COURSE SYLLABUS

Conservation Ecology 11:216:317
Tuesdays 8:30am - 11:30am, room 123 ENR building
3 credits; Fulfills requirement for Core Curriculum Contemporary Challenges: Our Common Future Courses (CCO), Discipline-Based Writing and Communication (WCd)

Instructor
Professor Rachael Winfree, 128 ENR building, rachael.winfree@rutgers.edu
Please contact me through the above email, not through Canvas
Office hours by appointment; please email me to schedule a time
Morgan Mark, grader, morgan.mark@rutgers.edu
Office hours by appointment; please email me to schedule a time

Pre-requisites
General biology (01:119:115 or 01:119:116), or equivalent, or permission of instructor

Format
One 3 hour meeting per week. Class time will be largely devoted to writing, discussion, and small group problem-solving exercises.

Required readings
Students are required to purchase one book which will be read outside of class and used as the basis for the midterm paper: Hannah Ritchie 2024, Not the End of the World (Little, Brown). The content of this book will also be included in the final exam. Books can be purchased for about $15 from various online sources (e.g., Amazon, eBay). Either the hardback or the paperback version is suitable. All other required readings for the course will be made available as pdfs on the course Canvas site.

Course Objectives
- Introduce students to the major environmental challenges of our time, including climate change, biodiversity loss, terrestrial and marine habitat destruction, invasive species, and the environmental consequences of our food and energy systems.
- Develop students' critical reasoning and writing skills.

Learning Outcomes
- Appropriately, knowledgeably, and concisely contribute to class discussions, including leading class discussion on one occasion.
- Knowledgeably discuss and write about the world's most significant environmental problems and their potential solutions, including understanding and evaluating the often opposing opinions that each issue generates.
- Evaluate published articles for their scientific merit; evaluate and cite sources of information appropriately.

- Write an organized, informed, and well-argued research paper on a current topic in conservation ecology and/or environmental science.

Grading policy

Grades will be assigned according to the following thresholds: 90% of possible points is an A, 80% B, 70% C, 60% D, <60% F. Total points for the course 465. Broken down as:

- 200 points for work done during in-person class meetings. 10 class meetings will count towards your grade, and each class is worth 20 points. The weekly writing (a written response to the assigned readings, done every week at the start of class) is 8 points; in-class verbal participation which includes asking and answering questions is 8 points; the in-class exercise (or for some class meetings, an assignment due before class begins) is 4 points. There are 11 graded classes (the first, introductory class is not graded) and the 10 classes for which you have the most points will count towards your grade. In other words, you can miss one class meeting without it affecting your grade.
- 15 points for leading class discussion of a paper
- 100 points for midterm paper, 10 of which are for your research paper topic
- 150 points for final exam

AI Policy

No use of AI (such as ChatGPT, Claude, or Bing) is allowed for any aspect of this course. The main purpose of this course is to develop your own skills in reading the scientific literature, critical reasoning, higher-order thinking, and writing. Thus using AI to perform these skills for you is a violation of the academic integrity policy.

Course protocols

- Readings will be available as pdfs in Canvas / Modules, organized by class date.
- You should come to class prepared to discuss the readings listed for that class.
- Any assignments listed as due at a class meeting are due to Canvas by 8:30am, i.e., before the class starts.
- The first 20 minutes of each class will be spent writing hand-written responses to questions about that day's readings. This part of the class will be tech-free for everyone, i.e., no laptops and no phones allowed. During this weekly writing assignment, desks must be clear with the exception of any hand-written notes you have taken on the assigned readings. You may use your notes, but not the papers themselves, to complete the writing assignment.
- Weekly assignments: the weekly writing assignment and the in-class exercise are both completed in class, and turned in as a piece of paper in class. For full credit on class participation, ask or answer at least 3 questions during class discussion. For some classes, there are additional assignments due to Canvas by the time class starts; these are noted in blue font on the syllabus.
- Optional: You may opt in to being distraction-free for the entire course and receive extra credit. 'Distraction free' is defined as (1) no phone use, with phones being stored out of sight during class, and (2) laptop use only for accessing the assigned readings and other parts of the course Canvas site, with no other tabs being open during class, and no

use of internet searches, social media, email, etc. during class. Students who opt in and adhere to it in every class will receive 15 points extra credit at the end of the course. Please make your decision about opting in before the second class meeting on Sept 9, when students will be seated in different sections of the room depending on their opt in / opt out choice. Note that the course grade is not curved; thus in principle you can receive 100% of the course points and an A+ without opting in. We will always take a 10-15 minute break halfway through the class period and phones and laptops can be used during the break.

Class schedule and assignments

Class 1, Sept 2: Introduction to course / critical thinking
due: nothing other than reading the two papers below prior to class

- Bergstrom, CT and JD West. 2020. Preface, pages xi to xvi in *Calling Bullshit: The Art of Skepticism in a Data-Driven World*. Random House, New York
- Puruggan, M and and J Hewitt. 2004. How to read a scientific article.

Class 2, Sept 9: Biodiversity and natural history
due: post photos of 3 species to iNaturalist

- May RM. 1992. How many species inhabit the Earth? Scientific American, October 1992:18-24.
- Wilson, E.O. 1992. The unexplored biosphere. Pages 131-162 in The Diversity of Life. Harvard University Press

Class 3, Sept 16: Habitat loss (Taught by guest lecturer Morgan Mark)

- Robinson SK, Thompson FR, Donovan TM, Whitehead DR, and Faaborg J. 1995. Regional Forest Fragmentation and the Nesting Success of Migratory Birds. Science 267(5206):1987-1990.
- Terborgh J, Lopez L, Nunez P, Rao M, Shahabuddin G, Orihuela G, Riveros M, et al. 2001. Ecological Meltdown in Predator-Free Forest Fragments. Science 294(5548):1923-1926.
- Moore RP, Robinson WD, Lovette IJ, Robinson TR. 2008. Experimental Evidence for Extreme Dispersal Limitation in Tropical Forest Birds. Ecology Letters 11:960-968.
- Hoekstra, JM et al. 2005. Confronting a biome crisis: global disparities in habitat loss and protection. Ecology Letters 8: 23-29

Class 4, Sept 23: How to write well
due to Canvas, upload under 'In class exercise': 3 bullet points per reading indicating things you learned that you are going to implement in your own writing.

- Zinsser, W. 2006. *On Writing Well: The Classic Guide to Writing Non-fiction, 30th anniversary edition* (22 pages of excerpts from the book)
- Bullock, R. 2009. *The Norton Field Guide to Writing, 2nd edition* (40 pdf pages of excerpts from the book, plus another 84 pages for reference on grammar, usage, and punctuation)

- Pechenik J. 2010. Chapter 6, Revising. Pages 82-125 in *A Short Guide to Writing about Biology*, Pearson.
- Winfree, Organizing a paper

Class 5, Sept 30: Quantitative critical thinking

- Bergstrom, C and J West. 2020. 'Causality.' Pages 55-58 and 68-76 in *Calling Bullshit: The Art of Skepticism in a Data-Driven World*. Random House, New York.
- Bergstrom, C and J West. 2020. 'Numbers and nonsense.' Pages 83-92 and 96-103 in *Calling Bullshit: The Art of Skepticism in a Data-Driven World*. Random House, New York.
- Bergstrom, C and J West. 2020. 'Spotting bullshit.' Pages 242-263 in *Calling Bullshit: The Art of Skepticism in a Data-Driven World*. Random House, New York.

Class 6, Oct 7: Conservation Policy (Taught by guest lecturer Morgan Mark)
due: 1-3 sentence statement of your topic for your midterm research paper. See 'ConservationEcology_Midterm Paper.docx' for detailed instructions. No use of AI assistance is allowed on your midterm paper assignment for any purpose (including information summary, writing, or editing).

- Readings TBD

Class 7, Oct 14: Overharvesting
due to Canvas, upload under 'In class exercise': one written question about each paper, which you can then ask during class discussion
due: if you are leading a paper discussion, turn in 'LeadingDiscussion' for the paper you are leading

- Redford KH. 1992. The empty forest. Bioscience 42(6):412-422.
- Jackson JBC, et al. 2001. Historical overfishing and the recent collapse of coastal ecosystems. Science 293:629-638.
- Wright TF, et al. 2001. Nest poaching in neotropical parrots. Conservation Biology 15:710-720.
- Goettsch, B et al. 2015. High proportion of cactus species threatened with extinction. Nature Plants: article number 15142
- McCauley, DJ, et al. 2015. Marine defaunation: Animal loss in the global ocean. Science 347: 1255641-1 to -7

Class 8, Oct 21: Invasive species
due to Canvas, upload under 'In class exercise': one written question about each paper, which you can then ask during class discussion
due: if you are leading a paper discussion, turn in 'LeadingDiscussion' for the paper you are leading

- Lowe, S et al. 2000. 100 of the world's worst invasive alien species: A selection from the global invasive species database. Published by the Invasive Species Specialist Group of the Species Survival Commission of the IUCN. 12 pages
- Gurevitch, J. 2004. Are invasive species a major cause of extinctions? Trends in Ecology and Evolution 19:470-474.

- Preston R. 2007. A death in the forest. The New Yorker, December 10:1-13.
- [The three news articles / letters to the editor below are in one pdf, and should be written about jointly] "2011-2013 Science_Nature": Davis M, et al. 2011. Don't judge species on their origins. Nature 474:153-154; Simberloff, Alyokhin, Lockwood, Wickham. 2011. Correspondence. Nature 475:36-37; Nicholls H. 2013. The 18-km2 rat trap. Nature 497:306-308
- Vellend M. 2017. The biodiversity conservation paradox. American Scientist 105:94-101.

Oct 28: NO CLASS / MIDTERM PAPER DUE - Upload your midterm paper to Canvas by 11:59pm.
Midterm is a 4-page review paper based on Hannah Ritchie's 2024 book Not the End of the World. See 'ConservationEcology_Midterm Paper.docx' for detailed instructions. No use of AI assistance is allowed on your midterm paper assignment for any purpose (including information summary, writing, or editing).

Class 9 , Nov 4: Ecosystem services

- Heal G. 2000. Basic economics, chapter 2: Pages 21-42 in Heal, G. *Nature and the Marketplace*. Island Press, Washington, D.C.
- Kleijn D, Winfree R, Bartomeus I, Carvalheiro LG, et al. 2015. Delivery of Crop Pollination Services is an Insufficient Argument for Wild Pollinator Conservation. Nature Communications 6:1-8.
- Max, D T. 2014. Green is good. The New Yorker, 12 May 2014 issue, 54-63
- Tercek, M and J Adams. 2013. Maybe it's not Chinatown after all, pages 1-17 in *Nature's Fortune: How Business and Society Thrive by Investing in Nature*. Basic Books, New York.

Class 10, Nov 11: Human population growth and resource use

- Crist, E, Mora, C, Engelman R. 2017. The interaction of human population, food production, and biodiversity protection. Science 356: 260-264
- Load of Rubbish. 2018. The Economist: 29 Sept, 2018, pages 3-12
- Our World in Data 2020. Graphs excerpted from ourworldindata.org: M Roser, H Ritchie, and E Ortiz-Ospina 2019, World population growth, H Ritchie and M Roser 2020, Environmental impacts of food production; H Ritchie and M Roser 2018, Energy.

Class 11, Nov 18: Climate change

- Our World in Data 2020. H Ritchie and M Roser 2020, CO2 and greenhouse gas emissions. This assigned reading is the series of web pages found at the following link: https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions
- Climate Central. 2012. Global Weirdness: Severe Storms, Deadly Heat Waves, Relentless Drought, Rising Seas, and the Weather of the Future. Vintage Books: New York. This assigned reading is a pdf of excerpts (chapters 1, 2, 5, 6, 7, 9, 10, 15, 17, 18, 19, 21, epilogue) from the book.
- Ritchie, H. 21 March 2023. 'We need the right kind of climate optimism.' Vox This assigned reading is an online article:

https://www.vox.com/the-highlight/23622511/climate-doomerism-optimism-progress-environmentalism

NO CLASS Nov 25, Thanksgiving week

Class 12, Dec 2: Human culture & ideas

- Battersby, S. 2017. Can humankind escape the tragedy of the commons? PNAS 114:7-10.
- Frank RH. 2020. 'Creating more supportive environments.' Pages 229-260 in *Under the Influence: Putting Peer Pressure to Work*. Princeton University Press, Princeton NJ.
- Soga, M and K Gaston. 2018. Shifting baseline syndrome: causes, consequences, and implications. Frontiers in Ecology & Environment 16: 222-230.

Class 13, Dec 9: In-class final exam

FINAL EXAM Bring your fully charged laptop and your course notes as hard copies (paper), **not** electronic. Exam is open notes, meaning you have access to your own written notes from the course, but not to any other course content. Exam will be taken on Canvas i.e. on your computer. No access to anything on your laptop other than the Canvas exam itself, and no internet use (e.g. no google searches). No use of AI assistance. Students observed with any laptop tabs open other than the exam itself, or observed using AI assistance, will be asked to turn in their exam and leave. Exam is cumulative. Questions will be based on the course readings, the book assigned for the midterm, and on class discussions from throughout the course. Short answer and essay questions, no multiple choice.