

Forestry Study Guide

Learning Objectives: Students should be able to: 1. Identify common trees without a key. 2. Identify specific or unusual species of trees or shrubs through the use of a key. 3. Understand how wildlife habitat relates to: forest communities, forest species, forest age structure, snags and den trees, availability of food and cover, and riparian zones. 4. Understand basic forest management concepts. 5. Be familiar with use of a diameter tape and other forestry tools. 6. Understand the benefits of trees in urban/suburban settings and the factors affecting their health and survival.



Key Topics

1. Basic Forestry Knowledge; such as tree identification, silvics of common trees, tree measurement and tool use, and interaction of forests and environment.
2. Forest Ecology; such as the observation and identification of forest types, observing and describing forest stand structure, observing and describing site variables that affect tree species, and observing and identifying the stages of forest succession.
3. Silviculture Systems - such as describing the difference between harvesting and silvicultural systems, describe the difference between the goal of thinning and final harvest, describe the purpose of common silvicultural systems, and describe the management practices and their purpose.
4. Viewing Ecosystems; such as the observation of how trees and forests impact soil development, wildlife habitat, public places, agriculture, and on water quality.
5. Urban Forestry; such as the recognition of the value of trees in the urban landscape, choosing the correct species for specific locations, energy conservation through tree plantings, urban wildlife benefits from tree plantings methods, proper tree care and maintenance, including wise choices in pest and disease control.

Description of Individual Learning Objectives:

1. Basic forestry knowledge involving the use of leaves, bark or twigs to identify common tree species of Montana (using a key if necessary), understanding rooting habit, shade tolerance, soil, and other characteristics of common tree species, identify and use such tools as a Biltmore stick, abney level or clinometer, prism or angle gauge, calculating the annual diameter growth by using annual ring measurements, understanding and explaining the use of basal area in forest management, and describing the effects of trees and forest on temperature, wind, sounds, and other variables.
2. Forest ecology involving the identification and description of adaptations for common trees associated with forest wetland systems, streamline forest systems, upland forest systems, old field sites, recognizing the different layers of vegetation found within most undisturbed forest stands, recognizing and evaluating variables, related to site such as depth to water table, soils, shade level and their effects related to tree species survival and growth, and recognizing and describing the process of secondary forest succession for old field and harvested sites.
3. Silviculture involving the explanation of the difference between clear-cut harvest and clear-cut silvicultural system, explain the difference between a thinning, diameter-limit cut and the single-tree selection system, understanding and explaining the difference between even-aged and uneven-aged management systems, listing probable reasons why a logger and a forester might select different trees for harvest, defining the goals of thinning in comparison to the goals of final harvest, outlining the goals and approaches used by the major silvicultural systems to insure stand regeneration after harvest, and be able to list at least five best management practices used to control flow of water on a harvest site and describe the situation where they are appropriately used.
4. The viewing of ecosystems where the goal at each site is to assess the whole area while addressing questions on the various components you are asked to observe and understand.
5. To understand the importance and benefits of trees in the urban habitat for a wide variety of reasons, including wildlife habitat, windbreaks, energy conservation, shade benefits, erosion control, aesthetics and others. To understand proper care of trees in the urban environment.

Critical Facts:

1. Trees and forests occur in certain locations for certain reasons that are often identifiable by observing the site and the larger area surrounding the site. These may be as simple as the soil type, the amount of soil moisture, or need for a park or natural area within a residential area.

2. Highly productive soils are often used for agricultural production and would also support a highly productive forest. As sites become less acceptable for agriculture due to drought or wet soils, certain tree species and forest types can still maintain high levels of productivity on many of these sites.
3. As the amount of soil moisture on a site increases, there is a change in the types of vegetation that become dominant. Wetland sites have special combinations of tree species, shrubs, and herbaceous plants that are part of the important functions these sites contribute to the environment.
4. Wildlife habitat is affected by the age, size, density, variety of tree species, and location of the trees or forest stands in relation to surrounding ecosystems such as residential areas, other wooded areas, streets and water sources. The level of importance of trees is dependent upon the ecosystem (prairie, wetland, agricultural field, forest) and the wildlife being studied.

Minimum Recommended Biota List:

- **Lodgepole Pine** *Pinus contorta*
- **Ponderosa Pine** *Pinus ponderosa*
- **Western White Pine** *Pinus monticola*
- **Whitebark Pine** *Pinus albicaulis*
- **Limber Pine** *Pinus flexilis*
- **Alpine Larch** *Larix lyallii*
- **Western Larch** *Larix occidentalis*
- **Engelmann Spruce** *Picea engelmannii*
- **Douglas-fir** *Pseudotsuga menziesii*
- **Western Hemlock** *Tsuga heterophylla*
- **Mountain Hemlock** *Tsuga mertensiana*
- **Grand Fir** *Abies grandis*
- **Alpine Fir** *Abies lasiocarpa*
- **Western Red Cedar** *Thuja plicata*
- **Rocky Mountain Juniper** *Juniperus scopulorum*

Publications

1. Forestry Best Management Practices MSU Extension Service (July 1991)
2. Guide to Montana Streamline MSU Extension Service Management Law & Rules (March 1994) MT DNRC
3. Montana Voluntary Wildlife Guidelines for Montana Fish, Wildlife & Parks Streamline Management Zones MT Dept. Natural Resource & Conserv. (September 1995)
4. Trees and Shrubs for Montana (1985) MSU Extension Service Bulletin # 323
5. An Introductory Guide to Urban and USDA Forest Service Community Forestry Programs (1993) Forestry Report R8-FR16
6. Recognizing Tree Hazards (1993) International Society of Arboriculture P. O. Box 66, Savoy, IL 61874
7. Benefits of Urban Trees (1990) USDA Forest Forestry Report R8-FR17
8. Can Silviculture Replace the Role of Fire? USDA Forest Service INT Res. Sta., (Russell T. Graham) Moscow ID
In MT Envirothon Registration Packet
9. Forest Types and Treatments (Choices in Silviculture)
In MT Envirothon Registration Packet
10. Forest Measurements - Tools for Measuring Your Forest (1983 Oregon Ext. Circular# 1129)
In MT Envirothon Registration Packet
11. Multiple Use - Agro-Forestry: Growing Trees, Forage, and Livestock Together (1985 Oregon Ext. Circular# 1114)
In MT Envirothon Registration Packet
12. Multiple Use - Enhancing Wildlife on Private Woodlands (1989 Oregon Ext. Circular #1122)
In MT Envirothon Registration Packet
13. Mammals of Montana, Kerry R., 2012, Mountain Press Publishing Company, Missoula, MT <http://fieldguide.mt.gov/>