Fall 9-1-2022

WILD 470.01: Conservation of Wildlife Populations

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Conservation of Wildlife Populations—WILD 470

Fall Semester 2022

Instructor
Dr. Martha Zillig
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Office Hours: 2-3pm Monday and Wednesday or by appointment
TA: Molly McDevitt, office hours Wed 10-11, Stone 112

Required Readings (read before each class)
Conservation of Wildlife Populations 2nd Edition Scott Mills (See schedule for details)

Additional readings will be assigned and uploaded on Moodle

Class Meeting Times

M/W/F 12:00 – 12:50 Lecture: Health Sciences 207

Th 1:00 – 2:50 Lab: Stone Hall 106/107 – Please bring your laptop to lab. Lab computers will be provided if you do not have a laptop or prefer to use a school computer.

Grading

Midterm Exam 1 15%
Midterm Exam 2 15%
Knowledge Checks 10%

- Knowledge checks are small, in-class assignments that will occur ~once a week.
- Knowledge checks are designed to be completed in class, but will not be considered late until 11:59pm on the day they are assigned.

Lab Assignments 20%
Research Proposal (20% Total)

- Annotated Bibliography (Due Sep 14)
- Project Title and Outline (Due Oct 3)
- Draft 1 (Due Oct 28)
- Review of other student's proposals (Due Nov 16)
- Final Draft (Due Dec 5)

Final Exam 20%

Research Proposal
Each student is required to prepare a research proposal on a topic of his or her choice related to wildlife population ecology. The proposal should include six sections: an abstract (≤250 words), introduction to the topic, hypotheses and predictions, research methods, expected

products and literature cited (in Journal of Wildlife Management style). The length of the proposal including all sections is 8 pages (including literature cited), double-spaced with 12 point Times New Roman font. An outline of the proposal is due October 3rd. An outline should contain (at minimum) all six sections with bullet-point outlines of what will be included in each section. A **rubric for creating an outline** is available on Moodle.

Draft 1 proposals are due October 28th. Draft proposals will then be anonymously reviewed by two students in the class. Reviews must follow specific review format**, a rubric for this format is posted on Moodle and additionally gone over in class**. Reviews should consider the scientific merit and clarity of presentation of the proposal. Reviews must be submitted on November 16th. Students then must consider the reviews of their proposal, revise the proposal and submit the original draft, revised proposal, and a cover letter describing how they addressed the reviewer comments and the reviews on December 5th. A **rubric describing cover letter guidelines and responses to reviewers** is available on Moodle. Students will be evaluated on their proposal, how they handled the reviews and their reviews of other students' proposals. See Moodle folder "Final Project Guidelines" for detailed instructions and rubrics for all aspects of the proposal, as well as examples from previous years.

Plagiarism
Plagiarism will not be tolerated. Be sure you recognize the difference between *plagiarism*—"submitting someone else's text as one's own" with the intent to avoid doing original work— and *misuse of sources*—"carelessly or inadequately citing ideas and words borrowed from another source". Questions about the differences between these two ideas are welcomed.

Late Work
For every day an assignment is turned in late, an additional 10% will be deducted from the grade.

Knowledge Checks that have not been turned in by 11:59pm on the day they were assigned will be considered incomplete. Submission after 11:59pm on the date assigned with not be considered.

Lab assignments

Lab assignments are due at 1:01pm (at the very beginning of lab) on the Thursday of the next lab session.

I understand that life happens and that difficult situations can arise during the school year. Please feel free to email or talk with Dr. Zillig about extensions for assignments, which will be given on a case-by-case basis.

Lecture Schedule (*subject to change*)

Date	Lecture Topic	Reading(s)/Notes
Mon, Aug 29	**Introduction to Wildlife Conservation** Learning Objective: By the end of the class students should be familiar with the syllabus including assignments, grading, and course content.	No Lab this week
Wed, Aug 31	**The Big Picture** Learning Objective: By the end of class, students should have a basic understanding of population processes including; age structure, species accumulation curves, and extinction rates.	Ch. 1
Fri, Sep 2	**Reliable Knowledge: Part 1, Study Design and Hypotheses** Learning Objective: By the end of the lesson, students will understand the difference between standard deviation, standard error and variance, and be able to describe the three rules of study design.	Ch. 2
Mon, Sep 5	*No Class*	
Wed, Sep 7	**Reliable Knowledge: Part 2, Comparing Hypotheses** Learning Objective: By the end of the lesson students will be able to recognize and explain the difference between Bayesian and frequentist statistics, and draw a figure illustrating the principle of parsimony.	Ch. 2 & 3
Fri, Sep 9	**Estimating Vital Rates, Methods for estimating Abundance** Learning Objective: Students will be able to explain the difference between Type I and Type II error. Students will be able to describe the Principle of Parsimony and draw a figure illustrating this principle.	Ch. 4
Mon, Sep 12	**Estimating Abundance: Mark-recapture**	Ch. 4

	Learning Objective: By the end of the lesson students will be able to implement the Lincoln-Peterson equation and for closed populations and identify assumptions in mark-recapture studies.	
Wed, Sep 14	**Survival and Reproduction** Learning Objective: By the end of the lesson students will be able to calculate survival probability using a Kaplan-Meier survival model, and list other methods scientists use to estimate survival. **Annotated Bibliography Due**	Ch. 4
Fri, Sep 16	**Population Trends and Exponential Growth** Learning Objective: Students will understand the difference between continuous and discrete geometric growth rates and how they can be connected, and be able to write equations for both types of growth.	Ch. 5; Grenier et al. 2007 **This lecture will be on zoom—no in-person class today!**
Mon, Sep 19	**Exponential Growth Continued** Learning Objective: Students will be able to calculate doubling time of a population, and recognize the consequences of different r and lambda values on population growth.	Ch. 5
Wed, Sep 21	**Stage Structured Populations** Learning Objective: Students will be able to construct a stage structured population matrix, and explain how to determine the stable stage distribution and SSD growth rate.	Ch. 6
Fri, Sep 23	**Stage Structured Populations: Continued** Learning Objective: The concepts of transient dynamics and reproductive value in the context of population dynamics will be introduced. Student will be able to explain how the two are related.	Ch. 6
Mon, Sep 26	Exam Review! Come with questions!	

Wed, Sep 28	**EXAM 1**	
Fri, Sep 30	Proposal Guidelines and discussion	Read the "Proposal Assignment Details" document on Moodle
Mon, Oct 3	**Sensitivity Analyses** Learning Objective: By the end of class students will be able to explain the difference between sensitivity and elasticity in matrix projection models, and describe ways we can model stochasticity. **Project Title and Outline Due**	Ch. 6
Wed, Oct 5	**Density Dependence: Part 1** Learning Objective: By the end of the lecture, students will understand how carrying capacity is determined, be able to identify all parts of the logistic growth equation.	Ch. 7
Fri, Oct 7	**Density Dependence: Part 2** Learning Objective: By the end of class students will be able to identify how changes in *r* impact population dynamics, and be able to describe positive density dependence.	Ch. 7
Mon, Oct 10	**Predation: Part 1** Learning Objective: By the end of the lesson students will be able to calculate predation rate, and explain the difference between Type 2 and Type 3 functional responses to predation.	Ch. 8
Wed, Oct 12	**Predation: Part 2** Learning Objective: At the end of the lesson students will be able to define compensatory vs. additive predation mortality, and offer three reasons why predation does not necessarily reduce prey numbers.	Ch. 8
Fri, Oct 14	**Predation: Mule Deer Example**	Read abstract, intro and methods of Bishop et al. (2009)

		and Hurley et al. (2011)
Mon, Oct 17	**Genetic Drift and Inbreeding** Learning Objectives: By the end of lecture students should comprehend the four processes that shape genetic variation in a population, and understand how genetic drift and inbreeding can affect population dynamics and/or vital rates.	Ch. 9
Wed, Oct 19	**Ken Zillig Guest Lecture:** Portfolio effects and Climate Change	
Fri, Oct 21	**Population Connectivity** Learning Objective: Students will learn how habitat fragmentation is connected to dispersal, and identify methods to quantify dispersal both through physical tracking and genetic methods.	Ch. 10
Mon, Oct 24	**Source, sinks, and ecological traps** Learning Objective: Students will be able to identify differences between source and sink habitats and provide examples of ecological traps and refugia.	Ch. 10
Wed, Oct 26	**Climate Change Effects: Part 1** Learning Objectives: By the end of class, students will be able to give examples of both the direct and indirect effects of climate change.	
Fri, Oct 28	**Climate Change Effect: Part 2** Learning Objectives: Students will be able to explain why population variability interacts with climate change predictions, and hopefully feel more optimistic about our future. **Draft 1 Due:** Bring a hard copy to class!	
Mon, Oct 31	Exam Review! Come with Questions!	

Wed, Nov 2	**EXAM 2**	
Fri, Nov 4	**Extinction and PVAs: Part 1**	Ch. 12
Mon, Nov 7	**Extinction and PVAs: Part 2**	Ch. 12
Wed, Nov 9	**Adaptive Management**	
Fri, Nov 11	*No Class*	
Mon, Nov 14	**Focal Species**	Ch. 13
Wed, Nov 16	**Sustainable Harvest** **Reviewer Comments Due**	Ch. 14
Fri, Nov 18	**Endangered Species**	
Mon, Nov 21	TBD	No lab this week
Wed, Nov 23	*No Class*	
Fri, Nov 25	*No Class*	
Mon, Nov 28	**Economics of Wildlife Management**	
Wed, Nov 30	**Policy Design**	
Fri, Dec 2	**Guest Lecture: Dr. Sarah Sells** Estimating Wolf Population Size in Montana	
Mon, Dec 5	**Final Research Proposal Due:** Bring a hard copy to class!	No lab this week
Wed, Dec 7	**Final Wrap Up Lecture**	
Fri, Dec 9	Exam Review! Come with questions! Final Exam is cumulative.	
Tues, Dec 13	**FINAL EXAM, 8-10am Location TBD**	

Lab Schedule (subject to change)

Thurs, Sep 1	**No lab**
Thurs, Sep 8	Lab 1: Introduction to R: Biodiversity and Humans
Thurs, Sep 15	Lab 2: Understanding Uncertainty
Thurs, Sep 22	Lab 3: Hypotheses and Predictions
Thurs, Sep 26	Lab 4: Mark-recapture
Thurs, Oct 6	Lab 5: Exponential Growth
Thurs, Oct 13	Lab 6: Stage Structured Populations
Thurs, Oct 20	Lab 7: Methods Review
Thurs, Oct 27	Lab 8: Density Dependence
Thurs, Nov 3	Lab 9: Peer Review
Thurs, Nov 10	Lab 10: Genetic Drift, Extinction, and Genetic Rescue
Thurs, Nov 17	Lab 11: Small Populations—Channel Island Foxes
Thurs, Nov 24	**No lab, Happy Thanksgiving!**
Thurs, Dec 1	Lab 12: Stakeholder debate, White Tailed Deer Policy
Thurs, Dec 8	**No lab**