

Forestry

Nebraska Forest Service

Did you know that . . . Nebraska is “the Home of Arbor Day?”

This day is particularly important to Nebraska. Julius Sterling Morton, the first editor of the “Nebraska City News” and later U.S. Secretary of Agriculture from 1893 to 1896, championed planting trees to help provide for the basic needs (fuel, lumber, food, etc.) and amenities (protection, shade, beauty, etc.) of early settlers.

In 1872, Morton first proposed a tree planting holiday called “Arbor Day.” That year, during the first Arbor Day, prizes were offered to counties and individuals for planting the largest number of trees. It was estimated that almost 1 million trees were planted in Nebraska during the first Arbor Day. Arbor Day became an official state holiday in 1885. Thus, Nebraska is known as the “Home of Arbor Day,” which is now celebrated in all 50 states, the District of Columbia, and 33 foreign countries.

J. Sterling Morton was extremely proud of his creation. In his words, “Other holidays repose on the past; Arbor Day proposes for the future.”

Here in Nebraska trees and forests provide:

- protection for land, water and air
- shelter for homes, livestock and wildlife
- lumber for various wood products
- shade for homes and streets
- woody biomass for fuel for heating and cooling

They also save money on energy costs and create more beautiful and livable communities, plus much, much more!

Where are Nebraska’s Forests?

With more than 1.2 million acres of natural forest land and another 1.5 million acres of nonforest land with trees, Nebraska is rich in forest resources. Since that first Arbor Day, Nebraskans have planted landscape and conservation trees to shade their homes and to protect agricultural land, livestock, and our natural resources. The forests of Nebraska are tremendously diverse. From the ponderosa pine forests of the Pine Ridge and Wildcat Hills in western Nebraska, to the riparian forests along Nebraska’s many waterways, to the hardwood forests of the Missouri Bluffs; trees and forests play an important role in the ecology and economy of Nebraska.

Objective #1: Tree Anatomy and Functions

All living organisms share a basic growth of structure and formation. The tree has components that function to conduct water and elements, support the tree, make food, store reserves and defend against pests and decay. The terms below are some of the key words in tree anatomy and function.

Know these terms and their functions.

- Photosynthesis
- Chlorophyll
- Transpiration
- Xylem
- Phloem
- Cambium
- Sapwood
- Heartwood
- Growth ring
- Roots
- Trunk
- Leaves
- Crown

Sample Questions

1. Leaf buds are produced during what season?
2. Water and nutrients are conducted upward in a tree through what structure?

Objective #2: Tree Identification

Each tree species has unique characteristics, which often determines the practical use of the species. Some are conifers (or softwoods), others are deciduous (or hardwoods). Each of these differences also determines how the tree is measured as to its height and volume. Conifers tend to have one tall leader; deciduous trees have several main branches that form the crown.

It is important to be able to accurately identify the common tree species in Nebraska. Become familiar with identification terminology using a dichotomous key to identify tree species.

- Dendrology
- Silviculture
- Forest type
- Genus and Species
- Deciduous & Conifer
- Softwood and Hardwood
- Leaf type, arrangement, shape, and composition
- Broadleaf, needle-like or scale-like leaves
- Whorled, pinnate or palmate

Sample Questions

3. What is the best way to tell the difference between pine and spruce needles?
4. Name a tree species with opposite branching patterns.

Objective #3: Tree Measurement

A method of forest and tree measurement is necessary to guide the sustainable management of the forest. Because wood from trees is a raw material used for many products from which homes, furniture, paper and other items can be produced, it is necessary to estimate not only the number of trees, but also the amount and size of wood for fuel and construction. The quantity of wood in trees and logs must be measured and quantified for the wood market. Specific forestry tools are used to measure the spacing of trees in the forest and the age, height, and volume of individual trees and logs. Today we measure trees for their age, height, diameter, and volume; some are measured as standing trees, while others are measured as logs in a lumber yard.

Become familiar with common forest and tree measurement terms.

- Crown size
- Diameter
- Log
- Basal area
- Stocking
- Stand
- Density
- Merchantable
- Board feet
- Cubic feet
- Cord

Understand how to use common forest and tree measurement tools

- Compass
- Increment borer
- Diameter tape
- Prism
- Clinometer
- Volume
- Hypsometer or Biltmore stick

Sample Questions

5. The age of a standing tree can be determined using what instrument?
6. What does the hypsometer or Biltmore stick measure?

Objective #4: Forest Ecology

A forest is a dynamic ecosystem characterized by the interaction of plants and animals in a specific environment. This forest is generally a wooded area, with more or less dense and extensive tree cover, often with varying characteristics as to the species composition, structure, age class and often with meadows, streams, fish and wildlife.

Become familiar with terminology and understand the systems and cycles that occur within the forest and how they are interrelated.

- Water cycle
- Carbon cycle
- Decay and decomposition
- Watersheds
- Succession
- Climax species
- Climate and microclimate conditions and changes
- Environmental conditions - human impacts, both positive and negative
- Sustained use
- Fragmentation

Understand how different influences can affect a forest. What happens when we disturb, disrupt or stop one of the above systems from functioning?

- Fire suppression
- Global warming/Climate change
- Flooding
- Droughts
- Insect infestations
- Invasive tree pests
- Urban expansion

Sample Questions

7. The native conifer that is expanding most rapidly across many parts of Nebraska is?
8. The process of long-term changes in a plant species composition of a forest is called?

Objective #5: Forest Management and Forest Health

Management practices can be incorporated to enhance and sustain the benefits and products that are obtained from a forest. Proper management practices will help keep the trees healthy and vigorous.

Become familiar with the terminology and understand the techniques used to manage forests and the threats to forest health.

- Sustainable use and the importance of it
- Fire suppression - fuel loading and fuel reduction
- Prescribed fire

- Forest thinning
- Silvicultural systems – clear cuts, patch cuts, and selective cuts
- Forest inventory measurements
- Determining a plot sample size vs. entire population
- Forest measurements - density
- Species identification - trees, shrubs, plants, animal sign
- Insect and disease identification - specify key insects and diseases
- Know key exotic tree species in your region - Scotch pine, white mulberry

Sample Questions

9. Why do foresters thin a pure stand of ponderosa pine?
10. Why is the forest type along the Platte River changing from primarily cottonwood to other species?

Objective #6: Forest Policy

There are many different options when managing a forest. Sometimes different objectives conflict with each other and the desired products and uses of a forest may not all be obtainable. Forestland managers need to understand the different uses and products that the forest can provide and help reach a compromise if a conflict occurs.

Use the different values each person has for themselves that relates to different management and utilization of our natural forest resources.

- Aesthetics
- Innate and ethical - environmental health
- Forest products
- Recreation - hunting, fishing, hiking, camping, etc.

Develop an understanding for how these different values can cause conflicts. Identify several resource conflicts in your region.

Understand what is meant by the urban forest; its importance to society and mental health; its value.

Understand who manages Nebraska's natural resources and the responsibilities they have.

- Nebraska Forest Service (NFS)
- United States Forest Service (USFS)
- National Park Service (NPS)
- US Fish and Wildlife Service (USFWS)
- US Army Corps of Engineers
- Bureau of Land management (BLM)
- Department of Natural Resources (DNR)
- Natural Resources Conservation Service (NRCS)
- Extension
- Natural Resources Districts (NRD)

Sample Questions

11. Why are Nebraska's forests so valuable?
12. True or False – Wood is the only natural resource that is renewable, recyclable and biodegradable.
13. True or False – A forest can be preserved in its present condition by removing all human influence.

Answers to Sample Questions:

1. Autumn/Fall
2. Xylem
3. Pine needles are usually in bundles of two or more, spruce are singly attached
4. Maples, ash, buckeye, etc
5. Increment borer
6. Diameter, tree or log volume as board feet, merchantable height, etc
7. Eastern red cedar
8. Succession
9. Reduces risk of wildfire, improves health of stand and reduces time until harvest
10. Fire suppression, flood suppression and livestock grazing
11. Forests produce wood products, provide wildlife habitat, and protect soil and water
12. True
13. False

Reference Material

Trees of Nebraska, EC1774: A comprehensive 75-page identification guide to 97 of the state's trees; includes how to compare leaves, twigs, fruit, bark and other parts and identify species.

Project Learning Tree Activity Guides

[Penn State Extension – Forest Management](#)

Websites (many sites have excellent publications too):

Nebraska Forest Service
PlantNebraska
Arbor Day Foundation
American Forests
Tree Farm
Smokey Bear
Forestry Index
Plant Database
USDA Forest Service
Nebraska National Forest
Temperate Forest Foundation

Ask your local district forester for help (forestry books, practical help with using the forestry tools and answering questions): <https://nfs.unl.edu/about-us/nfs-staff/>