COURSE SYLLABUS Population Ecology ZOO 4400/5400 Fall 2023

Instructor:

Jacob R. Goheen (Jake) Office: Berry Center 149 E-mail: jgoheen@uwyo.edu Personal website: goheenresearchgroup.com Office Hours: TTh 830-930am or by appointment

Teaching Assistant:

Leo Khasoha Office: Berry Center 314 Email: Ikhasoha@uwyo.edu Dersonal website: http://goheenresearchgroup.com/index.php/research-group.html Office Hours: W 10-11am or by appointment

Course Information:

- Lecture TTh (in person). 935am-1050am. Classroom Building 222.
- The purpose of lectures is to:
 - 1) learn fundamental and new topics in population ecology
 - 2) discuss/review material that may have been unclear; and
 - 3) discuss assigned pre-readings.

Prerequisites: LIFE 3400 and one of the following: ENR 3500, STAT 2050, or STAT 2070

Course Description: This course provides an overview of contemporary issues and methods in population ecology (and community ecology, to a lesser extent). In particular, we will focus on the application of concepts and methods to solving problems and interpreting data in wildlife and fisheries biology, conservation, and management.

Disability Statement:

"If you have a physical, learning, sensory or psychological disability and require accommodations, please let me know as soon as possible. You will need to register with, and provide documentation of your disability to University Disability Support Services (UDSS) in SEO, room 330 Knight Hall."

Objectives/Outcomes/Standards:

- 1) Gain knowledge and further appreciation for contemporary issues in population ecology through class lectures, readings, and extra credit.
- 2) Use case studies to appreciate both the science underlying conservation policy and management recommendations.
- 3) Hone critical thinking skills through analysis of material presented in class and primary literature.
- 4) Gain experience with program R.
- 5) Acquire ability to interpret and manipulate ecological datasets and graphs.

Readings: primary literature

Grading: A = 90.00-100%; B = 80.00-89.99%; C = 70.00-79.99%; D = 60.00-69.99%; F < 59.99%

Eight timed (30-45 minute) lecture quizzes (20 points each; lowest quiz dropped = 140 pts), 1 cumulative lecture final (60 pts), 4 extra credit homeworks (8 extra credit points each). 200 points total, with potential for 32 extra credit points.

Notes about quizzes:

- Eight quizzes will be assigned and posted to WyoCourses by 5pm of the date they are assigned. The first quiz will be posted by 5pm Tuesday 5 September.
- We will have three lectures dedicated for quiz-taking, 21 September, 24 October, and 21 November. After they are posted, you may take quizzes whenever you want. However, all quizzes prior to each quiz-taking dates are due by 5pm on that date. I.e., Quizzes 1-2 are due by 5pm 21 September, quizzes 3-5 are due by 5pm 2 November, quizzes 6-7 are due by 5pm 21 November, quiz 8 is due by 5pm 7 December.
- Once you open a quiz, you will have between 30-45 minutes to complete it, depending on the quiz. Ensure that you open a quiz only if you have an uninterrupted 45 minutes; there is no way to 'pause' the timer.
- You are free to use any materials you want during quizzes—notes, lecture slides, internet, etc. In the event that there is a discrepancy between the material covered in class and material on the internet, we will treat as correct the material as it was presented in class.
- Quizzes are to be taken by yourself, and are not to be discussed with your classmates. Honor system. If a classmate approaches you to collaborate on quizzes, please notify Jake for an exciting prize.

Notes about grade calculations: I will show you your grade once during the semester, sometime between weeks 7 and 9. If you need to know your grade at any other time, I will be counting on you to calculate it yourself. Please understand that I will be unable to calculate grades at any other times than these, although you are free to email me what you think your grade is for me to confirm.

Notes about extra credit: there are four homeworks in Program R for extra credit, worth 8 pts each. Extra credit will be graded rigorously. If you have questions about extra credit, there are two resources: (1) meeting with Leo (by appointment); or (2) the lecture period on the date that extra credit being due will be dedicated to discussing it. Also, Leo can answer questions about extra credit through email, provided that a response will take <2 min, and that those questions are asked >24 hours before the due date.

Attendance/participation policy:

University sponsored absences are cleared through the Office of Student Life.

Academic honesty:

UW Regulation 6-802. The University of Wyoming is built upon a strong foundation of integrity, respect and trust. All members of the university community have a responsibility to be honest and the right to expect honesty from others. Any form of academic dishonesty is unacceptable to our community and will not be tolerated [from the UW General Bulletin]. Teachers and students should report suspected violations of standards of academic honesty to the instructor, department head, or dean. Other University regulations can be found at: http://www.uwyo.edu/generalcounsel/info.asp?p=3051)

Important Note 1

Email Policy: Communication is important, and email is a form of communication. Please treat email correspondence as though it's important by initiating email with a greeting and signing off with your name. I will try my best to respond to email queries within 48 hours, provided questions are clear and concise, and provided it's not the weekend. If your question will take more than 1-2 minutes to answer, it's best to come to my virtual office hours or schedule an appointment outside of office hours; I'd be happy to answer your question then. If questions are written with improper spelling, grammar, or syntax, I reserve the right to ignore them.

Important Note 2

Participation: In each lecture, several questions will be posed to the class. Sometimes, I'll be looking for spontaneous answers; other times, I'll ask you to break into groups for a few minutes. These questions will extend some aspect of the lecture material in attempt to spur communication and critical thinking, while helping you to become more comfortable with impromptu delivery of scientific material. I am looking for evidence of engagement, problem-solving, and critical thought; I am less concerned that your answer is "correct".

Important Note 3

Please make double-sided copies and please recycle materials at the end of the semester.

Important Note 4

Why I cannot make powerpoint pdf's available before class:

--I want some of the material to be a surprise.

--I want us (as a class) to set our own pace, and go through material as slowly as needed to understand it. In the past, students have been confused/crusty/stressed/anxious/angry/salty/cranky when there are two versions of pdf's (pre- and post-lecture) per lecture. It is confusing for me too.

--our class emphasizes the dying art of listening.

--I am often working on them up until right before lecture is scheduled.

Tips for Success in Population Ecology

- 1) *Be in class, be punctual, and be engaged.* Final grades have been correlated positively with attendance since 2011. Simply attending class is necessary but probably insufficient, and I expect you to spend at least 3 hours studying outside of class per every credit hour. Be engaged and assertive.
- 2) *Participate in discussions*. I assume that you will have read papers prior to class. Questions make understanding easier, and are a requirement for doing science. So, ask them! Also, if something is unclear to you, odds are it is to a classmate as well. When a classmate asks a question, listen both to the question and the answer.
- 3) *Keep current*. This is especially true for courses in which memorization is a key component (e.g., most of the "ologies"). Students will vary widely in the ease with which they are able to memorize scientific names, and some students should expect to spend more time than others studying these. For this reason, the amount of time you spend studying isn't necessarily correlated with your grade.
- 4) *Learn how you learn*. Students can re-write notes, drill flashcards, draw graphs, make charts, or some combination of these and other study methods. Figure out which approaches work best for you. Again, this is good advice for most courses, but particularly those that combine critical thinking, conceptualization, and memorization (like this one!).
- 5) *Study with others and by yourself.* Group work is a good thing, because others can clarify issues with which you're struggling. Working by yourself is also a good thing, because it allows you to focus in depth on what you need to learn (rather than just whatever your group happens to be discussing).
- 6) *Review notes, powerpoint pdfs, and videos quickly (within 48hrs of class) and ask for clarification when needed.* PDFs of powerpoints will be posted on WyoCourses. It is my responsibility to ensure you understand the material; it is your responsibility to let us know when you don't understand something. When I periodically ask "are there any questions?", and there are no questions, I conclude that there are no questions.
- 7) *Please be patient with me and, more importantly, with your classmates and TA*. There will always be hiccups in life. Try to keep this in mind for us; we will for you!

Week	Date	Lecture	Quiz and Extra Credit Assignment and Due Date	Case Study or Technique	Pre-Reading
1	8/29	introductions and whatnot; statistics review and stochasticity	_	Patrick Mahomes' unusual performance in Superbowl LV	—
1	8/30	demographic stochasticity and λ	—	random fun with condors	_
2	9/5	demographic stochasticity and λ continued		effects of lead poisoning on eagle populations	Slabe et al 2022
2	9/7	matrix models	quiz 1 (Aug 29-Sep 7) assigned	conservation of a low profile, refugee species	Polasik et al 2016
3	9/12	matrix models continued	—	—	_
3	9/14	matrix models continued; demographic sensitivity and elasticity	extra credit 1 assigned; quiz 2 (Sep 12-Sep 14) assigned	a potential ecosystem service of carnivore restoration	<u>Gilbert et al 2016</u>
4	9/19	Program R tutorial (Leo Khasoha)	—	—	—
4	9/21	no lecture; quiz taking, quizzes 1-2	quizzes 1-2 due by 5pm		_
5	9/26	demographic sensitivity and elasticity continued; life table response experiments (LTRE)		using LTRE to guide recovery of world's most endangered antelope	<u>Ali et al 2018</u>
5	9/28	no lecture; help session = assistance with extra credit 1	extra credit 1 due by 5pm	_	—
6	10/3	positive density dependence and apparent competition	quiz 3 (Sep 26-Oct 3) assigned	can woodland caribou be conserved by shooting moose?	<u>Serrouya et al 2019</u>
6	10/5	the problems of unequal sampling effort and non-detection	extra credit 2 assigned	how much sampling effort is enough in fish communities?	<u>Beston et al 2016</u>
7	10/10	source-sink populations and island-mainland populations	_	exploitation of cougars in Utah	Stoner et al 2006
7	10/12	source-sink populations and island-mainland populations continued	quiz 4 (Oct 5-Oct 12) assigned	carrying capacities and connectivities for Canada lynx and Pacific marten	<u>King et al 2020</u>
8	10/17	no lecture; help session = assistance with extra credit 2	extra credit 2 due by 5pm		—
8	10/19	occupancy modeling and model selection	_	sauger distributions in Wyoming	_
9	10/24	guest lecture			

9	10/26	occupancy modeling and model selection continued	extra credit 3 assigned; quiz 5 (Oct 19-Oct 24) assigned	nest predation on sage grouse	<u>Bui et al 2010</u>
10	10/31	exploitation, overexploitation, and overabundance of populations		hunter- and wolf-killed elk, and reproductive value	<u>Wright et al 2006</u>
10	11/2	no lecture; quiz taking, quizzes 3-5	<u>quizzes 3-5 due by 5pm</u>		
11	11/7	no lecture; help session = assistance with extra credit 3	extra credit 3 due by 5pm		
11	11/9	negative density dependence and harvest management	quiz 6 (Oct 26-Nov 9) assigned	using ungulate life histories to inform sustainable yields	<u>Jesmer et al 2021</u>
12	11/14	resource selection by animals and resource selection functions (RSFs)		where dusky grouse choose to live, and what Wyoming pocket gophers choose to eat	
12	11/16	resource selection by animals and resource selection functions (RSFs) continued	extra credit 4 assigned; quiz 7 (Nov 14-Nov 16) assigned	responses of pronghorn to wind energy development	<u>Smith et al 2020</u>
13	11/21	no lecture; quiz taking, quizzes 6-7	<u>quizzes 6-7 due by 5pm</u>		
14	11/28	population introductions and exotic species	_	cascading effects of a tiny invader in central Kenya	Kamaru et al 2023 (to be <u>circulated)</u>
14	11/30	population reintroductions, shifting baselines, and answering the question 'what is natural'?	quiz 8 (Nov 28-Nov 30) assigned	why ferret introductions sometimes fail, and sometimes succeed	<u>Grenier et al 2007</u>
15	12/5	human population growth and the tragedy of the commons		property ownership and conservation	<u>Hardin 1968</u>
15	12/7	no lecture; help session=assistance with extra credit 4; quiz taking, quiz 8	extra credit 4 due by 5pm; quiz 8 due by 5pm		

-

Cumulative final is 1015pm Tuesday 12 December, room TBA.