

**SYLLABUS**  
**Wildlife Ecology and Management**  
EAS 518/ENV 438  
Winter Semester 2020

*Lecture: Tuesdays, Thursdays 12:00PM - 1:00PM* (1046 Dana)

*Discussion/Lab/Field Trips: Fridays 9:00 AM – 12:00 PM* (2520 Dana, unless otherwise noted)

**Primary Instructor: Johannes Foufopoulos**

Office: Dana, Rm 2064; Office hours: 12-1 at Amer's on State St.

Tel: (734) 763-9460, Email: [jfoufop@umich.edu](mailto:jfoufop@umich.edu)

**Graduate Student Instructor: Rachael Carlberg**

Office: Dana, Rm 2064; Office hours: T and W 2:30 - 4 pm, or by appointment

Tel: (724) 594-6932, Email: [carlberg@umich.edu](mailto:carlberg@umich.edu)

**Course description:**

The course focuses on the ecological processes and conservation management tools relevant to the survival of free-ranging mammal, bird, reptile, and amphibian populations. Students will utilize a diversity of approaches ranging from field research to computer exercises to address wildlife ecology, management, and conservation issues. Topics that will be discussed include wildlife habitat assessment, population abundance and density estimates, nutritional ecology, wildlife disease management, as well as endangered species restoration, both in an US and international context.

**Learning Objectives:**

It is expected that students are already familiar with the basic evolutionary and ecological principles and have completed at least 2 courses in ecology and evolutionary biology.

Over the course of the semester students will:

- Become familiar with the ecology, physiology, population biology management, and protection of vertebrate wildlife species through case studies and appropriate readings.
- Be introduced to the complex problems associated with the management of small or declining vertebrate populations.
- Become acquainted with the historical and socio-political background of wildlife conservation sufficiently to understand the real-world constraints, traditions, and diverse viewpoints involved in vertebrate biodiversity conservation and management.
- Develop analytical problem-solving skills and will gain experience in data interpretation and graphical and mathematical models.
- Expand their ability to conduct wildlife research and utilize the primary wildlife literature.

**Hence, by the end of the semester...** students should be intimate with many current wildlife ecology issues, demonstrate an ability to analyze data, work in groups, apply primary scientific literature to management decisions, be objectively skeptical and able to ask critical questions, have enhanced written and oral communication skills, and gain exposure to wildlife professionals and conservation agencies.

**Required Readings:**

1. A diversity of scientific publications associated with lectures and discussions (*to be downloaded from the Canvas website*)
2. Additional background materials are placed on reserve at the Reserve Desk in the Undergraduate Library.

## **Course Outline:**

### **Lectures** (subject to change)

<b><u>Date</u></b>	<b><u>Lecture</u></b>
Thursday Jan. 9	Course Intro; Focus, origins, and historical developments of Wildlife Ecology
Tuesday Jan. 14 Thursday Jan. 16	Wildlife habitats – Characteristics and management Wildlife habitat selection, use, and measurement
Tuesday Jan. 21 Thursday Jan. 23	Population size, vital rates, structure Population structure, growth; Lotka-Volterra
Tuesday Jan. 28 Thursday Jan. 30	Population structure and its significance for management- Leslie Matrices Consumer-Resource relationships: Herbivory
Tuesday Febr. 4 Thursday Febr. 6	Predation and wildlife I Predation and wildlife II
Tuesday Febr. 11 Thursday Febr. 13	Wildlife parasitism and disease I Wildlife parasitism and disease II
Tuesday Febr. 18 Thursday Febr. 20	Wildlife parasitism and disease III Wildlife energetics and metabolism I
Tuesday Febr. 25 Thursday Febr. 27	Wildlife energetics and metabolism II Food, nutrition, and digestion I
Tuesday March 10 Thursday March 12	<b><i>Midterm Exam</i></b> Food, nutrition, and digestion II – Water physiology
Tuesday March 17 Thursday March 19	Water physiology; Migration-animal movement I Migration-animal movement II
Tuesday March 24 Thursday March 26	<b><i>Guest Lecture</i></b> Behavior – Life history evolution I
Tuesday March 31 Thursday April 2	Behavior – Life history evolution II; Threats to wildlife I Threats to wildlife II
Tuesday April 7 Thursday April 9	Management of small populations; Global climate change & wildlife I Global climate change & wildlife II
Tuesday April 14 Thursday April 16	Agriculture and wildlife Urban wildlife ecology and management
Tuesday April 21	<b><i>Review of course – Take-home Exam</i></b>

## **Discussions / Labs / Field trips** *(subject to change)*

Locations will vary according to discussion subject.

<b><u>Date</u></b>	<b><u>Topic</u></b>
Friday Jan. 17 Discussion/Lab 1	History of Wildlife Ecology; reading & film screening followed by discussion (Dana 2520)
Friday Jan. 24 Discussion/Lab 2	Birds: Morphology, Ecology and Identification Lab.
Friday Jan. 31 Discussion/Lab 3	Mammalian Evolutionary Ecology Lab
Friday Febr. 7 Discussion/Lab 4	Mammal Identification Lab
Friday Febr. 14 Discussion/Lab 5	Ethics and public perceptions in Wildlife Conservation: Deer management in the US - Class Debate. (Dana 2520)
Friday Febr. 21 Discussion/Lab 6	<i>Field Trip</i> - Arboretum: Introduction to animal detection and identification (meet at the Arboretum's Reader Center, Washington Heights, across from Mott Children's Hospital)
Friday Febr. 28 Discussion/Lab 7	<i>Field Trip</i> - Wetland: Avian Ecology and Behavior (Location TBD; meet in Dana 2520)
Friday March 6	<i>No Discussion - SPRING STUDY BREAK</i>
Friday March 13 Discussion/Lab 8	<i>Field Trip</i> - Ann Arbor City Parks: Wildlife vegetation evaluation and impacts (meet in Dana 2520).
Friday March 20 Discussion/Lab 9	Wildlife disease and parasite diversity - Lab (Dana 2520)
Friday March 27 Discussion/Lab 10	<i>Field Trip</i> - Arboretum: Introduction to wildlife censusing. (meet at the Reader Center)
Friday April 3 Discussion/Lab 11	Population Viability Analysis: Age structured populations and sustainable harvest.
Friday April 10 Discussion/Lab 12	<i>No Discussion - SEAS Capstone symposium.</i>
Friday April 17	Group presentations and Social Event. (Dana 2520).

## **Field Trips**

Locations will vary but will be mostly located in Washtenaw country (e.g. Nichols Arboretum, Ann Arbor city parks, etc.). Field trip details will be announced the week before. Come dressed for appropriate field conditions!

### **Evaluation:**

15%	Lab reports and lab handouts
20%	Midterm Exam
5%	Leading a discussion
25%	Final group research paper (15 pages)
5%	Oral presentation of group research project
25%	Second Exam (take home)
5%	General class participation incl. completion of field notebook

### **Assignment / Evaluation Details:**

#### **Leading Discussion**

Small groups of 2-4 students are expected to lead one discussion/lab session. Working with your instructor each group will design a brief (powerpoint, if in lab) presentation providing background to the material covered in a given week. Group members are also expected to lead the discussion of the assigned reading for that week. Performance will be evaluated based on depth of preparation and quality of presentation.

#### **Field Notebook**

Every student is required to submit at the end of the semester a field notebook with records/observations of 30 different bird species including explanation/justification of how a species was identified. At a minimum, each record should include a date, location, weather conditions, species ID, justification for the ID (e.g. which morphological criteria were used); optional additional information might include behavioral observations and a line drawing. To be turned in by the end of lab (17-April). There will be a contest with prizes, for best looking field notebook! Hint: Start your notebook early and have fun! Go out with other classmates - more eyes see more species.

#### **Group 15-page Paper**

- 1 paragraph topic summary Due: January 31 (in Discussion).
- Detailed paper outline by the beginning of Spring Break.
- Final version due: by the end of the semester (last day of regular lecture Tuesday, April 21).
- Length: 15 pages text (not including literature cited, tables, and figures), double-spaced, 1-inch margins, 11-point font.
- In groups of 2-4, students will focus on a specific wildlife issue to discuss in the paper. Both topic and approach are open, as long as the academic/intellectual level is sufficiently rigorous. You should discuss your research ideas with your instructors before the official submission deadline. Students are encouraged to pick a research question that can be answered through collection of one's own field data. Such data will then be analyzed and presented in the paper (possible examples of such possible topics include: quantification of deer damage to vegetation in Ann Arbor parks, analysis of foraging strategies in chickadees, antipredator defenses in fox squirrels, behavioral analysis of zoo amphibians, etc.). If a field problem is not possible, students may pursue a library project, especially if it involves a quantitative analysis of existing data (e.g. a meta-analysis) and a substantial review of the literature. Possible topic examples include: effects and management of livestock grazing on wildlife, human-predator conflict, invasive diseases and their impact on wildlife, illegal hunting of bushmeat etc.
  - o Some suggestions: Define the problem in detail with special attention to the biologically pertinent dimensions of the situation. Draw on the primary literature to explain the biological and ecological dimensions of the topic. Articulate clearly any hypotheses you might be testing. If appropriate, explore potential management solutions to the problem, that are scientifically sound and socially/economically feasible, drawing on concepts and tools learned throughout the course.
- See 'TERMPAPER Guidelines.doc' in Canvas for further writing guidelines and criteria.

#### **Group Oral Presentation**

- 1 paragraph topic summary Due: January 24 (in Discussion). Topic should, but does not have to be, related to the group research paper topic.

- You will give your presentation in the last discussion section of the semester (Friday, April 10). Come prepared with your presentation on a Jump Drive, Google Docs, or bring a laptop to hook up to the projector!
- Length: 15 minutes plus 5-minute question/answer period. (Strictly enforced!)
- In groups of 3-4 people, select a topic that you wish to present—educate us about something interesting. The only stipulations for the presentation are (1) that your presentation is grounded in wildlife science; and (2) that each member of your group delivers a portion of the presentation. You will be evaluated on the depth of your analysis, and on your organization and delivery of the topic.
- Be careful to avoid a few common mistakes when developing and delivering your presentation:

\*Avoid putting too much information on any one slide. Your listeners should be paying attention to your verbal delivery of the material. To avoid this, use broad headings or bullet points to highlight the topics you wish to discuss.

\*Don't forget to Practice Your Talk! You have 15 minutes to inform us about your topic, and every person in the group must have a chance to talk. As interesting as your material may be, you will have to be cut off at the 15 minute mark, to ensure that everyone has adequate time to present.

\*Don't wait until the last minute to ask questions about your presentation. Come to office hours, email me or your GSI, to get any issues worked out early!

### **Exams**

- The midterm exam will be testing your knowledge on all of the course material offered to that point, including lectures *and* all primary literature readings. You should expect a mixed format including a few multiple choice as well as several essay questions. You are expected to know species names (both common and scientific name) for those cases where the species is mentioned as an example of an important concept. Unless stated otherwise, you are not expected to memorize equations, but you are expected to understand their meaning and the relationship between the different variables, and be able to manipulate them.
- The second exam has a take-home format. It allows you the opportunity to showcase your knowledge, understanding and synthetic ability of the materials covered in the course of the semester. It is challenging, as you will be evaluated on your ability to integrate diverse principles from the ecology, physiology and population biology of vertebrate wildlife and on the clarity, specificity, and succinctness of your writing. Questions will be geared towards conceptual understanding although you should also expect substantial questioning on fact-based details. You will be able to utilize both course-related (lecture materials, course readings) and other, quality sources (primary literature, library books etc.).
- For discussions, you will find that readings focus mostly on articles from the primary literature. While you may find reading these articles challenging, their inclusion serves a dual purpose. First, they familiarize you with the language that scientists use to communicate in, and second, inform you about some of the cutting-edge issues in wildlife biology.

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### **Class Policies:**

*Inclusive Classroom:* UM students represent a diversity of individual beliefs, backgrounds, and experiences. An equitable and inclusive classroom is important to me, and I do not wish to exclude anyone from a positive learning environment. I try to use a variety of teaching approaches and examples, and I ask that in all activities every member and instructor of this class show respect for others. If you have a concern about an event, comment, or course content that affects your own or another student's comfort or learning experience, please don't hesitate to speak with an instructor about it.

*Assignment Submission:* All discussion assignments/lab reports are due at the beginning of the discussion or lecture session listed on assignment overviews (generally one week after work was assigned). One letter grade of your final assignment grade (this includes second exam and final research paper) will be reduced per day your assignment is late, unless you have received prior permission from your instructor to turn it in late.

You are expected to attend lectures and all lab/discussion sections. If you think you cannot make a certain lab, make sure to contact your instructor ahead of time.

*Grade Changes:* Once a graded assignment has been returned to you, you have one week to appeal for grade changes or re-grading if you feel your assignment has been unfairly or incorrectly judged in some way. You must make your case in writing to your instructor if this is the case. After this one-week period, no appeals will be accepted. Be aware that re-grading involves “starting from scratch” on the grading process and may possibly result in you earning fewer points than the initial grade given.

*Extra Time on Exams:* If you have been diagnosed with a condition that necessitates the allocation of extra time on exams, then you should make the instructors aware of your situation before the exam takes place. The instructors reserve the right to request official documentation of your condition from the UM Office of Services for Students with Disabilities or another qualified source.

*Group Project Grievances.* In group projects, the situation occasionally arises where one member of the group puts substantially less effort in the project than other members, thus jeopardizing the entire group’s final performance. When such situations occur, you are encouraged to first try to work the problem out within your group. If the problem persists then you should make it known to your instructor so that appropriate action(s) can be taken. You should deal with this early on, and definitely notify your instructor prior to the assignment due date.

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**Reserve Book List - Partial (available at the Undergrad library: Reserve desk)**

Caughley G. and A. R. Sinclair. 1994. *Wildlife Ecology and Management*. Blackwell Press.

Collins, J. and M. Crump. 2009. *Extinction in Our Times: Global Amphibian Decline*. Oxford University Press, New York.

Eldredge, N. 1998. *Life in the Balance: Humanity and the Biodiversity Crisis*. Princeton University Press, New Jersey.

Godfrey M. *Restoring the tortoise dynasty*. Charles Darwin Foundation, 1999.

Middleton, S., and D. Liittschwager. 1994. *Witness: Endangered Species of North America*. Chronicle Books, San Francisco.

Mills, S. L. 2007. *Conservation of wildlife populations. Demography, Genetics and Management*. Blackwell Publishing.

Primack, R.B. 1993. *Essentials of Conservation Biology, Third Edition*. Sinauer Associates Inc., Sunderland, MA.

Leopold, A. 1949. *A Sand County almanac*. Oxford University Press, New York.

Sinclair, A. R. 2006. *Wildlife Ecology Conservation and Management*. Blackwell Press.

Wilson, E.O. 1988. *Biodiversity*. National Academy Press.

Botkin, D. 1990. *Discordant harmonies: A new ecology for the 21st century*. Oxford University Press, New York.

**Some helpful notes about literature citations:**

First, a reminder – the quality of your paper is very much a function of the quality of the literature you utilize. One purpose of the term paper is to introduce you to the scientific literature, often referred to as “primary” literature. Examples include articles from research journals such as *Journal of Wildlife Diseases*, *Ecological Applications*, and the *Journal of Wildlife Management*. Textbooks and review articles that are based on primary literature are referred to as “secondary”. Magazine articles such as *Time*, *The Atlantic Monthly*, and *Audubon Magazine*, are the “popular literature”. *Scientific American*, perhaps *The Smithsonian*, fall somewhere in between popular and secondary literature. Newspaper articles are newspaper articles.

A term paper that makes sophisticated use of primary literature is likely to be much stronger than one that draws most heavily from web sites and the popular literature. **At least 80% (or at least 30) of your citations**

**should be from the primary literature.** Fourty would be better. Avoid citations from popular literature. Use web sites as sources only very sparingly, and be sure they are authoritative (e.g., government web sites or very reliable non-governmental organizations like The Fish and Wildlife Service; -- 'Crazy Bob's Weather Page' does not cut it!). Papers that rely heavily on web sources usually turn out to be less substantive, and receive poorer grades.

### Using the Web

The internet provides enormous access to information. By all means, use it. There are pitfalls, however. How good is the information you get from the internet? The strength of the primary literature is its careful and rigorous review process. A study published in the *Journal of Wildlife Ecology* was submitted to the journal editor, who sent it to at least two other scientists known to be experts in the same field. After a thorough, anonymous review by these peer reviewers, the editor may reject the paper (probably the fate of three quarters of the papers submitted), or accept it after the author makes careful and thorough revisions. Then the paper is published. Now, what about that report you found on the web? No controls, no review, nada. It may look good, but it may still be bogus. The one exception to this rule are government reports (e.g. Fish and Wildlife Service) that you may access on the internet.

Below are some rules on the use of internet resources:

1. Use the web as much as you like, to get started. You'll find interesting stuff. You can use these sites to identify primary sources which you can then access.
2. **You must still use the primary literature.** See the bolded sentences just above.
3. You may include (a few) web citations. Cite them appropriately (see following pages).
4. Web sources vary in quality. I am much more positively inclined to credit information coming from NASA's home page than say the previously mentioned "Crazy Bob's Weather Page". Be careful to rely on quality web sources. It is your job to discriminate among web sources in terms of their quality.

Be aware of the temptations to plagiarize ("to steal [the language, ideas or thoughts] from another, representing them as one's own original work"). The reason we cite the work of others, in term papers and scientific papers, is to give credit to the work of others, to add authority to our claim (we aren't just making unfounded claims – our conclusions are based on someone's careful study), and to be honest about our own contribution and role. Any substantial claim or argument that you make, if it evolved directly out of your reading of the works of others, should be cited. It is OK to use limited text from a specific source as long as you cite the source, and put the text in quotation marks ("").

Typically, students encounter problems with citations and plagiarism not because they purposefully make incorrect use of the work of others, but because they are still learning the rules. We hope this will help you learn those rules. Plagiarism will not be tolerated and will result in the loss of credit for the course and the application of all university procedures for dealing with such a transgression.

### Format for Literature Citations

Literature citations in your term paper should follow the format below. For references not listed, refer to: Council of Science Editors (CSE). 2014. *Scientific Style and Format: the CSE Manual for Authors, Editors, and Publishers*. 8<sup>th</sup> Edition, Tye University of Chicago Press, Chicago.

#### A journal or magazine article:

Dale, J., Dey, C.J., Delhey, K., Kempenaers, B. and M. Valcu. 2015. The effects of life history and sexual selection on male and female plumage colouration. *Nature* 527: 367-370.

#### A book:

Merritt, J.F., 2010. *The biology of small mammals*. JHU Press, Baltimore.

#### Chapter in book:

Southwood, T.R.E. 1981. Bionomic strategies and population parameters. Pages 30-52 in R.M. May, ed., *Theoretical Ecology*. Sinauer Associates, Sunderland, MA.

#### Technical report:

Lassiter, R. R., and J.L. Cooley. 1983. Prediction of ecological effects of toxic chemicals, overall strategy and theoretical basis for the ecosystem model. EPA-600/3-83-084. National Technical Information Service PB 83-

261-685, Springfield, VA.

**Newspaper article:**

Blakeslee, S. Scientists Hope to Bring a Galápagos Tortoise Species Back to Life. *New York Times*. 2015 Dec. 14.

**Personal communication:**

Jones, M.R. 30 February 2015. Personal communication.

**Web Sources (use this reference for guidance if necessary):**

Columbia University Press. 2002. The Columbia Guide to Online Style.

[http://www.columbia.edu/cu/cup/cgos/idx\\_basic.html](http://www.columbia.edu/cu/cup/cgos/idx_basic.html) (5 September 2004).