

Field Biology 372



Goals

Upon successful completion of Biology 372, a student will be able to:

1. Use dichotomous keys and be able to identify plants, insects, and birds
2. Know how to keep a field journal, and know the value of it.
3. Use surveys and experiments to understand the distributions and behaviors of organisms.
4. Understand the connections between geology, ecology and culture in shaping the environments of Oregon.

Methods

Field Biology is designed to teach you how to become a naturalist. A naturalist is an advocate of the doctrine that the world can be scientifically understood. Naturalists are knowledgeable about natural history, in particular of botany and zoology. We will be asking: how do we identify the plants and animals (including insect and birds) that we see and what are the biotic, abiotic and historical factors affecting the composition and distributions of organisms in the major physiographic regions of Oregon? Basic ecological principles will be taught, including adaptation, competition, mutualism, and invasion biology, using local examples. Not only will you learn to identify organisms and to see biological patterns, but you will also learn to test hypotheses about what you see.

A large component of this class is the experiential learning that will take place during field study. Most of the three-hour “lab” periods will be spent in the outdoors, and there will also be

two day-long weekend trips. We will focus on the Willamette Valley prairies, coastal rivers, dunes and mudflats and we will take one trip through the Cascades to the high desert of Eastern Oregon. These fieldtrips and labs are designed to gain hands-on experience with different organisms and habitats. A large portion of the grade for this class is the field journal in which you will make observations and reflect on what you see and do in the field.

Time: Mon/Weds 12-1:30, lab Thurs. 2-5

Classroom: Heustis 130

Taught by Prof. Bitty Roy

Office: Room 461b Onyx Bridge (enter 461 and go through a pocket door to the left)

Tel. 346-4520

E-mail: bit@uoregon.edu

Please use 372 in the subject header

Office Hours:

Official office hour: Mondays 10-11, or by appointment, or feel free to drop-in, though it is always wise to call to be sure I am in.

GTF

Lorien Reynolds

Office hour and place TBA.

Required Materials:

1. You are required to buy a write-in-the-rain field journal and a hand lens (for looking at small things, like flowers). You will also be keeping a field journal. The form that this takes is up to you. See examples in class.
2. Pojar J, MacKinnon A. 2004. *Revised Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia and Alaska*. Vancouver: Lone Pine Publishing.
3. Sibley D. 2003. *Field Guide to Birds of Western North America*. New York: Alfred A Knopf. The two books you have been asked to buy for this course will be your constant companions on every field trip and hopefully for the rest of the time you are in the PNW.
4. SimUText Exercise on Metapopulations
5. JMP Computer program, for statistical analysis. This program is available FREE to UO students by going to this website: <https://it.uoregon.edu/software/jmp> and then clicking on "Login to view available downloads" at the bottom of the page. Choose the software that fits your operating system. If you have difficulty downloading or getting the software running, contact the IT helpdesk in 151 McKenzie Hall; you can reach them in person, by telephone 541-346-4357, or by email at helpdesk@uoregon.edu. If you do not have your own computer, JMP is installed on the computers in the Microcomputer lab in the basement of Klamath (KLA B13).
6. A camera and binoculars are strongly recommended.

Field Trips:

1. Most weeks our "lab" on Thursday is a fieldtrip, so come prepared with:
 - rain jacket (and rain pants if you have them)
 - hand lens and field notebook

- camera and binoculars (borrow if you don't own these)
- closed toe shoes-NO SANDALS
- expect to get dirty
- long pants (poison oak is everywhere)

2. There are two Saturday trips. You are REQUIRED to be on at least one of them
3. Several of our hour twenty lectures will be outdoors, so come prepared to go outside (see syllabus).

Field Notebook and Field Journal: see write-up for more detail. Briefly, you will keep notes and data from field trips and any additional fieldwork you do in your write-in-the rain field notebook. You will also keep a formal field journal where your notes are fleshed out.

Phenology Project: see write-up for more detail. You will be given a plant species to follow over the course of the spring.

Grading

400 pts (40%) 4 Data Exercises

- Lichen demography
- Comparison of two fresh water invertebrate communities
- Gopher population size and consequences
- Pollination, comparison of two species

100 pts (10%) Field trip data exercise (there are 2 trips, only 1 is required, if you turn in both, we will drop the lowest score)

- Coast: Mudflat invertebrate diversity (alpha and beta)
- Eastern Oregon: Environmental correlates of sage galls

300 pts (30%) Field Journal (which should include your data AND additional materials)

200 pts (20%) Phenology Project

Grade	%
A	90+%
B	80+%
C	70+%
D	60+%
F	0-59

Participation will aid your success in the class, and will make it more enjoyable for all. You all have skills that you can share and there are many ways you can contribute.

Plagiarism will not be tolerated. You are expected to do your own work on assignments. You are encouraged to discuss ideas and identifications with each other and to study together, but do not copy someone else's work, or allow them to copy yours. Penalties for cheating range from receiving a zero score on the relevant test, quiz or exercise to receiving an F grade in the class.

The student conduct code can be found at:

[http://studentlife.uoregon.edu/LinkClick.aspx?fileticket=puLfAzFDbsg %3D&tabid=69](http://studentlife.uoregon.edu/LinkClick.aspx?fileticket=puLfAzFDbsg%3D&tabid=69)

Late Policy: There are NO LATE PAPERS and NO MAKE UP EXAMS, except for genuine **Emergencies and crises**. When crises do occur, I will work with you to make arrangements and accommodations. I don't ever want anyone lying in a hospital bed worrying about class! Documentation may be requested.

STUDENTS WITH SPECIAL NEEDS

We do our best to support students with special needs. If you have special needs, such as test accommodations, note-taking, and sign language interpretation, please contact Disability Services so that their personnel and I can work together to help you learn comfortably in this class. The Disability Services office is located in 164 Oregon Hall. Telephone 541 346-1155. TTY: 541 346-1083. Fax 541 346-6013. On the web: <http://ds.uoregon.edu>. E-mail: disabsrv@uoregon.edu

If English is your second language and you find understanding my speech difficult, please contact me. I may be able to help you (I too have lived in other countries and have had to function in other languages).

SYLLABUS

Wk 1 Mar 31-Apr 4 *Biogeography and Phenology*

Mon: Introduction, Phenology, Field notebooks

Weds: Plant identification 101

Lab: FIELDTRIP Phenology Project (leave from classroom)

Homework:

1. read pages 50-62 from *Crow Planet: Essential wisdom from the urban Wilderness* by Lyanda Haupt (on Blackboard).

2. read Inouye, D. W., B. Barr, K. B. Armitage, and B. D. Inouye. 2000. *Climate change is affecting altitudinal migrants and hibernating species. Proceedings of the National Academy of Sciences, USA 97:1630-1633.*

Wk 2 Apr 7-11 *Populations*

Mon: Demography and lichens

Weds: FIELDTRIP (leave from classroom) Cemetery lichens: populations and demography

Homework:

Pringle, A., D. Chen, and J. W. Taylor. 2003. *Sexual fecundity is correlated to size in the lichenized fungus Xanthoparmelia cumberlandia. Bryologist 106:221-225.*

Lab: Statistics 101

Wk 3 Apr 14-18 *of Birds and Rivers*

Mon: Bird identification, behavior and biology 101

Weds: Coastal Habitats

Weds Homework due: Exercise 1, Lichen demography

Lab: FIELDTRIP Willamette River, birds, cottonwoods, fossils

SAT April 19th Coast FIELDTRIP to OIMB (meet at Onyx loading dock; be early we leave on time at 7am)

Data: mudflats (alpha and beta diversity), elk, dunes & landslides

Low tide: 9:53 am, so leave Eugene at 7am, lunch at OIMB

Wk 4 Apr 21-25 *Rivers link to the coast*

Mon: Riparian Zones

Mon. Homework due: BRING Field Journals for Review= first third of term=100pts (back to you by Thursday)

Weds: Salmon

Lab: FIELDTRIP (leave from classroom) Willamette River, compare aquatic invertebrate communities in river and millrace

Wk 5 Apr 28-May2 *Prairies I*

Mon: FIELDTRIP Phenology Walk in Alton Baker Park (leave from classroom)

Weds: Gophers, Guest Lecture by Jim Reichman

Weds. Homework due: mudflats

Lab: FIELDTRIP (leave from Onyx loading dock)

Pisgah Estimating Gopher populations and consequences

Wk 6 May 5-9 *Prairies II*

Mon: L1 The future: Humans, prairies and the Willamette Valley

Weds: Metapopulations

Weds. Homework due: gophers

Lab: FIELDTRIP (leave from Onyx loading dock)

WEW Lupines and Metapopulations

Wk 7 May 12-16 *Urban Ecology*

Mon: Urban Ecology: millrace

BRING Field Journals for Review= 2nd third of term=100pts (back to you by Thursday)

Weds: Pollination and Insect identification 101

Weds. Homework due: metapopulations

Lab: FIELDTRIP around town (leave from classroom)

Insects and Pollination

Sunday 18th of May is wildflower show

Wk 8 May 19-23 *High Desert*

Mon: Oregon's High desert, Sagebrush

Weds: Pollination discussion, galls and herbivory

Weds Homework due: pollination

Lab: Catch-up day and help session. Computers will be in lab and we will be there to help with analyses and identifications

Wk 9 May 26-30 *Forests*

Mon: Holiday

Weds: What is a forest? and Worldwide Forest Dieback

Lab: FIELDTRIP Mohawk Forest (leave from Onyx loading dock)

Old growth forest, bird and plant practice

31 Sat East side FIELDTRIP, leaving at 7am from Onyx loading dock

Data: Galls on sagebrush, geology, cascade transect

Wk10 June 2-6 *Predators*

Mon: Predators

BRING Field Journals for Review= last third of term=100pts (back to you by Thursday)

Weds: Summing up

Homework due: East side trip

Lab: FIELDTRIP (leave from classroom). Everyone reports on phenology projects in Alton Baker Park

Final Exam: No exam, but 10:15 am Monday June 9th is when your phenology project is due.

Field Notebook and Journal

“The naturalist’s field journal is to natural history what the telescope was to astronomy. The journal magnifies the memory – as the telescope magnifies the heavens.” (Sinclair 1981)

I. Assignment Goals

- Encourage you to take good notes during field trips, which will help you to remember what you see.
- Allow you to get in the habit of keeping a field notebook and to create your own personal system of recording field notes, which will assist you as an environmental professional and/or enrich your enjoyment of the outdoors.
- Practice field observation skills.
- Learn a standardized method for creating a field journal and begin your personal library of field journals to support your research.

II. Overview of Field Notebooks and Journals

Your field notebook is the most important, useful, and inexpensive piece of field equipment you will ever own! Field notes can give an environmental scientist context for his or her quantitative data and can lead to additional insights or hypotheses. They are a good reference if something is unclear on a datasheet. Naturalists take field notes to accumulate knowledge based upon their own personal observations. Museum personnel take notes that are ultimately bound as a permanent part of the museum’s records. Regardless of the application, the goal is to have a long-lasting record of observations since memorized details tend to get fuzzy (and disappear altogether!) as time goes by.

There are 3 important steps of recording and utilizing your field observations: collection, archival, and analysis (e.g., critical thinking creates ideas from data).

A commonly-used system for recording and archiving field notes was established by Joseph Grinnell and described by Steven Herman (1980). Grinnell’s methods are still in use by many field researchers employed by museums and universities, including myself (Bitty). His system has 4 main components (Greaves 2004):

1. Field Notebook – where you record observations in the field.
2. Field Journal – where you expand, clarify and summarize your field notes into a detailed diary-like account of the day.
3. Species Account – where you can index your observations according to species (or other objects of study such as weather or rocks). To do this, you maintain a page for each species of interest. Each time you observe that species, you record the date, location and 1-2 sentence summary. This allows you to build information about a species (e.g., behavior, nesting, flowering time) and note patterns. You will have a page for your phenology species for repeated observations.
4. Catalog – where you track when and where you collect specimens. The catalog is linked to the preserved specimen through a collection number. The specimen is tagged or labeled with the collection number, date collected, collection location, collector’s name, and identification of object. The study of natural history once involved collecting plants, animals and animal parts (including eggs). For the most part, this is no longer done

because museums have adequate collections, and there are legal and ethical limitations. For example, in Oregon, you must apply for a rather expensive permit to legally collect, transport or keep most animals or animal parts. A modern and very useful form of “collecting” is through a catalog of digital photographs and or drawings. Labeling your photographs and including them in the journal will also help you to learn the names of what you see. I no longer keep a species spreadsheet because it is so easy to sift through a word document using search commands. I do, however, have a list of the birds that I have seen, with the date and place of where I first saw it, and whether or not I have a photograph of it. This is recent for me—I only started being a bird lister in 2008. I also keep species lists of various places that I repeatedly visit, such as Malheur and Alton Baker Park.

As you can imagine, the full Grinnell system is time-consuming but it is particularly valuable for some types of research. For example, I have a colleague in Ecuador who uses this method of record keeping to keep track of bird nesting sites, almost none of which had ever been documented before.

Personal Notes: My field notebook is filled with a combination of data, collection notes, field observations, lists of taxa seen, and to-do lists. I translate the information each evening into a computerized journal, complete with photographs. People study natural history for many reasons. In addition to scientific inquiry, a field notebook can be used for artistic and creative exploration. The more personal approach to field notes is often referred to as a nature journal. For this use, you would incorporate your own personal narrative, thoughts, feelings, drawings or even poetry. My journals have changed over the years, as you can see from the displays. They remain one of the most fun and useful things I do.

Some key points and conventions:

- Keep a notebook with you whenever you do fieldwork. Don’t rely on paper scraps or loose sheets. Since the chances are very good that you will need to write in wet conditions, use an all-weather notebook (e.g., Rite in the Rain ®). You will need to use either a pencil or special all-weather pen. Do not use a standard pen – the ink will smear.
- The more relevant detail you can include, the more useful your notes will be later. Here is a guideline: if in doubt, write it down. Don’t trust your memory to recall that great observation or thought. Be thorough: you don’t know what detail might become critically important later.
- With a permanent marker, put your name, phone number and email on the cover.
- Date, title and number every page.
- Do not use abbreviations unless you are following a widely-accepted standard [e.g., 4-letter codes for birds and 6-letter codes for plants].
- Record quantitative information when you can (“42 meadowlarks” rather than “a large flock of meadowlarks”).
- Create a system for multiple notebooks. Put the date you began the notebook on the cover or spine, followed by a dash. When you fill the notebook, record the end date.
- Digital cameras are an incredibly useful tool and photos can be a valuable addition to a Field Journal. Time/date stamp your pictures. If you have the right equipment and software, you can link digital photos to GPS (Global Positioning System) locations and

upload them into mapping software. I use iphoto to make “contact sheets” that end up in my field journal.

- Digital voice recorders or video cameras with a voice narrative are sometimes used to record field information, but they can be challenging to use under field conditions and the notes can be tedious to translate.
- When creating a permanent archive, process your notes when still fresh. It is critical to translate your field notes within 24 hours, or you will forget important details.

Example: application of field notes. Jung, T.S., K.T. Everatt, and L.M. Andresen-Everatt. 2009. Kleptoparasitism of a coyote (*Canis latrans*) by a golden eagle (*Aquila chrysaetos*) in northwestern Canada. *Northwestern Naturalist* **90**:53-55.

This article shows how you can use field notes to document and postulate explanations for observed phenomena. Natural history journals, such as the *Northwestern Naturalist*, often publish observational data that has not been evaluated by the hypothesis-testing model. These natural history observations can be the basis for more rigorous ecological studies. Note how the article provides nice detail on habitat, location and animal behavior then puts the field observations within the context of published knowledge.

III. Assignment Details

Field Notebook

Field notes are required for all field trips

During the field trips, you should take brief notes in your Rite in the Rain ® notebook about what you see, observe, and learn. What should you record? First, take some notes about the monitoring techniques (when used, how used, assumptions or limitations, your personal experiences using the techniques). Second, use your field notebook to record data if you are not given a datasheet for that purpose. As time allows, you can add anything that strikes you as interesting or important: distinct patterns in plant or animal community structure, unique or unusual animal behaviors, dominant abiotic features (e.g., temperature, moisture, soil types), processes that hint at ecosystem function (e.g., fire scars indicating recent fire history), and questions or ideas that strike you at the time.

You may choose your own method of recording notes, but you need to include the date on every page and the location on the first page for that date (or all pages if it changes). A diary narrative is a useful format, but bulleted notes work fine as well, and this is what I tend to do. Fragmented sentences are fine if they are clear. Write legibly! Your notes will not be of use to you if you can't read them later (I have particularly nasty hand writing and find that if I don't transcribe right away I am lost). Clearly indicate when you change dates or locations.

Field Journal:

The traditional method is to translate field notes into a loose-leaf notebook (this allows the addition of pages), using a technical drawing pen. This method creates a lasting and reliable archival format, and if you use drawings it is far easier to include them in this format. Alternatively, you may record your observations via computer. If you do this, it is essential to periodically print out archival copies and store them in a binder. An advantage of the computer is that you can easily search for taxa, places and people using the find function.

General requirements:

- a. Include the date on every page and make sure the location is described on the first page, or whenever you change places. Number each page.
- b. Include scientific names for important observations. If using the paper method, underline scientific names with a single straight line and indicate common names with a wavy underline. Use italics for scientific names on the computer.
- c. Write in full sentences.
- d. Write on one side of the page only (usually the front or right side). This prevents ink from bleeding through and allows space for sketches or maps. You can also record ideas, insights and information to research further on the left side.
- e. Your goal is to be thorough but brief. Provide good detail in a concise manner.
- f. Try to include at least one question about what you saw each day.

Topics:

For each day, include these sections:

1. Date
 - International format: 7 March 2014.
2. Time
 - Arrival and departure from each location in 24-hour clock format (e.g., 1510 for 3:15 p.m.). (Note: you would need more detailed time information if you were recording animal behavior.)
3. Locality and Route
 - Locality – include county and more specific information: UTM, Lat-Long, Township-Range-Section, or distance from a “permanent” landmark.
 - Route – describe how you got to the site on travel days (e.g., “From Eugene, Lane Co., to Burns, Harney Co., Oregon, via Hwy 20.”).
4. Weather
 - Precipitation, cloud cover, estimated temperature/wind velocity. For some field projects, you will need to measure rather than estimate temperature and wind.
5. Habitat(s) and Vegetation:
 - A broad but succinct description of the biotic and abiotic features: vegetation structure (e.g., forest vs savanna), dominant plant species or plant community classification, plant phenology (e.g., stage of leaf-out, which plants are flowering or fruiting), topography, soil characteristics and other geologic features, characteristics of major water bodies including streams, elevation and human-made alterations.
6. General Commentary
 - This is the miscellaneous category: trip purpose, first and last names of co-workers, data collection methods, animal behaviors, species interactions (e.g., herbivory, predation, pollination), etc.
 - If you are collecting information associated with a plot, include plot number.
7. Species lists
 - In this section, you would list the species you saw or heard. You can also describe those that you can’t identify. For multiple-day trips, species lists can be daily for the entire trip, depending on the purpose of recording species.

- Generally, listing species in columnar format works best, and/or you can use contact sheets of labeled photographs (see my journal)
 - Make separate lists for plants, fungi, invertebrates, herps (reptiles and amphibians), birds and/or mammals. If you are focused on botanical work, separate your plant lists into groupings such as trees, shrubs, herbaceous plants, and non-vascular plants (e.g., moss, lichens and liverworts).
 - Include number of individuals observed, if practical.
8. Sketches, maps, or photos
- You will develop a system that works for you. In my early journals everything was drawn by hand, now everything is digital. My current system is to include google maps at the beginning of a new location, and to follow each day's description with the contact sheet of photographs.

IV. Literature Cited

Greaves, S. 2004. Hardcore field notes for the serious naturalist. Available from <http://www.sas.org/tcs/weeklyIssues/2004-04-16/features1/index.html>.

Herman, S. G. 1986. The naturalist's field journal: a manual of instruction based on a system established by Joseph Grinnel. Buteo Books, Vermillion, South Dakota.

Sinclair, P. 1981. Journal of exploration: an approach to teaching writing. Evergreen State College, Olympia, Washington.

V. Postnote - for more information on nature journals (which blend science with art)

Leslie, C. W, and C. E. Roth. 2000. Keeping a nature journal: discover a whole new way of seeing the world, second edition. Storey Publishing, North Adams, Massachusetts.

- Your Nature Journal (blog by Donna Long), <http://www.your-nature-journal.com/>.
- The Illustrated Nature Journal: a Handbook by Aleta Karstad, <http://pinicola.ca/jourbook.htm#begin>

Acknowledgments: This write up resulted from discussions Bitty Roy and Peg Boulay had about field notebooks during the fall of 2010. We've both been using field notebooks and journals our entire professional lives.

**Bi372: Field Notebook and Journal
Grading Rubric**

General requirements:

- g. Include the date on every page and make sure the location is described on the first page, or whenever you change places. Number each page.
- h. Include scientific names for important observations. If using the handwritten method, underline scientific names with a single straight line and indicate common names with a wavy underline. Use italics for scientific names on the computer.
- i. Write in full sentences.
- j. Write on one side of the page only (usually the front or right side). This prevents ink from bleeding through and allows space for sketches or maps. You can also record ideas, insights and information to research further on the left side.
- k. Your goal is to be thorough but brief. Provide good detail in a concise manner.
- l. Try to include at least one question about what you saw each day.

- Did you include the general requirements (see above)
- and required topics (Date, Time, Locality and Route, Weather, Habitat(s) and Vegetation, and General Commentary)?
- Did your notes reflect thoughtful observation of the monitoring techniques, habitat or other topics?
- We expect you to go beyond what we do in class. For a high grade, we expect entries beyond what we do in class (beyond what we point out on the outings and trips on your own)
- We will also be looking for unique features that indicate you are using the journal to suit your personal needs too (i.e., illustrations, consistent observations about particular organisms, questions)
- We are looking for evidence that you looked things up; that you are endeavoring to be scholarly.
- Follow up on your questions, and connect observations over time.

_____ A-B Park with class

_____ A-B park phenology

_____ labs/outdoor lectures

_____ field trip

Comments: