E&EB S115 Introduction to Conservation Biology

Instructor. Dr. Edgar Benavides

Office: YSB C104

Office Hours: By Appointment.

Course Description

Conservation Biology is a multidisciplinary discipline that examines how human activities influence biological diversity across different levels of complexity, including genes, populations, communities, ecosystems, and the global scale. This course will explore essential topics such as species diversity, wildlife management, invasive species, population decline, and species extinction. We will also investigate the pressing threats of habitat loss and Climate change, examining their far-reaching effects on the natural world.

Through lectures, discussions of primary literature, the completion of a science-based conservation paper, and the insight of guest speakers, we will deepen our understanding and commitment to preserving our planet's unique biodiversity.

Please read the entire syllabus. This syllabus is a general guide and is subject to change if necessary.

Course Structure

Three formal lectures per week will be complemented by a journal club-style discussion section and a case study discussion session featuring an invited speaker. All students must attend the lectures and discussion sessions. The discussion section involves presenting and discussing assigned reading material. Additionally, guest lecturers will share their work on various issues in Conservation Biology, followed by discussions with the guest lecturer. The aim is to learn from real-life conservation biologists facing real-world challenges. Our guest lecturers will include Yale scientists (Yale postdocs) and international experts who will present either in person (from the US) or online (from abroad). Participation will be graded for both discussion sessions.

Course Calendar

Course Format

Lectures: Live, synchronous lectures will be on MWF from 1:00 to 3:15 PM—classroom TBD.

Paper Discussion: We will cover primary literature readings each Monday for 45 minutes. These papers enhance lecture content and help solidify core concepts.

Exams: One in-lecture final exam will be on Friday, August 1, 2025 (Classroom **TBD**). **We will NOT provide make-up exams for conflicts with your end-of-semester travel. *Please plan accordingly.***

Assessment, grading, and course requirements:

1. In-class participation and discussion of weekly papers (20-30 pages; 20%),
2. Written project paper outlining a conservation biology problem (~1500 words; 6 pages; 30%).
3. Presentation on the research project (15%)
4. Final written exam (35%).

The course depends on in-class discussion. Thus, attendance at all lectures and discussion sections is required.

Textbook: An Introduction to Conservation Biology. By Anna A. Sher. 3rd Edition. 2022. Oxford University Press. ISBN 10: 0197564372 / ISBN 13: 9780197564370

Course Schedule

Week 1

- Lecture 1: Monday, June 30 – **Defining Conservation Biology.** Accelerated species extinctions and humans. Conservation Biology. Biodiversity has inherent value. Multiple disciplines help understand and protect species and ecosystems—conservation efforts: international, scientists, non-scientists.
- Lecture 2: Wednesday, July 2 – **Charles Darwin, The Theory of Evolution and the Tree of Life**. Darwin's 'One long argument'. Three domains of life: Bacteria, Archaea, and Eukarya. The emergence of multicellularity. Plants, fungi, and animals. Key evolutionary transitions.
- Lecture 3: Friday, July 4 – **What is Biodiversity?** What is a species? Methods to measure species diversity. Genetic diversity and how it is measured, and why it matters. Ecosystem diversity. Different biodiversity patterns across the globe.

Week 2

- Lecture 4: Monday, July 7 – **The Value of Biodiversity.** Ecological and environmental economics, cost-benefit analyses, financing conservation, ecosystem services, biodiversity use/ethical values.
- Lecture 5: Wednesday, July 9 – **Threats to Biodiversity: Habitat Change.** Human Population Growth and its environmental impact: habitat destruction, habitat fragmentation, environmental degradation, and pollution (pesticides, water, air).
- Lecture 6: Friday, July 11 – **Climate Change and Other Threats to Biodiversity.** Global Climate Change, Overexploitation, Invasive Species, and Disease

Week 3

- Lecture 7: Monday, July 14 – **Extinction Risk.** The Meaning of "Extinct". Current, human-caused mass extinction. Local extinctions, background extinction rates, habitat loss. vulnerability to extinctions. The extinction vortex.

- Lecture 8: Wednesday, July 16 – **Conserving Populations and Species.** Applied Population Biology, Population viability analysis (PVA), and Minimum viable population (MVP). Metapopulations, Conservation Categories. Prioritization: What Should Be Protected? Species, ecosystems, wilderness, biodiversity hotspots. Legal protection of species, US laws & international agreements (CITES).
- Lecture 9: Friday, July 18 – **Establishing New Populations and *Ex Situ* Conservation.** Establishing Populations. Animal programs. Plant populations. *Ex Situ* Conservation Strategies: Zoos, Aquariums, Botanical gardens, Seed banks. Can Technology Bring Back Extinct Species?

Week 4

- Lecture 10: Monday, July 21 – **Protected Areas.** Protected Areas. Marine protected areas. Effectiveness. Designing Protected Areas, Networks of Protected Areas, Habitat corridors, Managing Protected Areas, Poaching, Trophy hunting, and Human-animal conflict
- Lecture 11: Wednesday, July 23 – **Conservation Outside Protected Areas.** Biodiversity outside Protected Areas (PAs). Value of unprotected habitats. Conservation in urban areas. Ecosystem management. Local communities. Two case studies worth noting are from Namibia and Kenya.
- Lecture 12: Friday, July 25 – **Restoration Ecology.** Where to Start? Restoration in Urban Areas. Restoration Using Organisms. Restoration of Wetlands, Aquatic systems, Prairies. The Future of Restoration Ecology

Week 5

- Lecture 13: Monday, July 28 – T**he Challenges of Sustainable Development & An Agenda for the Future.** National conservation efforts. International habitat protection agreements. Debt-for-nature swaps. Ongoing challenges in conservation biology. Role of conservation biologists,
- Lecture 14: Wednesday, July 30 – **Term Paper Presentations.** This is an opportunity to share your work, new insights, and understanding of the topic you chose for your term paper.
- Lecture 15: Friday, August 1 – **Final Written Exam.**

Academic Integrity

Please read and understand the Yale College Undergraduate Regulations on Academic Integrity and the Yale Summer Session Handbook. For this course, plagiarism-specific examples include: (1) Quoting material without attribution. Material cited word-for-word must be placed in quotation marks, and the source of the quote cited. (2) Passing off another's idea as your own, even if it's been reworded. (3) Imitating a passage's structure or argument without attribution. Suppose a source presents an assertion and three supporting points; you need to cite the original even if you

substantially revise the wording. (4) Concealing the extent, you've borrowed from a text or other source. Citing a specific passage or observation prevents you from drawing on the rest of the work without citation. Finally, you can check your nearly finished draft with Yale's Turnitin to see patterns of source use or misuse.

A student violating the terms outline of the Yale summer session handbook (Appendix A)in any assignment, test, or examination in this class will receive a minimum penalty of a zero (0) for that exam, quiz or assignment, and may receive a grade of "F" for the course at the discretion of the instructor.

Artificial Intelligence

Inserting AI-generated text into an assignment without proper attribution violates academic integrity (Here for Guidelines on the Use of AI by the Office of the Provost). We recommend using Yale's AI Clarity platform for the final project (text of 6 pages + references). A proper acknowledgment is required whenever AI tools are utilized in writing or to enhance the final paper. Moreover, any AI chatbot can generate a list of prompts. Integrating this list into the Bibliography section is crucial for transparency of your work.

Diversity, Equity, Inclusion, Belonging & Accesibility

We will strive to be an inclusive community and provide an enriching learning environment regardless of level of preparation, race, ethnicity, religion, gender, sexual orientation, or ability. We aim to create an environment that promotes discussion, inquiry, and diligence in understanding and respecting other viewpoints. If you need academic accommodations due to a disability, please let us know as soon as possible, even if you have not yet completed registration with Student Accessibility Services. We will make every attempt to accommodate your needs. Finally, should you need well-being and mental health support or counseling, Yale College Community Care (YC3) is a click away 24/7.