

EFB 370: Population Ecology and Management

Syllabus

Instructors: Dr. Joshua Drew (jadrew@esf.edu; Illick 343; @Drew_Lab)
Dr. Eliezer (Elie) Gurarie (egurarie@esf.edu)

Teaching Assistant: Mr. Nathaniel (Nate) Wehr (nhwehr@esf.edu)

Class Schedule: MW 2:15-3:35 (Baker 145 Lecture) Recitational Th 5:00-6:20 Baker 309, 314

Office Hours: (JAD) M 3:45-4:45 Illick 343 (NW) Th 2-3:30 Illick 244) (EG) TBD

Overview and Objectives: Any organism can be part of a population regardless of whether it is a snowshoe hare, a willow shrub, a coral reef fish, or a bacterium. Population ecology is the study of the rise and fall of these individuals and how they interact with each other to form a population. This course will begin with the dynamics of individual populations and continue to consider how interspecific interactions influence populations. While this course is strongly focused on the underlying theories of population ecology and their mathematical foundations, the ultimate goal will be to view this information through the lens of conservation biology and wildlife management.

Textbook: [Introduction to Population Biology](#) by Dick Neal (Cambridge University Press).
[A Primer of Ecology](#) by Nicholas Gotelli (4th Edition)

Additional works from the primary literature will be posted to Blackboard.

Class Calendar:

- Week 1 (Jan 24) Natural Selection and linking the individual to the population
- Week 2 (Jan 31) HWEQ, the ideal population, mutation, and drift
- Week 3 (Feb 7) Inbreeding, migration and population subdivision **Problem Set 1**
- Week 4 (Feb 14) Phylogeography/ **Exam 1**
- Week 5 (Feb 21) Exponential and Logistic Growth **Problem Set 2**
- Week 6 (Feb 28) Population with Age Structure **Problem Set 3**
- Week 7 (Mar 7) Metapopulation Ecology **Problem Set 4**
- Week 8 (Mar 14) Life History Strategies / **EXAM 2**
- Week 9 (Mar 21) Spring Break
- Week 10 (Mar 28) Interspecific Competition **Problem Set 5**
- Week 11 (April 4) Mutualism
- Week 12 (April 11) Predator Prey/Plant Herbivore Interactions **Exam 3**
- Week 13 (April 18) Multi Trophic Interactions
- Week 14 (April 25) Landscapes of fear Endangered Species Management
- Week 15 (May 2) Human Wildlife Conflict

Expectations: To succeed in this course you must:

- Attend every lecture.
- Read assigned materials.
- Actively participate in class exercises and self-grading exams.

- Engage with the instructor if you feel you need help with your work. We are a team: The instructor is responsible for providing the best possible preparation for your classwork and future as a scientist. If you feel like you do not understand a topic it is essential that you come to the instructor for help.

Evaluation:

Exam 1	100 pts
Exam 2	100 pts
Exam 3	100 pts
Exam 4	100 pts
Problem sets	100 pts
Class participation	100 pts
Total	600 pts

Additional Important Information:

Religious holy days: Students who miss coursework due to the observance of a religious holy day will be given the opportunity to complete the work missed within a reasonable time after the absence, provided that the instructor is notified in advance (notify the course instructor at least 2 weeks prior to the class or an exam that will be missed).

Scholastic dishonesty: Students must act with integrity in accordance to ESF’s Code of Academic Integrity.

Common courtesy: Turn cell phones off, put on silent mode, or whatever it takes to keep them quiet. No texting, emailing, etc. during lecture. Please be on time.

Disability Services: SUNY-ESF works with the Office of Disability Services (ODS) at Syracuse University, who is responsible for coordinating disability-related accommodations. Students can contact ODS at 804 University Avenue-Room 309, 315-443-4498 to schedule an appointment and discuss their needs and the process for requesting accommodations. Students may also contact the ESF Office of Student Affairs, 110 Bray Hall, 315-470-6660 for assistance with the process. To learn more about ODS, visit <http://disabilityservices.syr.edu>. Authorized accommodation forms must be in the instructor's possession one week prior to any anticipated accommodation. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible

Diversity and Inclusion: SUNY-ESF values diversity and inclusion; we are committed to a climate of mutual respect and full participation. Our goal is to create learning environments that are usable, equitable, inclusive and welcoming. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment or achievement, we invite any student to meet with us to discuss additional strategies beyond accommodations that may be helpful to your success.

Class Readings

(Readings are to be done *before* the week, so week 1 readings should be done before classes start)

Week 1 (Jan 17) Natural Selection and linking the individual to the population

Readings: Neil Chapter 1,

[Zimmer 2008](https://www.scientificamerican.com/article/what-is-a-species/) (<https://www.scientificamerican.com/article/what-is-a-species/>)

Listen: [Radio Lab](#) “The Beauty Puzzle”

Listen: [Radio Lab](#) “G: Unfit”

Week 2 (Jan 24) HWEQ, the ideal population, mutation, and drift

Readings: Neil Chapters 9-11

Listen: [People Behind the Science Podcast Episode 80](#) Dr. Allison Miller “Genetic Variation is the Spice of Life Helping Plants Respond to Changing Environments”

Week 3 (Jan 31) Inbreeding, migration and population subdivision **Problem Set 1**

Readings: Neil Chapters 12-13

Listen: [Heredity Podcast December 8, 2021](#) Surprising Little Lemurs

[The Experiment Podcast October 21st 2021](#) What Does It Mean To Give Away our DNA?

Week 4 (Feb 7) Phylogeography **Exam 1**

Readings: [Avice 2009](#) (Avice, John C. "Phylogeography: retrospect and prospect." *Journal of Biogeography* 36.1 (2009): 3-15.)

[Marwayana et al. 2021](#) (Marwayana, Onny N., et al. "Environmental DNA in a global biodiversity hotspot: Lessons from coral reef fish diversity across the Indonesian archipelago." *Environmental DNA* (2021).

Week 5 (Feb 14) Exponential and Logistic Growth **Problem Set 2**

Readings: Neil Chapters 4-5, Gotelli Chapter 2

Week 6 (Feb 21) Population with Age Structure **Problem Set 3**

Readings: Neil Chapter 7-8 Gotelli Chapter 3

Week 7 (Feb 27) Metapopulation Ecology **Problem Set 4**

Readings: Gotelli Chapter 4

Week 8 (Mar 7) Life History Strategies **Exam 2**

Readings: Neil Chapter 8

Week 9 (Mar 14) Spring Break

Week 10 (Mar 21) Interspecific Competition **Problem Set 5**

Readings: Neil Chapter 18, Gotelli Chapter 5

Week 11 (Mar 28) Mutualism

Readings: IDK we could take Rockwood chapter 8 but as we see [here](#) there aren't a lot of texts that deal with it

Listen: Wild Crimes [Episode 9](#) "Rhino botflies: hidden victims of poaching"

Week 12 (April 4) Predator Prey/Plant Herbivore Interactions **Exam 3**

Readings: Neil chapter 19, Gotelli Chapter 6

Listen: [People Behind the Science Podcast Episode 563](#) Dr. Lauren Ponisio: Working to Preserve and Restore Populations of Bees and Other Pollinators

Week 13 (April 11) Multi Trophic Interactions

Readings: Neil chapter 20

Week 14 (April 18) Landscapes of fear Endangered Species Management

Readings: [Ripple and Beschta 2006](#) (Ripple, William J., and Robert L. Beschta. "Linking a cougar decline, trophic cascade, and catastrophic regime shift in Zion National Park." *Biological Conservation* 133.4 (2006): 397-408.)

[Díaz et al., 2021](#) (Díaz, M., et al. "Effects of climate variation on bird escape distances modulate community responses to global change." *Scientific Reports* 11.1 (2021): 1-9.)

[Matthews et al. 2020](#) (Matthews, Cory JD, et al. "Killer whale presence drives bowhead whale selection for sea ice in Arctic seascapes of fear." *Proceedings of the National Academy of Sciences* 117.12 (2020): 6590-6598.)

[McGowen et al. 2017](#) (McGowan, Conor P., et al. "Incorporating population viability models into species status assessment and listing decisions under the US Endangered Species Act." *Global Ecology and Conservation* 12 (2017): 119-130.)

Week 15 (April 25) Human Wildlife Conflict **NB Exam 4 during finals period)**

Readings: [Ludwig et al., 2017](#) (Ludwig, Sonja C., et al. "Long-term trends in abundance and breeding success of red grouse and hen harriers in relation to changing management of a Scottish grouse moor." *Wildlife Biology* 2017.SP1 (2017).)

[Blackburn et al., 2016](#) (Blackburn, Sara, et al. "Human-wildlife conflict, benefit sharing and the survival of lions in pastoralist community-based conservancies." *Journal of Applied Ecology* 53.4 (2016): 1195-1205.)

[Doubleday 2020](#) (Doubleday, Kalli F. "Tigers and "good Indian wives": feminist political ecology exposing the gender-based violence of human-wildlife conflict in Rajasthan, India." *Annals of the American Association of Geographers* 110.5 (2020): 1521-1539.)

Listen: [Wild Crimes](#) Episode 7 "Raptors: when birds of prey are persecuted"