excursions, lectures, readings and discussions, students will understand the natural history of the Greater Yellowstone Ecosystem and be able to identify community types and the processes that underlie community development and change.
2. ***The biological needs, behavior and ecology of key species in the Greater Yellowstone Ecosystem.*** Every organism in the Greater Yellowstone Ecosystem has evolved life history characteristics that determine its ability to survive in a human-dominated landscape. We will focus on the interactions of charismatic species that are sensitive to human activities and/or highly valued by humans, specifically grizzly bear, grey wolf, bison and elk. Through readings, lectures, discussions, journal assignments, and field studies, students will learn basic ecological concepts as they relate to these key species, and how human activity influences wildlife behavior and ecological relationships.
3. ***The real-world application of the principles of conservation biology.*** Human activities are impacting wildlife species at an unprecedented rate, increasing threats to the health and viability of wildlife populations everywhere, and the Greater Yellowstone Ecosystem is no exception. Through readings, lectures, workshops, and journal assignments, students will learn to recognize how the principles of conservation biology are playing out in the Greater Yellowstone Ecosystem, including proximal and ultimate causes of species decline and extinction, the principles of habitat fragmentation and reserve design, and how these principles have (or have not) been used to develop management and recovery plans for threatened or sensitive species.
4. ***The political, legal, and social dimensions of wildlife and endangered species management.*** Following introductory lectures on the cultural, political and management history of the Greater Yellowstone Ecosystem, students will have the chance to meet biologists, natural resource managers, tourism operators, and other local residents who may have very different perspectives on sustainability, management, and policy. Students gain additional insight into the political and management history through discussions and numerous readings.
5. ***Field observation skills, including methods for documenting and sharing findings.*** Field observation skills are an integral part of good science and promote understanding of the world around you. Through directed learning of biology and ecology in the region, students will gain experience observing the world around them and be able to identify changes. Students will be introduced to techniques for recording and presenting information (e.g., natural history sketching, Grinnell trip log, and species account techniques) and gain experience using a variety of techniques to present natural history observations.
6. ***Basic backcountry skills, including backcountry travel and safety, field navigation, and group management.*** Although not the focus of this course, students will learn the basics of how to plan for a prolonged backcountry trip, how to travel safely in the backcountry, and how to lead and manage a group. Each student will lead the group for one day, helping the instructors to plan, coordinate and implement the day's activities.

These topics will be addressed through classroom lectures and discussion, course readings, field activities, visits with local experts, exposure to ongoing research, extended backcountry excursions, and field research projects. The course generally progresses from faculty-led instruction in the beginning (i.e., more lectures and readings) to student-led critical evaluation, analysis, and synthesis in the middle and end of the course. Our overarching goal is to have students leave the course not only with extensive knowledge about this particular region, but also with broader skills and understanding of ecological, geological, and social sciences that allows them to critically evaluate information in other settings in their future lives and careers.

III. Course Description

We teach this course in an integrated format in the field. Students will receive transcript credit for the following course introduced on page 1:

ESCI 437A, Environmental Wildlands Studies (5 quarter / 3.35 semester credits)

Field-based course studying the environmental problems affecting the natural and human-impacted ecosystems of our study region, including the role of human interactions.

Experiences/Activities

Students will learn concepts and principles of environmental studies, conservation biology and ecology, as well as wildlife management and conservation planning methods, data collection techniques, and analysis of field data. We will conduct extended field studies of large mammals and the habitats in which they live, as well as ecological communities and ecological relationships. Students will examine outcomes of environmental policies and wildland/wildlife management, including both sociological and natural consequences, and evaluate environmental policy options. Along the way, students will consider concepts and principles of environmental research, ethics, land and wildlife management, and the role of culture in wildland management.

Outcomes

Students will gain the ability to critically read and evaluate scientific and policy literature, as well as texts written for popular audiences. Students will gain a knowledge base in wildland natural history and policy, with specific emphasis on the Greater Yellowstone Ecosystem. Students will discuss and critique the literature in light of other information they have learned in this project from local experts, lectures, personal observations, and other relevant readings. Students should be able to demonstrate understanding of basic ecological, management and policy concepts as related to the Greater Yellowstone Ecosystem, including community ecology and species interactions, effects of climate change, and different management designations (e.g., park vs. wilderness). Students will be able to apply their knowledge of ecology and social science to new scenarios and clearly demonstrate understanding of the material through their narratives.

Students will develop skills in field observation and documenting and sharing observations. Students will employ varied techniques to present and record their natural history observations including, but not limited to, Grinnell-style Trip Logs and species accounts, natural history sketching, narrative writing, and mapping. Students will demonstrate practice and/or competence in a variety of formats.

Students will be able to conduct basic field research and be able to synthesize, organize, and present their data in a way that is appropriate to the audience and subject matter. Students will discuss their results in light of current management or conservation issues. Students should be able to demonstrate their understanding of the ecological and/or social science processes and concepts that underlie their research.

IV. Assessment

The following is an overview of the academic requirements for the program. Some of the assignments are ongoing (journal and readings) and some have specific dates (Final Exam). Due dates are subject to adjustment in response to environmental and demographic changes. Final grades for the course listed above will be based on the following items:

Assessment Item	Date due	% of grade
Aspen regeneration research project	07/04	5
Bison ethology research project	07/04	5
Field journal	07/10	25
Reading, discussions and class participation/leadership	06/27-07/11	15
Exam (short answer)	07/03	20
Final paper	07/10	30

Research Projects (10%)

Each student is required to participate in two field studies, one on trophic cascades (specifically, aspen regeneration) and one on bison behavior in Yellowstone National Park's Lamar Valley. In both cases, we will split up into small groups (3-4 people), and you will work together to gather and analyze data. The final grade includes preparation, participation and fieldwork, as well as detailed written reports of the results in your field journal (10% of final grade). Students will be evaluated on their participation during the collaborative fieldwork as well as on their specific contributions to the final written product.

Field Journal (25%)

The field journal is an integral part of the Yellowstone course. It serves as a learning tool, a place for reflection upon experience, and a record of your experience as a whole. You should plan on writing in it every day. The following is a summary of our expectations/recommendations and a rough outline of due dates throughout the course, which constitutes a total of 40% of your final grade.

1. Trip Log (4 total; 2.5 pts each)

The trip log is a structured, narrative record of an excursion. We are using a format that has drawn from the Grinnell-style field journal format (as explained in the Reader). It includes the basic orienting information, a general route description, natural history observations, species lists, approximate distances, travel times, and important route details. This log is a careful summary of observations and field notes taken throughout the day. This entry should take approx. 20-60 minutes to write-up, but can take longer depending on the day of record. You will record one day during the first week in Yellowstone National Park, and a minimum of three days during the backcountry trip during the second week (4 total).

2. Extended Entries (1 total; 5 pts)

This entry should involve more extensive reflection and effort. The purpose of this is to allow students to focus on an aspect of their experience that they are most interested in. These can include entries such as poetry, detailed drawings or paintings, free-writes, or detailed natural history descriptions. For example, students in the past have included detailed study of edible plants, or focused study of certain taxa (e.g., mushrooms, moss, lichen, aquatic invertebrates), or reflections on the ethics of wildlife management. These entries still need orienting information. In order to receive credit they must be inspired by and related to this place.

3. Naturalist of the Day (1 total; 5 pts)

During the program students will be required to complete one structured in-depth natural history study in their journal. It will draw from observations made in species accounts combined with additional research from field observations, field guides, and other references. Specific requirements include observations about identification, habitat, life history, behavior, interactions with other species, etc. Each student will be required to make an oral presentation of their Naturalist of the Day study around the campfire.

4. Species Account (1 total; 5 pts.)

Each species account is an observation record for an individual species that is part of the Grinnell-style field journal. Though Grinnell kept accounts on all species he encountered, students should choose three species and keep more detailed observation records. At the back of the journal, leave a few blank pages for each species (plant, animal, insect, etc.), and add to the page each time the species is encountered. This is a dated encounter record, and should include information on location, behavior, slope, aspect, plant community, etc. Grinnell's records have been used to reconstruct community changes over the past century in California, thus careful records have immense value over a longer time span.

NOTE: All entries must include orienting information including date, time, location, weather, and individuals present.

Journal Grading Criteria:

1. Orienting Information: All entries need orienting information, even if on the same day.
2. Consistency of entries: This refers to regular and consistent use of the journal, which you should write in every day.
3. Organized: You should be able to use your journal as a reference. Information should be accessible and related to specific dates and locations. Include a table of contents in the beginning so we can find specific assignments.
4. Neatness/Readability: Someone else should be able to use your journal as a reference (or grade it).
5. Diversity of Expression: We encourage you to use a diversity of journaling techniques. Avoid using only one form of expression. We will discuss in detail a variety of journaling techniques.
6. Detailed Observation: Attention to detail will improve your observation skills.
7. Effort: We expect to see your field journal improve throughout the course, and will assess this accordingly.

Readings, discussion and class participation (15%)

This is ongoing throughout the program and includes group discussions of most of the readings presented in the Course Reader, incorporating readings from ecology, general natural history, social sciences, and wilderness and management theory (see the reading list below). We have tailored the discussions and reading choice to our backcountry location and current topic focus. We will cover the basics of reading scientific literature, magazine articles and essays early in the course, and will expect students to read on average one primary literature piece each day while in the field. We will discuss these readings as a group either in the morning or after supper. We strongly suggest that students read the readings once before the course begins, and then leave themselves ample time to read the papers a second time before discussions as some may take longer than others to digest. Grades will be based on whether a student participates in the discussions, whether it is obvious that the reading was read and understood, and on participation in other activities we do with readings (e.g., student-led discussions, leader of the day, etc.).

Exam (20%)

Each student will be required to complete an exam during the course. The exam will consist of 10 short-answer questions based on readings, lectures *and* class discussions. The exam is worth 20% of your final grade.

Final Paper (30%)

Each student is required to write a final paper that demonstrates an understanding of a wide range of academic and experiential content of the course. The final paper can be a more formal report, a personal essay, or a management plan for a particular species or place. Students will use personal experiences, notes from guest speakers and discussions, journal entries, instructor knowledge, course readings, and the course library. The final paper is worth 30% of your final grade.

V. Grading Scheme

To convert final grade percentages to letter grades for each course that will appear on your transcript, we will use the following grading scheme:

Letter grade	Percentage
A	92.5- 100+
A-	90.0- 92.4
B+	87.5- 89.9
B	82.5- 87.5
B-	80.0- 82.4
C+	77.5- 79.9

Letter grade	Percentage
C	72.5- 77.4
C-	70.0- 72.4
D+	67.5- 69.9
D	62.5- 67.4
D-	60.0- 62.4
F	< 60.0

VI. General Reminders

Academic Integrity is as relevant in this field course as it is at your home institution. Plagiarism, using the ideas or materials of others without giving due credit, cheating, or putting forth another student's work as your own will not be tolerated. Any plagiarism, cheating, or aiding another to cheat (either actively or passively) will result in a zero for the assignment. Cases of academic dishonesty may be reported to your home institution.

Assignment deadlines are established to promote equity among students and to allow for ample assessment time for faculty before other assignments are due or other activities are to occur. Therefore, deadlines are firm and late work will receive, at a minimum, a 10% loss of grade points for each day they are late. If you believe that extenuating circumstances have prevented you from completing your work on time, make sure to discuss this with the relevant faculty as soon as possible and certainly before the work is due.

Participation and attendance are crucial throughout this project. Because of the demanding schedule and limited time, all components of the program are mandatory (unless indicated) and missing even one lecture can have a proportionally greater effect on your final grade. Hence, it is important to be prompt and prepared (i.e., with required equipment) for all activities.

Students with special needs should meet with the lead faculty member as soon as possible to discuss any special accommodations that may be necessary.

VII. Academic Schedule & Course Content

Outlined in the following table, but subject to change. Readings may be added or changed, and some activities may shift from day-to-day depending on weather, opportunity, guest speakers, etc. Please be ready to be flexible.

Date	Location	Lecture Topics & Activities	Assignments
June 27	Bozeman	AM: Introductions; logistics, equipment and safety overview; food shopping PM: Logistics and safety briefing	
June 28	YNP	AM: Wildlife watching in Lamar Valley. PM: Lecture/discussion: Intro to Yellowstone; intro to journaling	
June 29	YNP	AM: Presentations from YNP biologists/staff PM: Lecture/discussion: Northern Range/climate change	
June 30	YNP	AM: Wildlife and habitat observations PM: Lecture/discussion: Wolf mgmt. in YNP	
July 1	YNP	AM: Wildlife and habitat observations PM: Guest lecture, Buffalo Field Campaign	
July 2	YNP	AM: Lecture/discussion: trophic cascades; wolf, elk, aspen ecology PM: design/conduct field study	
July 3	YNP	AM: Wildlife and habitat observations PM: Oral presentations, write-up field study	Exam
July 4	Gardiner	AM: Write-up field study PM: Shower and resupply; lecture/discussion on backcountry safety and leave-no-trace travel	Hand in journals and field studies
July 5	Backpack	AM: Backcountry travel PM: Lecture/discussion: biodiversity, conservation biology	
July 6	Backpack	AM: Backcountry travel PM: Lecture/discussion: Grizzly bear recovery and management	
July 7	Backpack	AM: Backcountry travel PM: Conservation biology and reserve design	
July 8	Backpack	AM: Backcountry travel PM: Work on final papers	
July 9	Backpack	AM: Backcountry travel PM: Work on final papers	
July 10	Backpack	AM: Backcountry travel PM: work on final papers	Hand in journals and final paper
July 11	Bozeman	AM: Lecture/discussion PM: Return to Bozeman	

VIII. Reading List

Recommended Pre-Course Reading

We cover a great deal of content in this two-week course. It is highly recommended that students do some pre-course reading before they arrive, to familiarize themselves with the history, ecology and management of the Greater Yellowstone Ecosystem (in order of priority). A couple of these are available free on-line, while the others can be found at your local library or online bookstores.

1. *The Yellowstone Resources and Issues Handbook*:
<http://www.nps.gov/yell/planyourvisit/resourceandissues.htm> (highest priority)
2. *Yellowstone's Northern Range: Complexity and Change in a Wildlands Ecosystem*. Available from Yellowstone National Park: http://www.greateryellowstonescience.org/files/pdf/Northern_Range_opt.pdf
3. *Searching for Yellowstone: Ecology and Wonder in the Last Wilderness*. Paul Schullery
4. *Yellowstone: A Visitor's Companion*. George Wuerthner
5. Any of the numerous books dealing with Yellowstone wolves and bears by Hank Fisher, Gary Ferguson, Frank Craighead, Paul Schullery and Doug Smith.

Required Reading (as it appears in your Course Reader)

The Course Reader and required reading for the course will be provided via email as a PDF file about a month before the course begins. An itinerary will be included so you know which readings will be discussed each day. However, students are strongly encouraged to read the material before they arrive. Many other books and scientific papers will be made available on these topics through the course library we have with us.