

## Conservation of Wildlife Populations – WILD 470

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**CLASS MEETING TIMES/PLACE:**

LECTURE: MWF 9:00-9:50 Stone Hall 304

LAB: Mon 1:00-2:50 Gallagher Business Building (GBB) L26 (basement)

**INSTRUCTOR:**

**Dr. L. Scott Mills**

Office: Main Hall 116, Email: [Scott.Mills@umontana.edu](mailto:Scott.Mills@umontana.edu)

Office Hours: Tuesday 3-4 pm; Wed 2-3; Friday 10-11am or by pre-arranged appointment. (Zoom appointments possible if necessary).

**Teaching Assistants:**

Andrew Lahr

[andrew.lahr@umconnect.umt.edu](mailto:andrew.lahr@umconnect.umt.edu)

Office Hour: Mon 10-11, W 11-12

Location: BioResearch Building 102

Lindsey Barnard

[Lindsey.Barnard@umconnect.umt.edu](mailto:Lindsey.Barnard@umconnect.umt.edu)

Office Hours: Wed 10-11, Thurs 9-10

Location: Natural Sciences 310

**COURSE OBJECTIVES (& Philosophy):**

Our planet faces daunting challenges, as human-caused stressors (including climate change, invasive species, habitat loss, and pollutants) cause elevated rates of loss of biodiversity. However, the sophisticated science of applied population ecology can provide insights that help catalyze the transformative changes needed for biodiversity conservation. This course will address topics across the broad reach of applied population ecology, where ecology, evolutionary biology, genomics, field studies, and population modelling intersect. It is at this juncture where we find practical and non-intuitive (often surprising!) insights about potential solutions that may reverse the effects of human-caused stressors on wild populations.

By the end of the course, students should be able to connect population ecology science to data (from the field, from genomes, and from computational models) and to science-based solutions to conserve wildlife in a crowded world. Also, you'll improve your science writing, because everyone benefits from practice in different forms of writing (AND because this class helps fulfill your university writing requirement).

**REQUIRED READINGS:** \*Note: it's crucial to read assignments **before** class\*

- Conservation of Wildlife Populations: Demography, Genetics, and Management. 2013 (2<sup>nd</sup> edition), by L. Scott Mills [hard copy at bookstore, e-book through library]
- Conservation of Wildlife Populations, 3<sup>rd</sup> edition DRAFTS IN PREP (to be provided).
- Additional readings to be assigned

➔ *Note: any royalties that return to me from your purchase of the 2<sup>nd</sup> edition will be donated.*

**CLASS STRUCTURE:**

I am convinced that in-person teaching is the most effective, rewarding and fun way to convey important and sometimes complex ideas. So, although I am fully committed to following best practices that keep us safe, which may require remote learning when required, my preference will be in-person as much as possible.

The lectures will assume that you: a) have read the reading material before each lecture; and b) will be actively engaged in the lab exercises, where you'll get hands-on practice diving into the concepts and equations from the readings and lectures.

Lectures will also be live on zoom, with recorded zoom lectures available 2 days after the lecture.

**COVID THOUGHTS (as per current UM policy)**

- Mask use is required within the classroom or laboratory.
- If you feel sick and/or are exhibiting COVID 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.
- UM recommends students get the COVID vaccine and booster. Please direct your questions or concerns about vaccines to the Curry Health Center.
- Drinking liquids and eating food is discouraged within the classroom.
- To assist students unable to attend class, this class is being recorded (with camera pointed at instructor, not at students). Please let me know if you have objections to that.

**GRADING:**

Grades will be based on 4 exams (3 during-semester and a final), lab exercises, online activities & lessons, and a substantial written research proposal (with multiple parts). **Late assignments will be penalized 10% for each day late.** Grades will be kept up to date on Moodle.

We will always strive to be fair and accurate in our grading. If you disagree with a grade on an answer or assignment, please submit a written appeal within a week of when you received the grade. The appeal should detail why you think your answer is correct. We may need to regrade the entire assignment/exam.

**Allocation of Points Determining Final Grade:**

	percentage		pts	When
Exams	43%	Exam 1	90	Feb 16
		Exam 2	90	Mar 14
		Exam 3	90	April 18
		Final	130	May 11
		subtotal	<b>410</b>	
Labs	23%		<b>220</b>	Weekly
Online Activities	10%		<b>90</b>	Weekly
Proposal	24%	Annotated Bibliography	20	Feb 4
		Project Title and Brief		Feb 28
		Overview	15	
		2-minute overview	15	March 14
		Full Draft	50	April 4
		Reviews	30	April 18
		Final Proposal	100	May 2
		subtotal	<b>230</b>	
total points	100.0%		<b>970</b>	

**GRADING OPTION:** This class is offered for traditional letter grade only, it is not offered under the credit/no credit option.

**RESEARCH PROPOSAL:** WILD 470 in conjunction with two additional upper division writing courses meets the university upper division writing requirement. The primary way that this class meets this requirement is through a research proposal, following real-world guidelines, on a topic of your choice related to wildlife population ecology. Details on the proposal are forthcoming.

**STUDENT CONDUCT CODE:** 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](#).

**PLAGIARISM:** Plagiarism is a special form of misconduct for which I have **zero tolerance** (i.e. if you plagiarize failing the course a likely outcome). Plagiarism includes “recycling” work verbatim from another class, copying and pasting from another student, “changing a few words” of someone’s text, etc. A few relevant examples from the code of academic conduct include:

- 1. Plagiarism:** Representing another person's words, ideas, data, or materials as one's own.
- 2. Misconduct during an examination or academic exercise:** Copying from another student's paper, consulting unauthorized material, giving information to another student or collaborating with one or more students without authorization.
- 3. Submitting work previously presented in another course:** Knowingly making such submission in violation of stated course requirements.

*\*\*NOTE : “recycling” your previous course work can constitute plagiarism. However, as we’ll discuss in class there are appropriate ways to clearly cite previous work that you build off of.*

**If you have any questions about what constitutes plagiarism, please visit with Dr. Mills.**

**STUDENTS WITH DISABILITIES:** 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. 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.

**SCHEDULE**

(2<sup>nd</sup> ed is book;  
3<sup>rd</sup> ed is provided as draft)

JANUARY	Wed	19	Humans and wildlife population ecology: what is it and why you should care	Ch. 1 (3 <sup>rd</sup> ed DRAFT)
	Fri	21	Biodiversity, extinction, and hope	Ch. 1 (3 <sup>rd</sup> ed DRAFT)
	Mon	24	How do we know what we know? (AND: Discuss your proposal assignments)	Ch. 2 (3 <sup>rd</sup> ed DRAFT)
	Mon	24	LAB 1: <i>Exploring human population ecology, and Intro to R</i>	Ch. 1 (3 <sup>rd</sup> ed DRAFT)
	Wed	26	Reliable knowledge, continued	Ch. 2 (3 <sup>rd</sup> ed DRAFT)
	Fri	28	Genetics and genomics: A new frontier for wildlife conservation	Ch 3 (3 <sup>rd</sup> ed DRAFT)
	Mon	31	Poached salmon and other insights from genetic tools	Ch 3 (3 <sup>rd</sup> ed DRAFT)
	Mon	31	LAB 2: <i>Reliable Knowledge</i>	
FEB	Wed	2	Estimating trend: Exponential growth	Ch 5 (3 <sup>rd</sup> ed DRAFT)
	Fri	4	Exponential growth II Annotated Bibliography Due	Ch 5 (3 <sup>rd</sup> ed DRAFT)
	Mon	7	Estimating within-population vital rates	Ch 4 (book)
	Mon	7	LAB 3: <i>Exponential Growth</i>	Ch 5 (3 <sup>rd</sup> ed DRAFT)
	Wed	9	Estimating survival and reproduction	Ch 4 (book)
	Fri	11	Wrap-up/catch-up expo growth and vital rates	
	Mon	14	Exam Review (come armed w/ questions!)	
	Mon	14	LAB 4: <i>Estimating Vital Rates</i>	Ch 4
	Wed	16	<b>EXAM 1</b>	
	Fri	18	Stage structure matters, and all age classes are not created equal	Ch 6 (3 <sup>rd</sup> ed DRAFT)
	Mon	21	PRESIDENT DAY HOLIDAY (NO LECTURE OR LAB)	
	Wed	23	Stage structured models lead to surprising dynamics	Ch 6 (3 <sup>rd</sup> ed DRAFT)
	Fri	25	How population models lead to better conservation	Ch 6 (3 <sup>rd</sup> ed DRAFT)
	Mon	28	Numbers can't increase forever: negative density dependence	Ch 7 (3 <sup>rd</sup> ed DRAFT)
	Mon	28	LAB 5: <i>Matrix models and sensitivity analysis</i> **DUE: Written project title and overview **	Ch 6 (3 <sup>rd</sup> ed DRAFT)
MARCH	Wed	2	When more numbers are better: positive density dependence	(3 <sup>rd</sup> ed DRAFT)
	Fri	4	Do more wolves mean less elk? Predation!	8 (book)

	Mon	7	Bodies on the field, compensation, and RV: Predation II	8 (book)
	Mon	7	<i>LAB 6: Density Dependence and Predation</i>	8 (book)
	Wed	9	Covid, Ebola, and wildlife: population ecology of zoonotic diseases	Reading TBA
	Fri	11	Exam Review	
	Mon	14	<b>EXAM 2</b>	
	Mon	14	<i>Lab 7: Speed-date presentation on your proposal idea!</i>	
	Wed	16	Genetic variation, fitness, and inbreeding	
	Fri	18	<b>No class: WORK ON PROPOSAL! (seriously!)</b>	
			SPRING BREAK MAR 21-25	
	Mon	28	Genetic Rescue	Ch 9 (3 <sup>rd</sup> Ed Draft)
	Mon	28	<i>LAB 8: Proposal related (TBA)</i>	
	Wed	30	Genetic Rescue	Ch 9 (3 <sup>rd</sup> Ed Draft)
APRIL	Fri	1	Metapopulations across species ranges	10 (book)
	Mon	4	When good animals choose bad habitats: sinks, traps, sources, and sinks	10 (book)
	Mon	4	<i>Lab 9: Metapopulations and Genetic Rescue</i> Full Draft of Proposal Due at Start of Class	
	Wed	6	Human-caused stressors: Move, Adapt or Die	Parts of 11 (Book)
	Fri	8	Climate change: scope for adaptive rescue	TBA
	Mon	11	Small populations and Viability	Ch 12 book
	Mon	11	<i>LAB 10: Population Viability Analysis</i>	
	Wed	13	Endangered Species case studies	Ch 12 book
	Fri	15	Exam REVIEW (come armed w/ questions!)	
	Mon	18	<b>EXAM 3</b>	
	Mon	18	<i>LAB 11: Work with TAs on your proposal reviews</i> Proposal Reviews Turned in & Returned	
	Wed	20	Focal Species	Ch 13 book
	Fri	22	<b>No class -- WORK ON PROPOSAL! (seriously!)</b>	
	Mon	25	Science to guide sustainable harvest	14 (book)
	Mon	25	<i>Lab 12: Sustainable harvest models</i>	
	Wed	27	Harvest II	14 (book)
	Fri	29	Delisting wolves: a tale from the trenches	
MAY	Mon	2	Course evaluations, catch up FINAL Research Proposal Due	
	Mon	2	No Lab	
	Wed	4	FINAL EXAM REVIEW	
	Fri	6	Big Picture wrap-up	Optional : epilogue

**FINAL EXAM: Wednesday May 11, 10:10-12:10**