COURSE SYLLABUS

Conservation Ecology 11:216:317 Spring 2023
Wednesdays 8:30am - 11:30am, room 123 ENR building
3 credits; fulfills SEBS/SAS Core Curriculum: 21st Century Challenges, Writing and Communication

Instructor
Professor Rachael Winfree, 128 ENR building, rachael.winfree@rutgers.edu

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

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. Lead class discussion on an assigned paper.
- Knowledgeably discuss the world's greatest 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 in the scientific language appropriate to the field of Conservation Ecology.
- Design and carry out a review of the scientific literature on a topic. Write an organized, informed, and well-argued paper that evaluates and interprets this literature.

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

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 360. Broken down as:
- 200 points for class meetings. Each class is worth 20 points: 5 for the quiz, and 15 for the weekly writing assignment, which includes 5 for in-class participation. Out of the 12 class meetings total, the 10 classes with the highest points will be used for the grade.
- 100 points for final paper
- 50 points for midterm paper
- 10 points for leading discussion of a paper

Protocols for in-person class attendance

- To receive credit for class assignments (quiz, any assignments turned in that day, class discussion) you must be present in person at that class.
- Roll call will be taken at the start of each class.
- Your work for the course will be graded out of a total of 10 class meetings, whereas there are in fact 12 class meetings for which there are graded assignments (Class 1 has readings but no graded assignments). If you attend all 12 class meetings your grade will be based on the 10 class meetings at which you received the greatest number of points. You can miss up to 2 class meetings and still in principle obtain the maximum possible numbers of points for the course; however, missing class makes it less likely that you will do well, because I can no longer calculate your grade based on the classes in which you did best. Once you miss two class meetings, your grade will be lowered for each additional class you miss.

Protocols for class assignments

- Readings will be available as pdfs in the Canvas / Files folder named with the date of the class at which they will be discussed.
- At the start of each class there is a quiz on the content that day's readings.
- All assignments listed as due at a class meeting, are due to Canvas by 8:30am, i.e., before the class starts.

Class schedule and assignments

Class 1, Jan 18 Course intro / Critical thinking and (mis)information

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, Jan 25 Biodiversity and natural history

due: weekly writing assignment with summary of each reading; see 'read me' in folder with pdfs for additional instructions

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, Cambridge, MA

Class 3, Feb 1 What is conservation ecology?

due: weekly writing assignment with summary of each reading

Soulé ME. 1985. What is Conservation Biology? BioScience 35:727-734.

Kareiva P, Marvier M. 2012. What is Conservation Science? Bioscience 62(11):962-969.

Mace, G. 2014. Whose conservation? Science 345: 1558-1560

Class 4, Feb 8 How to write well

due: 5 bullet points per reading indicating things you learned that you are going to implement in your own writing. This is in place of the usual WWA assignment, which would not make sense for these readings.

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.

Pechenik J. 2010. Chapter 8, Writing a review paper. Pages 137-147 in *A Short Guide to Writing about Biology*, Pearson.

Winfree, Organizing a paper

Class 5, Feb 15 Ecosystem services

due: weekly writing assignment with summary of each reading

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 6, Feb 22 Habitat loss

due: weekly writing assignment with summary of each reading

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 7, Mar 1 Overharvesting

due: weekly writing assignment with summary of each reading

due: if you are leading a paper discussion today, turn in 'LeadingDiscussion' for the paper you are leading, plus the usual weekly writing assignment for the other 4 papers

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, Mar 8 Invasive species

due: weekly writing assignment with summary of each reading

due: if you are leading a paper discussion today, turn in 'LeadingDiscussion' for the paper you are leading, plus the usual weekly writing assignment for the other 4 papers

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.

Vellend M. 2017. The biodiversity conservation paradox. American Scientist 105:94-101.

[The three articles / letters 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

MIDTERM PAPER Due to Canvas by 11:59pm, Friday March 10

Mar 15 NO CLASS SPRING BREAK

Class 9 , Mar 22 Quantitative critical thinking

due: weekly writing assignment with summary of each reading

note: there are three assigned readings here (selected pages from three different chapters) for your WWA, even though they are in the same pdf and from the same book

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 10, Mar 29 Human population growth and resource use

due: weekly writing assignment with summary of each reading; see Read Me for instructions on how to write up the Our World in Data graphs

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, Apr 5 Climate change

due: weekly writing assignment with summary of each reading; write up each set of readings as grouped below, such that you write up three readings for your WWA

Our World in Data 2020. H Ritchie and M Roser 2020, CO2 and greenhouse gas emissions. Read and be prepared to discuss the entire page found at the following link. https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions

Climate Central. 2012. Excerpts (chapters 1, 2, 5, 6, 7, 9, 10, 15, 17, 18, 19, 21, epilogue) from Global Weirdness: Severe Storms, Deadly Heat Waves, Relentless Drought, Rising Seas, and the Weather of the Future. Vintage Books: New York

The Economist 2020. "Bad times", May 16, 2020, pages 49-50, and "Energy,' May 23, 2020, pages 49-50

Class 12, Apr 12 Human culture & ideas

due: weekly writing assignment with summary of each reading

Battersby, S. 2017. Can humankind escape the tragedy of the commons? PNAS 114:7-10.

Masuda YJ, Scharks T. 2018. 'Science communication is receiving a lot of attention, but there's room for improvement.' Pages 115-120 in Kareiva D, et al., editors. *Effective Conservation Science: Data Not Dogma*. Oxford University Press, New York.

Skelly DK. 2018. 'From Silent Spring to the Frog of War: the forgotten role of natural history in conservation science.' Pages 85-89 in Kareiva D, et al., editors. *Effective Conservation Science: Data Not Dogma*. Oxford University Press, New York.

Frank RH. 2020. 'Creating more supportive environments.' Pages 229-260 in *Under the Influence: Putting Peer Pressure to Work*. Princeton University Press, Princeton NJ.

Class 13, Apr 19 In-class writing workshop

due: Self-assessment of your writing. One page that summarizes (1) the comments you have received in the course thus far with respect to what aspects of your writing most need to be improved, and (2) the recommendations from the assigned readings on how to write well (see class 4) that would most improve your writing if you implemented them going forward.

due: HAVE A COMPLETE ROUGH DRAFT OF YOUR FINAL PAPER ready for this class as you will revise it in class and will exchange papers with another student. Any electronic format that other students can easily comment on is fine (e.g., Microscoft Word, Google Drive).

NO CLASS Apr 26 Use this time to work on your final exam / paper

FINAL RESEARCH PAPER Due to Canvas by 11:59pm, Monday May 1