Biology 197C Fall 2022

Extinction on a Human-dominated Planet: Understanding Biodiversity Loss

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Best way to reach me is by e-mail.

Course Description:

Delves into the science and stories of losses of species at a time when humans prevail on Earth. We will examine the science of biological diversity, the intricacies of measuring populations, and the function of ecosystems to address why some species thrive and others dwindle in light of human domination. What should citizens know about endangered species, and how could they apply deeper knowledge of the non-human world to strive for a future where fewer extinctions happen? We will gain scientific grounding in conservation through reading, discussion, lecture and research. Through observations of nature and structured imagining, we will envision a future world allowing for coexistence of us and all other species.

I look forward to helping you to learn about Earth's biodiversity, and am here to answer questions, to offer approaches to learning and study, and to be a tour guide to just some of the many fantastic species that have come to be on our planet (the only one we get).
Office hours are a dedicated time for us to interact one-on-one - for help, for concerns, for curiosity, for talking about the issues that come up in this course.

Office Hours: Tuesday 2:20 to 3:30 - Lovejoy 104
Thursday 10:00 to 11:00 - Lovejoy 104
Wednesday 1 to 2:30 - On Zoom:
Meeting link: *https://colby.zoom.us/j/94223480667*

You are also welcome to drop by any time on Tuesday or Thursday, but it is better to arrange a meeting in advance by email or phone to make sure you find me. Connecting remotely on other days at other times can also be arranged.

Learning Objectives:

By the end of this course, students will be able to

- Articulate the state of the earth's biological diversity today, in the context of past massive extinctions and of a future possible Earth.
- Research and appraise the complex and various factors that threaten a particular species.
- Distinguish between species' anthropogenic biological declines, naturally rare species, and biological losses leading to the extinction of species.
- Access and comprehend global and North American conservation ranking systems to compare the situation for different species.
- Sharpen observation and documentation skills through vital connection with a small piece of Maine.
- Appreciate the variety and complexity of ecosystems on planet Earth, and the different ways they have been impacted by human activity.
- Evaluate and articulate a personal moral position vis-à-vis other species in their bioregion, their nation, and their planet.
- Foster practices in their own lives that can help support Earth's biological diversity
- Apply their knowledge of biological conservation to the particular field they are choosing to pursue.
- Frame the current loss of biodiversity in an measured, reasoned and informed context - seriously but without a sense of catastrophe.
- Visualize a future planet Earth where *Homo sapiens* lives in coexistence with intact natural ecosystems, and a complete (remaining) terrestrial biota.
- Gain a deeper appreciation for how science works, and how it is communicated to the public

Core reading:

Kolbert, Elizabeth, 2014. The Sixth Extinction. New York: Henry Holt and Company. 319 pgs.

Chapters/ pages from:

Begon, Michael and Colin R. Townsend, 2021. Ecology: From Individuals to Ecosystems. (5th edition). Hoboken NJ: John Wiley & Sons.

Dasgupta, Partha, Peter Raven, and Anna McIvor (editors), 2019. Biological Extinction: New Perspectives. Cambridge University Press.

Pilcher, Helen, 2016. Bring Back The King: The New Science of De-Extinction. London: Bloomsbury Sigma.

Sodhi, Navjot S. & Paul R. Ehrlich, editors, 2010. Conservation Biology For All. Oxford Univ. Press.

Wilson, E. O. 2016. Half Earth: Our Planet's Fight for Life. New York: Liveright Publishing Corporation (W.W. Norton & Company).

and articles from the scientific literature.

You will also be watching four hour-long films, to help bring some of the life we are talking about to life, and to show interviews with some of the scientists who are on the front lines of combatting those forces that are eroding biological diversity, and who are working to restore what has been lost.

Course Components:

In addition to **meeting as a class** twice a week, you will be doing **homework assignments** designed to encourage your thinking about the material we will be learning. These will be frequent and should not take you too much time - frequent practice and review of the material will reinforce the concepts for you and deepen your understanding.

You will participate in **class discussions**, as many of the issues we will talk about may be based in science, but ultimately come down to human behavior. As the humans in the room, your views count towards shaping the future, and the way we get there is thinking and talking about it.

There will be three **tests** throughout the semester, and no final exam. These are opportunities for you to demonstrate how your learning is going, and for me to see how well you are grasping the ideas. It is important to have checkpoints for gauging progress.

There will be a project through the first eight weeks of the semester, called **Biodiversity Watching**, to connect you with local biodiversity, and to make real for you some of the more abstract concepts we will be learning about in class.

You will write a **final paper** synthesizing your learning in this course thorough a vision of what we could do, as a species, to help steer human activity towards something that is less destructive to the rest of life, and more conducive to a whole planetary biota. Your summary of your ideas will be shared with the class at the end of the semester.

We are going to learn about particular threatened species with a daily (Tues/Th) time to **Love A Species Every Day**. A student will make a short presentation about a species of their choice, and tell us why we should love this species.

Assessment Allocation:

Class Participation	25%
Homework Assignments	25%
Three tests	20%
Biodiversity Watching	15%
Final paper	15%

My Expectations:
Your attendance to the class is expected, and I also expect you to arrive on time, as a courtesy to all of us.
I expect you to challenge yourself to advance your own learning - we are all starting from different places, but we can all make significant growth in our learning. I expect you to come to class with an open mind, ready to learn new things, and to participate fully in what is happening that day, and to do the work requested of you.
I expect your work to be your own, and needless to say (but I say it anyway), Colby's policy of academic integrity (copied below) applies here: **give credit, build trust, reach out.** Don't hesitate to ask any questions about this (or about anything else) if in doubt.
I expect your work to be submitted on time, and will consider penalizing late work.

This syllabus is an approximation, and will likely change some as we get into the material. It is important to see the **Moodle** for the current schedule, & for reading and homework assignments.

Date	**Subject**
Sept. 8	Introductions. The Sixth Extinction. Discussion: Who are we?
Sept. 13	Geologic time. Time in general. Extinction discovered. More discussion.
Sept. 15	Biodiversity defined. Populations, metapopulations, and why they matter.
Sept. 20	Species defined. Natural Selection. Speciation. Giant auks.
Sept. 22	XTreme XTinction: Just add an asteroid. Also: How science works.
Sept. 27	The Anthropocene & Anthropocentrism: 5 key geologic-scale changes
Sept. 29	**Test;** and Group Share on Biodiversity Watching.
Oct. 4	Ocean acidification. Biogeochemical cycles.
Oct. 6	Resilience of Reefs. Geographic patterns of biodiversity. Biodiversity Hotspots.
Oct. 13	Tropical rainforests. Species-area relationship. Island Biogeography.
Oct. 18	The BDFFP. Habitat loss, fragmentation, and degradation.
Oct. 20	Invasive species
Oct. 25	Rhinos and Rarity Assessment
Oct. 27	**Test;** and Practice on IUCN assessments
Nov. 1	The Pleistocene megafauna, Neanderthals, and Us.
Nov. 3	Frozen Zoos & Seed Banks: Hanging on to life, generating solutions.
Nov. 8	Harvesting Nature
Nov. 10	Plants: The Green Stuff
Nov. 15	Restoring Biodiversity: Restoration, Rewilding, Reforestation, De-Extinction
Nov. 17	Insects: Are they experiencing an apocalypse?
Nov. 22	**Test;** and Biodiversity Loss and Climate Change
Nov. 29	Solutions: The Law. The Endangered Species Act and more.
Dec. 1	What if we get this right? Imagining a better future 1
Dec. 6	What if we get this right? Imagining a better future 2
Dec. 8	Extinction Rebellion?: Averting *(as much)* Extinction *(as possible)*

Resources for Lifting Spirits

Learning about the biological losses happening on Earth can be sobering, if not, at times, depressing. But there are lots of great minds working on this problem; reading, hearing, and watching these sources of inspiration can help to keep things in proper perspective, and to offer hope. Links to these resources will be posted on the Moodle page. I welcome your suggestions for additional resources that you have found helpful.

Academic Honesty & Consequences for Academic Dishonesty

Honesty, integrity, and personal responsibility are cornerstones of a Colby education and provide the foundation for scholarly inquiry, intellectual discourse, and an open and welcoming campus community. These values are articulated in the Colby Affirmation and are central to this course. You are expected to demonstrate academic honesty in all aspects of this course. If you are clear about course expectations, give credit to those whose work you rely on, and submit your best work, you are highly unlikely to commit an act of academic dishonesty.

Academic dishonesty includes, but is not limited to: violating clearly stated rules for taking an exam or completing an assignment; plagiarism (including material from sources without a citation and quotation marks around any borrowed words); claiming another's work or a modification of another's work as one's own; buying or attempting to buy papers or projects for a course; fabricating information or citations; knowingly assisting others in acts of academic dishonesty; misrepresentations to faculty within the context of a course, on an academic assignment, or an academic record; and submitting the same work, including an essay that you wrote, in more than one course without the permission of the instructors for those courses.

Academic dishonesty is a serious offense against the college. Sanctions for academic dishonesty are assigned by an academic review board and may include failure on the assignment, failure in the course, or suspension or expulsion from the College for multiple academic dishonesty findings.

For more on recognizing and avoiding plagiarism, see the library guide:
libguides.colby.edu/avoidingplagiarism