BIOL 140 AND 140L: IDAHO NATURAL HISTORY AND IDAHO NATURAL HISTORY LAB COURSE GUIDE AND POLICIES: SPRING 2023

DESCRIPTION AND LEARNING OUTCOMES: Natural history is a field of (mostly) observational science focused on organisms in their natural environments. This course will provide a basic introduction to how landscapes and ecosystems of Idaho, but more generally, the Intermountain West, evolved from earliest geological time until European settlement, how they function, and how they have been modified as a result of human activities. In order to better understand this story, many principles of geology, climate, soils, ecology, biology, and evolution will be introduced.

Students completing this course will:

1. Describe key ecological, geological, and evolutionary concepts and processes
2. Understand the evolutionary processes shaping plant and animal adaptations to their environments
3. Explain relationships between groups of organisms and the abiotic environment
4. Understand and apply the scientific process
5. Describe and interpret models of species interactions
6. Demonstrate understanding of ecological implications of human actions, and the relevance of natural history to society

PREREQUISITES: BIOL 201, BIOL 202, BIOL 203, and corequisite labs.

INSTRUCTOR:

Dr. Robert G. Laport — Email: rlaport@collegeofidaho.edu
Office: Boone 221A — Phone: 208-459-5292

Visiting hours: M 2:00p-3:00p, W 2:00p-3:00p, F 2:00p-3:00p and by appointment. All students should visit with me at least once during the semester.

COURSE TEXTBOOK: There is no textbook, but a number of readings will be posted to Canvas. You should make every effort to attend class and labs and take good notes. Reading assignments will greatly aid your understanding of the concepts. Unless otherwise indicated, you are responsible for all reading assignments as indicated on the syllabus. A portion of all worksheet and exam questions will relate to the reading assignments.

CANVAS: We will use Canvas for this course (canvas.collegeofidaho.edu). The syllabus/policy, learning objectives, handouts, assignments, article readings, lecture slides, and announcements will be posted here. Check Canvas often, particularly to ensure that you are aware of upcoming due dates and exams, but you may also keep track of your grade in the course.

PLICKERS: We will use Plickers ("Paper Clickers") as a classroom response method in this course. You will use your assigned barcode to respond to formalized in-class questions and quizzes. Responses will count toward your final grade, so be sure to take note of your barcode number and bring your barcode every class and lab period. You may download a replacement barcode on Canvas or at www.plickers.com.

ACCESSIBILITY RESOURCES AND SERVICES: My goal is to create an accessible, equitable, and inclusive classroom. The College of Idaho seeks to provide an educational environment that is accessible to the needs of students with disabilities. The College provides reasonable services to enrolled students who have a documented permanent or temporary physical, psychological, learning, intellectual, or sensory disability that qualifies the student for accommodations under

the Americans with Disabilities Act or section 504 of the Rehabilitation Act of 1973. Students that have, or think they may have, a disability that will impact their performance as a student in this class are encouraged to arrange support services and/or accommodations through the Department of Accessibility and Learning Excellence (DALE) located in Hendren Hall. Reasonable academic accommodations may be provided to students who submit appropriate and current documentation of their disability. Accommodation can be arranged only through this process and are not retroactively applied. More information can be found on the DALE webpage: https://www.collegeofidaho.edu/academics/support/learning-disability-services

COMMITMENT TO DIVERSITY: The College of Idaho and The Biology Department are committed to creating an academic climate that is safe and respectful of all students, staff, and faculty regardless of race, ethnicity, sexual orientation, gender identity, age, size, socioeconomic background, religion, spirituality, physical ability, mental ability, or any other aspect of one's identity. A climate of mutual respect allows us to ask difficult questions and to participate in honest discussions, even in the context of strong disagreement. Creating this kind of open, honest, and respectful climate is our mutual responsibility. The Biology Department is continually seeking to understand how students and faculty—particularly those from historically excluded groups—experience our classrooms, and to provide actionable resources to support teaching approaches that promote equity and foster a sense of belonging. I encourage you to reach out to me or other Faculty in the Biology Department with any concerns or ideas you may have.

SEXUAL MISCONDUCT DISCLOSURE: I will do my best to help any student who comes to me with concerns. For emergencies, call 911 and/or Campus Safety at x5151 or (208) 459-5151. All faculty members are mandated to report any incidents of sexual misconduct that comes to their attention. The College has specific confidentiality and anti-retaliation protections in place. Health and Wellness Center Staff and the College Minister can advise you confidentially. Also, the Title IX Coordinator (Jodi Nafzger; titleix@collegeofidaho.edu; (208) 459-5139) can help you access other resources on campus and in the local community. The Sexual Misconduct Policy and other Title IX information can be found on the College website at: https://www.collegeofidaho.edu/about/offices/human-resources/sexual-misconduct.

GRIEVANCES: A student who has a grievance with any aspect of this course should meet with me to discuss the problem. If an honest and sincere dialogue cannot resolve the grievance, the student may make an appointment to discuss the problem with the Biology Department Chair as the appropriate next step.

SCHEDULE: This four-credit course meets M, W, F 9:00a-9:50a in Boone 132. The required associated lab meets T 1:40p-4:20p in Boone 216. Many of the labs will be field trips (see schedule). On field trip days, we will meet in the Boone parking lot near the greenhouse to load the van.

CLASS ATTENDANCE: Students must be registered by the end of the Drop/Add period to attend class (see academic calendar: https://iq2prod1.smartcatalogiq.com/en/Catalogs/College-of-Idaho/current/Undergraduate-Catalog/The-College-of-Idaho-s-2022-2023-Academic-Calendar). Regular attendance is integral to success in this course and is expected of every student. In the event of an absence, in-class handouts and slides will be provided. Notes must be obtained from a classmate. Students requiring accommodation for conflict(s) (e.g., major religious holidays, health issues) should notify me privately at the beginning of the semester or as soon as possible. Non-accommodated absences from more than two class periods is

considered excessive and experience shows decreased course performance with increasing absences.

LABS: Labs will sometimes be outdoors—rain or shine—so come prepared with sturdy shoes, long pants, jacket, rain gear, warm jacket, gloves, water, snacks, sunscreen, insect repellent, etc. Take notes during the duration of trips. Some questions on exams will relate to field trip activities. Extremely inclement weather may lead to a change in the schedule, perhaps at short notice. If there is a change, I will email the class by noon on lab day. Make sure to check your email, but if you are unable to do so, have a fellow lab member contact you about lab changes.

The lab focuses on observation, generation of hypotheses, collecting, analyzing, and presenting real data. Some aspects may be tedious, others challenging. As in the world outside campus, some activities will go as planned and others will not. When activities do not go as planned, we will think about possible causes and may design new activities to test some possibilities.

Though some formal lab times are set aside for you to work on team projects, you will need additional time outside of scheduled lab meetings to complete your projects. The skills you learn in this course will help lay a foundation for Ecology & Evolutionary Biology and Environmental Studies and Sciences graduate programs, and careers in natural resources, wildlife management, data analytics, health careers, and will also provide a foundation for conducting ecology and evolution-focused research.

NOTEBOOKS: All students will need a Field Notebook. Because we may experience inclement weather that could "soil" your notebook, I recommend a bound notebook with water resistant paper (one example: https://www.riteintherain.com/4-625x7-stapled-notebook#371FX). These can be purchased from the Biology Office for **$6**. **If you need assistance obtaining a notebook, please reach out to me confidentially so that I can help ensure you can access the materials you need for the course.** Field Notebooks represent a "diary" of your activities and observations, and are essential for both laboratory and field settings. Notebooks are used to record data, as well as your first thoughts on ideas, chance unrelated (at the time) observations, and explanations for results. A good notebook should be understandable to others as well as you at a future time. Thus, it is essential that your notebook be legible and organized.

You will need to bring your notebook to class/lab every day. The details of what to record and how to do so will vary from person to person, but some general suggestions:

Lab Notebook:

1. At the beginning of each experimental section, include a short description of the purpose of the experiment. State the hypotheses that you are testing and at least one particular result would not be consistent with the hypothesis. Learn to state your hypotheses, verbally and on paper.
2. Outline the experiment, as a flow chart or cartoon (not necessarily repeating the lab handout!). Note what data is to be collected and what kind of layout you are going to use to record it. What kind of check can you do in the lab to confirm that things are working? What are the controls? Steps 1 and 2 should be done before the lab period.
3. During the lab period, everything you write should be in the notebook (notes and tables of results, including ad hoc figures that you might use). Do not record on paper towels and then recopy to obtain a neat notebook. Think before you write. Your lab notebook should also contain additional notes about the experimental details so that you could use your notebook and the handout to reproduce the experiment with much less supervision and with greater security about its success than in your first run-through. For example, a lab handout might indicate only that a gel should be run until the dye reaches about 2/3 of the way to the bottom. By recording the % gel, voltage/amperage, and running time, you can compare results from experiment to experiment.
4. After the lab, initial analysis: the rough figures and calculations that you might do when you start your analysis of the results.
5. Any time, ideas for repeating the experiment to get better results …or, if the experiment was unsuccessful, repeating the experiment

Field Notebook:
1. For each day you collect field data, record the date, time, location, weather conditions, and names of people you are working with.
2. Record any notable or interesting observations, even if you aren't sure if they directly relate to your current study. For example, if you are measuring trees and notice a lot of woodpecker activity, make note of this. Or, if a plot is near a wetland, or looks "odd" in some way, note this. These observations can help interpret your data, and they can provide ideas for future projects.
3. Record data clearly. Be sure the meaning of all abbreviations is clear. Do not mix tic marks and numbers ("||" can be "11" or "2").
4. At the end of every activity, provide a brief summary of questions being asked, what you did, why you did it, and any preliminary results.

ABSENCE ACCOMMODATIONS: Reasonable accommodations and flexibility will be afforded to students who must be absent from class or lab because of religious holidays, college-sponsored activities, etc. Students are asked to privately identify all course conflicts at the beginning of the semester or well in advance of known absences.

CAMPUS CLOSURES, INTERNET OUTAGES, AND OTHER BARRIERS TO NORMAL INSTRUCTION. In the event that the College is closed unexpectedly for inclement weather, or any other reason, students should expect a missed exam to be given during the next regularly scheduled class period. Similarly, widespread power or internet outages may also result in adjustments to the course and exam schedule. No oral presentations or exams will be administered prior to the scheduled times.

PROFESSIONALISM: It is expected that students adhere to the Honor Code and display a professionalism in class similar to that expected in the workplace. This pertains to attendance, respect for others, engagement, organizational skills, initiative, responsiveness to feedback, personal responsibility, interpersonal skills, independence, quality of work, and communication.

ASSESSMENTS: Late assignments will be marked down 10% per week. Consult with Dr. Laport in advance if you anticipate an excused absence.

REPORTS, WORKSHEETS, NOTEBOOKS, AND CLICKER QUESTIONS (35%): Students will be assigned several worksheets, written reports, and reading reports designed to reinforce material covered in class and lab. These activities will provide practice for developing reasoning and problem-solving skills, and verbal and written communication skills.

TEAM PROJECT (15%): Students will develop an independent research project relevant to topics in the course as part of the lab. Assistance will be provided, but this is your opportunity to develop and test an idea of interest to you. If you have a question that you have always wanted to explore in depth, let's discuss how it could be tested! Projects can begin at any time in the semester, but a proposal must be made by the scheduled date (see below). Field studies, dependent upon being outdoors, will likely need to be started earlier in the semester than lab or computer-based studies due to seasonal changes.

Projects require: 1) development of a proposal based upon prior research (approved prior to proceeding), 2) presentation to the class of your hypothesis, experimental design and anticipated results, and 3) 10 min. oral presentation of your final results.

MIDTERM EXAMS (30%): Two midterm exams each valued at 15% of the total grade will be administered during the semester (see class schedule). Questions will be a combination of multiple choice, true/false, fill-in-the-blank, and short answer.

FINAL EXAM (20%): A cumulative final will be administered during finals week. Questions will be a combination of multiple choice, true/false, fill in the blank, and short answer.

GRADES: Letter grades will be assigned as follows based on cumulative performance:

GRADE BREAKDOWN:

>93.3% = A	80.0-83.3% = B-	66.7-69.9% = D+
90.0-93.3% = A-	76.7-79.9% = C+	63.4-66.6% = D
86.7-89.9% = B+	73.4-76.6% = C	60.0-63.3% = D-
83.4-86.6% = B	70.0-73.3% = C-	< 60.0% = F

INCOMPLETE GRADES: Administration of an incomplete is at the discretion of the instructor. The grade of I (Incomplete) may be assigned when a student has met all of the following conditions:

The student has attended class through the final withdrawal date in accordance with the course attendance policy. The last date of attendance should occur after the withdraw deadline.

The student has completed the majority of possible coursework at the point in time and is in good standing, having earned C- or better.

When the instructor believes the student's inability to complete the course is due to legitimate causes beyond the student's reasonable control (such as an illness or traumatic event occurring after the final withdrawal date).

The instructor and student must submit an Incomplete Grade Contract to the Registrar's Office before the last day of finals in the semester in which the student is registered for the course. Final approval for the incomplete is at the discretion of the Registrar, providing that the student meets the conditions listed above.

ACADEMIC HONOR CODE SYSTEM AND ACADEMIC DISHONESTY: I aim to create a supportive, collegial, and intellectually encouraging environment in my courses. The College of Idaho maintains that academic honesty and integrity are essential values in the educational process. Operating under an Honor Code philosophy, the College expects conduct rooted in honesty, integrity, and understanding, allowing members of a diverse student body to live together and interact and learn from one another in ways that protect both personal freedom and community standards. Violations of academic honesty are addressed primarily by the instructor and may be referred to the student Judicial Board:
http://collegeofidaho.smartcatalogiq.com/current/Undergraduate-Catalog/Policies-and-Procedures/Academic-Misconduct

Academic dishonesty is defined as the use of unauthorized assistance with intent to deceive, or to misrepresent the work of another as their own, in meeting course and degree requirements. Academic dishonesty consists of plagiarism, cheating, fabrication and falsification, multiple submission of the same work, misuse of academic materials, and complicity in academic dishonesty (see below). All work in this class is to be completed independently, unless otherwise indicated. Non-compliance will result minimally in a grade of zero for that effort, documentation of the episode, and disciplinary action as set forth by College policy, with penalties ranging from failure of this course to dismissal from the College.

Examples of academic dishonesty include, but are not limited to:

A. Plagiarism: Plagiarism is the use of another person's distinctive words or ideas without acknowledgment. Examples include:

1. Word-for-word copying of another person's ideas or words
2. The mosaic (interspersing of one's own words here and there while, in essence, copying another's work)
3. The paraphrase (rewriting of another's work, yet still using their fundamental idea or theory)
4. Fabrication of references (inventing or counterfeiting sources)
5. Submission of another's work as one's own, including AI-generated responses (e.g., ChatGPT)
6. Neglecting quotation marks on material that is otherwise acknowledged

NOTE: Acknowledgment is not necessary when material used is common knowledge.

NOTE: Use of AI utilities is becoming common. **If you do utilize an AI resource, it must be acknowledged/cited, and you will be responsible for inaccuracies or incorrect information provided by the AI resource (which are well-documented to occur!).**

B. Cheating: Cheating involves the possession, communication, or use of information, materials, notes, study aids or other devices not authorized by the instructor in an academic exercise, or communication with another person during such an exercise. Examples include:

1. Copying from another's paper or receiving unauthorized assistance from another during an academic exercise or in the submission of academic material
2. Using a calculator or other electronic device when its use has been disallowed
3. Collaborating with another student or students during an academic exercise without the consent of the instructor.

C. Fabrication and Falsification: Fabrication involves inventing or counterfeiting information, i.e., creating results not obtained in a study or laboratory experiment. Falsification, on the other hand, involves the deliberate alteration of results to suit one's needs in an experiment or other academic exercise.

D. Multiple Submissions: This involves submitting work for which academic credit has already been earned, when such submission is made without instructor authorization.

E. Misuse of Academic Materials: The misuse of academic materials includes, but is not limited to:

1. Stealing or destroying library or reference materials or computer programs
2. Stealing or destroying another student's notes or materials, or having such materials in one's possession without the owner's permission
3. Receiving assistance in locating or using sources of information in an assignment when such assistance has been forbidden by the instructor
4. Illegitimate possession, disposition, or use of examinations or keys to examinations
5. Unauthorized alteration, forgery, or falsification
6. Unauthorized sale or purchase of examinations, papers, or assignments

F. Complicity in Academic Dishonesty: Complicity involves knowingly contributing to another's acts of academic dishonesty. Examples include:

1. Knowingly aiding another in any act of academic dishonesty
2. Allowing another to copy from one's paper for an assignment or exam
3. Distributing test questions or information about test materials before the assessment
4. Taking an exam or test for someone else
5. Signing another's name on attendance roster or on an academic exercise

EXAMPLE STRATEGIES FOR SUCCESS: Following are suggestions that students have found useful in the past for ensuring success in this course:

- Review your notes shortly after each lecture or lab— the sooner the better. Rewrite them, or at least annotate them. Write down all questions and have them addressed during the next class period.
- Read assignments promptly. Each week you will be responsible for substantial readings. Set aside one or two hours each week to complete the readings. Interact with your texts. Write in them! Highlight them!
- Email Dr. Laport before the second meeting of class with "Mary Anning" in the subject line once you have read the syllabus for two bonus points.
- Form a study group of your peers for regular, if only brief, meetings.
- Utilize visiting hours and appointments. Come prepared with questions.

Date	Topic	Assessment	Important Dates
6 Feb 8 Feb 10 Feb	Introduction, Science of natural history Geologic principles and deep time The geological time scale	Concept Inventory Pre-Test	
13 Feb 15 Feb 17 Feb	Fossils Plate tectonics and implications of a dynamic Earth Precambrian history		17 Feb. Add/Drop deadline 17 Feb. Census date
20 Feb 22 Feb 24 Feb	Precambrian history Paleozoic I—Early ecosystems Paleozoic II—Life to land		
27 Feb 1 Mar 3 Mar	Paleozoic to Mesozoic Mesozoic Cenozoic: Paleogene Period ecosystems and events	Splendid Isolation Worksheet (27 Feb)	
6 Mar 8 Mar 10 Mar	Neogene Period ecosystems and events Lake Idaho	Exam I (6 March)	
13 Mar 15 Mar 17 Mar	Pleistocene Holocene and Paleoindians Native Americans		
20 Mar 22 Mar 24 Mar	Intermountain Geography 19th Century ecosystems meet Europeans Shrub-steppe soils and crusts	Seminar Worksheet 1 (20 March)	
27 Mar 29 Mar 31 Mar	Spring Break		29 Mar. Midterm Grades Due
3 Apr 5 Apr 7 Apr	Shrub steppe ecosystems in the 20th Century and …? Shrub-steppe ecosystems: Sagebrush and its dependents		
10 Apr 12 Apr 14 Apr	Shrub-steppe animals I **How to Define a Tree** **Plants are Cool, Too! – Fossilized Forests**	How to Define a Tree Worksheet (12 April) Fossilized Forests Worksheet (14 April)	
17 Apr 19 Apr 21 Apr	Shrub-steppe animals II Pinyon-juniper woodlands	Exam II (17 April)	

24 Apr 26 Apr 28 Apr	Montane forests ecology and fire Subalpine forests to timberline		28 Apr. Withdraw deadline
1 May 3 May 5 May	Aspens and subalpine forest ecology Wolves, coyotes and other predators	Prehistoric Global Warming Worksheet (1 May)	
8 May 10 May 12 May	Salmon Aquatic Ecosystems I		
15 May 17 May 19 May	Aquatic Ecosystems II Invasive species Human Ecosystems	Seminar Worksheet 2 (15 May) Concept Inventory Post-Test	
22 May 25 May 26 May	Finals Week	Comprehensive Final 25 May on Canvas	

Date	**Topic/Activity**	**Assessment**
Week 1 / 7 Feb	Ecological Niche Modeling/Niche Evolution	
Week 2 / 14 Feb	Owyhee Phenology 1	
Week 3 / 21 Feb	Ecological Niche Modeling/Niche Evolution	
Week 4 / 28 Feb	Ecological Niche Modeling/Niche Evolution	Ecological Niche Modeling/Niche Evolution Presentations
Week 5 / 7 Mar	Boise Front montane forests 1	
Week 6 / 14 Mar	Treasure Valley, landscapes, geology, overview	
Week 7 / 21 Mar	Owyhee Phenology 2 (Reynolds Creek)	

Week 8 / 28 Mar	Spring Break	
Week 9 / 4 Apr	Celebration Park archaeology of ancient Americans	Independent Project Proposals
Week 10 / 11 Apr	Boise River riparian habitats and island flora	
Week 11 / 18 Apr	Boise Front montane forests 2	
Week 12 / 25 Apr	Owyhee herpetofauna (Reynolds Creek)	
Week 13 / 2 May	Owyhee Phenology 3 (Reynolds Creek)	
Week 14 / 9 May	Team Project work time	
Week 15 / 16 May	Team Project work time	Team Project Presentations Field Notebooks Due
Week 16 / 24 May	Finals Week	Finals Week

Severn Major Themes in Natural History

1. Landscapes are dynamic. Change is inevitable and evident on many time scales.
    Ontogenetic time: development of one organism takes as long as that organism's life span. (e.g. 1 day to 1 century)
    Generational time: time to pass 10 generations varies among species. (years to centuries)
    Ecological time: time for ecosystems to respond to change varies. (years to centuries)
    Evolutionary time: change within a lineage (decades to centuries, or millennia)
    Geological time: change in that is infinitesimal in a human lifetime but noticeable over millions of years (thousands to millions of years)

2. Evolution (descent with modification) helps to explain diversity and unity of life. As life evolves new species appear and others become extinct (locally and globally). As species evolve, so do the multiple players with whom they interact, thus ecosystems change, and they often change the Earth as well.

3. Mechanisms of evolutionary change (e.g. natural selection) help to explain the multitude of adaptations we see among organisms in ecosystems. The many forms we see result from each species unique history of experience in its environment. Changes in generations of ancestors over evolutionary time results in each unique species' adaptations.

4. Each place experiences a unique history (geological and biological), the understanding of which helps to understand the unique qualities of that place.

5. Scientific theories (e.g. plate tectonics, evolution) are based on multiple forms of evidence from many observations and experiments. They are powerful in being able to explain many phenomena. They can generate testable predictions (even if they are about events that transpired thousands, millions, or even billions of years ago), and are, thus, refutable. When a powerfully predictive theory stands the test of time (in not being refuted) it comes to be accepted. The most powerful of theories (e.g. plate tectonics, evolution) become seemingly factual within the scientific community (e.g. that life on Earth evolves, that plates move across the Earth, that climates change in response to Earth activities, including life itself, etc.)

6. Ecosystems are the consequence of millennia of evolution and their functions, including interdependencies of different species, have a long history. Ecosystems change through time and vary over the landscape (spatially), but the scales of such change are limited. Each ecosystem has a unique capacity to respond to disturbances, depending on its evolutionary history.

7. Idaho Natural History results from a combination of general phenomena that can be understood in many places (processes in geology, biology, evolution, etc.) as applied to this unique place. Thus, plate tectonics, geologic events, evolution of ecosystems, and related processes when applied in this particular place produce the landscapes, ecosystems and natural systems unique to Idaho.

Reading List. Below are complete literature citations for readings. All readings are posted on Canvas.

Geologic Time and Deep History
Hazen, R.M. 2010. Evolution of minerals. Scientific American (March): 58-65.
Valley, John W. 2005. A cool, early Earth? Scientific American (October): 58-65.
The Abyss of Time (essay on geologic time—E. Yensen)
Zimmer, C. 2014. The oldest rocks on Earth. Scientific American (February): 58-63

Precambrian and Paleozoic History
Hoffman, P.F., and D.P. Schrag. 2000. Snowball Earth. Scientific American (January): 68-75.
Fortey, R.A. 2004. The lifestyles of the trilobites. American Scientist 92: 446-453 (September-October).
Gray, J., and W. Shear. 1992. Early life on land. American Scientist 80: 444-456 (September-October).

Mesozoic History
Kring, D.A., and D.D. Durda. 2003. The day the world burned. Scientific American (December): 98-105.
Motani, R. 2000. Rulers of the Jurassic seas. Scientific American (December).
Ward, P.D. 2006. Impact from the deep. Scientific American (October): 64-71.
*Owners of the Jurassic Skies (*essay on pterodactyls—E. Yensen)

Cenozoic History
Flynn, J.J. 2009. Splendid Isolation. Natural History (June) 118.5:26-32.
Miocene Park? (essay on Miocene fossils—E. Yensen)
The Strange Clarkia Fossils (essay on Clarkia fossil beds and getting DNA from fossils—E. Yensen)

Pliocene and Pleistocene Events
The Bonneville Flood (summary on the Bonneville Flood—E. Yensen)
Mead, J.I. 1980. In search of ancient pack rats. Natural History (September): 40-49.

People Arrive in Western North America
Bednarik, R. Ethnographic analogy in rockart interpretation. IFRAO, Caulfield South, Victoria, AUS.
Plew, M.G. 1986. An introduction to the archeology of southern Idaho. Boise State University, Boise, Idaho, 43 pp.
Pringle, H. 2011. The first Americans. Scientific American (November): 36-45.
Lichatowich, J. 1999. Salmon without rivers (excerpt, pp. 32-51). Island Press, Washington, D.C., 317 pp.

Intermountain Geography—Sagebrush Sea
Paige, C., and S.A. Ritter. 1999. Birds in a sagebrush sea: managing sagebrush habitats for bird communities. Partners in Flight, Western Working Group, Boise, Idaho, 47 pp. (20 points)
Belsky, A.J., A. Matzke, S. Uselman. 1999. Survey of livestock influences on stream and riparian ecosystems in the western United States. Journal of Soil and Water Conservation 54: 419-431.
The Sound that Built an Ecosystem (essay on beavers—E. Yensen)

Cold Desert Ecosystems
Wolfe, B.E. & E. Klironomos. 2005, Breaking new ground: soil communities and exotic plant invasion. Bioscience (June) 55(6):477-487.
Eldridge, D.J. 2004. Mounds of the American Badger (*Taxidea taxus*):
Significant Features of North American Shrub-Steppe Ecosystems. J. Mammalogy. 85(6):1060–1067. (technical but accessible)
Under the Radar (essay on invasive bur buttercup—E. Yensen)
Armored Specialist (essay on horned toads—E. Yensen)

Stuebner, S. 2015. Biological Soil Crusts (Chapter 9 in forthcoming desert guidebook)

Woodland and Forest Ecology
Keane, R.E., K.C. Ryan, T.T. Veblen, C.D. Allen, J.A. Logan, and B. Hawkes. 2002. The cascading effects of fire exclusion in Rocky Mountain ecosystems. Pp. 133-152, *in* J.S. Baron (editor), Rocky Mountain futures: an ecological perspective. Island Press, Washington, D.C., 325 pp.
Miller, R.F. and P. Wigand. 1994. Holocene changes in semiarid pinyon-juniper woodlands. BioScience 44(7):465-474.
The Missing Earthworms (essay on earthworms—E.Yensen)

Forest Ecosystems and Wolves
Harvey, A.E., J.W. Byler, G.I. McDonald, L.F. Neuenschwander, and J.R. Tonn. 2008. Death of an ecosystem: perspectives on western white pine ecosystems of North America at the end of the Twentieth Century. USDA Forest Service, Rocky Mountain Research Station, General Technical Report RMRS-GTR-208, 10 pp.
Smith, D.W., R.O. Peterson, and D.B. Houston. 2003. Yellowstone after Wolves. BioScience 53(4):330-340.
Ripple, W.J., and R.L. Beschta. 2004. Wolves and the ecology of fear: can predation risk structure ecosystems? BioScience 54: 755-766.

Aspen and Aquatic Ecosystems
Kay, C.E. 1997. Is aspen doomed? Journal of Forestry (May): 4-11
Gende, S.M., and T.P. Quinn. 2006. The fish & the forest. Scientific American (Aug.): 84-89.
You may respond to the Lichatowich article (see Week 6) if you did NOT respond to it earlier.

Anthropogenic Ecosystems
Palumbi, S.R. 2001. Humans as the world's greatest evolutionary force. Science 293: 1786-1790.
Ruddiman, W.F. 2005. How did humans first alter global climate? Scientific American (March): pp. 46-53.
Vitousek, P.M., H.A. Mooney, J. Lubchenco, and J.M. Melillo. 1997. Human domination of Earth's ecosystems. Science 277:494-499.