

WILD 3850 (Spring 2016)
Vegetation and Habitat Management

Prof. Jim Long
NR 326
james.long@usu.edu

Prof. Fee Busby
BNR 275
fee.busby@usu.edu

Catalogue Description:

Applying ecological principles and concepts to manipulate the composition, structure, and productivity of wildland vegetation for a range of objectives, including the creation and maintenance of wildlife habitat, using a variety of methods, including biological, chemical, mechanical, and fire. (3cr).

Course Background:

It is expected that students already have a solid background in ecology and are familiar with, for example, succession and relative tolerance, and have had an introduction to regeneration ecology and the nature of plant communities. We will build on this background to develop an understanding of vegetation management practices as they relate to: ecological and biological principles, natural resources management strategies, and socioeconomic and environmental constraints. The basic objectives of vegetation management, both in general terms or as they relate to a specific project, must be explicitly understood in terms of desired species composition and structure. We will use specific examples to make this clear, and will focus on implementation of these objectives, using a variety of tools and practices. The relevance of the course will be reinforced by examples and case studies relating to a diversity of natural resource situations, (e.g., restoration, wildlife habitat management, and management of invasive plants).

Learning Objectives:

- 1) Ability to apply ecological concepts and principles to manipulate the composition, structure, and productivity of wildland vegetation for a range of objectives, including the creation and maintenance of wildlife habitat, using biological, mechanical, chemical, pyric, and revegetation methods.
- 2) Ability to analyze economic, environmental, and social consequences of vegetation management strategies and decisions.
- 3) Develop/improve technical writing skills that are critical for natural resource professionals.

Format: Lectures TR 3:00-4:15 BNR 278

The first half of the semester will focus on vegetation and habitat management in forest ecosystems; the second half will focus on vegetation and habitat management in range ecosystems.

Grading:

Grading will be based on:

90% or better	A
80-89%	B
70-79%	C
60-69%	D
59% or less	F

Percentages will be based on:

Midterm exams	50%
Assignments	50%

Readings and Assignments:

Half of your grade (50 points) will be derived from the forest portion of the course and the remaining half of your grade (50 points) will be derived from the rangeland portion of the course.

All course materials (syllabus, readings, review questions, etc.) are on CANVAS (<https://usu.instructure.com/courses/361447>). Powerpoints used during class will be posted to CANVAS immediately after each class.

During the first half of the semester, there will be four short writing assignments. Each will be in the same format, i.e., a 1.5-2 page background report on a particular aspect of a native plant species. Feedback on each report should facilitate improvement in both style and efficiency. These assignments have two purposes: provide practice in clear and concise organization of technical material; and, by focusing on a plant species and wildlife species of your choice, help you to put lecture and reading content into context (i.e., apply the material in a meaningful way). To summarize, during the forest portion of the course there will be a mid-term exam (Mar 3) (25% of the total course grade) and the reports (25% of the total course grade).

During the rangeland portion of the course you will have five assignments: (1) select an Ecological Site of interest; (2) set a management objective of how you would like to use your site; (2) address how climate, soil topography, and biotic condition of you selected ecological site affect vegetation treatments;(3) to meet your management objective, address how prescribed burning, mechanical treatments, and chemical treatments might be applicable to your site; and (4) to meet your management objective, address appropriate grazing management for your selected site. Each assignment is worth 6 points for a total of 30 points or 3/5ths of the grade for this portion of the class. Finally, a mid-term on May 3 will test your grasp of material from the classes (20 points).

- 10% will be deducted from the grade for each day an assignment is late.

Accommodations for disabilities:

Students with physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations in accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973. All accommodations are coordinated through the Disabilities Resource Center (DRC) in Room 101 of the University Inn, 797-2444 voice, 797-0740 TTY, or toll free at 1-800-259-2966. Please contact the DRC as early in the semester as possible. Alternate format materials (Braille, large print or digital) are available with advance notice.

Academic integrity:

Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to establish the higher level of conduct expected and required of all USU students. Infractions (cheating, falsification, and plagiarism) and their associated penalties are described in the USU Academic Policies and Procedures Manual (www.usu.edu/policies).

How can I succeed in this class?

It is as easy as 1, 2, 3: 1) show up 2) pay attention (don't check email during class) and 3) do the assignments. Materials covered in this course cannot be memorized from a textbook. The material in this course has been collated from a wide variety of sources by your professors. It is your job to extract all the information you can from them and make sure that it makes sense TO YOU. Ask questions in class and ask questions during office hours or in the hallways. The more you put in, the more you will get out.

Course Schedule and Reading Assignments:

Date	Topic	Readings
<i>Forest Vegetation Section</i>		
1) Jan 12	Course introduction/Forest vegetation dynamics	
2) Jan 14	Forest vegetation dynamics, cont.	Long (2003)
3) Jan 19	Forest vegetation dynamics, cont.	Bartos & Campbell (1998)
4) Jan 21	Forest disturbances (<i>Fire effects assessment due</i>)	Long et al. (2004)
5) Jan 26	Stand dynamics	<i>Long & Shaw (2005)</i>
6) Jan 28	Stand dynamics, cont.	<i>Perera & Buse (2004)</i>
7) Feb 2	Disturbance-based management	<i>Long (2009)</i>
8) Feb 4	Seed collection and handling	Johnson et al. (2004)
9) Feb 9	Reproduction treatments (<i>Propagation protocol due</i>)	Tappeiner et al. (1997)
10) Feb 11	Stand treatments	<i>Long and Smith (2000)</i>
11) Feb 16	No class (virtual Monday)	
12) Feb 23	Stand treatments, cont. (<i>Habitat value/ecosystem services due</i>)	<i>Hayes et al. (1997)</i>
13) Feb 25	Stand treatments, cont.	Agee & Skinner (2005)
14) Mar 1	Summary & review (<i>Habitat assessment due</i>)	
15) Mar 3	Forest midterm	
Mar 7-11	Spring break	
<i>Range Vegetation Section</i>		
16) Mar 15	Range fundamentals and history	(1) Monsen (2004b)
17) Mar 17	Ecological sites and state and transition models	(2) Briske et al. (2005)
18) Mar 22	Principles of rangeland vegetation manipulation ¹	(3) Stevens (2004a), (4) Stevens (2004b)
19) Mar 24	Site suitability (climate, soil, topography, and biotic condition) ²	
20) Mar 29	Controlling plant competition: (1) fire / prescribed burning	(5) Monsen (2004a), (6) Monsen (2004c), (7) Whisenant (2004)
21) Mar 31	Controlling plant competition: (2) mechanical treatments	(8) Stevens and Monson (2004a)
22) Apr 5	Controlling plant competition: (3) chemical treatments	(9) Vallentine (2004)
23) Apr 7	Seeding desired plants	(1) Monsen and Stevens (2004b)
24) Apr 12	Grazing and biological control treatments ⁴	(11) Briske et al. (2008), (12) Kothmann (2009)
25) Apr 14	Grazing and biological control treatments	
26) Apr 19	Social and political perspectives ⁵	(13) Boyd and Svejcar (2009)
27) Apr 21	Economic considerations	(14) NRCS (1997)
28) Apr 26	Planning – Putting it all together	(14) State of Washington (2008) (15) Swanson (1994)
29) Apr 28	Mid-term review	
	Range Mid-term May 3	

Assignment due dates: ¹Ecological site description. ²Management objective. ³Address how climate, soil topography, and biotic condition of you selected ecological site affect vegetation treatments. ⁴Address how prescribed burning, mechanical treatments, and chemical treatments might be applicable to your site. ⁵Address appropriate grazing management for your site.

READINGS (PDFs can be found on Canvas)

Forest Vegetation – Habitat Management Section

- Agee, J. K. and C.N. Skinner. 2005. Basic principles of forest fuel reduction treatments. *Forest Ecology and Management* 211:83-96.
- Bartos, D.L. and R.B.Campbell, Jr. 1998. Decline of quaking aspen in the Interior West - examples from Utah. *Rangelands* 20:17-24.
- Hayes, J.P., S.S. Chan, W.H. Emmingham, J.C. Tappeiner, L.D. Kellogg, and J.D. Bailey. 1997. Wildlife response to thinning young forests in the Pacific Northwest. *Journal of Forestry* 95:28-33.
- Johnson, G. R.; F.C. Sorensen; J.B. St. Clair and R.C. Cronn. 2004. Pacific Northwest forest tree seed zones: a template for native plants? *Native Plants* 5:131-140.
- Long, J.N. 2003. Diversity, complexity and interactions: an overview of Rocky Mountain forest ecosystems. *Tree Physiology* 23:1091-1099.
- Long, J.N. 2009. Emulating natural disturbance regimes as a basis for forest management: a North American view. *Forest Ecology and Management* 257:1868-1873.
- Long, J.N.; T.J. Dean; and S.D. Roberts. 2004. Linkages between silviculture and ecology: examination of several important conceptual models. *Forest Ecology and Management* 200:249-261.
- Long, J.N. and J.D. Shaw. 2005. A density management diagram for even-aged ponderosa pine stands. *Western Journal of Applied Forestry* 20:205-215.
- Long, J.N. and F.W. Smith. 2000. Restructuring the forest: goshawks and the restoration of southwestern ponderosa pine. *Journal of Forestry* 98:25-30.
- Perera, A.H. and L.J. Buse. 2004. Emulating natural disturbance in forest management: an overview. Chapter 1. IN: Perera, A.H.; Buse, L.J.; Weber, M.G. (eds.). *Emulating natural forest landscape disturbances: Concepts and applications*. Columbia University Press. N.Y. pg. 3-7.
- Smith, D.M.; B.C. Larson; M.J. Kelty; and P.M.S. Ashton. 1997. Silviculture and its place in forestry. Chapter 1 (pg. 3-19). IN: Smith et al. *The Practice of Silviculture: Applied Forest Ecology*. John Wiley & Sons, Inc. N.Y.
- Tappeiner, J.C., D. Lavender, J. Walstad, R.O. Curtis, and D.S. DeBell. 1997. Silvicultural systems and regeneration methods: current practices and new alternatives. Chapter 9 (pg. 151-164). IN: K.A. Kohm and J.F. Franklin (eds.). *Creating a forestry for the 21st century: the science of ecosystem management*. Island Press, Washington, D.C.

Range Vegetation -- Habitat Management Section

- Boyd, C. S. and T. J. Svejcar. 2009. Managing Complex Problems in Rangeland Ecosystems. *Rangeland Ecology & Management* 62:491-499.
- Briske, D. D., N. F. Sayre, J. R. Brown, L. Huntsinger, M. Farnandez-Guminez, B. Budd, and J. D. Derner. 2011. Origin, persistence and resolution of the rotational grazing debate. *Rangeland Ecology & Management* 64:325-334.
- Briske, D. D., S. D. Fuhlendorf, and F. E. Smeins. 2005. State-and-Transition Models, Thresholds, and Rangeland Health: A Synthesis of Ecological Concepts and Perspectives. *Rangeland Ecology & Management* 58:1-10.
- Kothman, M. 2009. Grazing methods: a viewpoint. *Rangelands* 31:5-10.

- Monsen, S. B. 2004a. Controlling Plant Competition. Pages 57-64. IN: Monsen, Stephen B.; Stevens, Richard; Shaw, Nancy L., comps. 2004. Restoring western ranges and wildlands, vol. 1. Gen. Tech. Rep. RMRS-GTR-136-vol-1. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Monsen, S. B. 2004b. History of range and wildlife habitat restoration in the Intermountain West. Pages 1-5. IN: Monsen, Stephen B.; Stevens, Richard; Shaw, Nancy L., comps. 2004. Restoring western ranges and wildlands, vol. 1. Gen. Tech. Rep. RMRS-GTR-136-vol-1. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Monsen, S. B. 2004c. Restoration or rehabilitation through management or artificial treatments. Pages 25-32. IN: Monsen, Stephen B.; Stevens, Richard; Shaw, Nancy L., comps. 2004. Restoring western ranges and wildlands, vol. 1. Gen. Tech. Rep. RMRS-GTR-136-vol-1. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- NRCS. 1997. Grazing Lands Economics. Pages 1-10. IN: NRCS. National Range and Pasture Handbook. USDA. Washington, D.C.
- Stevens, R. 2004a. Basic considerations for range and wildland revegetation and restoration. Pages 19-24. IN: Monsen, Stephen B.; Stevens, Richard; Shaw, Nancy L., comps. 2004. Restoring western ranges and wildlands, vol. 1. Gen. Tech. Rep. RMRS-GTR-136-vol-1. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Stevens, R. 2004b. Incorporating wildlife habitat needs into restoration and rehabilitation projects. Pages 155-173. IN: Monsen, Stephen B.; Stevens, Richard; Shaw, Nancy L., comps. 2004. Restoring western ranges and wildlands, vol. 1. Gen. Tech. Rep. RMRS-GTR-136-vol-1. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Stevens, R. and S. B. Monsen. 2004a. Mechanical plant control. Pages 65-88. IN: Monsen, Stephen B.; Stevens, Richard; Shaw, Nancy L., comps. 2004. Restoring western ranges and wildlands, vol. 1. Gen. Tech. Rep. RMRS-GTR-136-vol-1. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Stevens, R. and S. B. Monsen. 2004b. Seedbed preparation and seeding practices. Pages 121-154. IN: Monsen, Stephen B.; Stevens, Richard; Shaw, Nancy L., comps. 2004. Restoring western ranges and wildlands, vol. 1. Gen. Tech. Rep. RMRS-GTR-136-vol-1. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Swanson, S. 1994. Viewpoint: Integrating CRM (Coordinated Resource Management) and NEPA (National Environmental Policy Act) processes. *J. Range Manage.* 47:100-106.
- Vallentine, J. F. Herbicides for plant control. Pages 89-100. IN: Monsen, Stephen B.; Stevens, Richard; Shaw, Nancy L., comps. 2004. Restoring western ranges and wildlands, vol. 1. Gen. Tech. Rep. RMRS-GTR-136-vol-1. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Washington CRM Task Force. 2008. Washington State coordinated resource management handbook. 31 p.
- Whisenant, S. G. 2004. Vegetative manipulation with prescribed burning. Pages 101-119. IN: Monsen, Stephen B.; Stevens, Richard; Shaw, Nancy L., comps. 2004. Restoring western ranges and wildlands, vol. 1. Gen. Tech. Rep. RMRS-GTR-136-vol-1. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.