Forest and Wildlife Ecology 561 – Wildlife Techniques

Instructors

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Office Hours: By appointment

Time and Location

Lecture Monday 8:45-10:45 AM (104, Russell Labs)
Lab Tuesday-Thursday 7:45-10:45 AM (A228, Russell Labs, unless specified otherwise)

Overview

FWE561 is a survey of the techniques and methodologies that wildlife biologists use to conduct research, and make management decisions. Biologists have many techniques in their 'toolbox'. We will discuss current techniques we think you are likely to use early in your career. A biologist's choice of a technique is dependent on the question they're answering and hypothesis they're testing, but almost always subject to logistical constraints.

We have organized the course using a week-by-week approach, highlighting both traditional and "cutting-edge" techniques used to study free-ranging animal populations. A highlight of the course is the emphasis on pairing hands-on activities in the field with data organization and summary. Included is a detailed course syllabus that contains a description of goals, lecture and lab topics, and activities, covered each week.

Weekly Topics

Week	Date	Lecture	Instructor	Lab
1	9/1	Labor Day ***Labs only, no Lecture***	JNP	Intro to course and data management -- compass, GPS, radio telemetry
2	9/8	Outside projects / GIS and GPS	JNP	ArcGIS exercise
3	9/15	Animal capture and immobilization	JNP	Squirrel captures (meet @ Bill's Woods)
4	9/22	Telemetry I	JNP	Tracking squirrels (meet @ Bill's Woods)
5	9/29	Vegetation survey*****	JNP	Vegetation survey (meet @ Bill's Woods)
6	10/6	Animal behavior*****	JNP	Turkey observations (meet @ 0730)
7	10/13	Animal surveys	RSL	Waterfowl surveys
8	10/20	Indices*****	RSL	Collect cameras – summarize carnivore index
9	10/27	Occupancy models I	RSL	Occupancy problem sets
10	11/3	Occupancy models II*	RSL	Occupancy problem sets (combine with week 9)
11	11/10	Disease ecology	GL	Necropsy
12	11/17	Non-invasive sampling	JNP	DNA fragment analysis of carnivore scat samples
13	11/24	Herptile surveys	GL	Thanksgiving Break ***Lecture only, no lab***
14	12/1	Stable isotopes (SI)*****	JNP	SI analysis of squirrels
15	12/8	Telemetry II*	JNP	Analysis of squirrel home ranges

*****"full" lab write-up required; brief reports should be submitted for the remaining weeks (see details below)

Teaching approach
We rely on 5 approaches in this class: reading, lectures, quizzes, writing and doing.

Readings
Our text offers an encyclopedic and up-to-date compilation of most wildlife techniques and their applications:

Silvy, N. J., editor. 2012. The Wildlife Techniques Manual: Research. Seventh edition. Volume 1. John Hopkins Press, Baltimore, Maryland and The Wildlife Society, Bethesda, Maryland, USA.

We have placed a copy of our text on Reserve in Steenbok library as well as in the FWE 561 cabinet in Room A228. We will also augment course readings with assigned peer-reviewed articles, which will be posted at the course website (Learn@UW). The essence of each week's lesson is the assigned readings – during this course the student will be assigned readings from about half of the text. We will lecture on the readings to highlight the key concepts and provide context. Readings are designed to help promote understanding; students will also be tested on these concepts via weekly quizzes. ***(See the reading list appended to this syllabus)***

Lectures
Lectures will be split between Drs. Lutz (RSL) and Pauli (JNP) with occasional guest speakers (GL). Lectures will introduce the conceptual framework to a new technique, which the class will be employing during that week's laboratory. In addition to providing context and understanding for subsequent field work, students will also be tested on these concepts presented via weekly quizzes.

Quizzes
We will assess your grasp of techniques using weekly quizzes. Quizzes will be given either during lecture or lab and will cover material principally from lecture and readings, but may also include material covered in labs and other coursework material. Quizzes will consist of 5-10 short answer questions and will comprise 40% of your final grade.

Lab Participation
This class is designed for you to "learn-by-doing." Consequently, you will not learn (nor receive a good grade) unless you are actively participating in laboratory and field exercises.

Extramural Work
A common thread throughout the semester is your work on squirrels within Bill's Woods. As part of that effort you will be required to radio-track your lab's radio-collared squirrels a minimum of five times during the semester (outside of class time) and ensure that your lab's squirrel has been relocated twice a week for our home range lab (week 15). We will present details on scheduling radio-tracking in week 2 of lecture.

Lab Notebook
During the course, you are required to assemble a personal 'techniques manual' lab reports. Although laboratory exercises are done in groups, we expect each student to prepare their own laboratory reports. To facilitate lab reporting, we suggest you take field notes in a personal notebook. Traditionally, field biologists used bound surveyors' notebooks (4"x 6") with rite in the rain paper, but any notebook will do in our class. Your lab reports should report on the result of activities and tasks during lab. Some weekly topics will require reference to data compiled in previous classes, and we will provide these data when needed. When you collect data in Lab, we require that the hard copy of your data be stapled into your Lab notebook. You will be expected to write-up a report for each lab; roughly two-thirds will be brief reports (or memos); the remaining (one-third) will be full reports (denoted with ***** in the above calendar) featuring a structure similar to that found in journal articles.

For "memos" you will provide a short (no more than 2 pages of text) summary of the day's activities as well as append any tables and figures that you're instructed to make during class. Although shorter, these should be treated as a professional memo to a supervisor that summarizes your efforts in the field and laboratory, and what you learned. ***A template for these short memos is appended to the syllabus***.

Those "full" lab write-ups (i.e., again, denoted with a * above: vegetation survey, animal behavior, stable isotope, occupancy models, telemetry II) should be composed of a maximum of 5-6 pages. Subheadings in your write-up should be: Introduction, Materials, Results, and Discussion. In the introduction you should describe the goals of the lab exercise and identify the tasks, Materials should describe the materials used during the exercise, Results will display the data you collected during the exercise and the Discussion should include tips to remind yourself of how to use the equipment along with examples of when you could use the techniques. The last piece of the Discussion will be for you to find an example of how this technique was used in the published literature and summarize how the technique was used in 3-4 sentences. We'd like you to restrict your inclusion of literature to the following journals: The Auk, Condor, Conservation Biology, Ecology, Ecological Applications, Journal of Herpetology, Studies in Avian Biology, Wildlife Society Bulletin, J. of Wildlife Management, Wildlife Professional, or Wilson Journal of Ornithology (Wilson Bulletin). For the sake of consistency, we require that you use the style guidelines for writing in The Wildlife Society's Journal of Wildlife Management. The URL to these style guidelines is http://joomla.wildlife.org/documents/JWMguidelines2011.pdf
If this link goes 'bad', Google Journal of Wildlife Management Style Guidelines

We ask that you store your lab exercises in a 3-ring binder and use separators (e.g. tabbed sheets) to separate the labs. Your lab notebooks will be due in week 5 or 6 for RSL to review to insure you are preparing them correctly. This is not a graded item; it's our attempt to insure that Notebook preparation meets our expectations. Your Notebooks are due and will be graded at the end of the semester. Your final lab notebook grade will account for 40% of your final grade. Grades will be based on whether or not the labs are complete and the quality of your work. We've identified criteria we use for evaluating writing assignments below.

As an incentive to complete your Notebook each week, we can call for your Notebooks to be turned in at any time.

Your final lab notebooks are due in Dr. Lutz's office by noon, Monday ***15 December 2014.***
Lab Notebooks turned in late will be docked one point for every day past the due date!

Criteria for Grading Lab Notebooks

Grade	Criteria
90-100%	This is an excellent write-up. You address all components of the lab as well provide an insightful and thoughtful discussion that is well organized. Your write-up demonstrates an excellent command of the standard conventions of good composition and grammar has a pleasing appearance and is easy to read.
80-90%	This is a very good write-up that fulfills the assignment but doesn't quite measure up to a paper receiving a score of 5. Your writing is well organized and shows evidence of good planning and clear thought. Ideas and concepts are developed clearly and persuasively, but the paper does not demonstrate any strong insights or lacks strong support for your arguments. There are a few minor writing errors but they do not interfere seriously with the message you are trying to convey.
70-80%	This write-up fulfills the assignment. Your writing is generally clear and coherent. You fail, however, to demonstrate any particular insights, arguments or supporting evidence that would merit an above-average score. There are some writing errors but they are not excessive or serious enough to detract significantly from the points you make in your paper.
60-70%	This write-up relates poorly to the assignment. Your writing fails to convey basic concepts and ideas, either because of poor organization or lack of clarity or coherence. Errors in grammar or writing mechanics are common and they interfere with the message you are trying to convey.
60%	We are not able to see how this write-up relates to the assignment or we had such a difficult time following what you were trying to say that we lost your central message.
0	The assignment was not turned in at all or was turned in too late to receive any credit.

* We reserve the right to adjust the grading criteria for students whose first language is not English.

Extra Credit
Students will have two opportunities to replace their lowest quiz score by 1) helping to deploy cameras in week 1 or 2) aiding in live captures in week 3. Details of these opportunities will be provided in class.

Graded products

Pop quizzes	40%
Extramural projects	20%
Lab Notebook	40%

Reading list

Week 1 – Course introduction, data management and geopositioning essentials

None

Week 2 – Introduction to GIS and GPS

O'Neil, T. A., P. Bettinger, B. G. Marcot, W. B. Cohen, O. Taft, R. Ash, H. Bruner, C. Langhoff, J. A. Carlino, V. Hutchison, R. E. Kennedy, and Z. Yang. Application of spatial technologies in wildlife biology. Pages 429-461 *in* N.J. Silvy, editor. The Wildlife Techniques Manual: Research. Seventh edition. Volume 1. John Hopkins Press, Baltimore, Maryland and The Wildlife Society, Bethesda, Maryland, USA.

Week 3 – Chemical immobilization & capture

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. Seventh edition. Volume 1. John Hopkins Press, Baltimore, Maryland and The Wildlife Society, Bethesda, Maryland, USA.

Kreeger, T. J. 2012. Wildlife chemical immobilization. Pages 118-139 *in* N.J. Silvy, editor. The Wildlife Techniques Manual: Research. Seventh edition. Volume 1. John Hopkins Press, Baltimore, Maryland and The Wildlife Society, Bethesda, Maryland, USA.

Week 4 – Radio telemetry I

Millspaugh, J. J., D. C. Kesler, R. W. Kays, R. A. Gitzen, J. H. Schulz, C. T. Rota, C. M. Bodinof, J. L. Belant, and B. J. Keller. Wildlife radiotelemetry and remote monitoring. Pages 258-283 *in* N.J. Silvy, editor. The Wildlife Techniques Manual: Research. Seventh edition. Volume 1. John Hopkins Press, Baltimore, Maryland and The Wildlife Society, Bethesda, Maryland, USA.

Week 5 – Vegetation surveys

Higgins, K. F., K. J. Jenkins, G. K. Clambey, D. W. Uresk, D. E. Naugle, R. W. Klaver, J. E. Norland, K. C. Jensen, & W. T. Barker. 2012. Vegetation sampling and measurement, page 381-409, in N. J. Silvy, editor. The Wildlife Techniques Manual. 7th edition. John Hopkins Press, The Wildlife Society, Bethesda, Maryland, USA.

Week 6 – Animal behavior

Young, J. R. 2012. Animal behavior. Pages 462-479 *in* N.J. Silvy, editor. The Wildlife Techniques Manual: Research. Seventh edition. Volume 1. John Hopkins Press, Baltimore, Maryland and The Wildlife Society, Bethesda, Maryland, USA.

Week 7 – Animal surveys

Pierce, B., L., R. R. Lopez, & N. J. Silvy. 2012. Estimating animal abundance . Pages 284-310 in N. J. Silvy, editor. The Wildlife Techniques Manual. 7th edition. John Hopkins Press, The Wildlife Society, Bethesda, Maryland, USA.

Week 8 – Indices

Pierce, B., L., R. R. Lopez, & N. J. Silvy. 2012. Estimating animal abundance. Pages 284-310 in N. J. Silvy, editor. The Wildlife Techniques Manual. 7th edition. John Hopkins Press, The Wildlife Society, Bethesda, Maryland, USA.

Locke, S., L., I. D. Parker, & R. R. Lopez. 2012. Use of remote cameras in wildlife ecology.Pages 311-318. in N. J. Silvy, editor. The Wildlife Techniques Manual. 7th edition. John Hopkins Press, The Wildlife Society, Bethesda, Maryland, USA.

Week 9,10 – Occupancy models

Bailey, L., and M. Adams. 2005 Occupancy models to study wildlife. U.S. Department of the Interior. U.S. Geological Survey. Fact Sheet 2005-3096

Donavan, T. M. and J. Hines. 2007. Exercises in occupancy modeling and estimation.This text is on web @ http://www.uvm.edu/rsenr/vtcfwru/spreadsheets/?Page=occupancy/occupancy.htm

Occupancy exercise example @:
http://www.uvm.edu/rsenr/vtcfwru/spreadsheets/occupancy/Occupancy%20Exercises/Exercise3/Exercise%203.%20%20Single-Species,%20Single-Season%20Occupancy%20Models.pdf

Week 11 – Disease ecology

Peterson, M., and P. J. Ferro. 2012. Wildlife health and disease: Surveillance, investigation, and management. Pages 181-206 in N. J. Silvy, editor. The Wildlife Techniques Manual. 7th edition. John Hopkins Press, The Wildlife Society, Bethesda, Maryland, USA.

Week 12 – Non-invasive sampling

Oyler-McCance, S. J. and P. L. Leberg. 2012. Conservation genetics and molecular ecology in wildlife management. Pages 526-546 *in* N.J. Silvy, editor. The Wildlife Techniques Manual: Research. Seventh edition. Volume 1. John Hopkins Press, Baltimore, Maryland and The Wildlife Society, Bethesda, Maryland, USA.

Week 13 – Herptile Surveys

Selections from:

Graeter, G.J., Buhlmann, K.A., Wilkinson, L.R., and J.W. Gibbons, editors. 2013. Inventory and Monitoring: Recommended Techniques for Reptiles and Amphibians. Partners in Amphibian and Reptile Conservation Technical Publication IM-1, Birmingham, Alabama, USA. (Learn@UW)

Week 14 – Stable isotope ecology

Ben-David, M. and E. A. Flaherty. 2012. Beginners guide to stable isotopes – from atoms to ecosystems. Journal of Mammalogy 93:312-328 (Learn@UW)

Week 15 – Telemetry II

Millspaugh, J. J., R. A. Gitzen, J. L. Belant, R. W. Kays, B. M. Keller, D. C. Kesler, C. T. Rota, J. H. Schulz, and C. M. Bonifof. Analysis of radiotelemetry data. Pages 480-501 *in* N.J. Silvy, editor. The Wildlife Techniques Manual: Research. Seventh edition. Volume 1. John Hopkins Press, Baltimore, Maryland and The Wildlife Society, Bethesda, Maryland, USA.

Template for "memos" (i.e., brief reports)

Below is a template we'd like you to use for writing up the 'Memo's for your lab notebook. These write-ups should be double spaced and 1-2 pages in length. You should use the Bold items to describe the activities for each of your Memos

Technique: Which technique are you summarizing?

Description of activity completed in lab:

Where: Where did the exercise take place?

Tools: What tools did you use? For example, telemetry receiver, compass, tomahawk trap, GPS unit

How: Write a short description of how you used the technique. This section could help refresh your memory if you ever need to revisit use of the technique covered this week.

Example of use of technique: Describe a case where you'd use this technique. You can use lecture lab, or the Techniques Manual as resources for examples.