

**Habitats of North Dakota**

# **WOODLANDS**



**By Gwyn Herman and Laverne Johnson**



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## **HABITATS OF NORTH DAKOTA**

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# ABOUT HABITATS OF NORTH DAKOTA

Distribution of these **Habitats of North Dakota** units is made possible by the North Dakota Game and Fish Department in collaboration with the North Dakota Center for Distance Education.

The information presented in **Habitats of North Dakota** seeks to promote teaching and learning about the wildlife and conservation topics of North Dakota. Five separate units have been developed to discuss the habitats. They are *Wetlands*, *Prairie*, *Badlands*, *Woodlands*, and *Riparian Areas*.

The **Habitats of North Dakota** units have been produced, published, and distributed by the North Dakota Center for Distance Education.

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The **Habitats of North Dakota** units are made possible through the efforts of a dedicated team of individuals at the North Dakota Game and Fish Department and the North Dakota Center for Distance Education.

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# ABOUT THE AUTHORS

Dr. Gwyn Herman and Ms. Laverne Johnson were born and raised in rural North Dakota, and both have a deep love for their home state. They are educators who have over 60 years of combined teaching experience at all grade levels, including the teaching of North Dakota Studies to both fourth and eighth grade students.

**Dr. Herman** earned her bachelor of science degree from Dickinson State University, her master of science degree from Minot State University, and her doctor of philosophy degree from the University of North Dakota. She taught for 10 years at the secondary level and 16 years at the fourth grade level. Since 2000, Dr. Herman has been teaching education courses and coordinating the Elementary Education program at the University of Mary in Bismarck.

**Ms. Johnson** received her bachelor of science and master of science degrees from Minot State University. Her experience includes 23 years as an elementary teacher in grades ranging from kindergarten through eighth grade, and 10 years as a speech/language pathologist in grades nine through twelve. She is currently an adjunct professor at the University of Mary where she supervises pre-service and student teachers.



Gwyn Herman (left) and Laverne Johnson (right)

## Welcome

**Welcome to the study of the *Woodlands of North Dakota!*** This book is filled with interesting and useful information about the woodlands of North Dakota—what they are, where they are located, which animals and plants call the woodlands their home, how they are threatened, and why they must be preserved and protected for future generations. Through reading and engaging in a variety of activities that accompany this text, you will find yourself on a dynamic and educational journey. **Read on....**

# WILDLIFE HABITATS AND CONSERVATION

## HISTORY by Chris Grondahl, Wildlife Biologist

Wildlife has long been an important part of the North Dakota prairies. American Indians depended on this abundant resource for their food, clothing, and shelter for thousands of years before Euro-Americans arrived in the area.

In European countries, wildlife resources were scarce. The only people who were allowed to hunt in Europe were wealthy landowners and members of royal families.

In the 1800s, Euro-Americans immigrated to North Dakota. The earliest settlers depended on hunting and trapping game animals to help feed their families and make a living. At the same time, market hunting for these wildlife resources began.

Market hunters killed large numbers of wildlife for furs and feathers, which they sold to people in the clothing industry on the East Coast and in Europe. They also sold meat to restaurants.

No laws existed to protect wildlife in North Dakota in those early years. Populations of wildlife such as the white-tailed deer, bighorn sheep, elk, and pronghorn decreased to very low numbers.

In 1883, Theodore Roosevelt came from New York to the Badlands of northern Dakota Territory to hunt. He liked the area so much that he bought two ranches in the Badlands and spent summers enjoying the wildlife and wide-open spaces of North Dakota.

Theodore Roosevelt's adventures in a land of wildlife and open spaces inspired his interest in wildlife conservation. Conservation is defined as caring for, managing, and protecting natural resources, including wildlife. When Theodore Roosevelt became President of the United States in the early 1900s, one of his major goals was to preserve and protect these natural resources. He set aside 230 million acres of land throughout the United States in the form of national parks, national forests, and other areas for conservation and public use. Other conservationists during this time realized the importance of protecting habitat and wildlife and developed plans to manage these resources.

During the 1900s, laws were passed to protect wildlife. In 1930, the North Dakota Game and Fish Department was created. Its purpose was to manage the state's wildlife resources for public enjoyment. Hunting was an important part of this management plan.

In order to pay for managing wildlife conservation, the U.S. government began collecting a special tax on hunting equipment such as guns and bullets. The money collected was given to state wildlife agencies for wildlife and conservation programs. A similar system was also adopted to fund fisheries programs. In this way, the group that uses and enjoys the resource pays for its management.

The state Game and Fish Department has used these funds along with money collected from sales of hunting and fishing licenses to purchase tracts of land that could be used by hunters and anglers. These public areas are called “Wildlife Management Areas,” or WMAs. Public lands that were purchased by the federal government included National Grasslands, waterfowl production areas, and wildlife refuges. These lands were purchased for the public, not only for protecting habitats for wildlife, but also for providing places for people to enjoy all kinds of outdoor recreation. Habitat (food, water, shelter, and space) is the key to sustaining healthy wildlife populations, and quality habitats have been created and preserved by individuals, conservation organizations, and governments.

An example of a very important habitat development for wildlife in North Dakota is a program called the “Conservation Reserve Program” (CRP). CRP was established by the U.S. government and farmers to plant grass on some less fertile land that had been plowed for crop-raising. For 10 to 20 years, these grass habitats have replaced low production farm ground. CRP has increased populations of wildlife such as white-tailed deer, pheasants, ducks, and nongame species.



**Figure 1.** Teddy Roosevelt traveled to North Dakota over 100 years ago. Here, he learned to enjoy and appreciate the wide open spaces and the importance of hunting and conservation. (*State Historical Society of North Dakota, 0410-127*)











The “North American Model of Wildlife Conservation” was developed as a result of all the effort wildlife conservationists put forth in the last 100 years to create good wildlife habitat and keep wildlife available for everyone to use. This model promotes equal access to wildlife for everyone and is in contrast to the European model in which wildlife was controlled and used only by wealthy people.

Just like what happened 100 years ago when some people sold wildlife for personal profit, there are commercial interests doing that today. The public owns the wildlife in North America. Our North American wildlife conservation system has been extremely successful. Activities that prevent access to wildlife by the public destroy the framework of this system. The more that people of all ages understand the importance of the North American model, the better chance present and future generations will have of enjoying this great American resource.



# WOODLANDS

**Which of the following has something to do with Woodlands of North Dakota?**

-  Crowns on trees
-  Needles that never sew
-  Foxes that climb trees
-  Birds that drum
-  Mammals that fly
-  A roof on a forest
-  A floor in a forest
-  Hairy without hair
-  Horns made of feathers
-  Lungs of the Earth

**So which of the choices above has something to do with Woodlands of North Dakota? Answer: All of them!**

## Introduction

North Dakota is a prairie state. A **prairie** is a large, treeless region covered with grasses and forbs, or wildflowers. North Dakota, however, is not entirely treeless. Almost 2 percent of the state, or about 700,000 acres, is woodlands. An **acre** (Ay-ker) is a piece of land approximately the size of a football field.

A **woodland** is a land covered with woods, or trees. A **forest** is a plant community of trees, shrubs, and herbaceous (her-Bay-shus) plants that cover an area. **Herbaceous plants** are plants that do not have woody stems.

## Forest Ecosystems

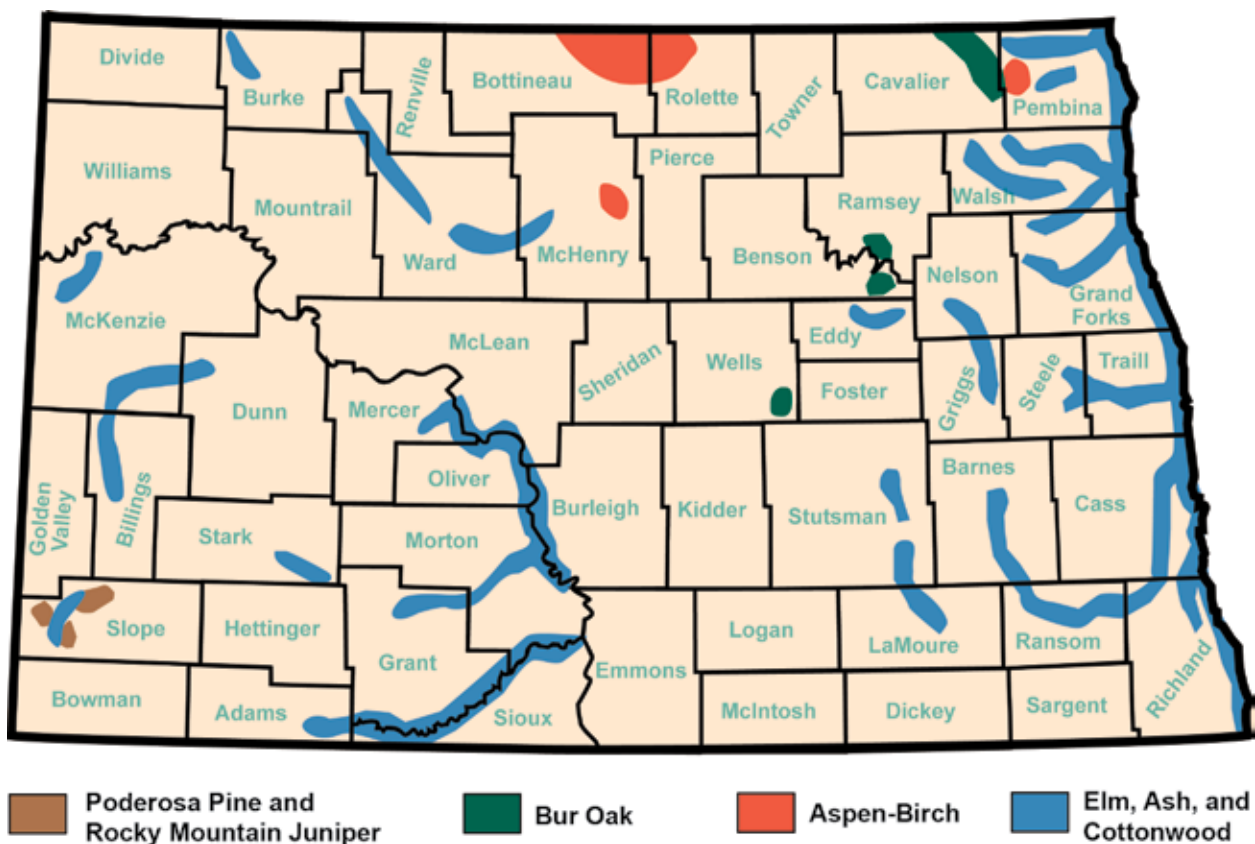
Trees are what define forests; however, many other features also help to make a forest ecosystem. An **ecosystem** is an area that contains organisms (living things) interacting with one another and with their non-living environment.

**Forest ecosystems** consist of trees and other vegetation (plants), wildlife, and non-living things such as soil and water.

Trees that are not shaded by other trees can make a great deal of food for themselves through photosynthesis. In **photosynthesis**, a green plant uses energy from the sun, along with materials from soil, water, and air, to make its own food.

Forest vegetation is arranged in several layers. Trees that are not shaded by other trees make more food through photosynthesis and grow to greater heights than shaded trees. The tallest and largest trees in a forest are called **dominant trees**. They receive full sunlight from above, as well as some sunlight on their sides. They have larger crowns (tops) than other trees.

The trees that grow between the dominant trees get sunlight from the top but not from the sides. These trees grow to be medium-sized. The crowns of the dominant and medium-sized trees form the **canopy**, or roof, of the forest.

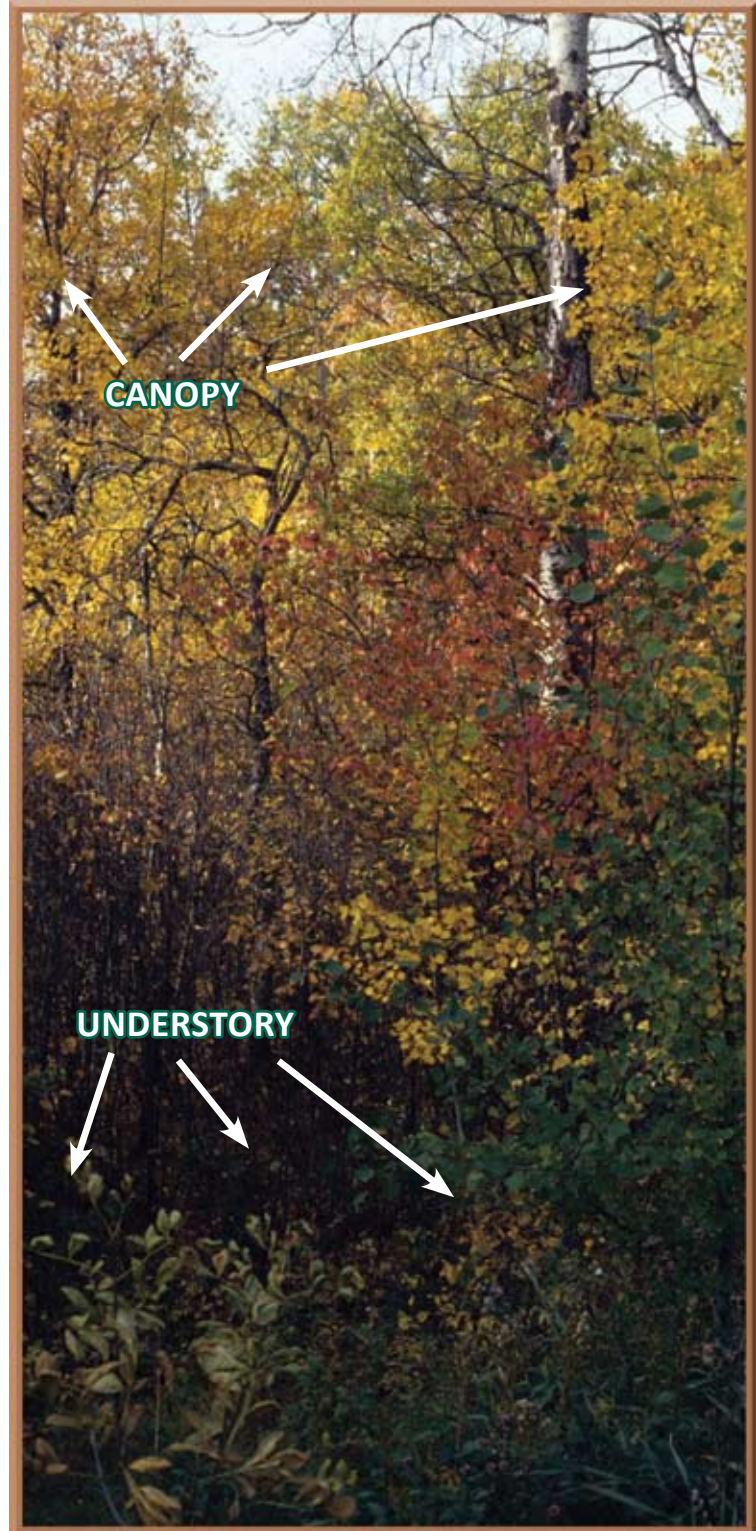


**Figure 2. North Dakota Forest Types.** Forests are not a large part of the landscape of North Dakota but yet are important additions to the diversity of habitats and wildlife in the state. Smaller, wooded areas such as conservation plantings and the woody draws of the Badlands are not shown on this map. (Courtesy North Dakota Forest Service)

Below the canopy is another layer of vegetation called the **understory**. The canopy shades the understory, so less light is available there. Vegetation in the understory tends to grow better in shaded areas, rather than in direct sunlight. The understory consists of smaller trees, shrubs, and **saplings** (young, thin trees).

The ground level of a forest is called the **forest floor**. It includes fallen leaves and branches, dead trees, and other plant litter. Grasses, forbs (wildflowers), and young trees that have sprouted from seeds are also found on the forest floor.

The forest floor is a busy place, serving as the home of small mammals and other wildlife, as well as insects and decomposers. **Decomposers** are tiny life forms that feed on dead plants, dead animals, and animal droppings. As the decomposers break down these substances, nutrients are put back into the soil. **Nutrients** are substances that are necessary for living things to grow and maintain life.



**Figure 3.** A healthy forest consists of several types and ages of trees. The top layer called the “canopy” creates a shaded and cooler area called the “understory,” which consists of shorter trees and bushes.

Each spring, the woodland seems to come to life, one layer at a time, beginning with the lowest layer. Vegetation on the forest floor becomes green and blooms the earliest. The next layer to become green and bloom is the understory. Lastly, the dominant and medium-size trees get their leaves. The canopy then shades the lower levels until fall when the canopy trees again shed their leaves.



**Figure 4.** The ground underneath a canopy of trees is called a “forest floor.” Shade from leaves, together with years of leaves dropping to the ground, creates a blanket that traps moisture. This environment is ideal for many different plants not found on the prairie and allows new trees to sprout.

## Types of Trees

The various species of trees are divided into two groups—deciduous trees, or hardwoods, and coniferous trees, or softwoods. The members of each group have characteristics that are similar to each other.

**Deciduous** (de-Sid-jew-us) **trees** are those that lose their leaves each fall. They have larger, wider leaves, and generally have more branches and rounder crowns than coniferous trees.



**Figure 5.** Deciduous forests are located in places like the Turtle Mountains. Here, trees like oak, aspen, and birch create a community that is much different from most other parts of the state.

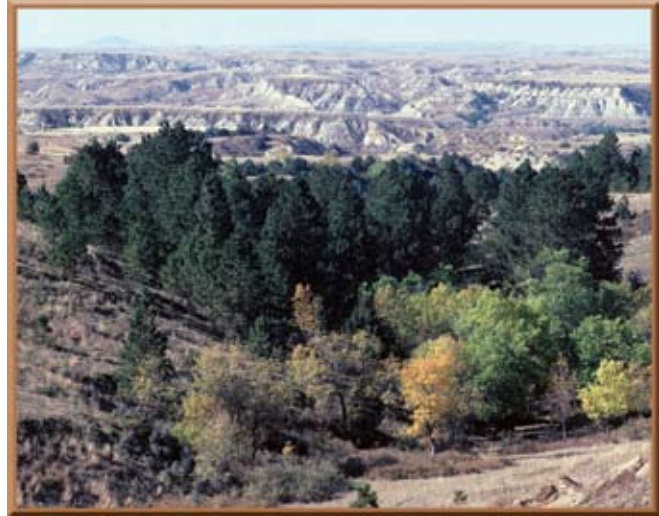
Trees with cones are called **coniferous** (koe-Nif-er-us) **trees**. The leaves of coniferous trees are so narrow and sharp that they are called “needles.” Because the needles stay green all year long, coniferous trees are often referred to as “evergreens.” Most coniferous trees are triangular-shaped, coming to a point at the crown. Some species of coniferous trees are commonly used as Christmas trees.

Most of the forests in North Dakota are deciduous forests that are found along the rivers in the eastern half of the state. Less than 6 percent of the forested land in North Dakota is made up of coniferous trees. The forest ecosystems of North Dakota are classified into three types—native forests, rural plantings, and community forests.

## Native Forests

**Native forests** are naturally occurring forests. They were not planted by humans. Three major kinds of forests make up the native forests of the state—lowland deciduous forests, upland deciduous forests, and western coniferous forests. The category of each kind of forest is determined by the location of the forest and the species of trees that are dominant.

The **elevation** (height of the land) determines whether an area is called “lowland” or “upland.” Lowlands along rivers are also referred to as “riparian areas” or “bottomlands.”



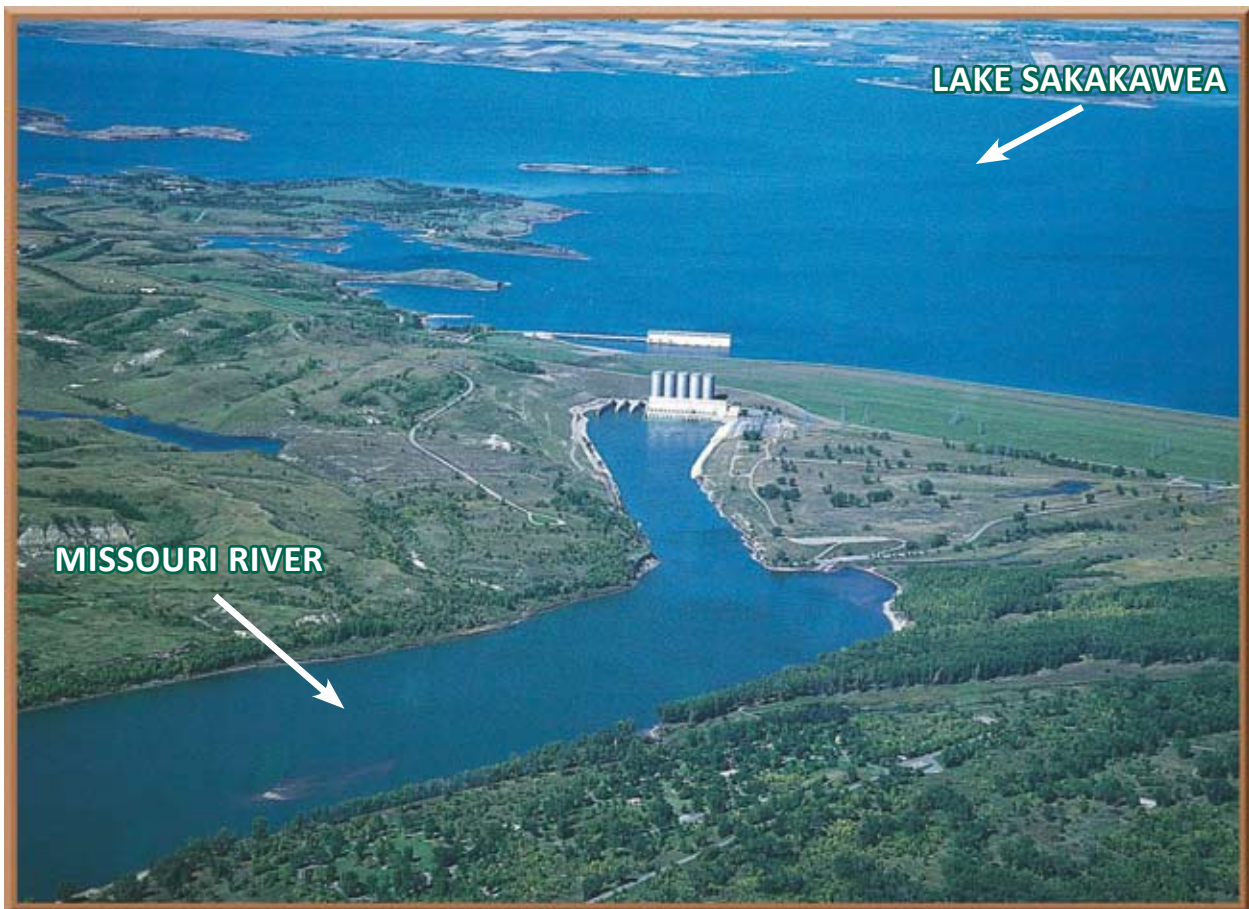
**Figure 6.** The Badlands of North Dakota is the location where most of the naturally occurring coniferous trees are located. This ponderosa pine stand is typical of the small forested areas found along the Little Missouri River.



**Figure 7.** Sheyenne River Valley near Valley City. Ash, oak, elm, and box elder trees are common along the river corridors of North Dakota. The riparian areas formed by the trees are very important for wildlife, water quality, and beauty.

Original woodlands of North Dakota covered river valleys and large, hilly areas such as the Turtle Mountains and Killdeer Mountains. Today, native woodlands are found in the same locations, but in much smaller patches.

The Garrison Dam was built across the Missouri River in the 1950s as a way to manage the Missouri River and prevent future flooding in North Dakota and in other states where this river flowed. The result was an artificial (man-made) lake, or reservoir, called “Lake Sakakawea.” Unfortunately, the permanent flooding to create this reservoir caused hundreds of people to lose their homes, their towns, their fertile farmlands, and their way of life. The creation of this lake also destroyed thousands of acres of native forest. Crowns of the giant cottonwood trees ended up being many feet below the surface of Lake Sakakawea. Countless wildlife habitats were lost forever. At the same time, Lake Sakakawea created a new, large water habitat with tremendous fishing and recreational opportunities.



**Figure 8.** The construction of the Garrison Dam in the mid 1950s covered many acres of cottonwood forest along the Missouri River. Today, the last remnants of the cottonwood forest are disappearing rapidly because flooding in river backwaters and flood plains is required in order to establish these trees.



**Figure 9. Woodlands in the Badlands of North Dakota** are often scattered but are still very important to wildlife. Trees tend to grow in drainages where water is more plentiful. These woodlands provide food, nesting cover, and winter protection for many species of wildlife.

Most of North Dakota's **lowland deciduous forests** are located in the eastern half of the state. They are found along the Red River, Sheyenne River, and tributaries (branches) of these rivers such as the Tongue River and Forest River. Other lowland deciduous forests are found along the James River, particularly between Jamestown and Grand Rapids in LaMoure County; and the Mouse and Des Lacs Rivers in Ward, McHenry, and Renville Counties. Lowland deciduous forests in the western part of the state occur along the Missouri River and Little Missouri River.

The lowland, or bottomland, deciduous forests of the eastern and central part of the state are mainly American elm and green ash. These forests are sometimes called "elm-ash forests." Other trees found in elm-ash forests are box elder, bur oak, and ironwood. Understory shrubs include chokecherry, juneberry, wolfberry, and currant.

The **American elm** is able to withstand very cold temperatures and can grow to be 100 feet tall. In recent years, American elms have been attacked by Dutch elm disease, which has killed many of these beautiful trees. **Green ash** trees grow to be 35 to 45 feet tall. They can withstand cold and dry conditions and may live to be 100 to 120 years old.



**Figure 10.** A single mature cottonwood tree towers above other trees along the Missouri River. Flooding, which is required to generate new cottonwoods, no longer occurs along the river. The loss of the cottonwood canopy allows grass and invasive trees such as Russian olive to grow.



**Figure 11.** The Pembina Hills is a large, deciduous forest in North Dakota. Wooded areas such as the one shown above provide habitat for wildlife including moose, elk, and ruffed grouse.

**Cottonwood** is the most common tree of the lowland deciduous forests in the western part of the state. The bottomlands along the Missouri River and Little Missouri River are dominated by these fast-growing trees that may reach heights of 100 feet. The Missouri River has been losing its cottonwoods for over 50 years because these trees require regular flooding, which no longer occurs. Cottonwood trees also generally need more water than most other trees; therefore, they are isolated to lowland areas.

**Upland deciduous forests** are located in the Turtle Mountains, Devils Lake Hills, and Pembina Hills in the northern part of the state. The steep slopes of the Pembina Hills, also known as the “Pembina Gorge,” contain one of the largest woodland regions in North Dakota.

The largest upland deciduous forest in the western part of the state is located in the Killdeer Mountains. Aspen and bur



oak are the dominant trees of upland deciduous forests. Other trees found in these woodlands include ash, elm, and birch. Chokecherry and juneberry are two of the shrubs that grow in upland deciduous forests. Upland deciduous forest vegetation is also found on steep slopes of the Missouri Coteau (koe-Toe) along the Missouri River.

**Woody draws** are small woodlands that are scattered throughout the Badlands of North Dakota. They are considered upland deciduous forests. The dominant tree in woody draws is the green ash; therefore, these areas are often referred to as “ash draws.”



**Figure 12.** The woody draws, often referred to as “ash draws,” contain primarily green ash trees. Also present are fruit-bearing shrubs such as juneberry, chokecherry, and golden current. Woody draws are extremely important for wildlife.

A woody draw provides important habitat because it is a wooded “oasis” within the dry prairie. Wildlife such as deer, elk, sharp-tailed grouse, and wild turkey find food, shade, and protection from the winter winds and snow. Many songbirds and raptors also use the trees as sites for nesting.

**Aspen** is sometimes called “quaking aspen” or “trembling aspen” because its leaves quake, or tremble (shake), even in the slightest breeze. This is a fast-growing tree, but it has a lifespan of only about 50 years. Aspen trees may reach heights of 80 feet.

**Bur oak** is a slow-growing tree that may live to be 200 to 400 years old. When the tree is mature, it is 40 to 60 feet tall. The bur oak has a deep root system, which allows it to withstand drought (droust), or very dry, conditions.

The dominant trees of the Pembina Gorge are mainly bur oak. At one time, bur oak woodlands may have totally covered the Turtle Mountains. In 1886, the largest known forest fire in North Dakota occurred, burning almost the entire Turtle Mountain region. After this fire, fast-growing aspen trees grew in the burned areas. The shade of these trees prevented bur oak trees from sprouting because bur oaks do not grow well in shade. After that forest fire, aspen trees became a dominant tree in the area. One of the major shrubs of this understory is beaked hazelnut.

**Western coniferous forests** are located in the Badlands of southwestern North Dakota. The dominant trees are ponderosa pine and Rocky Mountain juniper. Cedar and limber pine also grow here in small numbers.

**Ponderosa pine** is usually located within 3 to 4 miles of the Little Missouri River on slopes and ridges of sandstone or clinker (scoria). These trees generally grow in clumps on bare ground or mixed-grass prairie. The average height of the ponderosa pine found in North Dakota is about 30 feet, but some trees may reach a height of 50 feet or more.

Between 1881 and 1908, large stands of ponderosa pine were logged by the railroad companies and by Euro-American (“white”) settlers. The railroads used the pine timber for railroad ties on which to lay their tracks. Settlers needed the wood for building materials and fence posts.

**Limber pines** inhabit one area in the Badlands in Slope County 12 miles north of Marmarth. Limber pine got its name because it is limber. This means it can be twisted and bent by the wind without breaking. Limber pine trees reach average heights of only about 15 feet. They can live to be over 200 years old. The best explanation of how these trees got started here is that American Indians brought the seeds from the Black Hills of South Dakota, over 160 miles away.



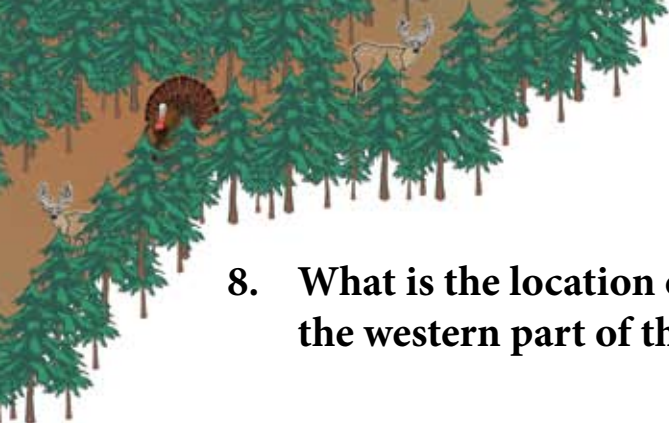
**Figure 13.** Rocky Mountain juniper is the predominant coniferous tree found in the rough terrain of the Badlands. It can withstand very dry conditions and maintains its dark green color year round.

**Rocky Mountain juniper** occurs in a variety of habitats in the Badlands. Some of the juniper stands contain almost no other trees, while in other areas, junipers are mixed in with cottonwood, ash, and box elder stands. Rocky Mountain juniper is a slow-growing tree. Rocky Mountain junipers can live to be 300 years old. More juniper trees are found in the Badlands today than 100 years ago. The main reason for this is that humans have prevented forest fires from spreading. Some of the main understory shrubs among the juniper stands are creeping juniper, chokecherry, buffaloberry, and skunk bush.



## Comprehension

1. How much of North Dakota is woodlands?
2. What are the three layers of a forest?
3. Trees are divided into what two groups? Give another name for each group.
4. Name the three types of forest ecosystems in North Dakota.
5. Name the three major kinds of native forests in North Dakota.
6. What species of trees make up most of the lowland deciduous forests of the eastern and central part of the state?
7. What is the dominant tree of the lowland deciduous forests in the western part of the state? Which two river bottomlands are dominated by these trees?



8. What is the location of the largest upland deciduous forest in the western part of the state? What are its dominant trees?
  
9. What tree was dominant in the Turtle Mountains before 1886? After 1886? What event triggered this change?
  
10. Where in the state are western coniferous forests located?

### **Critical Thinking**

1. If you were a bird, in which layer of the forest would you like to live? Explain.

## Rural Plantings

**Rural** refers to being in the country, rather than in towns or cities. The people of rural North Dakota have been planting trees ever since the first Euro-American settlers began moving to the treeless prairie in the late 1800s. A U.S. government program called the “Timber Culture Act” even gave free land to people who planted from 10 to 40 acres of trees on the prairie and kept them alive.

**Rural plantings** include trees planted in farmyards, windbreaks, shelterbelts, and living snow fences. Protection from the wind is of high importance to people living on the prairie.

A windbreak is a fence of trees designed to break the force of the wind. One form of windbreak is a shelterbelt. **Shelterbelts** consist of long rows of trees. They not only provide shelter from the wind, but they also help control wind **erosion** (carrying away of soil), reduce water evaporation from soil on farm lands, and supply cover for livestock (farm animals) and wildlife.

Snow fences keep snow from drifting onto roads and other places where it could cause problems. Rows of trees and bushes that block the snow are called “living snow fences.”

It has been estimated that there are 1.5 million acres of rural plantings in the state. If the windbreaks in North Dakota would be set end to end, they would stretch for 55,000 miles. This row of trees would wrap around the earth more than two times.



**Figure 14.** Windbreaks were planted on the prairies of North Dakota in the early and mid 1950s. These trees were planted in straight rows to protect farm fields from wind erosion. Also known as shelterbelts, these plantings have provided habitat for several wildlife species, but they have also taken away from the historical grassland ecosystem.

## Community Forests

**Community forests** are made up of trees that have been planted over the past 100 years or so in towns and cities. They may be located in yards, on boulevards, or in city parks. Woodlands in residential (rez-ah-Den-chal) areas (areas with homes) add beauty, shade, and wind protection for the residents. They also take carbon dioxide gas which contributes to global warming out of the air and return oxygen to the environment as part of the oxygen-carbon dioxide cycle in the process of photosynthesis.

The American elm was the most common tree planted in towns by the early Euro-American settlers. In 1947, the American elm became the official state tree of North Dakota. Other common tree species planted in towns and cities include ash and basswood.

When Dutch elm disease began destroying many of the American elm trees in the state, several cities developed forestry programs. Some of them hired city foresters to help manage community forests.



**Figure 15.** Trees planted in towns provide beauty but can also provide shade to cool houses, remove carbon dioxide from the air, create places for birds to nest, and minimize the noises of city traffic.

## Woodlands Vegetation Types

Woodland plants come in many forms. They include trees, shrubs, vines, grasses, forbs, and non-flowering plants. **Trees** are the tallest plants and generally have one large, woody stem called a “trunk.”

**Shrubs** are shorter and smaller plants than trees. Rather than having a trunk, shrubs have several smaller woody stems. Shrubs are usually less than 15 feet tall. They are found in forests, on the edges of woodlands and shelterbelts, and on the

open prairie. They are also found in ravines (narrow valleys) and woody draws.

When shrubs form dense thickets, they provide winter cover for wildlife and protection from predators. Many species of wildlife use the berries, leaves, stems, and other plant parts as food. Included among the many common woodland shrubs are juneberry, golden current, snowberry (buckbrush), chokecherry, buffaloberry, American cranberry, and wild plum.

**Juneberry** is a tall shrub that grows at the edges of forests and in woody draws. Adequate moisture is needed for this plant to produce fruit. Late spring frosts may damage the blossoms and prevent fruit from forming. The green berries of the juneberry plant turn red and then purple as they get ripe. Deer and rabbits browse on juneberry leaves, and birds eat the berries as soon as they ripen. Juneberries are great for people to eat fresh or to use in baking pies. In Canada, juneberries are called “Saskatoon berries.”



**Figure 16. Understory shrubs such as the American cranberry** can be found in the deciduous forests of northern North Dakota. This shrub is commonly called “high bush” cranberry. The berries are eaten by wildlife after a hard freeze.

Another tall shrub that serves as a food source for various wildlife species is the **chokecherry**. The chokecherry is the state fruit of North Dakota. Chokecherries have white flowers and produce small, bitter, purple berries, which are eaten by wildlife and are used by people to make jelly. The smaller stems and bark of the chokecherry plant are also eaten by deer and other animals that browse. **Browsing** refers to animals eating leaves, stems, and buds from plants.

**Buffaloberry** plants also form thickets. This tall, thorny shrub is common in woody draws of the southwest. It provides cover and nesting sites for birds, and its leaves provide browse for mule deer. Its berries are an important food source for songbirds and sharp-tailed grouse.

**Wild plum** grows on the edges of woodlands. Its yellow and red fruits are similar to cherries, each containing one large seed, or pit. The fruit is eaten by wild turkeys, deer, and other wildlife.

**Vines** are plants that twist along the ground or climb up shrubs and trees in order to reach sunlight. Three native vines grow in North Dakota woodlands. They are riverbank grape, or wild grape; bittersweet; and Virginia creeper, or woodbine.

**Riverbank grape**, or wild grape, has clusters of purple berries that are eaten by wildlife and also make excellent jelly. **Bittersweet** can grow thick vines that climb very high and display bright orange flowers. **Virginia creeper**, or woodbine, grows dense masses of large leaves that turn a brilliant red in the fall.



**Figure 17.** Wild grape is a native fruit-bearing vine of North Dakota woodlands. The fruit is excellent as food for birds as well as for human consumption.

Herbaceous (non-woody) plants of the woodlands include grasses, forbs, and non-flowering plants. **Grasses** are plants with hollow, non-woody stems and narrow leaves. **Forbs** are native wildflowers with deep roots. **Non-flowering plants** include mosses, lichens (Like-ens), and mushrooms that do not have stems, roots, or leaves. The non-flowering plants often cover rocks, logs, and moist areas of the ground.

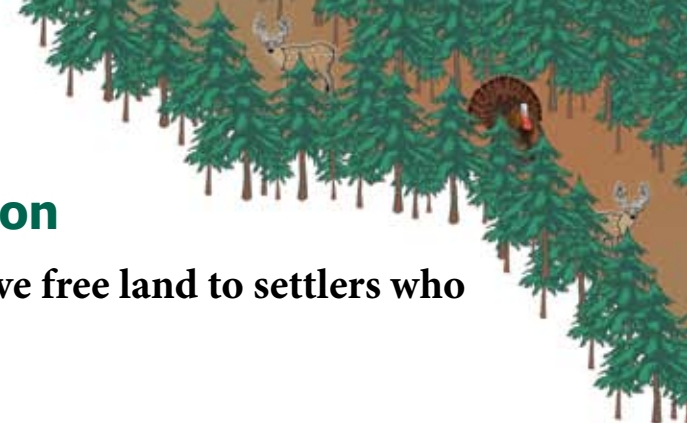


**Figure 18.** Woodbine is a native vine of the state's woodlands. Like the grape and bittersweet vines, it can grow vertically up the side of both dead and live trees. Its leaves turn a brilliant red color in the fall.



**Figure 19.** Mushrooms are a common part of the forest floor in woodlands. They aid in the decomposition of fallen trees.





## Comprehension

1. Which U.S. government program gave free land to settlers who planted trees?
2. What is a fence of trees designed to break the force of the wind called?
3. What are rows of trees that block the snow called?
4. What was the most common tree planted in towns by the early settlers? How was it recognized in 1947?
5. Name woodland plants.
6. Name common woodland shrubs in North Dakota. Which one is the state fruit?
7. Name the types of herbaceous plants of the woodlands.

## Critical Thinking


1. How would your hometown be different if it had no trees? Explain.

# WOODLANDS IN A NUTSHELL


-  Almost 2 percent of North Dakota is woodlands.
-  Forests are made up of three main layers of vegetation: the canopy, the understory, and the forest floor.
-  Decomposers break down dead plants, dead animals, and animal droppings to return nutrients to the soil.
-  In the spring, the forest becomes green from the bottom up.
-  Trees are divided into two groups: deciduous, or hardwood, and coniferous, or softwood (evergreens).
-  Most of the North Dakota forests are deciduous and are found along the rivers in the eastern half of the state.
-  North Dakota has three types of forest ecosystems: native forests, rural plantings, and community forests.
-  Native forests consist of lowland deciduous forests, upland deciduous forests, and western coniferous forests.
-  The waters of Lake Sakakawea destroyed thousands of acres of native forests.
-  Upland deciduous forests are located in the Turtle Mountains, Devils Lake Hills, Pembina Hills, and Killdeer Mountains.
-  Aspen trees have a lifespan of about 50 years; bur oak trees have a lifespan of 200 to 400 years.
-  The largest known forest fire in North Dakota may have totally covered the Turtle Mountains in 1886.
-  Western coniferous forests are located in the Badlands.
-  Shelterbelts provide shelter from the wind and help control soil erosion.
-  About 1.5 million acres of rural plantings exist in North Dakota.
-  The American elm was the most common tree planted by early settlers; it became the state tree in 1947.
-  Woodland plants include trees, shrubs, vines, grasses, forbs, and non-flowering plants.

# WOODLANDS VOCABULARY


## Acre:


 A piece of land approximately the size of a football field

## Browsing:


 Animals eating leaves, stems, and buds from plants

## Canopy:

 Roof of the forest

 Formed by crowns of dominant and medium-sized trees

## Community forests:

 Made up of trees that have been planted in towns and cities


## Coniferous trees:


 Trees with cones and needles

 Softwood trees


 Evergreens

## Deciduous trees:

 Trees that lose their leaves each fall

 Hardwood trees


## Decomposers:

 Tiny life forms that feed on dead plants, dead animals, and animal droppings


## Dominant trees:

 The tallest and largest trees in a forest


## Ecosystem:

 An area that contains organisms (living things) interacting with one another and with their non-living environment

## Elevation:

 Height of the land


**Erosion:**

 Wearing away of soil by wind or water


**Forbs:**

 Native wildflowers with deep roots


**Forest:**

 A plant community of trees, shrubs, and herbaceous plants that covers an area

**Forest ecosystem:**

 Trees and other vegetation, wildlife, and non-living things such as soil and water

**Forest floor:**


 Ground-level of a forest

 Made up of fallen leaves, branches, dead trees, and other plant litter

**Grasses:**


 Plants with hollow, non-woody stems and narrow leaves

**Herbaceous plants:**

 Plants that do not have woody stems

**Lowland deciduous forests:**


 Hardwood forests found on low-lying land

 Bottomland forests


**Native forests:**

 Naturally occurring forests


**Non-flowering plants:**

 Mosses, lichens, and mushrooms that do not have stems, roots, or leaves

**Nutrients:**

 Substances that are necessary for living things to grow and maintain life


**Photosynthesis:**


 The process of a green plant using energy from the sun, along with materials from soil, water, and air, to make its own food

**Prairie:**


 Large, treeless region covered with grasses and forbs

**Rural:**


 In the country, rather than in towns or cities

 Opposite of urban


**Rural plantings:**

 Trees planted in farmyards, windbreaks, shelterbelts, and living snow fences


**Saplings:**


 Thin, young trees

**Shelterbelt:**

 Long rows of trees that provide shelter from the wind


**Shrubs:**

 Shorter and smaller plants than trees

 Have several small, woody stems

**Trees:**


 The tallest plants

 Have one large, woody stem called a “trunk”


**Understory:**

 Layer of vegetation below the canopy

**Upland deciduous forests:**

 Hardwood forests found in higher elevations


**Vines:**

 Plants that twist along the ground or climb up shrubs and trees in order to reach sunlight

**Western coniferous forests:**

 Softwood forests located in the Badlands

**Woodland:**

 A land covered with woods, or trees

**Woody draws:**

 Small woodlands in the Badlands that contain trees and brush

**Other Vocabulary I Want to Know:**

# WOODLANDS WILDLIFE

## Woodlands Habitats

The woodlands of North Dakota provide habitat, nesting cover, and food for many different species of wildlife. A **habitat** is an environment that provides the food, water, shelter, and space for wildlife to make their homes.

## Mammals

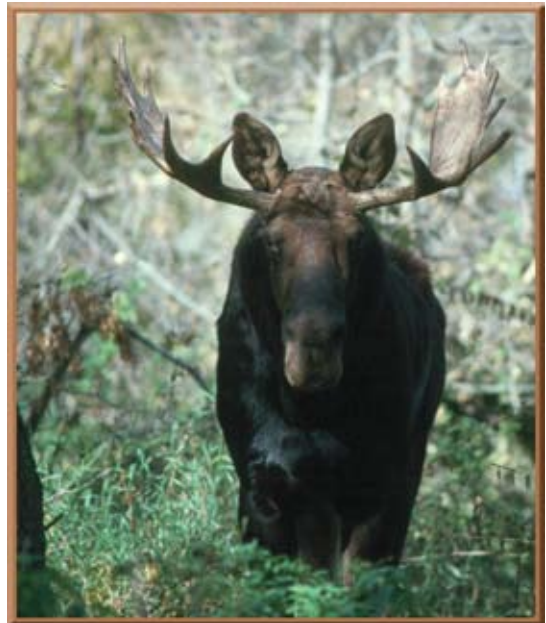
Woodlands serve as primary habitat for two big game species in North Dakota: moose and white-tailed deer. **Big game** are large animals that are hunted. Hunters must follow strict regulations for hunting big game in North Dakota. They must get a license from the **North Dakota Game and Fish Department** for each big game species.

Moose are the largest members of the deer family. Both the bull (male) and the cow (female) moose stand over 6 feet tall at the shoulder, with the bull being slightly larger than the cow. The average weight of a moose bull is 890 pounds, but some bulls weigh half a ton (1,000 pounds) or more. Cows weigh slightly less.

As with all members of the deer family, moose have antlers. **Antlers** are different from horns, in that horns are permanent, whereas antlers are shed every year. Only the moose bulls have antlers; the cows have no antlers.



**Figure 20.** Beaked hazelnut is a common understory shrub of the woodlands in northern North Dakota. The fruit shown above contains a nut that is edible and commonly used by wildlife.



**Figure 21.** Moose inhabit the woodlands of northern North Dakota. Moose are large mammals that eat woodland vegetation but also feed on agricultural crops surrounding areas with trees.



**Figure 22.** White-tailed deer are known for living in woodlands; however, because of plentiful food sources found in agricultural areas, these animals have adapted to many habitats.



**Figure 23.** A white-tailed fawn hides in the grass away from its mother where the adult's scent will not attract predators. Fawns are born in June and grow rapidly to a size where they can withstand the cold winter.

Most moose found in North Dakota live in the aspen forests of the Turtle Mountains and along forested rivers in the northeastern part of the state. They are also found in other parts of northern North Dakota where they find adequate habitat within the farmland, but occasionally moose wander throughout the state.

Moose browse on young deciduous trees and shrubs. They are most active at dawn (early morning) and dusk (late evening).

**White-tailed deer** are woodland animals, but they can also adapt to living in open areas. These **herbivores** (plant eaters) eat most vegetation, including green plants, leaves, shrubs, twigs, bark, and berries. They also eat farm crops such as corn, sunflowers, and alfalfa, as well as garden plants and fruit trees. Each white-tailed deer eats 10 to 12 pounds of food per day.

The buck (male deer) averages 3½ feet in height at the shoulder and weighs from 100 to 330 pounds. The doe (female deer) is somewhat smaller. Only the bucks have antlers. These animals are fast runners and can reach speeds of 30 miles per hour. As they run, they hold their white tails upright like a flag. White-tailed deer are also good leapers and good swimmers.

One to two fawns (young deer) are born at a time and weigh about 7 pounds at birth. They can stand up and walk immediately after birth and can run in about a week.





**Figure 24.** A “browse line” in a woodland indicates there are too many deer. Deer eat the buds of trees and underbrush that they can reach, leaving an empty space in the understory which is unhealthy for a woodland.

Fawns are preyed upon by coyotes and other carnivores, but adult deer have few natural predators. At one time they were preyed upon frequently by gray wolves and mountain lions. Today, only rarely is a gray wolf seen in North Dakota. Mountain lions have established a population in western North Dakota and prey upon deer, but mainly mule deer. The population of white-tailed deer in North Dakota is greater now than it was at the time of the Lewis and Clark Expedition in the early 1800s.

When deer populations grow too large for their environment, they can starve to death. Others may become weak and die of diseases. The large number of deer makes it more likely that they will cross roads and collide with cars. Each year during the hunting season, thousands of deer are harvested, which helps control over-population.

The **American black bear** is a woodland animal that was common throughout North Dakota at one time. With Euro-American settlement, the population of black bears in North Dakota almost disappeared because of unregulated hunting, human development, and loss of habitat.

Today, black bears are rarely seen except in the wooded portions of the Turtle Mountains and Pembina Gorge. They eat berries, acorns, birds, eggs, small mammals, fawns, and carrion (dead animals).

**American martens** live in forested areas in northern North Dakota. They are a member of the weasel family and weigh 2 to 3 pounds. Martens are primarily nocturnal and hunt small mammals such as squirrels and other rodents. They spend a lot of time in the tree tops and nest in natural tree cavities or in nests built by squirrels. Martens were long thought to be extinct in North Dakota, but in the past few years, they have made a comeback in the state.

**Fishers** are mammals similar in appearance to martens, but fishers are larger than martens. Like martens, fishers have also recently reappeared in North Dakota.

The **snowshoe hare** makes its home in large woodlands with thick underbrush. Some of the best habitat for snowshoe hares in North Dakota is in the aspen forests of the Turtle Mountains. Aspen buds and bark serve as a food source, along with grass, leaves, and flowers.

Hares look similar to rabbits, but they do not belong to the same family as rabbits. The snowshoe hare got its name because of its large back feet which enable it to walk on top of snow without sinking in.



**Figure 25.** Porcupines are docile animals that inhabit forested areas. They eat the bark of trees and will defend themselves by turning their back side toward a pursuer. They cannot “shoot” their quills.

During the summer, the snowshoe hare has a rusty brown coat, but as daylight hours get shorter with the arrival of winter, the brown coat is replaced with a white coat. This wintertime change in color gives the snowshoe hare **camouflage** (protective coloring) protection in the snow.

**Rodents** are gnawing or nibbling mammals such as rats, mice, voles, ground squirrels, and tree squirrels. The second largest rodent (after beaver) in North America is the **North American porcupine**. The name “porcupine” came from a French word meaning “thorny pig.” The porcupine has a rounded body; strong, short legs; and a small head with small ears.

The front feet have four toes, and the back feet have five toes. Except for its underside, the porcupine is covered with quills.

These herbivores are excellent tree climbers and often climb cottonwood and ash trees to feed on twigs and bark. They also eat berries, leaves, and green plants.

Female porcupines give birth to one or two porcupettes (Pork-you-pets). The newborn porcupettes have soft quills that harden after they have been exposed to air for about an hour.

Porcupine quills are hollow, needle-sharp hairs with barbed tips on the ends. When a porcupine raises its quills, they loosen and come out very easily. The quill barbs face backward so that when they catch on the skin of another animal, they become embedded (pressed in) and are difficult and painful to remove. Animals with embedded quills may die of infection or may starve to death if quills embedded in the throat prevent them from eating.

Porcupines are docile (Dah-sul) (not aggressive) animals. When threatened, however, the porcupine raises its quills, turns its back on the attacker, and remains motionless. Porcupines are preyed upon by coyotes, bobcats, mountain lions, and fishers.

Several other species of rodents make their homes in North Dakota woodlands. These include tree squirrels, chipmunks, and white-footed mice.

Three species of tree squirrels are found in the woodlands of North Dakota: the fox squirrel, the gray squirrel, and the red squirrel. Tree squirrels are **diurnal** (active during the daytime). They eat mainly tree seeds, but they also eat other seeds, fruits, buds, leaves, bark, and flowers.



**Figure 26.** The bark eaten from a tree high in the canopy is a sign that a porcupine has been there. Porcupines live in underground dens but still venture out during the winter to feed.

The young of tree squirrels are born blind and helpless. They are cared for by their mother, who nurses them until they are able to eat solid food. Predators of tree squirrels include coyotes and raptors (birds of prey) such as hawks and owls.

**Fox squirrels** are found throughout most of North Dakota. They live in forests and **urban** (city) areas where mature trees are present. From nose to tail, the fox squirrel measures about 20 inches and weighs about 1½ pounds. The tail is very bushy and makes up about half the total length of the squirrel.

Fox squirrels are good jumpers that can leap 15 feet from branch to branch. They spend more time on the ground than the other tree squirrels, and they often bury nuts in various places on the ground. Some people like to put out food for fox squirrels, but others think of them as “tree rats” that rob bird feeders. When an



**Figure 27.** Fox squirrels are woodland rodents that live in the canopy of trees. In cities, they are common in mature trees since older trees often provide cavities where they nest. Fox squirrels are commonly hunted and eaten in southern states.

intruder enters the territory of a fox squirrel, the squirrel responds by flicking its tail and calling out with loud “chatter barks.” Fox squirrels are considered small game animals and can be hunted for food.

**Gray squirrels** are slightly smaller than fox squirrels. They are found mainly in mature deciduous forests in the eastern part of the state. Populations of gray squirrels also live in the Killdeer Mountain forests. Gray squirrels spend most of their lives in trees. They gather acorns and other nuts, which they hide to eat later.

Both fox squirrels and gray squirrels often use old woodpecker holes or natural cavities as dens in which to live and raise their young. They may also construct nests of leaves.

The **red squirrel** is the smallest of the tree squirrels found in North Dakota.

It measures about 13 inches in length, including the tail. Red squirrels are found in maple-basswood forests of eastern North Dakota and also in the Turtle Mountains.

Red squirrels eat small seeds such as those of pine, maple, basswood, and elm trees. They store large quantities of these seeds in tree cavities, hollow logs, and other hiding places.

**Chipmunks** are ground squirrels. They are diurnal, gathering food during the day and spending nights in their burrows. During the winter, chipmunks partially hibernate, but come out on mild, sunny days. Their burrows contain storage rooms for the hoards of food they gather during the summer. The diet of chipmunks consists mainly of tree seeds, berries, and nuts. During the summer, they also eat insects such as grasshoppers and caterpillars.

Chipmunks can be identified by the two black stripes that run down the sides and middle of the back. North Dakota has two chipmunk species: the **eastern chipmunk** and the **least chipmunk**. Both of these species can be found in the mixed forests of northeastern North Dakota and in the Badlands. The least chipmunk is the smallest of all the chipmunks.

The **white-footed mouse** is one of the many animals that make their homes on the woodland floor. This small rodent measures about 7 inches from its nose to the end of its tail and weighs about 1 ounce. An ounce is the weight of about 5 nickels.



**Figure 28. Red Squirrels** are much smaller than fox squirrels or gray squirrels. Red squirrels prefer to inhabit coniferous trees but will also live in deciduous forests such as the ones found in the Turtle Mountains. Red squirrels nest in trees and eat the seeds of pine, maple, basswood, and elm.



**Figure 29. Chipmunks** are found in the forests of northern North Dakota and in the area known as the Badlands. They feed on berries, tree seeds, and insects during the day. They retire to ground burrows during the night.



**Figure 30.** Ten species of bats can be found in North Dakota during the summer months. The little brown bat shown above is the most common. Bats are beneficial since they eat thousands of insects every evening using their unique echolocation system.



**Figure 31.** Bats roost (rest) during the day in a variety of dark places including underneath the bark of trees and within cavities of dead and dying trees.

Like squirrels and chipmunks, white-footed mice have pouches inside their mouths for carrying food to storage sites. Their diet is mainly seeds and nuts.

The only mammal that is able to truly fly is the **bat**. Ten bat species live in North Dakota, but the most common one is the **little brown bat**. It is about 3½ inches long and has a 10-inch wingspan. It weighs only about ¼ of an ounce.

Many of the North Dakota bats migrate to the Black Hills of South Dakota where they hibernate in caves over the winter. When they return to North Dakota in the spring, one young is born to each mature female. After birth, the baby attaches itself to the mother where it stays for about two weeks. If bats survive their first year, they may live for about 30 years.

Bats are **nocturnal** (active at night). They are **insectivores** (in-Sek-tah-vors) (insect eaters) that eat great quantities of mosquitoes, flies, gnats (nats), and a variety of other insects. One little brown bat can catch 1,200 mosquito-sized insects in just one hour. Bats often roost near wetlands where there is a good supply of mosquitoes and other insects. The little brown bat makes its home in hollow trees, caves, or other dark, enclosed places.

Bats have a unique (you-Neek) (rare and unusual) ability to locate prey. They send out sounds that cannot be heard by humans. These sounds bounce off objects and back to the bat's ears. This system is called "echolocation" (ek-oh-loh-Kay-shun). The echolocation system of bats is so accurate that they can detect insects no wider than a thread.

A bat usually captures insects in its mouth, but sometimes it uses its wings to scoop the insects into a pouch in its tail. It then reaches down and takes the insects into its mouth. Bats are beneficial (ben-ah-Fish-ul) (helpful) to humans because they consume so many insects.

## Reptiles and Amphibians

Both reptiles and amphibians are ectotherms (Ek-toe-therms). An **ectotherm** is an animal whose body temperature changes with the temperature of its surroundings. Ectotherms are also called "cold-blooded" animals.

Some basic differences separate reptiles from amphibians. **Reptiles** have dry, scaly skin and claws on their toes; their young are born or hatch on land and breathe through lungs; and they live their entire lives on land.

**Amphibians** have smooth, moist skin and no claws; the young hatch in water as tadpoles and go through **metamorphosis** (met-ah-Mor-fus-is); and they live part of their life in water and part on land. Metamorphosis is the process of changing from the larva (tadpole) stage to the adult stage.

The **redbelly snake** is a reptile that lives in or around woodlands. It is the smallest snake in North Dakota, measuring less than 1 foot in length. Redbelly snakes are nocturnal. During the daytime, they hide under stones, logs, or other forest cover. Their food sources are small earthworms, slugs, and the larvae of beetles. Redbelly snakes hibernate in ant mounds during the winter.



**Figure 32.** Redbelly snakes are small snakes that live in and around woodlands and prefer feeding along the edges of these woodlands. They eat earthworms, beetle larvae, and slugs. (Courtesy of Ted Hoberg)



**Figure 33.** Gray tree frogs are small amphibians that live in the aspen and deciduous forests of northern and eastern North Dakota. They can change color from gray to brown in minutes and have toes that are tipped with adhesive discs for climbing on branches and leaves. *(Courtesy of Ted Hoberg)*



**Figure 34.** Wood frogs are amphibians that live near moist woodlands in northeastern North Dakota. In the spring, they are the first frog to emerge from hibernation. *(Courtesy of Ted Hoberg)*

The **gray tree frog** is an amphibian that lives in trees. Gray tree frogs are found near water throughout the aspen woodlands of northeastern North Dakota.

These frogs have the ability to change their color to blend in with their surroundings. They can change from gray to brown or green within just a few minutes. The undersides of their back legs are yellow. These small frogs measure about 2 inches in length.

Gray tree frogs have large, sticky toe pads. This adaptation enables them to climb and cling to smooth branches. Gray tree frogs eat insects and spiders.

**Wood frogs** are found near moist woodlands. During the winter, they hibernate under dead logs or rocks. In the spring, they are one of the first frogs to come out of hibernation. Their diet consists of insects and worms they find on the forest floor.

Wood frogs can be identified by a dark mask around the eyes. The body coloring of wood frogs varies from pink to brown to black.





## Comprehension

1. Which two North Dakota big game species use woodlands as their primary habitat? Which is the largest member of the deer family?
2. Where is some of the best habitat for snowshoe hare in North Dakota?
3. Which rodent's name comes from a word meaning "thorny pig"? What are the young called?
4. Name the three species of tree squirrels in North Dakota. Which one spends most of its life in trees? Which is the smallest?
5. What feature do squirrels, chipmunks, and white-footed mice have for carrying food?
6. Name the only mammal that is able to truly fly. Which species is the most common in North Dakota? What is the system called that these animals use to locate prey by sound waves?
7. Which amphibian lives high in trees? What adaptation does it have on its feet?

## Critical Thinking

1. Explain why people should be happy if bats live in their neighborhood.

## Birds

The woodlands of North Dakota provide habitat for dozens of species of birds. The high canopies, large branches, and understories of deciduous forests provide ideal nesting habitat for many different kinds of birds. Coniferous forests attract certain other bird species.

**Ruffed grouse** got their name from the collar-like band of feathers, called a “ruff,” around the neck. Ruffed grouse are found in areas where aspen is abundant such as the Turtle Mountains and Pembina Hills. Everything the ruffed grouse needs is provided in an aspen forest. The hens (females) nest in open patches of the forest. Shortly after the chicks are hatched, the hen leads them to the nearest patch of young aspen or willow brush. Here, the chicks have cover and plenty of insects to eat. As they get older, they switch to a diet of aspen leaves, buds, and berries.

Ruffed grouse have comb-like projections on their feet that enable them to walk on top of snow. During snowy or cold weather, these birds may burrow into the snow to keep warm. The snow may completely cover them, and the temperature beneath this blanket of snow may be 20 to 30 degrees warmer than the air temperature. When they are ready to come out, they simply burst through the snow and go on their way.



**Figure 35.** Ruffed grouse prefer aspen forests that are found in the Turtle Mountains and Pembina Hills of northeastern North Dakota. In the spring, male ruffed grouse can be heard flapping their wings rapidly (drumming) from on top of a fallen log. They do this to defend a territory and attempt to attract females. (Courtesy Ed Bry)

Male ruffed grouse display an interesting behavior called “drumming.” They stand on a log and fan their wings in such a way that a drumming sound is made. The sound of the drumming can carry up to one-fourth of a mile away. The purposes of drumming are to attract females and to defend territory.

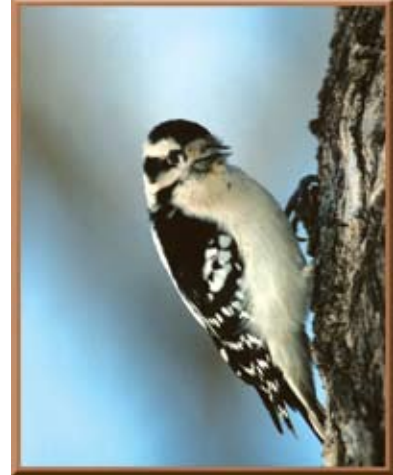
An overpopulation of white-tailed deer may have an effect on the ruffed grouse population. These birds need brushy cover in order to survive, and brush is a favorite food of white-tailed deer. That is one reason why it is important to have a healthy forest with all ages of trees.



**Figure 36. Wild turkeys** are found in a variety of woodland habitats across the state. The males (toms) have a brilliant display of feathers that they use while strutting (dancing) in the spring to attract females.



**Figure 37. Wood ducks** are brightly colored members of the waterfowl family that roost in trees and build their nests within the cavities of dead and dying trees. One of their favorite foods is the acorn nut produced by oak trees.



**Figure 38. This female downy woodpecker** is similar in appearance to the closely related hairy woodpecker which is about twice its size. Males of both species can be identified by a small red patch on the head. (Courtesy Ed Bry)

The **wild turkey** is the largest game bird in North Dakota. This large, ground-dwelling bird searches the forest floor for insects and berries. At night, it roosts in the tops of trees. Wild turkeys have excellent hearing and eyesight. They can fly almost 60 miles per hour. Turkeys are not native to North Dakota. They were introduced by biologists in the 1950s.

Ducks are birds of the wetlands, but one duck species is also a woodland bird. The **wood duck** is a dabbling duck, which means it feeds in shallow water or on land. Wood ducks are also “perching” ducks that spend time out of the water perched on tree branches. These ducks have strong feet and large, gripping claws. The claws allow the wood duck to reach the hollow cavities of trees where they nest. A **cavity** is an open space in a dead or dying tree where wildlife raise their young.

Several species of woodpeckers are found in North Dakota. A woodpecker has a strong, stiff tail that it uses as a brace as it clings to a tree. Its tongue is long and barbed to help pull insects from tiny places. Woodpeckers drum on trees, not only to make holes and find insects, but also to announce their territory. Most woodpeckers do not migrate.

One of the most abundant woodpeckers in North Dakota is the **downy woodpecker**. It is found throughout the state, wherever trees are present.



**Figure 39.** Like other woodpeckers, the red-headed woodpecker nests in the cavities of dead and dying trees. (Courtesy of Ed Bry)



**Figure 40.** The northern flicker shown above is poking its head out of the hollow cottonwood tree cavity in which it nested. Unlike other woodpeckers, this large, brown-speckled bird spends much of its feeding time on the ground searching for insect larvae, caterpillars, and grubs.

This 6-inch-long bird has black-and-white spotted wings and a white underside. The male has a red mark on the back of its head.

The **hairy woodpecker** is misnamed because it does not have hair. It has tiny bristles at the base of its bill that keep wood dust out of the nostrils. The hairy woodpecker is about 9 inches long and looks a lot like the downy woodpecker, except the hairy woodpecker is larger. The hairy woodpecker male also has a red mark on the back of its head. Sometimes, the hairy woodpecker digs a nest cavity in a live aspen tree.

The **red-headed woodpecker** prefers dead trees at the edges of woodlands. This bird stores food for the winter. Among the items on its diet are insects, seeds, nuts, fruit, and bird eggs.

The red-headed woodpecker population has decreased dramatically over the last 100 years. This is mainly due to competition with the European starling for nesting cavities. Also, because red-headed woodpeckers feed near roads in open areas, vehicles take their toll on these birds.

The **northern flicker** is the only woodpecker in North Dakota that has a brown back. It can be identified by its yellow tail feathers and red patch on the back of its head or neck. This bird is the only woodpecker that regularly feeds on the ground. Its main diet consists of ants and beetles.

Dozens of species of songbirds make their homes in North Dakota woodlands.

**Songbirds** are small, perching birds that sing a variety of different songs.

Several of these songbird species build their nests in cavities of dead and dying trees. Among them are **bluebirds**, **black-capped chickadees**, **white-breasted nuthatches**, and **tree swallows**.

Other songbirds such as **warblers**, **finches**, and **grosbeaks** build cup-shaped nests within the branches of trees. **Orioles** build unique nests that hang from fiber or string. These nests can often be seen swaying back and forth in the wind.

Two species of bluebirds are found in North Dakota. They are the mountain bluebird and the slightly smaller eastern bluebird. Bluebirds are members of the thrush family. The American robin is another member of this family. Birds in the thrush family are noted for their singing ability.

The **mountain bluebird** lives mainly in the western part of North Dakota, while the **eastern bluebird** is found throughout the state. Both bluebird species build their nests in cavities of dead and dying trees. They eat mostly spiders and insects such as crickets, beetles, and moths, as well as insect larvae and caterpillars.

The **black-capped chickadee** is a small, common bird that is found in both native and community forests throughout the state. This bird does not migrate. Because it needs to eat every day, even during winter storms, it is attracted to urban (city) bird feeders.

Another small songbird that can be found in both native and urban woodlands is the **white-breasted nuthatch**. The nuthatch hops headfirst



**Figure 41.** The small, black-capped chickadee is a common songbird of the state's woodlands. It eats the seeds of a variety of wild fruit and forages in tree bark for insects. It stays here year round unlike many other songbirds that migrate to warmer southern climates.



**Figure 42.** The white-breasted nuthatch nests within a high tree cavity and stays here year round. It has the adaptation of large claws that can cling to the bark of trees as it searches for insects. In colder months, it feeds on fruits, seeds, and nuts produced by trees.



**Figure 43.** The **tree swallow** is one of four common swallows found in North Dakota. It nests in the cavities of dead and dying trees and is easily attracted to man-made nest boxes. Tree swallows are beneficial insect eaters.



**Figure 44.** The **yellow warbler** is the most common nesting warbler species in the state. It builds a cup-shaped nest 40 to 60 feet high in the fork of a tree. The nest is lined with fine plant materials such as the silk from milkweed plants.

down trees as it looks for insects. Its back toe claw is about twice as long as the front toe claws. This adaptation makes it an excellent tree climber. Nuthatches gather seeds and nuts that they jam into tree bark. They then crack the food open with their long, sharp bills.

The **tree swallow** is a small bird with a tiny bill. This bird feeds on insects that it catches in the air. It gathers dropped feathers from other birds in order to line its nest, which is also built in a cavity within a dead or dying tree. Tree swallows fly in large flocks when they migrate for the winter.

One warbler species that nests in the woodlands of North Dakota is the **yellow warbler**. This small, sparrow-sized bird is brilliant yellow with rust-colored lines on its breast. Yellow warblers nest in trees usually 6 to 8 feet off the ground, but nests can also be high up in the forest canopy 40 to 60 feet above the ground.

The **ruby-throated hummingbird** is the only hummingbird species that nests in North Dakota. It can be found nesting in deciduous forests in the northern and eastern parts

of the state. This bird weighs only one-eighth of an ounce and is so small that it is often mistaken for a moth when it flies. Its wings can beat up to 75 times per second. It is attracted to bright, colorful flowers where it feeds on the sweet nectar.

The **cedar waxwing** has a pointed crest on its head and a black mask around the eyes. Its red wing tips look like wax. Large flocks of waxwings move from one area to another as they look for berries.

A **raptor** is a predator bird that hunts animals for food. Raptors are also called “birds of prey.” Raptors have an important role in helping to maintain the balance of nature. By hunting and catching prey, these carnivores control the population of rodents.

**Cooper’s hawk** is about the size of a crow. It has a large head, rounded wings, a long, rounded tail, and red eyes. This raptor is most commonly found in the Pembina Hills, Turtle Mountains, and in the woodlands along the Missouri, Sheyenne, and Red Rivers.

Cooper’s hawks build nests high in the trees. The male picks out the nest site and does most of the building. The female begins laying eggs on the same day each year. After the young hatch, the female does not allow the male back in the nest. Instead, he brings food to her on a nearby branch. She then takes this food back to the young in the nest.

Prey of the Cooper’s hawk includes small birds and small mammals such as chipmunks and red squirrels. Rather than chasing down their prey, Cooper’s hawks will often ambush them.



**Figure 45.** The **ruby-throated hummingbird** is the only species of hummingbird that nests in the state. Most of the nesting birds are attracted to deciduous forests of northern and eastern North Dakota. Hummingbirds feed on the sweet nectar of colorful flowers. (Courtesy Harold Umber)

The **sharp-shinned hawk** resembles the Cooper's hawk, but the sharp-shinned hawk is smaller and does not have a rounded tail. Sharp-shinned hawks are common in backyard woodlands. Their main prey is small birds, and they often catch birds that are eating at bird feeders. They also eat small mammals.

The **great horned owl** got its name from the tufts of feathers that look like horns on the top of its head. The great horned owl is one of the few animals that will kill skunks and porcupines. Great horned owls became more common throughout North Dakota as trees, such as those found in shelterbelt plantings, became more common.

Great horned owls are the first birds to begin nesting in North Dakota each spring. During February and March, great horned owls often choose an abandoned hawk's nest in a farm shelterbelt in which to raise their young.

Another owl with ear tufts is the **eastern screech owl**, which is much smaller than the great horned owl. This nocturnal raptor catches insects, mice, pocket gophers, snakes, frogs, fish, and small birds.



**Figure 46.** The sharp-shinned hawk is one of two hawks that spends the majority of its life in the woods. Unlike the larger, soaring hawks that fly high over the prairie looking for food, the smaller sharp-shinned hawks maneuver quickly through trees in search of their main prey, songbirds. (Courtesy of Bob Gress)



**Figure 47.** Screech owls are small owls that live in wooded areas across the state. They nest in tree cavities, feed at night, and make an eerie call that often frightens people. (Courtesy Ed Bry)






















## Comprehension

1. How did ruffed grouse get their name?
2. What is the largest game bird in North Dakota? Where does it spend the day? The night?
3. What two adaptations do woodpeckers have?
4. Name some songbirds that build their nests in tree cavities.
5. For what are members of the thrush family noted? Name some members of this family.
6. What role do raptors play in maintaining the balance of nature?
7. How did the great horned owl get its name?

## Critical Thinking


1. Explain why wild turkeys can fly almost 60 miles per hour, but domestic (farm) turkeys can barely fly at all.

# WOODLANDS WILDLIFE IN A NUTSHELL



-  Moose and white-tailed deer are the two big game species that make their homes in North Dakota woodlands.
-  At one time, black bears were common throughout the state; today, they are found mainly in the Turtle Mountains and Pembina Gorge.
-  North Dakota has more white-tailed deer today than at the time of the Lewis and Clark Expedition.
-  The aspen forests of the Turtle Mountains make good habitat for the snowshoe hare.
-  The North American porcupine is the second largest rodent on the continent.
-  The tree squirrels of North Dakota are the fox squirrel, the gray squirrel, and the red squirrel.
-  The chipmunk is a woodland ground squirrel.
-  Bats use echolocation to find their prey; they help control the mosquito population.
-  Amphibians go through metamorphosis in their change from tadpoles to adults.
-  The smallest snake in North Dakota is the redbelly snake.
-  Gray tree frogs have sticky toe pads; they can change their coloring to blend in with their surroundings.
-  Ruffed grouse have projections on their feet that help them walk on top of snow.
-  The wild turkey is the largest game bird in North Dakota.
-  Wood ducks have strong feet and large, gripping claws to perch on tree branches and to reach tree cavities.
-  The northern flicker is the only woodpecker that feeds on the ground.
-  Raptors are birds of prey; woodland raptors include hawks, falcons, and owls.
-  Great horned owls are the first birds to begin nesting in North Dakota each spring.

# WOODLANDS WILDLIFE VOCABULARY


## Amphibian:

-  Cold-blooded animal that lays its eggs in water or on moist land; has a tadpole stage with gills and an adult stage with lungs

## Antlers:

-  Horn-like projections that are shed every year
-  Found on members of the deer family


## Big game:

-  Large animals that are hunted


## Camouflage:

-  Protective coloring



## Cavity:

-  Open space in a dead or dying tree where wildlife raise their young


## Diurnal:

-  Active during the daytime

## Ectotherm:

-  Animal whose body temperature changes with the temperature of its surroundings
-  Also called “cold-blooded”


## Habitat:

-  Environment that provides the food, water, shelter, and space for wildlife to make their homes



## Herbivore:

-  Plant eater

## Insectivore:

-  Carnivore that eats only insects and spiders



**Metamorphosis:**

-  Process of changing from the larva stage to the adult stage
-  Amphibians go through metamorphosis


**Nocturnal:**

-  Active at night


**Raptor:**

-  Bird of prey
-  Predator bird


**Reptile:**

-  Cold-blooded animal with dry, scaly skin; lives its entire life on land



**Rodents:**

-  Gnawing or nibbling mammals such as rats, mice, voles, and ground squirrels

**Songbirds:**

-  Small, perching birds that sing a variety of different songs

**Urban:**

-  City
-  Opposite of rural

# THE IMPORTANCE OF WOODLANDS

## Value of Woodlands

Trees have been called the “Lungs of the Earth.” When people and animals breathe air, they take oxygen into their lungs and breathe out carbon dioxide. Trees and other green plants absorb carbon dioxide and produce oxygen, which is necessary for life.

Because trees are the largest plants on Earth, they can produce a great deal of oxygen. A U.S. Department of Agriculture bulletin states that 1 acre of forest absorbs 6 tons of carbon dioxide and produces 4 tons of oxygen per year.

The leaves of trees filter the air we breathe by removing dust and other particles. These particles are washed to the ground when it rains. Leaves also absorb pollutants from the air.

When on the ground, leaves trap moisture, keeping the water available for trees and other plants. When the leaves decompose, they add richness to the soil.

Tree roots hold soil in place to fight erosion. The destructive effects of flooding are reduced by trees

## A Tree Will Take The Heat For You

by Robert Priest

*A tree will take the heat for you  
when a stone cannot be found  
when the sun is bearing down  
in a great hot force  
that staggers you  
a tree casts a cool shade  
almost liquid as you walk along  
a thousand feet beneath  
the lowest singing leaf.*

*A tree will take the wind for you  
bending into it from far away  
so all you hear is rustling  
and the creak of wooden limbs  
as you lean against it—safe  
it will take the rain for you  
and roll it round in a riverbed  
of living leaves high overhead.*

*A tree will stand by you  
in all kinds of weather  
and even when you're lonely  
a tree will hold the earth still  
in its green grip  
so you can climb up like a child  
into its arms and be held there  
in creature music  
with bugs and birds unafraid  
part of the music now  
part of the shade.*



**Figure 48.** Snag is a name given to brush, trees, or logs that have fallen in water areas. Snags are great habitat for aquatic insects, small fish, and amphibians. Many times people think snags should be removed because they are “unsightly,” but they are beneficial because they provide great wildlife habitat.



**Figure 49.** Wooded areas are a limited resource in our state. They provide excellent areas for outdoor recreation including deer, turkey, moose, and ruffed grouse hunting. Above, a turkey hunter calls for a spring tom (male turkey) in the Killdeer Mountains.

absorbing water. The trees that fall into the water because of the natural erosion of riverbanks provide great habitat for aquatic insects, amphibians, and fish.

The cost of heating and cooling homes is lowered by the presence of nearby trees. Homes that are sheltered from winter winds will stay warmer, and homes that are shaded during the summer will stay cooler.

Trees provide habitat for birds and other wildlife. This helps to maintain a balance with nature, even in urban areas (cities).

Tourism is the second-largest industry in North Dakota, after agriculture. Millions of dollars are brought to the state every year by people who enjoy outdoor recreational opportunities in North Dakota woodlands. Recreational activities include hunting, camping, picnicking, bird-watching, wildlife viewing, sight-seeing, and taking photographs.



**Figure 50. Woodlands attract attention in North Dakota** since their overall area is limited in comparison to prairie and farmland. Wooded areas also provide protection from the wind and furnish shade for campers during hot, summer months. Wooded areas provide a visual barrier and help block sounds from neighboring areas.

Native forests, rural plantings, and community forests are all necessary and of great value. Woodlands are even more valuable in North Dakota than they are in many other states because compared with other states, woodlands in North Dakota are rare.

## Threats to Woodlands

An ecosystem is an area that contains organisms (living things) interacting with one another and with their non-living environment. If one part of the ecosystem is changed or destroyed, it has an effect on everything else in that community.

The greatest threat to the woodlands ecosystem is habitat destruction. Some disturbances to the woodlands ecosystem are natural, while others result from human activity. Natural disturbances can sometimes be brought on by human activity. Livestock (farm animals), as well as high deer populations, can be harmful to woodlands.



**Figure 51. Development and construction** along wooded areas such as the Missouri River in central North Dakota can be damaging to woodlands. The trees removed are replaced by houses.

Ice storms, wind storms, drought (drou) (long period with no precipitation), and flooding are natural weather disturbances that can damage and destroy trees. Humans do not have direct control over these natural conditions when they happen, but indirectly, human activities have added to flooding. For example, many areas of North Dakota have lost a majority of their wetlands due to draining for agriculture. With few places to capture snowmelt or heavy rains, the water goes directly into rivers all at once. This causes flooding with resulting loss of habitat and destruction of property.

Summer flooding of elm-ash forests along the Red, Sheyenne, and Pembina Rivers may cause the roots of the flooded trees to die. Root death will in time kill the trees.

The cottonwood forests of North Dakota have the opposite problem. Cottonwood trees need to be flooded from time to time in order for the seeds to sprout. Dams built on the Missouri River now prevent the flooding needed for maintaining cottonwood tree populations. This lack of new trees, along with the destruction of mature trees for development, will lead to an end of the cottonwoods along the Missouri River.

Over-maturity (old age) of trees can be a problem in forests. When over-mature trees are not harvested, the large trees prevent smaller ones from growing and create shade so that the understory is not thick and lush. The best forest is one that has a combination of all ages of trees.



**Figure 52. Removal of trees along a river** changes the natural condition of the woodland and disturbs the vegetation and wildlife. Trees with an understory and healthy forest floor are removed and replaced by turf grass. Since people fertilize grass and spray for insects, these poisons enter the water, which can negatively affect aquatic insects, amphibians, fish, and drinking water supplies.



Insects can cause severe damage to woodlands. An example is the **forest tent caterpillar**. This insect attacks deciduous trees and causes **defoliation** (dee-foal-ee-Ay-shun), or complete loss of leaves. Repeated defoliation weakens trees, which may result in their death.

The **yellow-headed spruce sawfly** threatens all species of spruce conifers. This insect defoliates the evergreens. **Spider mites** also attack spruce trees by sucking juices out of the needles.



**Figure 53.** Nuisance insects can kill trees by defoliation (complete loss of leaves). It is important that we all prevent insects from other regions of the country from reaching our state.

A combination of a disease and an insect has significantly impacted the state tree of North Dakota—the American elm. Many millions of elm trees throughout the world have been killed by **Dutch elm disease**. This disease is carried from tree to tree by the **elm bark beetle**. The disease originally came from Asia and was brought to Europe and then to North America in elm wood that was infested with the elm bark beetle. The disease is almost always fatal (causes death) to elm trees.

The larvae (caterpillar stage) of various butterflies feed on the leaves of American elm trees. The loss of these trees from Dutch elm disease means loss of the butterflies.

Many of the American elm trees that have been lost to Dutch elm disease have been replaced by green ash, a popular tree throughout the state. A new threat to green ash trees is the **emerald ash borer**, an insect that has already killed millions of ash trees on the continent. This insect could be headed toward North Dakota if we do not do our part to prevent it. Ash wood from other states could be infected with this insect, and it is important that we do not bring the disease here by doing things like bringing ash firewood to our own state.

Another pest that has destroyed millions of acres of both deciduous and coniferous trees in North America is the **gypsy moth**. This destructive insect has been detected in North Dakota but has not yet caused a great deal of damage in the state.

Fires are a constant threat to woodlands, particularly during dry periods. In 1886, the entire forest region of the Turtle Mountains was consumed by the largest fire in the history of North Dakota. The native bur oak trees were burned, and aspen trees grew in their place. The whole forest ecosystem was changed by this fire.

Any change in the conditions of a woodland can be a threat to wildlife. In this food chain example, leaves are eaten by insects, which in turn are eaten by birds. If the trees are removed, the insects cannot survive. The birds then have nothing to eat, so they perish (die) or leave the area.

Another danger to the food chain is bio-accumulation. **Bio-accumulation** is the introduction of chemicals into the food chain. This can occur with the use of insecticides.

**Insecticides** (chemicals for killing insects) are used for killing insects in agricultural fields. These insects are often eaten by songbirds or other insect-eating animals.



**Figure 54.** In a state with few forests, fire can have a damaging effect upon this habitat type. Fire kills trees and opens up the tree canopy permitting more sunlight to reach the forest floor. This allows more grass to grow, which in turn can become an increased fire hazard. Any small trees that germinate will be burned by the next grass fire.



**Figure 55.** Livestock can damage existing woodlands as well as prevent new trees from growing if grazing is too intense. Lack of rain can also prevent woodlands from regenerating.

The birds either die quickly from the poison or carry it in their bodies until they accumulate enough so that it kills them over time. If a raptor eats a songbird, for example, with enough accumulated chemical, the raptor can die. This is an example of bio-accumulation.



**Figures 56 & 57.** Spraying agricultural crops can kill trees if the spray comes in contact with the trees. **INSET** If the wind is not calm, chemicals sprayed from airplanes can drift through the air onto nearby trees.

Sometimes crops are sprayed with **herbicides** (chemicals that kill plants) in order to kill weeds in the fields. At times, the spray can drift, or be carried by the wind, to trees. Many shelterbelts in North Dakota have been accidentally killed by drift from herbicides.

When livestock (farm animals) graze in woodlands, they eat and trample down the understory. The loss of this vegetation means the loss of habitat for many species of wildlife.

Thousands of acres of trees have been cleared off land to make way for crops, roads, buildings, houses, and construction projects. The loss of trees for these purposes continues today.

## Conserving Woodlands

When Euro-American settlers came to North Dakota, they found that trees on the prairie were scarce. Trees were not available for building and heating homes, for making fence posts and other wood products, or for wind protection. The settlers quickly began planting trees. Some of them had tree seeds that they had brought with them, while others transplanted seedlings from the riverbanks into their yards.

After North Dakota became a state in 1889, the state government declared that a school of forestry should be created. The purpose of this school was to develop tree and shrub species for planting in North Dakota and to provide education about planting and maintaining trees.

In 1906, the **State School of Forestry** was established at Bottineau. This site was selected because it was so close to the largest forest area in the state, the Turtle Mountains. In 1913, the office of State Forester was established, and a State Forestry Nursery opened at Bottineau. A **nursery** is a place where plants are grown for sale or for experiments.



**Figure 58. Cabins or home construction in woodlands** have a permanent effect on the number of undisturbed wooded acres remaining in some areas. Construction in wooded areas provides evidence that people do value wooded places. The question is: When does the construction reach a point where there is no natural value to the woodlands?

Today, the **North Dakota Forest Service** is managed by the State Forester. The **USDA Forest Service**, a branch of the U.S. Department of Agriculture, is a major partner in supporting state conservation programs. **Conservation** means preserving natural resources by careful use and management of the resources.

Among the goals of the forest agencies are controlling and slowing the spread of harmful pests, preserving wildlife habitats, improving forest resources for individuals and communities, and providing recreational opportunities for the public.

The **North Dakota Game and Fish Department** and other wildlife agencies have information available on how to become involved in conservation activities. Everyone, no matter what age, can participate in woodland management and protection of habitats and wildlife.

In 1989, a special project, the “Centennial Tree Program,” was organized to help celebrate the state’s centennial (100<sup>th</sup> birthday). This project encouraged the planting of 100 million trees over a 10-year period. Individuals and communities throughout the state participated in tree planting projects in an effort to reach this goal.

Today, the state of North Dakota owns three nurseries. Trees planted in shelterbelts, farmyards, and urban areas generally come from one of these nurseries. **Lincoln-Oakes State Nursery** has two locations—Bismarck and Oakes. These two nurseries produce deciduous tree seedlings. The **Towner State Nursery** at Towner grows coniferous trees and sells evergreen seedlings for planting. It is the only conifer seedling nursery in North Dakota. A **seedling** is a young plant that has grown from a seed.



**Figure 59.** The Lincoln-Oakes Nurseries grow young deciduous trees that are used in every soil conservation district and county in the state for conservation tree plantings. A separate tree nursery called Towner Nursery grows the coniferous trees used in these plantings. The aerial photo above shows the Lincoln-Oakes unit near Bismarck.

The North Dakota Forest Service owns and manages five state forests. The largest block of forested land in this system is the **Turtle Mountain State Forest**. It extends from the Turtle Mountains to the Canadian border and covers 7,814 acres.

Hahn's Bay Recreation Area and Strawberry Lake Recreation Area are located within the Turtle Mountain State Forest. Hahn's Bay borders Lake Metigoshe. Strawberry Lake Recreation Area contains a swimming beach and also an area for people to camp with their horses.

The smallest state forest is **Mouse River State Forest**. It is made up of 2 land parcels and totals 259 acres. Towner State Nursery is located nearby.

**Tetrault Wood State Forest** is located in the Pembina Gorge along the banks of the Pembina River near Walhalla. It consists of 432 acres.

**Sheyenne State Forest** lies in the Sheyenne River Valley between Lisbon and Fort Ransom. It covers 509 acres and contains the only real waterfall in North Dakota.

**Homen State Forest**, in the Turtle Mountains, is located east of Lake Metigoshe. This state forest contains the largest aspen tree and the largest balsam poplar tree in North Dakota. It covers 4,184 acres.



**Figure 60.** Trees, both dead and alive, are important resources for wildlife. Forests are unique habitats in North Dakota and should be treated with care for future generations.

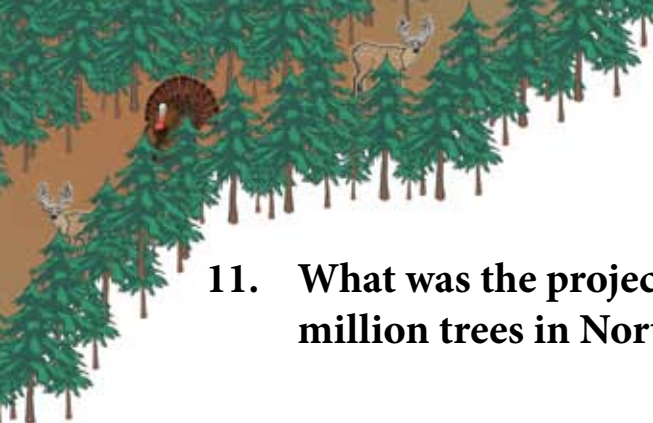
State forest lands are open to the public (all the people) for hunting and outdoor recreation. They contain hiking trails, picnic areas, campsites, and fishing areas. Forests are ideal places for people to enjoy spending time with nature.

Trees are amazing features of nature. They provide oxygen, wildlife habitat, wind protection, shade, beauty, recreational opportunities, and countless other benefits. Trees are extremely valuable resources. They must be conserved so that future generations will be able to enjoy the wonderful woodlands of North Dakota!



## Comprehension

1. With what body organ have trees been compared? Why?
2. How do leaves filter the air we breathe?
3. What is the greatest threat to the woodlands ecosystem?
4. Name some natural weather disturbances that can damage or destroy trees.
5. What happens to trees if they are defoliated repeatedly?
6. Name two insects that attack conifers.
7. What disease threatens our state tree? How is it passed from tree to tree?
8. What changed the Turtle Mountain forest ecosystem in 1886?
9. Where did the early Euro-American settlers get trees to plant on the prairie?
10. Where was the State School of Forestry established? Why?




















11. **What was the project that encouraged the planting of 100 million trees in North Dakota? In what year was it started?**
12. **How many tree nurseries are owned by the state of North Dakota? Where are they located?**
13. **How many forests are owned by the state of North Dakota? What are they?**
14. **Where is the only true waterfall in North Dakota located?**

### **Critical Thinking**

1. **If you were to spend time in a forest, what would you like to do there? Explain.**
2. **Pretend that you are in charge of setting up a conservation project for your community. What will your project be, and how will you organize it?**




# THE IMPORTANCE OF WOODLANDS IN A NUTSHELL

-  Trees are called “Lungs of the Earth” because they produce oxygen, which is necessary for life.
-  One acre of forest absorbs 6 tons of carbon dioxide and produces 4 tons of oxygen.
-  Leaves filter air, absorb pollutants, and trap moisture.
-  Tree roots fight erosion and absorb pollutants.
-  Trees keep homes warmer in the winter and cooler in the summer.
-  Tourists bring millions of dollars into the state each year.
-  Woodlands are rare in North Dakota and, therefore, are more valuable than in many other states.
-  Habitat destruction is the greatest threat to the woodlands ecosystem.
-  Mature trees need to be harvested to prevent decay of the stems and rotting of the roots.
-  Insects can cause severe damage to woodlands.
-  Dutch elm disease, spread by the elm bark beetle, almost always kills the infected elm trees.
-  North Dakota’s largest fire on record destroyed the bur oak forests of the Turtle Mountains in 1886.
-  Bio-accumulation, or introduction of chemicals into the food chain, kills wildlife.
-  Many North Dakota shelterbelts have been accidentally killed by herbicide drift.
-  Woodland habitat has been lost through farming, road-building, construction, and other human activities.
-  The state of North Dakota operates nurseries in Towner, Bismarck, and Oakes.
-  North Dakota has five state forests.

# THE IMPORTANCE OF WOODLANDS

## VOCABULARY


### **Bio-accumulation:**

 Introduction of chemicals into the food chain

### **Conservation:**

 Preserving natural resources by careful use and management of the resources

### **Defoliation:**

 Complete loss of leaves

### **Herbicide:**

 Chemical for killing plants


### **Insecticide:**

 Chemical for killing insects

### **Nursery:**

 A place where plants are grown for sale or for experiments

### **Seedling:**

 A young plant that has grown from a seed

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# NORTH AMERICAN MODEL OF WILDLIFE CONSERVATION

*Best effort to conserve and manage wildlife that the world has ever seen.*

*"The nation behaves well  
if it treats the natural  
resources as assets...*



*...which it must turn over  
to the next generation  
increased, and not impaired,  
in value."*

*— Theodore Roosevelt*

*Through history, countries in Europe evolved into systems of hunting and fishing where the public did not have access to wildlife. Hunting in North America is being threatened today and may potentially lead toward a European system benefiting only the wealthy. The following 7 concepts of the North American model are the basis upon which the North American system of hunting and fishing evolved.*

## **1. Wildlife is Held in Public Trust**

Wildlife in North America is public property. North Dakota law further clarifies that the North Dakota Game and Fish Department manage the wildlife resource for the public.

## **2. Eliminating Commerce in Dead Wildlife**

In the past, some hunters killed wildlife for personal profit. This led to the rapid decline of many wildlife species. Eliminating the marketing of dead game animals is one of the most important policies of wildlife conservation.

## **3. Allocating Wildlife Use Through Law**

Every citizen in good, legal standing – regardless of wealth, social standing or land ownership – is allowed to participate in the harvest of wildlife within guidelines set by the public and lawmakers.

## **4. Hunting Opportunity for All**

In North America, all citizens have the opportunity to participate in harvesting wildlife. Because of this opportunity, citizens feel a connection with wildlife and work toward conserving the resource for future generations.

## **5. Wildlife May Be Killed Only for Legitimate Reasons**

Wildlife can be killed only for a good purpose and in a fair chase manner that provides sustainable populations. Legitimate reasons to harvest include food, fur and protection of life and property.

## **6. Wildlife is an International Resource**

Wildlife is an international resource to be managed cooperatively by states. This policy is basic to international wildlife treaties as well as the broad-based, continental cooperation between professionals and conservation organizations. Cooperation is very important in managing wildlife such as waterfowl which use several countries in their migration.

## **7. Science is the Basis for Wildlife Policy**

Science is the proper tool for managing wildlife rather than politics or popular opinion. This assures that public wildlife is managed by trained biologists and favors a hands-off policy by elected or appointed officials.

