

# Certificate Course in Ecosystem Silviculture:

## *Silvicultural Application of Minnesota's Ecological Classification Systems*

Coordinated by

**Sustainable Forests Education Cooperative**

College of Food, Agricultural  
and Natural Resource Sciences

UNIVERSITY OF MINNESOTA

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BLANDIN FOUNDATION

## COURSE SYLLABUS

### COURSE OBJECTIVES

This course was developed to advance the use of ecological classification systems (ECS) when designing silviculture prescriptions.

The target audience is professional forest management field staff – wildlife biologists and foresters - from county land departments, tribal forest management departments, forest industry, USDA Forest Service, the MN Department of Natural Resources, private forest consultants, soil and water conservation districts, and post-secondary instructors of forestry and wildlife ecology and management curricula.

The course curriculum will:

- 1) Provide a review of the technical aspects of forest ecological site classification using a MN DNR native plant community field guide, a habitat typing field guide developed by John Kotar, and associated references; and
- 2) Advance trainee knowledge and application of the underlying ecological principles of ecological classification when designing silviculture prescriptions.

Ultimately, this course will demonstrate how ecological classification systems give forest land managers logically organized and defensible management options based on quantifiable ecological attributes of forest stands.

### COURSE LOCATION

All modules will use as a meeting place and home base the UMN North Central Research and Outreach Center (ROC) in Grand Rapids, Minnesota. The ROC is located on the north side of Highway 169, just east of the Itasca Community College campus.

## **TRAINING DATES**

**Module 1: Silviculture and Ecological Classification Systems – the marriage of silvics and forest ecology**

*Training Group 4: July 30, 2008*

**Module 2: Ecological Forest Management, Part I – why do it?**

*Training Group 4: July 31, 2008*

**Module 3. Glacial Landform and Soils Interpretation – huh?**

*Training Group 4: August 5, 2008*

**Module 4. Forest Ecological Classification Practicum – plants are your friends!**

*Training Group 4: August 14-15, 2008*

**Module 5. Ecosystem Silviculture – don't throw the baby out with the bathwater!**

*Training Group 4: October 7-8, 2008*

**Module 6. Ecological Forest Management, Part II - putting it all together**

*Training Group 4: June 9-10, 2009*

## **TEACHING STRATEGY and COURSE FORMAT**

Course content will be presented in a variety of formats, including lectures, seminars, field work, and guided learning. The course is organized into six separate modules, ranging from one to two days in length, for a total of 8 ½ class days.

The module format provides an iterative learning structure and a forest stand level focus for the use of ECS tools. Course modules have been organized to illustrate how ECS can be used to relate management actions to predictable outcomes based on measurable site characteristics.

## SAF CFE CEUs

At the end of the course, you will receive a CEU sheet for each module. These may be submitted by you to fulfill CEU requirements for programs such as Certified Forester (Society of American Foresters) or Forest Stewardship plan preparer (Minnesota Forest Stewardship Program).

## TRAINEE PREREQUISITES AND REQUIRED ASSIGNMENTS

### Prerequisites

1. Plant identification skills
2. Purchase of the MN DNR Field Guide to Native Plant Communities of Minnesota: The Laurentian Mixed Forest Province

### Trainee Assignments

1. Each trainee is asked to provide a timber sale plan, silviculture prescription or written management recommendation prior to Module 4. **The plan is due August 5 and can be turned in during Module 3. This plan must have been completed prior to January 1, 2008.**
2. Each trainee is asked to complete an independent project: a silvicultural prescription, timber sale or stewardship plan for one stand of the trainee's choice. This project should be part of each trainee's normal work activities. Additional details will be provided by the conclusion of Module 5. In Module 6, each trainee will give a 10 minute presentation on his or her final independent project. **The independent project is due May 1, 2009. This project should be something the trainee started while enrolled in the Ecosystem Silviculture course anytime after completing Module 5.**

## COURSE CONTENT OVERVIEW

1. Tour – Field applications, Forest Management and Cost (Module 2)
2. Forest ECS Field Practicum (Modules 1, 3 and 4)
  - a. Technical: Identifying glacial landforms, plants and soils, and classifying forest communities
  - b. Ecological concepts and principles
3. Readings (Modules 1 and 5)
  - a. Forest Stand Dynamics Theory and Concepts
  - b. Forest Succession and Disturbance Regimes
4. Ecosystem Silviculture (Modules 5 and 6)
  - a. Silvics
  - b. Field measurements
  - c. Silviculture discussions

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## SYLLABUS

### ***Module 1. Silviculture and Ecological Classification Systems – the marriage of silvics and forest ecology.***

***Instructors: Beth Jacqmain, Aitkin County Land Department; Tony D’Amato and Louise Levy, University of Minnesota.***

This module:

- Outlines the course structure and content;
- Explains that while silviculture remains the basic means of modifying stand density and composition, forest ECS is used to identify dominant controlling factors of ecosystem structure, function and composition;
- Links forest land certification standards with course objectives;
- Provides a lecture, exercise and discussion on silviculture and silvics; and
- Provides an opportunity for trainees to share their expectations.

We will discuss how ECS can be used by professional forest land managers who seek to provide silvicultural solutions and options that are economically viable, ecologically suitable, financially feasible, institutionally attractive, legally acceptable and defensible, and which consider landscape scale and long spans of time. The argument will be made that ECS is a powerful tool for forest resource managers and others to refine and deepen their understanding of Minnesota’s forests while providing valuable defensibility to management planning and activities.

### ***Module 2. Ecological Forest Management, Part I – why do it?***

***Instructor: Cheryl Adams, Blandin Paper Company.***

This module is a one-day field tour with multiple stops to discuss silvicultural treatments and costs versus profits in forest management activities. Trainees will visit thinning sites and plantations located in the following forest types: northern hardwood, northern boreal hardwood, and northern mixed. The instructor will address other issues during the tour such as stand development patterns, predicting successional trajectories, importance of understanding advanced regeneration, importance of monitoring and evaluation, and other silviculture topics.

### **Module 3. Glacial Landform and Soils Interpretation – huh?**

***Instructors: Dan Hanson MN DNR Forestry; Art Norton, The Nature Conservancy; Louise Levy, University of Minnesota.***

Understanding glacial landforms and their relationship to soil characteristics aids understanding and use of ecological classification system tools. This module combines the topics of glacial landform and forest soil interpretation to more efficiently and effectively cover two topics that are typically outside the day to day field experience of foresters and wildlife biologists. Instructors will present the following information:

- Glacial landform terminology with photo examples;
- Minnesota's glacial history and its effect on today's landscape forms and soils;
- Basic soil concepts and accompanying handouts.

Classroom and field site activities will include:

- Practicing glacial landform interpretation by using aerial photos and topographic maps;
- Practicing field identification and interpretation of glacial landforms and soils;
- Discussing relationships between soil characteristics, native plant communities and forest management.

### **Module 4. Forest Ecological Classification Practicum.**

***Instructors: Bruce Carlson and Becky Marty, MN DNR Ecological Services; John Kotar, Terra Silva Forest Ecology and Management.***

***Assistants: Beth Jacquain, Aitkin County Land Department; Louise Levy, University of Minnesota.***

This module will guide trainees through the role of a forest ecological classification using two ecological classification field guides, charts, keys and tables to: 1) classify a site's ecological attributes; 2) determine successional stage; 3) envision successional trajectories; 4) identify site limitations and opportunities.

This module includes intensive field sampling and identification of understory plants, soils and classifying ECS plant community types using two ecological classification tools: the MN DNRs *Field guide to the native plant communities of Minnesota: The Laurentian Mixed Forest Province*, and John Kotar's *Field Guide*

*to Forest Habitat Type Classification for North Central Minnesota.* Trainees will learn and review characteristics of three forested systems in the field while studying their specific native plant communities. The case study sites will represent one fire dependent and one or two mesic hardwood communities.

Field days will include detailed discussions of tree adaptive characteristics, stand dynamics and development, forest succession and disturbance regimes specific to the study sites.

### ***Module 5. Ecosystem Silviculture.***

***Instructors and field experts: Tony D'Amato and Louise Levy, University of Minnesota; Harvey Tjader, MN DNR Forestry; Jeff Hines, MN DNR Wildlife; Beth Jacqumain, Aitkin County Land Department; Jason Meyer, St Louis County Land Department; and others.***

This module will continue to demonstrate methods for developing ecosystem silviculture prescriptions based on a process that: 1) locates a management stand in a present ecological condition, 2) predicts how the stand will develop over time without management and with management, and, 3) compares predicted outcomes to actual outcomes.

In this module trainees will work on an in-class exercise to construct a management scenario for a hypothetical forest stand. Trainees will use resources such as the silvics sheets from the SFEC Silvics and Silviculture webpage (<http://sfec.cfans.umn.edu/silvics/index.html>) and readings from Modules 1 and 5.

Trainees will visit the same sites that were examined in Module 4. At each site, trainees will build on Module 4 activities and discussions by reviewing and summarizing current ecological attributes and determining dominant controlling factors of forest system structure, function and composition. At each site, trainees interpret information regarding dominant disturbance regimes and silvics of primary tree species to predict long-term successional trajectories. Given future target conditions, trainees will discuss silvics, stand dynamics and assess options to reach given target conditions in desired time frames for each case-study site. Finally, at each site, trainees will examine options for monitoring and evaluation of silviculture treatments within an ECS framework.

***Module 6. Ecological Forest Management, Part II – putting it all together.***

**Instructors: Cheryl Adams, Blandin Paper Company; Jeff Hines, MN DNR Wildlife; Beth Jacqmain, Aitkin County Land Department; John Kotar, Terra Silva – Forest Ecology and Management; Louise Levy, University of Minnesota; and others.**

The final module is a 1 ½ day session with a field trip to examine a site with an implemented ECS based forest management program; a review and discussion of the 2nd trainee assignment, with a 10 minute presentation by each trainee; presentation of the certificate; what can we learn from Wisconsin; and “where do we go from here?”

Module 6 includes presentations by guest speakers, a field site visit on day 1, trainee presentations on day 2, and retaking the introductory quiz from Module 1. Because this is the final module, there will also be an evening banquet at the end of day 1, with presentation of certificates and recognition of trainee effort.

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Funding from the Blandin Foundation, as part of their “Vital Forests Vital Communities” initiative, has provided the financial means by which the development team\* can advance the creation and distribution of user oriented ECS tools to experienced forest land managers.

From Society of American Foresters “The Dictionary of Forestry:”  
“Silviculture is the art, science, and practice of establishing, tending, and reproducing forest stands with desired characteristics to meet the diverse needs of landowners and society on a sustainable basis. “

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\* Development Team: Beth Jacqmain, Aitkin County Land Department; Cheryl Adams, Blandin Paper Company; John Almendinger, Dan Hanson, and Alaina Berger, MN DNR; Louise Levy, UMN; Julie Ernst; UMD.