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### FOR 347.01: Multiple Resource Silviculture

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**FORESTRY 347**  
**MULTIPLE RESOURCE SILVICULTURE**  
Autumn 2005

Instructor: John Goodburn  
Office: Rm. 439 Science Complex  
Telephone: 243-4295 Email: goodburn@forestry.umd.edu  
Office hours: Mon. 3:00 - 5:00 pm, Thurs. 8:00 - 10:00 am (*or by advance appointment*)

Lecture and Discussion Mon. & Wed. 10:10 - 11:00 a.m. Rm. 301 Forestry Bldg.  
Lab/Field Work Thur. 2:10 - 6:00 p.m. Rm. 206 Forestry Bldg.  
(*Field labs will meet at vans in parking lot south of Science Complex building*)

### Course Description

The Multiple Resource Silviculture course introduces the concepts behind various silvicultural techniques and their application in forest ecosystems to meet multiple resource objectives. This course integrates the biological principles of tree growth and regeneration (silvics) with the application of this knowledge to the management of forest stands (silviculture). The study of Silvics considers the biological life histories and environmental requirements of forest trees. It includes such topics as soil and site requirements, pattern and rates of growth, competition, seed production and dissemination, and reproductive strategies. Silviculture is the theory and practice of influencing forest regeneration, species composition, and growth to accomplish a specified set of resource objectives. Silviculture can be thought of as applied forest ecology.

The subject matter of the course will include coverage of silvics, forest dynamics, intermediate stand treatments, reforestation principles, even-aged and uneven-aged silvicultural systems, and ecological restoration techniques. We will discuss ecologically-based forest management strategies aimed at sustainable wood production, wildlife habitat enhancement, watershed protection, and the maintenance of biological diversity, site productivity, and aesthetic quality.

Performance goals for students completing the Multiple Resource Silviculture course will include the following:

- Students should have a clear understanding of key ecological concepts related to forest stand development and the response of forest vegetation to silvicultural practices.
- Students should be familiar with the key silvical characteristics of the common tree species in the northern Rockies.
- Students should demonstrate a familiarity with silvicultural terminology and be able to discuss practical application of regeneration techniques, intermediate stand treatments, and alternative silvicultural systems.
- Students should be able to diagnose current conditions in a stand given inventory information, to describe desired conditions given landowner objectives, and to prescribe silvicultural treatments that will move current stand towards desired conditions.
- Students should be able to consider how different silvicultural practices might affect soil resources, forest health, wildlife habitat, biological diversity, wood production, water quality and yield, recreation, and aesthetics.
- Students should also gain an appreciation for the social dimensions of silvicultural planning and need to adapt silvicultural practices to meet landowner objectives and landscape scale issues.

### Readings

**Two alternative texts:** This semester we will reference your choice of two different textbooks that cover much of the same material, without major disagreement on terminology, methodology etc. Both are available in the book store, listed as optional/recommended for the class. Suggested background reading assignments associated with various topics covered during the semester will be listed for both texts in the course schedule, and you can choose from which text to read. Both books will also be on traditional reserves at the Mansfield Library for your use if you are unable to purchase either text.

The Practice of Silviculture: Applied Forest Ecology, 9<sup>th</sup> edition. Smith, Larson, Kelty, and Ashton. 1997.

Silviculture: Concepts and Applications, 2<sup>nd</sup> edition. Nyland. 2002.

**Additional reading materials** will also be referenced and will include both required reading for discussion and “further additional reading” for students that would like to further pursue topics of interest. These will be available either as pdf files on Electronic Reserves (ERes). In some cases they may also be available as hardcopy versions on traditional reserves at the Mansfield Library for 2-hour loan.

### Class Participation

Class participation is encouraged and will be incorporated into your grade. Your preparation and willingness to ask questions and discuss various topics will benefit not only your own learning experience, but also that of your colleagues in the class.

### Labs

Thursday field labs will generally meet in the parking lot south of the Science Complex where we will board vans. Indoor lab periods will meet in Room 206 of the Forestry Buildings. Attendance at scheduled lab sessions is expected, and unexcused absences could negatively affect your grade. Please notify me as soon as possible if you will be unable to attend class for some reason.

Labs are scheduled for a four hour block for efficiency in travel and field work logistics. The trade-off is that lab will meet only about  $\frac{3}{4}$  of the weeks (in order to approximate a 3 hour lab).

\*\* Unless lab is scheduled to be indoors, always wear appropriate field clothes and footwear (boots) to labs. If rain is forecast, bring rain gear and do not expect lab to be canceled on account of bad weather. \*\*

\*\*\* Please be on time for lab. We will often have a bit of travel to get to field sites (e.g., Lubrecht Experimental Forest) and the vans may not be able to wait for you. \*\*\*

### Drop in or drop me a line

You are encouraged to ask questions and initiate discussions both in and out of class. I am available during office hours or at other times if you wish to schedule an alternative time. Also feel free to contact me or clarify questions you have via email. Please do not wait until *after* an exam to ask questions!

### Grading System

Lab assignments, Written exercises	-	35%
Field Lab Write-ups, Site index problem set, Quizzes (?), Other		
Silvicultural Prescription	-	15%
Midterm Performance I	-	15%
Midterm Performance II	-	15%
Class participation	-	2%
Final exam	-	18%

### Special Accommodations

Students with disabilities who need accommodations should see me privately during my office hours to make arrangements.

**MULTIPLE RESOURCE SILVICULTURE**  
Autumn 2005  
**Tentative Course Outline and Reading Assignments\***

**Lecture/Lab Schedule**

<u>Date</u>	<u>Topic</u>	<u>Associated Reading in Text</u>
Week 1		<b>Smith text</b> <i>Nyland</i>
8/29 M	Introduction, Purpose of Silviculture	**
8/31 W	Forest stand dynamics, Stages of stand development	<b>Chap. 1 &amp; 2</b>
9/1 H	<b>No Lab</b>	

Part I. Silvics and forest ecology as a basis for silvicultural planning

**Week 2**

9/5 M	<b>No Class</b> – Labor Day Holiday	
9/7 W	Regeneration ecology, Disturbances, Silvicultural systems	<b>Chap. 7, Chap 11</b>
9/8 H lab1	Overview of Stand Development and Silvicultural Strategies (Deer Creek)	

**Week 3**

9/12 M	Ecological Site Classification; Succession, Forest Habitat Typing	Kimmins
9/14 W	Site Classification; Site quality estimation; Site index problem set	<b>Chap. 9, pp 235-252</b>
9/15 H lab2	Stand dynamics; Forest structure evaluation - (Lubrecht Experimental Forest)	

**Week 4**

9/19 M	Forest stand dynamics, Interpreting stand structure and history	
9/21 W	Reforestation, Natural regeneration vs. Planting or Seeding	<b>Chap. 10</b>
9/22 H	<b>No Lab</b>	

**Week 5**

9/23 M	Nursery production of planting stock & tree planting	
9/24 W	Site preparation - Alternative methods	<b>Chap. 8</b>
9/29 H lab3	Planning for Regeneration, Site classification, Evaluating stocking levels (Blue Mtn)	

**Week 6**

10/3 M	Methods and effects of herbicide applications	<b>Chap. 6, pp. 133-146</b>
10/5 W	<b>Midterm Performance I</b> (Covering material through 10/4)	
10/6 H lab4	Silvicultural Inventory; Stand Assessment/Diagnosis – (Rattlesnake NRA)	

Part II. Intermediate Stand Treatments

**Week 7**

10/10 M	Stand density concepts; Natural self-thinning	<b>Chap. 3 pp 47-60. &amp; Chap. 4</b>
10/12 W	Tree and Stand response to thinning	
10/13 H lab5	Landscape Management on the Flathead Indian Reservation	(Arlee, MT)

**Week 8**

10/17 M	Pre-commercial thinning; Release and Improvement cuts	<b>Chap. 6, p. 131-133, 147-156</b>
10/19 W	Application of thinning; Commercial thinning methods	<b>Chap. 5</b>
10/20 H	<b>No Lab</b>	

## Week 9

- 10/24 M Commercial thinning methods  
10/26 W Thinning frequency and intensity; Quantitative Assessment tools  
10/27 H **lab6** Fire & Thinning as tools of restoration ecology; Ponderosa Pine (Ninemile RD, Lolo NF)

## Part III. Management and regeneration of mature forest stands

### Week 10

- 10/31 M Silvicultural systems - Even-aged methods **Chap. 11, 12**  
Clearcutting methods and regeneration alternatives  
11/2 W Seed tree method; Shelterwood method **Chap. 14**  
11/3 H **lab7** Mark thinning using stocking guides and crop tree release method - (Lubrecht Exp. Forest)

### Week 11

- 11/7 M Partial Retention Harvests for Various Objectives (Regen, Wildlife, Aesthetics)  
11/9 W Silvicultural systems - Uneven-aged methods **Chap. 15**  
11/10 H **lab8** Seed-Tree & SW Systems, Regen under Partial Retention Harvests – (Roman Creek)

### Week 12

- 11/14 M Introduction to Single-tree and group selection  
11/16 W Quantitative methods of managing Uneven-aged stands **Chap. 16**  
11/17 H **lab9** Managing Uneven-aged stands; Silvicultural Prescriptions (Pattee Canyon or Lubrecht)

### Week 13

- 11/21 M **Midterm Performance II** (Covering material through 11/8)  
11/23 W No Class - Thanksgiving vacation  
11/24 H No Lab - Thanksgiving vacation

## Part V. Silviculture for Alternative Objectives

### Week 14

- 11/28 M Silvicultural control of damaging agents **Chap. 19**  
11/30 W Management of Whitebark pine in high elevation ecosystems  
12/1 H **lab10** Work on Silvicultural Prescriptions

### Week 15

- 12/5 M Silvicultural techniques for maintaining biological diversity **Chap. 20**  
12/7 W Silvicultural strategies for the Northern Goshawk and Red-cockaded Woodpecker  
12/8 H **lab?** Review and questions?

## Finals Week

- 12/16 Fri **Final Exam Performance** 8:00 – 10:00 a.m., Friday, Dec. 16

\* Course outline and reading assignments may be subject to minor changes as necessary.

\*\* Chapter numbers for Suggested Readings listed in bold refer to The Practice of Silviculture text (Smith et al.). Alternative chapters in the *Nyland text* are shown to right (handwritten). Additional Readings will be listed separately.