

ERS 346 - Wildlife Ecology

Lecture: Asynchronous recordings will be made available each Monday morning at 9am (all times are presented for the Eastern Time Zone. detailed schedule below)

Lab: Wednesdays 11:30am-1:00pm, Online virtual classroom via LEARN

Professor:

Dr. Brad Fedy

e-mail: bfedy@uwaterloo.ca

Given the remote-delivery model of the course this semester, most student questions and concerns will be addressed through the Discussion Boards or e-mail. We will also be meeting synchronously to cover the lab component of the course each week and students will be allowed to ask questions at those meetings also, when possible. Dr. Fedy will be available for one-on-one meetings (i.e., Office Hours) every Monday from 1 - 2pm Eastern Time Zone. These meetings will be available in 15 min. time intervals and will be held through the Virtual Classroom function in LEARN. To request a time slot please send an e-mail request to Dr. Fedy via LEARN with the subject heading "Office Hours". You will then be assigned the next available time slot. If you would like to meet and cannot make office hours, please send Dr. Fedy an e-mail to find an alternative, mutually agreeable, time to meet. ***Please expect, at least a 2 day turnaround for an e-mail response.*** Sometimes it will be quicker, sometimes slower.

Communication

Please use LEARN Discussion Forums for course-related questions and communications, rather than email. There are two forums: (1) Admin and general discussion, and (2) Lab discussion. The admin forum will be monitored by the course instructor and TA to facilitate timely, accurate response. This is the place for all questions regarding course content and scheduling. The Lab discussion forums are there for students to help each other with the Lab assignments. If you are having trouble with some of the programming, you can post questions here for your classmates to help with.

If necessary, personal questions may be directed as follows:

Admin: You may send questions related to Dropbox, late enrolment, and late lab assignments to the TA via LEARN.

Grading: Email the TA using LEARN.

Lecture: It is reasonable (and encourage) to post questions regarding lecture content within the general discussion group. Personal or private questions regarding the lectures can be addressed by booking a time during Dr. Fedy's weekly office hours.

We aim to respond to forum posts and necessary emails within 24-48hrs, except over weekends.

Calendar Description

This course introduces the main concepts and principles of wildlife ecology. Topics covered include: population dynamics, animal behavior, habitats, genetics, predation, and habitat use. The lab component will introduce students to wildlife data collection, analysis, and interpretation.

Course Goals

This course will provide an introduction to the main concepts and principles of wildlife ecology and management. Modern approaches to wildlife management and conservation often require the use sophisticated quantitative methods. This is not a statistics course; however, students will be introduced to the basic principles of quantitative ecology including study design, data collection and analysis, and simulation modeling. Understanding these basic quantitative principles will help students determine the reliability and quality of the information provided by researchers. Students will have the opportunity to explore data and model development through the lab component of the course. R is a powerful and flexible statistical software that we will use throughout the course to better understand the principles presented in lecture. Students will also collect field data on the local wildlife populations around the University of Waterloo and will develop models in lab to better understand the space use patterns of these species.

Overall, it is my goal to provide you some tools to think clearly and critically about wildlife research and provide the basics for understanding the biology and ecology of a suite of taxa including birds, mammals, and herpetofauna. I also want to provide you with working knowledge of R programming language and an introduction to the use and power of this tool. Computer programming is an important skill for modern ecologists. This course will provide an introduction.

Lecture Schedule

Lectures will be released as video files through LEARN at 9am Eastern Time on the dates listed in the table below. Lecture content will be approximately 1.5 hours of pre-recorded material. Students are expected to watch the content prior to the synchronous lab meetings that will occur every Wednesday from 11:30-1pm Eastern Time (see table below). Readings are meant to support the lecture content and should be read prior to lecture. The content presented in the readings may be included on the midterm or final. Individual readings are all available on LEARN as .pdfs and the the textbook is available electronically through course reserves. A complete list of references is available under Required Readings.

Date	Topic	Readings
Jan. 11	L1: Course overview; the scientific method	Sells et al. 2018; Garton et al. 2012: p. 1-12
Jan. 18	L2: Wildlife: Mammalogy, Ornithology, and Herpetology	
Jan. 25	L3: Habitat, Movement, Dispersal, and Distributions	Chapters 3 and 4
Feb. 1	L4: Population Dynamics	Chapter 5

Feb. 8	L5: Competition, Predation, and Disease	Chapters 6, 7, and 8
Feb. 15	Reading Week - no class	*Confidentiality Form must be submitted*
Feb. 22	MIDTERM (Lecture 1 - 5)	
Mar. 1	L6: Wildlife Management	Organ et al. 2012
Mar. 8	L7: Sampling and Counting	Chapter 12
Mar. 15	Cancelled by UW administration	
Mar. 22	L8: Wildlife Capture and Handling	Schemnitz et al. 2012 Silvey et al. 2012
Mar. 29	L9: Harvest Management and Wildlife Control	Chapters 18 and 19
April 5	L10: Population Models	Benton et al. 1999; Ticktin et al. 2012
April 12	L11: Genetics	Oyler-McCance and Leberg 2012

A note on lecture materials: Lectures will be recorded as narrated video files. Dr. Fedy will also provide a .pdf document of all lecture slides. Transcripts will not be provided. It is critical that you practice and develop the capacity to absorb and process information that is presented through audio and video. The lecture content is your opportunity to further develop your note taking skills. Because the lectures are recorded you can always pause, repeat, or slow down content. The text book is your opportunity to refine your capacity to absorb information from text.

Tips on effective note taking can be found here:

<https://uwaterloo.ca/student-success/resources/note-taking-reading>

Lab Schedule

Date	Topic	Lab Due Dates*
Jan. 13	Module 1 - Beginning with R	
Jan. 20	Module 2 - Operators and Functions	Module 1
Jan. 27	Module 3 - Getting Started with Data	Module 2
Feb. 3	Module 4 - Graphics	Module 3
Feb. 10	Module 4 - Graphics	
Feb. 17	Fall Break - no classes	
Feb. 24	Module 5 - Exploring Data with Graphics	Module 4
Mar. 3	Module 6 - Spatial Data	Module 5
Mar. 10	Module 6 - Spatial Data	
Mar. 17	Cancelled	
Mar. 24	Module 7 - Population Projection Models	Module 6
Mar. 31	Module 7 - Population Projection Models	
Apr. 7	Open Lab to meet re: assignments	

*** Assignments are due before lab (11:30 am) on the date indicated above. All assignments must be uploaded to LEARN as .pdf documents.**

Electronic Delivery

The course has a dedicated web page that you can access through UW's LEARN system (<http://learn.uwaterloo.ca>). All course materials will be provided through the site. I will also use the LEARN site to post general messages to the class. I encourage you all to become familiar with the site as soon as possible and to check for updates on the site on a regular basis. All assignments must be handed in through LEARN as .pdf documents.

Required Readings

There are required readings that expand upon topics covered in lecture. Required readings for the course are mostly from Fryxell et al. 2014, which is electronically accessible from the library, or they will be provided through LEARN. The majority of your out-of-class time will be spent on the lab component of the course.

Text on e-Reserve

I have arranged for electronic access to Fryxell et al. (2014) through the University of Waterloo library. ([Wildlife Ecology, Conservation, and Management](#)). You should be able to access this from anywhere provided you login to your library account. You can also access it through library course reserves. There are limitations to what you can download, but you should always be able to access for reading while online.

Textbook:

Fryxell, J. M., A. R. E. Sinclair, and G. Caughley. 2014. *Wildlife ecology, conservation, and management*. Third Edition. John Wiley & Sons, Ltd. West Sussex, United Kingdom

Other readings (see lecture schedule above for each week):

Benton, T. G., and A. Grant. 1999. Elasticity analysis as an important tool in evolutionary and population ecology. *Trends in Ecology & Evolution* 14:467–471.

Garton, E. O., J. S. Horne, J. L. Aycrigg, and J. T. Ratti. 2012. Research and Experimental Design. Pages 1–12 in N. J. Silvy, editor. *The Wildlife Techniques Manual: Research*. 7th edition. Volume 1. John Hopkins University Press, Baltimore, Maryland.

Organ, J. F., V. Geist, S. P. Manohey, S. Williams, P. R. Krausman, G. R. Batcheller, T. a. Decker, R. Carmichael, P. Nanjappa, R. Regan, R. a. Medellin, R. Cantu, R. E. McCabe, S. Craven, G. M. Vecellio, and D. J. Decker. 2012. *The North American Model of Wildlife Conservation*. The Wildlife Society Technical Review. The Wildlife Society, Bethesda, Maryland.

- Oyler-McCance, S. J., and P. L. Leberg. 2012. Conservation genetics and molecular ecology in wildlife management. Pages 526–547 *in* N. J. Silvy, editor. The Wildlife Techniques Manual. 7th edition. John Hopkins University Press, Baltimore, Maryland.
- Schemnitz, S. D., G. R. Batcheller, M. J. Lovallo, H. B. White, and M. W. Fall. 2012. Capturing and Handling Wild Animals. Pages 64–117 *in* N. J. Silvy, editor. The Wildlife Techniques Manual: Research. 7th edition. Volume 1. John Hopkins University Press, Baltimore, Maryland.
- Sells, S. N., S. B. Bassing, K. J. Barker, S. C. Forshee, A. C. Keever, J. W. Goerz, and M. S. Mitchell. 2018. Increased scientific rigor will improve reliability of research and effectiveness of management. *Journal of Wildlife Management* 82:485–494.
- Silvy, N. J., R. R. Lopez, and M. J. Peterson. 2012. Techniques for Marking Wildlife. Pages 230–257 *in* N. J. Silvy, editor. The Wildlife Techniques Manual: Research. 7th edition. Volume 1. John Hopkins University Press, Baltimore, Maryland.
- Ticktin, T., R. Ganesan, M. Paramesha, and S. Setty. 2012. Disentangling the effects of multiple anthropogenic drivers on the decline of two tropical dry forest trees. *Journal of Applied Ecology* 49:774–784.

Lab Component

The course has a mandatory lab that meets on Wednesday. Attendance at the lab is highly recommended. Each week, we will work through a set of exercises. A short assignment is associated with approximately half of the lab sessions. The lab sessions will focus on introducing the students to R software and programming. Students are strongly encouraged to review the lab material in the lab manual prior to attending the weekly lab sessions. All of the information required to complete the weekly lab assignments is contained within the lab manual.

Assignments

There are a suite of assignments associated with the lab component of this course. Lab sessions are typically spread across two weeks. These assignments are short, so do not let the number of them worry you. There is one major assignment due throughout the course that will rely on the basis of analysis that we develop throughout. More details on the assignment will be provided during the course; however, they are briefly outlined here.

- **Matrix population modeling** - For the assignment we will use simulated data to understand how wildlife populations change and what features of animal life history have the greatest influence on fluctuations in population numbers. I will provide more details on this assignment as the course progresses.]

Assessment

		Due date
Lab assignments (6 total)		

<i>Module 1</i>	<i>1%</i>	Jan. 20
<i>Module 2</i>	<i>2%</i>	Jan. 27
<i>Module 3</i>	<i>4%</i>	Feb. 3
<i>Module 4</i>	<i>4%</i>	Feb. 24
<i>Module 5</i>	<i>4%</i>	Mar. 3
<i>Module 6</i>	<i>10%</i>	Mar. 24
Total	25%	
Confidentiality Form	NA	February 18 by 1700 h
Midterm examination	25%	February 22
Population modeling assignment	20%	April 16 by 1700 h
Final examination	30%	TBA; During final exam period

Late policy and extensions

Assignments will be assigned a late penalty of 10% per day up until 5 days after which assignments will not be accepted. The midterm and final examinations will not be accepted late and must be completed within the allotted time window of 24 hours. Students are expected to have access to a functioning computer that can access LEARN and run the most current version of R statistical software and RStudio. Remote access to UW computers (all of which have R and RStudio installed) can be arranged through the Faculty of Environment's Computer support group: Mapping Analysis and Design (MAD). There are six lab modules and one final group assignment. Any exceptions to the late policy outlined above will only be accommodated for documented medical reasons.

Academic integrity

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check [the Office of Academic Integrity](#) for more information.] You are expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for your actions. If you are unsure whether an action constitutes an offence, or need help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration, please complete the tutorial at <http://www.lib.uwaterloo.ca/ait> and seek guidance for the course professor, your Undergraduate Advisor, or the office of the Associate Dean - Undergraduate.

The "Confidentiality Agreement & Statement of Honesty Form" in the General Course Documents folder needs to be signed and submitted on LEARN prior to the midterm exam. The form must be submitted by February 18 at 1700 h Eastern Time. If you do not sign and submit the form on time, you will not have access to the midterm or the final exam and will therefore receive a grade of zero for those assessments.

Grievance

A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70, Student Petitions and Grievances, Section 4](#). When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline

A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for his/her actions. [Check [the Office of Academic Integrity](#) for more information.] A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to [Policy 71, Student Discipline](#). For typical penalties, check [Guidelines for the Assessment of Penalties](#).

Appeals

A decision made or penalty imposed under [Policy 70, Student Petitions and Grievances](#) (other than a petition) or [Policy 71, Student Discipline](#) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to [Policy 72, Student Appeals](#).

Note for students with disabilities

[AccessAbility Services](#), located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

Intellectual Property

Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo. Intellectual property includes items such as:

- Lecture content, spoken and written (and any audio/video recording thereof);
- Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
- Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
- Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual

property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights.

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

Mental Health

The University of Waterloo, the Faculty of Environment and our Departments/Schools consider students' well-being to be extremely important. We recognize that throughout the term students may face health challenges - physical and/or emotional. **Please note that help is available.** Mental health is a serious issue for everyone and can affect your ability to do your best work. Counselling Services <http://www.uwaterloo.ca/counselling-services> is an inclusive, non-judgmental, and confidential space for anyone to seek support. They offer confidential counselling for a variety of areas including anxiety, stress management, depression, grief, substance use, sexuality, relationship issues, and much more.

Religious Observances

Students need to inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and assignments.

Unclaimed assignments

Unclaimed assignments will be retained until one month after term grades become official in quest. After that time, they will be destroyed in compliance with UW's [confidential shredding procedures](#).

Communications with Instructor

All communication with students must be through either the student's University of Waterloo email account or via Learn. If a student emails the instructor or TA from a personal account they will be requested to resend the email using their personal University of Waterloo email account.

Recording lectures

- Use of recording devices during lectures is only allowed with explicit permission of the instructor of the course.

- If allowed, video recordings may only include images of the instructor and not fellow classmates.
- Posting of videos or links to the video to any website, including but not limited to social media sites such as: facebook, twitter, etc., is strictly prohibited.

Co-op interviews and class attendance

Co-op students are encouraged to try and choose interview time slots that result in the least amount of disruption to class schedules. When this is challenging, or not possible, a student may miss a portion of a class meeting for an interview. Instructors are asked for leniency in these situations; but, a co-op interview does not relieve the student of any requirements associated with that class meeting.

When a co-op interview conflicts with an in-class evaluation mechanism (e.g., test, quiz, presentation, critique), class attendance takes precedence and the onus is on the student to reschedule the interview. CECA provides an interview conflict procedure to manage these situations.

Students will be required to provide copies of their interview schedules (they may be printed from WaterlooWorks) should there be a need to verify class absence due to co-op interviews.