

Habitats of North Dakota

BADLANDS



By Gwyn Herman and Laverne Johnson



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Presented by the
North Dakota Game and Fish Department

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Published by the
North Dakota Center for Distance Education

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Box 5036—1510 12th Avenue North
Fargo, North Dakota 58105-5036

www.ndcde.org

ISBN 978-0-9801993-2-1

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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.

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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All photos and other images are from the North Dakota Game and Fish Department unless otherwise cited.

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Gwyn Herman (left) and Laverne Johnson (right)

Welcome

Welcome to the study of the *Badlands of North Dakota!* This book is filled with interesting and useful information about the Badlands of North Dakota—what they are, where they are located, which animals and plants call the Badlands their home, how they are threatened, and why they must be 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.

BADLANDS

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

-  Hoodoos
-  A forest made of stone
-  Needle and thread that never sew
-  Draw not related to art
-  Winter fat
-  Towns with hundreds of residents but no people
-  Porcupines with soft quills
-  Kangaroos that weigh 2 ounces
-  Racers without legs
-  Squirting blood from the eyes

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

Introduction

One of the most unusual areas in North Dakota is the **Badlands**, located along the Little Missouri River in the southwestern part of the state. Because of its location along this river, the area is also referred to as the “Little Missouri Badlands.”

The Badlands are about 20 miles wide and about 150 miles long. They extend from the South Dakota border to Lake Sakakawea and cover about 4 percent of North Dakota. They are known for their great natural beauty. Many shades of red, yellow, brown, black, and green color the unusual landforms. Early French trappers and explorers who came to the area called this area “bad land to travel across,” which led to the name “Badlands.”

The Little Missouri Badlands of North Dakota should not be confused with “Badlands National Park” in southwestern South Dakota.

The rugged landscape of the Little Missouri Badlands consists of hills, cliffs, valleys, gullies, buttes, hoodoos, and other natural features. A **butte** is a flat-topped, very steep hill with flat sides. A **hoodoo** is a tall, thin pillar of rock with a capstone, or flat rock, on its top.

The features of the Badlands were formed in a way that was different from the formation of the prairies that covered almost all of North Dakota. All of North Dakota, however, was affected in one way or another by glaciers.

Formation and Features

Most of North Dakota's landscape was shaped toward the end of the Ice Age by the **Wisconsinan** (wis-Kon-sin-an) **glacier**. This gigantic mass of ice entered the area from Canada about 40,000 years ago. It acted like a giant bulldozer, scraping the land and moving huge amounts of earth as it advanced and retreated over the next 28,000 years.

By the time the Wisconsinan glacier melted about 12,000 years ago, it had created the flat and rolling plains that make up most of North Dakota. The southwestern corner of the state, however, was never touched by the Wisconsinan glacier. This unique (you-Neek) (rare and unusual) area became known as the "Little Missouri Badlands," or simply the "Badlands."



Figures 2 & 3. The Badlands consist of a variety of land formations and vegetation. The landscape can include prairie grasses, brush clumps, small forested areas in small canyons (called woody draws), buttes, rock formations, creeks, clinker outcroppings, and other features. **INSET** The photo shows a formation call a hoodoo, which is a pillar of rock or sandstone with a flat rock top.



Figure 4. The Little Missouri River played a major role in forming the rugged terrain of the Badlands through thousands of years of water erosion. Wind and rainfall also helped shape the terrain and continue to make changes today. This terrain is significantly different from the terrain in the remainder of the state where glaciers had a big impact.

Even though Ice Age glaciers did not directly shape the Badlands, in a strange way a glacier helped form the Badlands anyway. The Little Missouri River originally flowed north, but about 600,000 years ago, a glacier blocked its path, and it was forced to flow east.

The river channel that the Little Missouri River made for itself was shorter and steeper than the old one. This caused the river water to rush very fast. The fast-moving water washed away land, and wind also carried away soil. Over thousands of years, this water and wind **erosion** (wearing away) worked to create the rugged features of the Badlands.

The various features and colors of the landscape resulted from the different types of rock that had formed millions of years before the Badlands were ever created. During the **Paleozoic** (pay-lee-ah-Zoe-ik) **Era** from about 540 million years ago to about 248 million years ago, shallow seas covered North Dakota several times.

Sharks and other fish, along with many other kinds of animals, lived in the water. Vegetation (plant life) grew along the edges of the seas, and in time, forests appeared.

Each time the seas would recede (go back), decayed matter from the living things would be left. The plants and animals rotted and decayed, leaving layer after layer of matter. Fast-flowing rivers carried and deposited sand, silt, and clay into the area, and these **sediments** (small pieces of rock and dirt carried by water) were also piled into layers.

After many millions of years, the area that had been covered by the seas slowly filled with sediments before the seas came again. These particles (pieces) of sediment were pressed together and formed **sedimentary** (sed-ah-Men-ter-ee) **rocks**.

Many fossils of ancient (very old) plants and animals have been found in the Badlands. A **fossil** is the remains of a plant or animal that has been buried in the earth (in rock, soil, ice, etc.). It could be a skeleton, bone, shell, tree leaf, or an imprint, such as a footprint.



Figure 5. This fossil dig in Stark County is for a 30-million-year-old rhinoceros called *Subhyradon*. Hundreds of millions of years ago, the area now called the Badlands experienced times of being covered by great oceans. At other times, the land had giant trees, dinosaurs, and other animals. As time continued, animals and plants that died were covered by sediments and formed fossils, which are still being uncovered today. Erosion continues to uncover fossils, but archaeologists (those that study fossils) dig them up to add knowledge to answer what actually did live in North Dakota hundreds of millions of years ago.

As decayed plants and animals became trapped in the sedimentary layers, the weight of the sediments pressed them into materials which millions of years later became **fossil fuels**. Petroleum (oil), coal, and natural gas are fossil fuels. They are called “fossil fuels” because they were formed from the fossilized remains of prehistoric (very ancient) plants and animals.

Petroleum and natural gas were created from very tiny plants and animals that had lived in the seas that covered North Dakota. Hundreds to thousands of feet of earth continued to cover the dead plants and animals over the millions of years when the ancient seas kept advancing and receding. Even after the seas were gone, weight from the layers above continued to press down. This pressure squeezed the



Figure 6. Dinosaurs roamed the Badlands of North Dakota more than 65 million years ago, during the Mesozoic Era. *(Painting by Geoff Elsen, North Dakota Heritage Center)*

material into liquid that we call “petroleum.” Today, many oil wells that remove petroleum from the earth are located in the Badlands.

After the Paleozoic Era ended, the **Mesozoic** (mez-ah-Zoe-ik) **Era** began and lasted until about 65 million years ago. The Mesozoic Era is sometimes called the “Age of Reptiles” because during the millions of years of this era, many dinosaurs and other kinds of reptiles developed. Today, dinosaur fossils are being dug up in the Badlands. Several museums in the state contain dinosaur fossils that were found in the Badlands.

The **Cenozoic Era** began about 65 million years ago. At that time, the last of the seas that had come inland drained away. As the water receded (went back), reptiles, mammals, insects, and plants lived on the land. Huge swamps formed, creating a good environment for crocodiles, large amphibians, and other animals and plants. On the land, thick forests of redwoods, sequoias, and other trees developed and grew to be gigantic.

After the last of the seas had drained away, layer after layer of rotted trees and other vegetation accumulated (piled up) in swamps over millions of years. Pressure from the heavy weight and heat from the earth turned these mats of vegetation into coal. **Coal** is a solid fossil fuel created from land vegetation that had been squeezed by pressure for millions of years.

The kind of coal that was formed in western North Dakota is called “lignite.” **Lignite** is a very soft coal. Lignite coal that burned underground formed a type of red rock called **clinker**. Clinker, along with many different types of rocks and layers of soil, makes the Badlands very colorful. People who live in the area call clinker “scoria” (Skor-yah).

Some of the best plant fossils in the Badlands are those that have become petrified. **Petrified wood** looks as if it turned to stone, but actually another process took place. As the cells of the wood decayed, minerals filled in where the cells had been. In this way, when the wood became completely petrified, it looked exactly like the plant that had been there in the first place, except it was now stone.

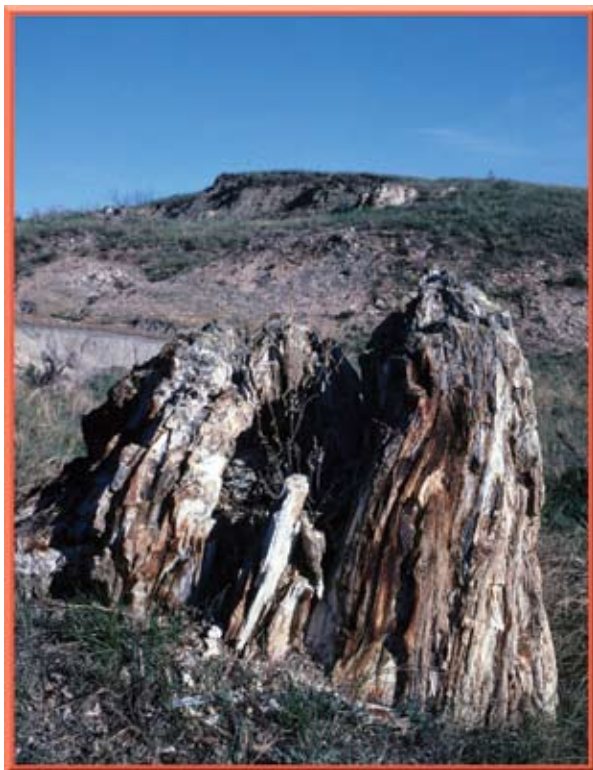


Figure 7. Fossilized tree stumps, often referred to as petrified wood, are a reminder that this area once consisted of forests of giant trees such as redwood and cypress.

Some areas of the Badlands contain so many petrified stumps and logs that they are called “petrified forests.” A petrified forest in Theodore Roosevelt National Park contains petrified wood about 60 million years old. Some of the stumps are 10 feet in diameter (measured across). The trees may have been 100 feet high when they were living.

Land Distribution

The **Little Missouri National Grassland** in western North Dakota covers over 1 million acres and is owned by **the public** (all of the people). An **acre** is about the size of a football field. The area of land in the Badlands owned by the public is about the same size as the state of Delaware.



Figure 8. The Little Missouri National Grassland refers to the land within the Badlands that belongs to the public and is managed by the United States Forest Service. There are over 1 million acres of this public property mixed with private lands. The Forest Service manages these public lands for “multiple uses” including hunting, livestock grazing, mineral development, camping, and hiking. *(Graphic by Cassie Theurer)*

The Little Missouri Grassland is the largest grassland in the United States. National grasslands are managed by the **U.S. Forest Service**, a federal (United States) government agency. The Little Missouri National Grassland is not all connected because some privately owned land is scattered throughout it.

The Little Missouri Badlands are located within the Little Missouri National Grassland. Over 1 million acres of the Badlands are public lands managed by the federal government and the state government.

Theodore Roosevelt National Park is located in the Badlands. A **national park** is an area of land set aside by the federal government for the purpose of preserving it in a natural state for the public to enjoy.

Theodore Roosevelt, who lived for a time in the North Dakota Badlands, later became the twenty-sixth President of the United States. As a result of his experiences in the Badlands, he gained an appreciation of wildlife, natural beauty, and the importance of conservation. **Conservation** means preserving

natural resources by careful use and management of the resources. A **natural resource** is a supply of something useful that comes from nature.

One of Roosevelt's life-long goals was to help safeguard and preserve wildlife, natural resources, and wilderness areas for future generations. Roosevelt established several national parks in order to help fulfill his conservation goals. Although he was no longer living at the time, a national park in the North Dakota Badlands was established and named in his honor.

Theodore Roosevelt National Park covers 110 square miles, or over 70,000 acres of the Little Missouri Grassland in the Badlands. The park is divided into three parts: the South Unit, the Elkhorn Ranch, and the North Unit. The North and South Units are about 70 miles apart, with the Elkhorn Ranch Unit located between them. The entrance to the South Unit is in the town of Medora. The North Unit is near Watford City.



Figure 9. The Theodore Roosevelt National Park system is federal land managed for the public to enjoy. Hunting is not allowed within park boundaries, but many other activities are enjoyed including camping, hiking, bird watching, canoeing, and taking photographs. The park was named in honor of Theodore Roosevelt, who was a great conservationist. The park is divided into the North Unit, the South Unit, and the Elkhorn Ranch, which Roosevelt actually owned for a period of time. All three park units are located along the scenic Little Missouri River.



Comprehension

1. What is the location of the North Dakota Badlands?
2. What makes up the rugged landscape of North Dakota's Badlands?
3. What shaped most of North Dakota's landscape? What part of the state was not shaped by this force?
4. What forces created the Badlands?
5. The area of public land in the Badlands is about the same size as what state?
6. What national park is located in the Badlands? Name its three units.

Critical Thinking

1. French trappers and traders called southwestern North Dakota "bad land to travel across." What other descriptions might have been fitting for them to use? Explain.

Vegetation

A lot of prairie in North Dakota was plowed up by Euro-Americans (“whites”) who began farming in the area in the late 1800s. However, most of the steep, rocky, rugged landscape of the Badlands is not suitable for farming. For this reason, over 90 percent of the Badlands remains in **native** (naturally occurring) vegetation.

The native prairies of the Badlands provide habitat and nesting cover for several species of wildlife. A **habitat** is an environment that provides the food, water, shelter, and space for wildlife to make their homes. The grasslands of the Badlands are also used as rangeland for grazing cattle.



Figure 10. Prairie plants such as native grasses and forbs (wildflowers) have deep roots that allow them to survive in dry conditions. This is especially important in the Badlands where soil is less fertile and precipitation is minimal.

Badlands vegetation consists of grasses, shrubs, trees, and forbs. Forbs are plants that do not have woody stems. All of the native plants of the Badlands are adapted to a dry climate.

Shortgrass prairie is the type of grassland found in areas where the precipitation averages 10 to 12 inches annually (each year). **Shortgrasses** are bunch grasses that may reach a height of only 3 to 7 inches.

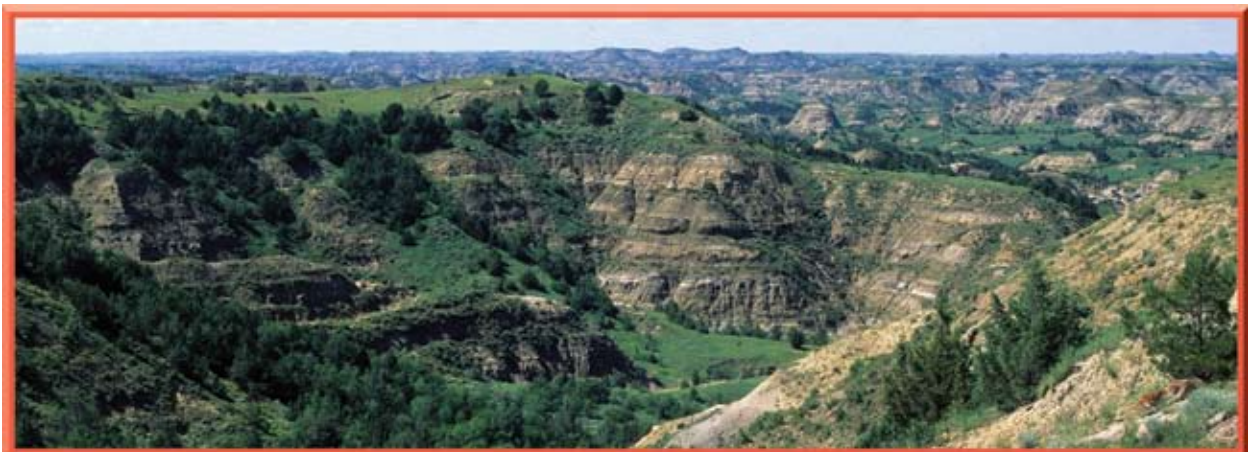


Figure 11. Many vegetation types are found in the Badlands. Even though the climate is arid (dry), trees such as juniper and green ash are common. Aspens are sometimes found on cooler, north-facing slopes, and cottonwoods are found along the Little Missouri River and smaller streams. Vegetation found on bare sidehills is made up of drought tolerant native grasses and other plants such as sagebrush, buckbrush, yucca, and cactus.

Bunch grasses grow in bunches, or clumps, and are spread by seeds. These plants have extremely long roots that stretch downward many feet below the surface of the ground. Because they can reach moisture that is deep underground, they are able to survive in dry areas where other plants wither and die. One of the most common bunchgrasses in the shortgrass prairie is **blue grama**.

Little bluestem is another example of a bunchgrass that grows in the shortgrass prairie. This plant is eaten by wildlife and livestock (farm animals) when it is young. After it matures, grazing animals avoid it because the stems get tough. The seeds of little bluestem are eaten by songbirds and upland game birds. In the fall, little bluestem plants turn a reddish-brown color.

Needle and thread grass got its name from the sharp-pointed seed stalks and long, twisted, thread-like strands that branch out from the stalks. Early in the spring, this grass is tender and makes good forage for animals. **Forage** is grass and other plants that grazing animals eat. When the plant matures later in the summer, the “needles” can be irritating to the mouths and eyes of animals.



Figure 12. Little bluestem is a common native grass species found on prairie habitat within the Badlands. It can grow knee-high and is easily identified in the fall by its brilliant reddish-brown color.



Figure 13. Many native grasses grow in Badlands prairies. Needle and thread is unique because its seeds have long, wispy strands that make it stand out from other native species.

In other parts of the Badlands where annual precipitation may reach 15 inches, medium-height grasses such as western wheatgrass exist. **Western wheatgrass** is the official state grass of North Dakota.

Woody draws are small woodlands in the Badlands that contain trees and brush. They are located in low places that can hold enough moisture throughout the year to support larger forms of vegetation than open areas.

The trees found in woody draws are deciduous (de-Sid-jew-us) trees. **Deciduous trees** are those that lose their leaves each fall. Examples are cottonwood, green ash, boxelder, and elm. Many birds build their nests in these trees. Deciduous trees are also found in other areas of the Badlands. Cottonwoods, for example, grow along the Little Missouri River.

Bushes, or shrubs, found in woody draws include juneberry, chokecherry, current, and American plum. These species produce fruits that are eaten by birds and



Figures 14 & 15. Woody draws refer to the low areas between hills (drainages) within the Badlands in which deciduous trees and shrubs grow. These small woodlands are also called “ash draws” because green ash makes up a majority of the cover. Woody draws also contain chokecherry, juneberry, golden current, and buckbrush. These places provide a very important habitat for wildlife to feed as well as nest and escape from cold winter winds. **INSET Songbirds** use woody draws in the Badlands in which to nest and raise their young. The nests and adults are often not observed since the cover in these wooded areas is heavy during summer months.

mammals. Forbs (wildflowers) that require more moisture such as wild bergamot are also common in the shaded areas around woody draws. Elk, deer, wild turkeys, and other wildlife use woody draws as shelter during hot summer days, as well as for food and cover during harsh winter weather.

Coniferous (koe-Nif-er-us) **trees** also grow in the Badlands. The leaves of some 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.” Examples of coniferous trees found in the Badlands include ponderosa pine, Rocky Mountain juniper, and cedar.

Ponderosa pine occurs as isolated stands or individuals along the Little Missouri River in Slope, Billings, Bowman, and Golden Valley Counties. American Indians used the inner bark and seed of this tree for food and the sap as chewing gum.

A single isolated stand of **limber pine** occurs in western Slope County, 12 miles north of Marmarth. The closest occurrence of limber pine outside the Badlands is 160 miles away in the Black Hills of South Dakota. The best explanation of how these trees got started here is that American Indians brought the seeds as food when they came from the Black Hills in summer hunting parties.

Rocky Mountain juniper is the most common coniferous tree in the Badlands. Rocky Mountain junipers can live to be 300 years old.



Figure 16. Wild bergamot is a wildflower (forb) that can often be found at the edges of woody draws since it requires more moisture and shade. Wild bergamot is generally found in clusters, or groups. Many other wildflowers are found as single plants in the Badlands.

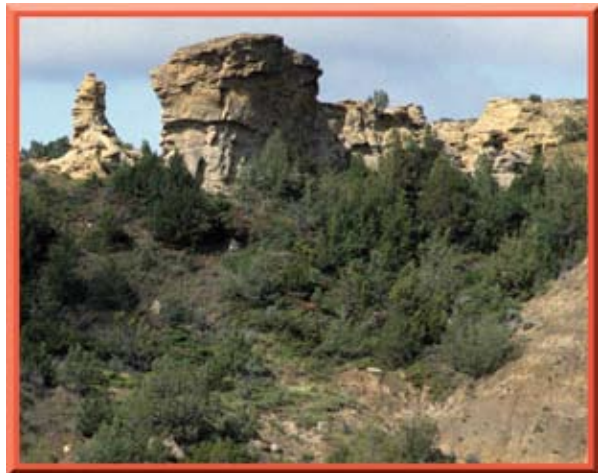


Figure 17. Junipers are coniferous trees that can be found scattered throughout the Badlands. They are adapted to survive in dry climates and remain green year round.

Juniper trees are found throughout the Badlands because they can grow almost anywhere. They require so little water that they can even grow on dry hillsides. The northern part of the Badlands contains juniper-filled canyons. **Cedar trees** are less common and tend to grow along the Little Missouri River bottomlands and the bottomlands of creeks flowing into this river.

A common type of shrub that grows in the Badlands is **sagebrush**. This silver-gray bush has a strong, spicy smell and a bitter taste. Sagebrush is important for some wildlife species that depend on it for both food and protective cover. Sage grouse, the sagebrush lizard, and the sagebrush vole all need this shrub as their habitat.

Winter fat is a shrub that has a silvery color early in the spring, but when the plant matures, it turns orange-brown. The upper part of the stem has numerous tiny, white flowers. Winter fat is sometimes called “white sage,” but it is not part of the sage family.



Figure 18. Sagebrush and rabbitbrush are common vegetation species in the Badlands. Sagebrush is required by several wildlife species such as the sage grouse and sagebrush lizard. It is an olive-colored woody shrub that can grow waist high. Rabbitbrush is usually less abundant and can be identified in the summer by its bright, yellow flowers.

Another shrub that looks similar to sagebrush is **rabbitbrush**. This plant has a pleasant scent that can be noticed more when it is wet after a rainfall. During the late summer and early fall, rabbitbrush is covered with small, yellow flowers that are attractive to butterflies, bees, and other insects.

Buckbrush grows close together, forming thickets that provide good cover for wildlife. The plants reach a height of about 4 feet. Several species of birds eat its white berries, and white-tailed deer browse on its leaves and stems. **Browsing** refers to animals eating leaves, stems, and buds from plants.

Buffaloberry plants also form thickets, or clumps, that can be found scattered across the western prairies. This tall, thorny shrub provides cover and nesting sites for birds. Its leaves provide browse for mule deer. Its berries are an important food source for songbirds and sharptail grouse. Like some of the native grasses, buffaloberry is a very drought-tolerant shrub that can survive the dry conditions of western North Dakota habitats.

Juneberry is a tall shrub that grows in woody draws. Adequate moisture is needed for this plant to produce fruit. Late spring frosts often 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. In Canada, juneberries are called “Saskatoon berries.”

Another tall shrub that serves as a food source and cover for various wildlife species is the **chokecherry**. It is also found growing in or near woody draws where moisture conditions are better. The chokecherry is the state fruit of North Dakota.

Forbs are native prairie wildflowers with deep roots. Most forbs have thick leaves, which help hold moisture in dry prairie conditions. Forbs provide a direct food source for wildlife. Their colors also attract insects, and by doing so, provide a food source for birds.



Figures 19 & 20. Buffaloberry is a woody shrub that has olive-colored leaves similar to sagebrush. It is often found in clumps and grows 6 to 10 feet tall. **INSET Buffaloberry** has small thorns and produces bright red clumps of berries that are eaten by birds, including the sharp-tailed grouse.



Figure 21. Chokecherry is a tall shrub that is often found growing in close association with woody draws. It produces a pea-sized dark fruit that is eaten by birds. The plant is also browsed (eaten) by deer.



Figures 22 & 23. Yucca is a drought-tolerant plant with a huge taproot that travels deep into the soil to keep it alive in extremely dry conditions. It has many spike-shaped leaves that are sharp on the ends. **INSET** The seed pods are large and are found attached to a stem that grows up from the middle of the plant.



Figure 24. The gumbo lily is a wildflower found on clay flats. The name “gumbo” refers to the fine, clay soil where they commonly grow. Gumbo lily flowers bloom white and turn pink as they age.

Many forbs need to be pollinated. **Pollen** is powder produced by certain plants and must be carried from plant to plant in order for the plant to reproduce. When insects land on a flower, pollen sticks to their legs. Some of this pollen falls off when they land on another flower. In this way, pollen is carried from one flower to another. This process is called **pollination**.

The **yucca** is a plant that has stems arranged in clumps of spikes. It has flowers that are pollinated only by the **yucca moth**. This insect transfers the pollen from one yucca plant to another, and at the same time lays an egg in the flower of the plant. After the egg hatches into a larva, the larva eats some of the yucca seeds. The yucca cannot live without the yucca moth, and the yucca moth cannot live without the yucca. This is called a “symbiotic relationship,” which means that the two species cannot survive without each other.

The **gumbo lily** is a flower that opens in the evening and is pollinated by night-flying insects. The flowers of the gumbo lily are white when they are young, but as they age, they become pink or rose-colored. They are often found on sparsely vegetated clay flats.



Figure 25. Yellow coneflower, or “prairie coneflower,” is a common wildflower (forb) found in the Badlands. It is named because of the cone-shaped seed head. American Indians made tea from this plant to cure stomachaches and headaches.

A plant that is very attractive to butterflies and honeybees is the **yellow coneflower**. Its yellow petals droop downward around a tall, brown center cone. This plant reaches a height of from 1 to 3 feet. Plains Indian tribes made tea from the yellow coneflower to treat headaches, rattlesnake bites, and poison ivy. They also used it to make dye for paint and clothing.

Scarlet globemallow is a deep-rooted plant that grows in patches of dry soil since it can withstand very dry conditions. The plant has leafy spikes with four to six red flowers on each spike. Dakota medicine men rubbed a paste made from this flower on their hands, which protected their hands from burning when they picked meat out of boiling water.

Prickly pear cactus is widespread throughout the Badlands. Like other cacti, the prickly pear is a **succulent** (Suk-you-lent), which means it stores water in its pads. The pads are actually thick leaves and stems that carry on photosynthesis (make their own food) and produce flowers. The pads are covered with sharp, needle-like spines. The red, fleshy fruit of the prickly pear is a favorite among birds.



Figure 26. Scarlet globemallow is one of the most drought-resistant prairie plants. It is commonly eaten by all species of herbivores and is important in the diets of small mammals and pronghorn.



Figure 27. Like yucca, cacti are found in many areas too dry for other plants. South-facing hillsides are good places to find these plants. This prickly pear cactus stores water in its thick “leaves” and shows off bright yellow flowers in the summer.




















Comprehension

1. What kind of grass can cause injury to animals when it matures?
2. Name some bushes found in woody draws.
3. Which slow-growing tree can reach the age of 300 years?
4. Which trees need so little water that they can grow on dry hillsides?
5. Name the common silver-gray shrub that several wildlife species depend on for food and shelter.
6. What helps forbs hold moisture in dry conditions?
7. What kind of wildlife is necessary for pollination to occur?

Critical Thinking

1. Make up a name for each of these forbs and explain why each would be a fitting name: yucca; gumbo lily; coneflower; scarlet globemallow; prickly pear cactus.

BADLANDS IN A NUTSHELL


-  The Badlands, located in southwestern North Dakota, covers an area about 20 miles wide and 150 miles long.
-  The Badlands, also called the “Little Missouri Badlands,” resulted from water erosion by the Little Missouri River and wind erosion.
-  Petroleum, natural gas, and lignite coal are fossil fuels found in the Badlands.
-  Clinker (scoria) and other types of rocks and layers of soil make the Badlands very colorful and beautiful.
-  Over 1 million acres of land in the Badlands is owned by the public.
-  Theodore Roosevelt National Park is divided into the South Unit, the North Unit, and the Elkhorn Ranch.
-  Over 90 percent of the Badlands remains in native vegetation.
-  Badlands vegetation consists of grasses, shrubs, trees, and forbs.
-  The shortgrass prairie of the Badlands is made up of bunch grasses.
-  When needle and thread grass is mature, the “needles” can irritate the mouths and eyes of animals.
-  Woody draws containing trees and brush are located in low areas that hold adequate moisture.
-  Deciduous trees lose their leaves every year; coniferous trees do not.
-  The Rocky Mountain juniper is the most common coniferous tree in the Badlands.
-  Wildlife such as the sage grouse, sagebrush lizard, and sagebrush vole require sagebrush to survive.
-  Most forbs have thick leaves which help hold moisture in dry conditions.
-  Yucca plants require yucca moths, and yucca moths require yucca plants in order to survive.
-  The pads of succulent plants such as prickly pear cactus carry out photosynthesis, produce flowers, and store water.

BADLANDS VOCABULARY


Acre:

 Area of land approximately the size of a football field


Badlands:

 Area of southwestern North Dakota having colorful, rugged land features

 Extend from South Dakota border to Lake Sakakawea


 Carved by wind and water erosion thousands of years ago

Browsing:


 Animals eating leaves, stems, and buds from plants

Bunch grasses:


 Grass species that grow in bunches, or clumps, and are spread by seeds

 Have extremely long roots that stretch downward many feet below the surface of the ground

Butte:

 Flat-topped, very steep hill with flat sides


Clinker:

 Type of red rock formed from lignite coal burning underground


 Adds color and beauty to the Badlands

 Also called “scoria”

Coal:

 Solid fossil fuel created from land vegetation that had been squeezed by pressure for millions of years


Coniferous trees:

 Also called “evergreens” because the needles stay green all year long

Conservation:

 Preserving natural resources by careful use and management of the resources

Deciduous trees:

 Trees that lose their leaves each fall

Erosion:

 Wearing away soil by water or wind

Forage:


 Grass and other plants that grazing animals eat

Forbs:

 Native prairie wildflowers with deep roots


Fossil:

 Remains of a plant or animal that has been buried in the earth (in rock, soil, ice, etc.)


 Skeleton, bone, shell, tree leaf, or an imprint such as a footprint

Fossil fuels:


 Formed from the decayed remains of prehistoric (very ancient) plants and animals

 Petroleum, natural gas, and coal


Habitat:

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

Hoodoo:

 Tall, thin pillar of rock with a capstone, or flat rock, on top


Lignite:

 A very soft coal found in western North Dakota

National park:

 Area of land set aside by the federal government for the purpose of preserving its natural environment for the public to enjoy

Native:


 Naturally occurring

Natural resource:


 A supply of something useful that comes from nature

Petrified wood:



 Stone formed from minerals filling in cells of wood as it decayed

 Looks exactly like the plant that had been there in the first place, except it is stone

Pollen:

-  A powder produced by certain plants and must be carried from plant to plant in order for it to reproduce


Pollination:

-  Process of pollen being carried from one flower to another
-  Carried out when pollen sticks to the legs of bees and other insects


Sedimentary rocks:

-  Rocks formed by particles of sediment pressed together

Sediments:

-  Small pieces of rock and dirt carried by water


Shortgrasses:

-  Bunchgrasses that may reach a height of only 3 to 7 inches

Succulent:

-  A plant that stores water in its pads





The public:

-  All of the people

Vegetation:

-  Plant life

Wisconsinan glacier:

-  Last glacier that moved over North Dakota
-  Stayed about 28,000 years
-  Melted away about 12,000 years ago
-  Covered all of North Dakota, except for the southwest corner

Woody draws:

-  Small woodlands in the Badlands that contain trees and brush
-  Located in low places that can hold enough moisture for larger forms of vegetation

BADLANDS WILDLIFE

Variety of Habitats

A great variety of habitats spans the Badlands of North Dakota. These include native prairie, woody draws, sagebrush flats, caves, rock crevices (cracks), and brush. Hundreds of different species of wildlife rely on these Badlands habitats. Even areas that look bare and empty are abundant with wildlife.

Mammals

The Badlands is home to several species of big game. **Big game** are large animals that are hunted. Badlands species include bighorn sheep, elk, mule deer, white-tailed deer, and pronghorn. Hunters must follow strict regulations for hunting big game in North Dakota and must get a license from the **North Dakota Game and Fish Department** for hunting these species. Hunting is allowed on the public land within the Little Missouri National Grassland, but not in the South and North Units of Theodore Roosevelt National Park.

All of the big game species in the Badlands are **herbivores** (plant eaters) that depend on Badlands vegetation for their food supplies. They graze on the shortgrass prairie or browse on trees and shrubs.

Bighorn sheep are the least common big game species in North Dakota. They were first identified for science by the Lewis and Clark expedition in 1805. Euro-American settlers named these animals for the large, curling horns of the **rams** (male sheep). The **ewes** (yous), or female sheep, have much shorter curved horns.

During the 1800s, there were no laws to regulate hunting, and sport hunters killed great



Figure 28. The bighorn sheep is one of the big game mammals of the Badlands. This male bighorn is called a ram and has large, curled horns. Females are called ewes, and the young are called lambs.

numbers of bighorn sheep. Euro-American settlers also brought domesticated (not wild) sheep into the area. These farm animals brought diseases that spread to the bighorns, killing many of them.

By 1905, bighorn sheep had been extirpated (Eks-ter-pay-ted) from North Dakota. This means that bighorn sheep no longer existed in North Dakota, but they were not extinct from Earth. No wild sheep lived in the state for the next 50 years.



Figure 29. There were no hunting regulations in the 1800s and early 1900s. This unregulated harvest resulted in the last sheep being taken around 1900. Bighorn were reintroduced to the Badlands near a place called Magpie Creek in 1956.

In 1956, the North Dakota Game and Fish Department imported 18 bighorn sheep from British Columbia, Canada, and released them into the Badlands. This began an ongoing management plan, which continues today. The population of bighorn sheep in the Badlands now numbers between 200 and 300 animals. A special hunting season for bighorn sheep keeps the population at a number that the Badlands can support.

Bighorn ewes are about 3 feet tall at the shoulder, and rams are about 4 inches taller. The weight of rams



Figure 30. These two ewes and the lamb on the left look down from typical sheep habitat. Bighorn sheep raise their young in elevated areas where they can see predators approaching and make an escape. Without these secluded areas, sheep would have little chance of raising their young to adulthood.

averages about 200 pounds, while ewes weigh about 125 pounds. Rams' horns grow longer each year, continuing to spiral back until they reach a point of completing a full circle. This is called "full curl" and represents an adult ram at least 8 years of age. The horns can reach 30 inches in length. Even though ewes have horns, they grow to be only 8 to 10 inches long and are much smaller in diameter.

The steep cliffs and buttes of the Badlands are ideal habitat for bighorn sheep. These animals are well adapted to climbing and prefer land that is steep and open so that they can watch for predators. Coyotes, eagles, and mountain lions prey on the lambs (young sheep). Bighorn sheep live in herds and graze on grasses. They also browse on shrubs.

The most abundant form of wildlife that Lewis and Clark encountered in North Dakota in 1804 and 1805 was the bison. The second most abundant animal was the **pronghorn**. This animal had never before been reported to science.

In 1873, a disease killed a large number of pronghorn in western North Dakota, and their population was further reduced after Euro-American settlers arrived in the area. By 1925, only a couple hundred pronghorn were left in western North Dakota.

The population of pronghorn in the Badlands today has increased to several thousand. Pronghorn can also be found in western grasslands all the way to



Figure 31. Bighorn sheep are comfortable in very steep habitat. They are sure-footed and can move quickly where other animals would have great difficulty.



Figure 32. Pronghorn are found west of the Missouri River and are more common in the southwest corner of the state. They are the fastest North American animal and use their speed and excellent vision to escape predators.

the Missouri River. If conditions are good, it is common for the doe, or female pronghorn, to give birth to twin fawns each spring. The fawns weigh about 8 pounds at birth.

When fully grown, the pronghorn stands about 3 feet tall at the shoulder. The weight of the buck (male) averages about 120 pounds, while the doe weighs about 10 pounds less.

Both the adult buck and doe have black horns that are made of fused hair. These black sheaths of fused hair have a bone core underneath that supports them. The buck's horns curve up and back with prongs sticking forward. These prongs are what gave the pronghorn its name. The horns of a buck can reach over 15 inches in length, and the sheath of hard hair is shed every year. The doe has much shorter horns that are barely visible.

Pronghorn live in herds. They feed on sagebrush, cactus, forbs, and grass. Two special adaptations help pronghorn avoid predators—their extremely sharp eyesight and their amazing speed. A pronghorn's eyes can pick up movement 3 miles away. Pronghorn are the fastest-running animals on the continent. They have been clocked running over 60 miles per hour, and this is how they avoid being caught by predators.



Figure 33. The pronghorn male (on the right) is called a buck. The female (on the left) is called a doe. The two smaller animals in the middle are young pronghorns called “kids.” The buck grows horns made of fused hair that can be 15 inches long or more. Does have very small horns measuring about an inch in length.



Figure 34. Elk were once common all over North Dakota. Today, they are found in the Pembina Hills in northeast North Dakota and in the Badlands. Males are called bulls. They make a noise called a “bugle” which communicates their presence with other elk during the mating season in September.

Pronghorn are not good jumpers. When they come to a barbed-wire fence, they usually do not jump over it. Instead, they crawl underneath the fence. Pronghorn are sometimes misnamed “antelope”; however, true antelope are not found on the continent of North America.

The third most common large animal that Lewis and Clark encountered was the **elk**. With the coming of settlers and market hunters, the population of elk in North Dakota was significantly reduced. By 1900, only a small number remained in the state.

Several elk wandered to the Badlands from the Fort Berthold Indian Reservation in the 1970s. In 1985, the National Park Service released 47 elk into Theodore Roosevelt National Park. The elk population in the Badlands has since grown to over 1,000 animals.

Elk are members of the deer family. In fact, elk are the second-largest species of deer in the world with only moose being larger. As with all members of the deer family, elk have antlers. **Antlers** are bony and branched growths on the head. They are different from horns, in that horns are permanent, whereas antlers are shed every year. Only the elk bulls (males) have antlers; the cows (females) have no antlers.

The bull elk stands about 5 feet tall at the shoulder and weighs about 700 pounds. The cow is slightly smaller.

During hot summer days, elk escape the heat by taking shelter in woody draws. They graze on grasses and forbs and browse on shrubs such as chokecherry and juneberry.

Mule deer got their name because of their large ears. They are generally larger than white-tailed deer, are darker in color, and have an off-white rump patch with a dark-tipped tail. Even though mule deer can be found in small numbers



Figure 35. Mule deer are found primarily west of the Missouri River and more commonly in the rougher Badlands habitat of western North Dakota. They have large ears and a black-tipped tail which are identifying characteristics.



Figure 36. White-tailed deer are found statewide but in smaller numbers in the Badlands. They are found along the Little Missouri River and its drainage areas. White-tailed deer numbers can be limited by a disease called EHD, which is carried by a small biting insect found near water areas. EHD is fatal (deadly) to deer.

in other places, their primary range has always been the rougher terrain of the Little Missouri Badlands.

As with all of North Dakota's big game species, mule deer were almost extirpated from the Badlands by 1900. With the introduction of hunting laws, their numbers have increased. Today, mule deer can be found throughout the Badlands. Chokecherry, juneberry, and green ash found in woody draws are eaten by mule deer. They will also forage on sagebrush and a variety of prairie forbs and grasses.

Mule deer have an unusual way of running. They jump into the air and bounce with each leap. This bouncing run is called **“stotting.”**

White-tailed deer are also found in the Badlands, mainly along rivers and creeks. Mule deer prefer the rough, steep canyon country.

A popular big game animal during the middle and late 1800s was the largest land animal on the continent. The **American bison** almost became extinct because no hunting laws had been established, and bison were harvested with no thought for the future. It has been estimated that by 1900, only about 300 bison existed.

Today, a small population is managed within the boundaries of Theodore Roosevelt National Park. Fences and other obstacles developed by people have decreased the size of the open habitats required by this large animal and prevent bison from being a free-roaming species.



Figure 37. Bison once roamed across the grasslands of North Dakota. Some people call these animals “buffalo,” which is not the correct name.

Bison are part of the same animal family as cattle and goats. They are not related to the buffalo family of animals found in Asia and Africa. However, when early European explorers saw bison for the first time in North America, they misnamed them by calling them “buffalo.” Some people still use this word when referring to bison.

Besides the big game animals, many other species of mammals make their homes in the Badlands. They include the prairie dog, badger, porcupine, cottontail rabbit, bobcat, mountain lion, kangaroo rat, and bushy-tailed woodrat.

Lewis and Clark observed hundreds of species of animals in their expedition through North Dakota. One of the creatures that interested the explorers was the “barking squirrel.” Millions of these mammals lived on the prairie where they burrowed underground to make their homes. It is now known that the “barking squirrels” written about by Lewis and Clark were really black-tailed prairie dogs.

The **black-tailed prairie dog** is a rodent. **Rodents** are gnawing or nibbling mammals such as rats, mice, voles, and ground squirrels.

Prairie dogs live in colonies or “towns” of closely spaced burrows. Each burrow has interconnecting tunnels and several entrance holes. Prairie dogs do not like tall grass; therefore, they establish their towns on land that has been overgrazed or is otherwise bare so that they can see predators coming from a great distance.

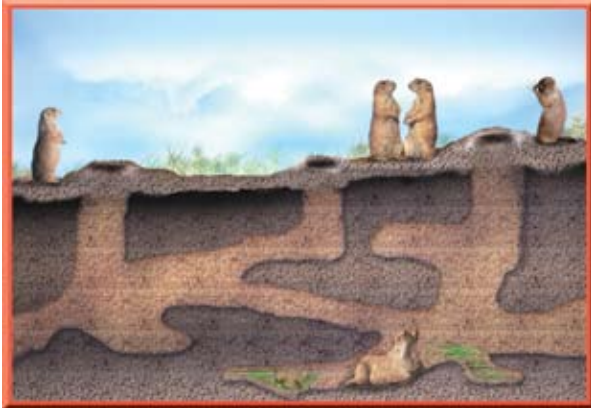


Figure 38. Prairie dog towns are underground mazes of tunnels where these rodents live and escape from predators.

When danger approaches, prairie dogs warn the other town residents by “barking.” The barks sound like high-pitched squeaks. Certain patterns of barks warn of specific dangers.

The body of a prairie dog averages 14 to 17 inches with a 3- to 4-inch black-tipped tail. The short, strong legs and long toes with sharp nails are adaptations for their burrowing lifestyle.



Figures 39 & 40. Prairie dog towns are scattered across the Badlands and can be identified by very short grass and mounds of earth that have been dug out to form underground living chambers. Pronghorn, badgers, burrowing owls, golden eagles, and other wildlife are often found at these sites. **INSET** Young prairie dogs emerge from the underground den in late April or May. There can be 2 to 10 in a litter, but normally 4 to 6. By the end of the summer, they will have reached adult size.



Figure 41. Burrowing owls are small owls that are sometimes referred to as “ground owls” since they nest underground. They do not build their own underground burrows, so they rely on prairie dogs and other excavators to build their homes.



Figure 42. The coyote is found throughout the Badlands and can be seen hunting prairie dogs near prairie dog towns.

The diet of prairie dogs consists of forbs and grasses. Because of the lack of grass in prairie dog towns, forbs tend to grow there. This attracts pronghorn and bison to feed in prairie dog towns. Trampling of the ground reduces grass growth even more, which encourages the growth of these other plants. The burrows of prairie dogs are often used as nest sites by burrowing owls, cottontail rabbits, and prairie rattlesnakes.

Prairie dogs build up stores of fat on their bodies to get them through the winter. They do not hibernate but may stay underground during harsh weather.

A litter of four to six prairie dog pups is born underground in the spring. They are blind, hairless, and helpless at birth. After about six weeks, they have developed enough to come out of the burrow and are protected by their mother.

Predators of prairie dogs include badgers, bobcats, coyotes, foxes, golden eagles, and several species of hawks. Rattlesnakes and bullsnakes also prey on young prairie dogs. Prairie dog towns are therefore very important places for many species to find a home and a meal.

The **American badger** is a **carnivore** (meat eater) with short legs and a wide, flat body. Its average weight ranges from 12 to 16 pounds. Badgers, with their strong front legs and sharp claws, are excellent diggers. Their underground dens are made up of tunnels that range from 6 to 15 feet deep and contain bedrooms and separate toilet rooms. Rodents are the main diet of badgers. Badgers can often be seen near prairie dog towns at night or early in the mornings.

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.

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.



Figure 43. Porcupines are found throughout the Badlands in woody draws and other places with trees. Porcupines eat bark from trees as a primary source of food. They do not “shoot” their quills, but use them as a defense to avoid being eaten by predators.

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 backwards 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, the porcupine raises its quills, turns its back on the attacker, and simply remains motionless. Porcupines are

preyed upon by coyotes, bobcats, and mountain lions.

Porcupines are solitary animals, which means they live alone rather than in groups. They are **nocturnal** (active at night), so during the daytime, they may rest in caves or hollow trees. These herbivores are excellent tree climbers and can often climb cottonwood and ash trees to feed on twigs and bark. They also eat berries, leaves, and green plants. In some states like Montana, porcupines are still protected by law because they are easy to catch; however, they may be used as food by humans in a survival situation.



Figure 44. Cottontail rabbits can be found in many habitats throughout the Badlands. They provide a great source of food for predators such as coyotes, bobcats, and great-horned owls.

The **cottontail rabbit** is a solitary herbivore. Three species inhabit the Badlands. They are the eastern cottontail, the mountain cottontail, and the desert cottontail. Cottontails are mostly nocturnal but often come out at dusk (early evening) or dawn (early morning). Their diet consists of vegetation such as grasses, berries, twigs, and tree bark.

Cottontails perform an interesting courtship display. The buck (male) chases the doe (female) until she turns around and faces him, boxing at him with her front feet. Then they start leaping into the air. They jump about 2 feet into the air, leaping near and over each other. This running, boxing, and leaping activity may last for quite some time.

Female cottontails give birth to several litters each year. The cottontail kittens are born in the burrow. They are hairless, blind, and helpless at birth and need their parents' care for four to five weeks.

Because of their many predators, only about 1 percent of the rabbits that are born reach 2 years of age. This means that out of every 100 rabbits born, only 1 is alive after 2 years. Their many predators include foxes, coyotes, weasels, eagles, hawks, and owls.

The **bobcat** is the most common wildcat in North America. In North Dakota, it is found primarily in the rougher habitats of the Badlands. This colorful feline (cat) is spotted on its legs and underside. It stands up to 18 inches tall at the shoulder and usually weighs from 20 to 30 pounds. It has round eye pupils and tufts, or points of fur, on its ears.

The bobcat got its name from its short tail, which looks as if it has been bobbed, or cut off. The bobcat is closely related to the larger-sized lynx, which also has a short tail but longer ear tufts.

Bobcats have excellent eyesight and hearing. They are carnivores that feed on cottontail rabbits, prairie dogs, ground squirrels, birds, and woodrats. They stalk (stawk), or sneak up, on their prey or wait to ambush unsuspecting prey from a perch near a trail. They can pounce up to 10 feet to grab their food.



Figure 45. Bobcats are found in rough terrain throughout the Badlands. They are not seen very often since they hunt at night and rest during the day.

Bobcats do not dig their own dens. Rather, they use a cave, crevice in a rock, or hollow log to make their hideaway. These nocturnal animals are solitary and shy; therefore, people seldom see them.

Another member of the cat family that makes its home in the Badlands is the **mountain lion**. This cat is also known by other names including cougar, puma, and panther. Members of the feline family leave tracks that rarely show their claws which remain retracted within their feet. That is different from the canid family (dogs) who leave tracks that show toenail marks.

Adult male mountain lions stand 2 to 3 feet tall at the shoulders and are about 8 feet long, nose to tail. Their weights vary between male and female.

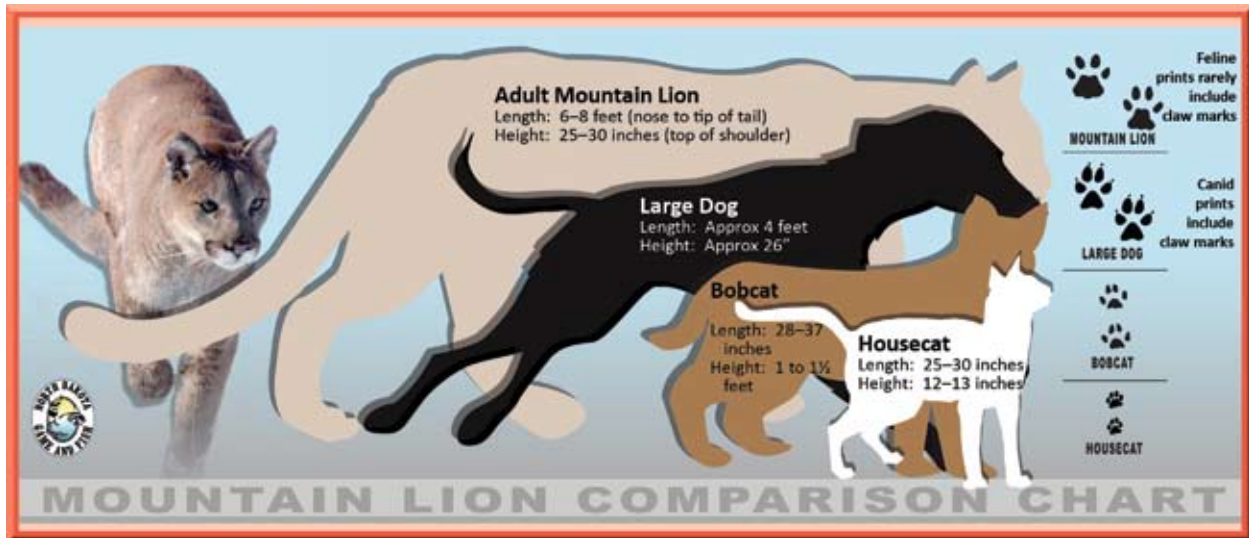


Figure 46. Adult mountain lions have a long, dark-tipped tail. They are larger than most dogs. Mountain lion tracks do not generally show toenail marks as do the tracks of members of the dog family.

A large adult male could weigh over 150 pounds. A large adult female may weigh over 100 pounds.

The mountain lion has a small head and small, rounded, black-tipped ears. The tail also has a black tip. Large front feet with 5 claws enable the mountain lion to easily grasp prey. The back legs are powerful and provide great leaping ability. A mountain lion can pounce from 20 to 40 feet. It can run up to 35 miles per hour, is a good climber, and can swim if necessary.



Figure 47. Like bobcats, mountain lions live in rougher habitats and either stalk or ambush their prey. They generally avoid areas with high traffic or activity and feed mostly at night.

Prey of this carnivore includes mule deer, white-tailed deer, elk, bighorn sheep, as well as smaller mammals such as porcupines and mice. The mountain lion catches prey by stalking. It crouches down and slinks slowly and silently toward the prey until it gets close enough to pounce.

Mountain lion kittens are born in a den located in a rock crevice, cave, or other protected place. At birth, they are blind and dependent on their mother, who does all of the parenting.

The mountain lion is the fourth heaviest feline in the world after tiger, lion, and jaguar. Even though it is large, it is considered a “small cat” rather than a “big cat.” A mountain lion cannot roar as the “big cats” do; but it can purr, growl, hiss, and scream.

There are several small mammals that live in the Badlands. The bushy-tailed woodrat, Ord’s kangaroo rat, sagebrush vole, and least chipmunk are four rodents found only in this western habitat.

The **bushy-tailed woodrat** is a large rodent that can weigh over half a pound. It is about 14 inches in length, including a 6-inch-long bushy tail. Very large ears are set back on the small head.

Bushy-tailed woodrats construct nests that are hidden in rock crevices. These animals have a practice of collecting objects that they bring back to store in the nest. Items might range from feathers to pine cones to bits of glass and coins. From this custom, bushy-tailed woodrats are sometimes called “pack rats.” The nocturnal woodrats feed on leaves of forbs and shrubs, pine needles, fruits, and seeds.



Figure 48. Bushy-tailed woodrats are medium-sized rodents with large ears and a long, bushy tail. They live in rock and sandstone outcroppings as well as in places like old buildings or foundations. They are often referred to as “pack rats.”

Ord’s kangaroo rat has very large back legs and feet and a long tail. These features enable it to hop on its back feet and balance itself with its tail without using its front legs, much like a kangaroo. The tiny kangaroo rat, which weighs only about 2 ounces, can jump as far as 6 feet.

The kangaroo rat is found in areas of the Badlands that have sandy soil. This type of soil makes burrowing easy. Kangaroo rats also use the sandy soil to take dust baths.

Kangaroo rats eat insects and seeds. They have cheek pouches in which they can carry seeds back to the burrow. Kangaroo rats are very active at night. They can often be seen scurrying across a road in the headlights of a vehicle.

Least chipmunks make their homes in rocky or sandstone outcroppings, as well as within fallen debris (dah-Bree) such as old logs. They scurry around very quickly, but can often be seen as they watch their surroundings from a high perch. Chipmunks eat berries and seeds as well as beetles, caterpillars, and grasshoppers. They are prey for weasels, mink, red fox, and birds of prey.

Two of the smallest mammal species in North Dakota are voles and mice. Voles look similar to mice, but voles have shorter faces, shorter ears, and shorter tails than mice.

The **sagebrush vole** is about 4½ to 5 inches long with a short, furry tail. This vole weighs less than 1 ounce. It eats grasses and the leaves and twigs of a variety of plants including sagebrush. It may also utilize the undigested plant materials left in cow “chips” when other foods are scarce. Like other voles, they live under the snow in colonies during the winter, choosing areas with the best food.

The Badlands rodents are prey for coyotes, badgers, snakes, bobcats, weasels, and birds of prey such as owls.



Figure 49. Kangaroo rats are small rodents that live in the loose and sandy soils of western North Dakota. They got the name “kangaroo rat” because of their huge back feet and long tail. They are active mainly at night and can hop quickly to escape predators.



Figure 50. The least chipmunk is a small striped rodent found mainly along rock and sandstone formations, where they find underground homes.



Comprehension

1. Which game animal prefers steep and open land so that it can watch for predators?
2. How did the pronghorn get its name?
3. Which mammal got its name because of its large ears?
4. What were the “barking squirrels” that Lewis and Clark wrote about?
5. Which rodent’s name comes from a word meaning “thorny pig”? What are the young called?
6. What is the most common wildcat on the continent?
7. Which rodent is sometimes called a “pack rat”?

Critical Thinking

1. The pronghorn is the fastest animal in North America, but the cheetah is considered the fastest animal in the world. Nevertheless, a pronghorn would beat a cheetah in a two-mile race. Explain.

Reptiles and Amphibians

Several species of reptiles and a few amphibians are found in the Badlands. 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); 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 prairie rattlesnake, bullsnake, racer, sagebrush lizard, and short-horned lizard are reptiles that use the Badlands habitat as their home. These reptiles spend winters hibernating in dens. The dens are located in rock crevices, caves, and burrows dug by prairie dogs or other burrowing animals. These winter retreats must be below the frost line where temperatures are above freezing (32° F); otherwise, the cold-blooded reptile could perish.

The only venomous (poisonous) snake in North Dakota is the **prairie rattlesnake**. It is known for the rattles on its tail and its poisonous bite. All non-venomous snakes in the state have pointed tails and round eye pupils, but a rattlesnake’s tail is blunt (not pointed), and its eye pupils are vertical, rather than round.

Adult prairie rattlesnakes average about 3 feet in length and weigh about 1 pound. Female rattlesnakes do not lay eggs, but instead give birth to live young. About 8 to 12 young are born at a time. They are each about 10 inches long at birth. After



Figure 51. On a warm day, rattlesnakes **emerge** (come out) from a den where they have spent the winter. They will stay close to the den until the chance of frost has passed, since they are ectotherms and must maintain their body temperatures above freezing to survive. (Courtesy of Joshua Coursey)

they are born, the young receive no care from their parents and must provide their own food and protection. Like other wild animals, many of the young do not survive.

Snakes have dry scales on their skin that protect them as they crawl over rocks and rough ground. The skin of snakes does not grow with them as they get bigger. Several times a year, they shed their skin by crawling out of it. The more a snake eats, the more often it sheds its skin. Each time a rattlesnake sheds its skin, a new “button” (piece of rattle) is added to its tail.

The rattles are made of a substance similar to horns and claws. If rattle segments get broken off, they do not grow back. When a rattlesnake feels threatened, it uses muscles in its tail to shake or vibrate the rattles. This rattle alerts those who approach that a snake is in the area; however, rattlesnakes do not always rattle before they strike.

Rattlesnakes prefer not to tangle with animals they cannot eat. They would rather avoid confrontation with humans since they have a chance of being killed themselves. This is not what they want.



Figure 52. South-facing slopes of clinker (scoria) are ideal locations for rattlesnake dens. These areas are warmer in the spring and fall, which allows snakes to congregate before entering or leaving the den site.

The venom (poison) of a rattlesnake is injected into its prey by two hollow fangs (long, pointed teeth). The snake then waits for its victim to die before swallowing it whole. The jaws of a snake unhinge so that it can swallow animals larger than its normal mouth opening. Prey of rattlesnakes includes prairie dogs, ground squirrels, mice, voles, and cottontail kittens.

The largest snake in North Dakota is the **bullsnake**. Adult bullsnakes can reach over 6 feet in length.

Bullsnakes look somewhat similar to rattlesnakes, and they make a “hissing” sound that might be mistaken for the rattling sound of a rattlesnake. A bullsnake may also shake its tail in a pile of leaves,

Rattlesnake

- ▶ Venomous
- ▶ Nocturnal
- ▶ Greenish-brown
- ▶ Thick body
- ▶ Wide head and narrow neck

- ▶ Vertical eye pupils
- ▶ Blunt tail with rattles
- ▶ Shakes rattles to make rattling sound
- ▶ Gives birth to live young
- ▶ Kills prey with venom



Figure 53. A rattlesnake has a rattle as a defense mechanism to warn those who approach that a snake is nearby. They eat small mammals and do not want confrontations with things they cannot eat.

Bullsnake

- ▶ Non-venomous
- ▶ Diurnal
- ▶ Yellowish-brown
- ▶ Slender body
- ▶ Head and neck are the same width
- ▶ Round eye pupils
- ▶ Pointed tail
- ▶ Makes hissing sound

- ▶ Lays eggs that hatch into young
- ▶ Kills prey by constricting (squeezing)



Figure 54. Bullsnakes are North Dakota's largest snakes. They eat small mammals and kill them by constriction. They typically have a docile (calm) behavior.

which can also be mistaken as the sound of a rattle. However, the body of a bullsnake is more slender than that of a rattlesnake, and the bullsnake's tail is pointed. Bullsnakes are non-venomous and very beneficial (helpful) predators that can decrease small mammal populations such as mice and voles in local areas.

The bullsnake is a constrictor (kon-Strik-ter) that squeezes its prey until the victim can no longer breathe. Its prey consists of small mammals such as voles, mice, ground squirrels, rabbits, and ground-nesting birds. It also eats the eggs of birds.

Young bullsnakes are preyed upon by raptors (birds of prey) and skunks. Full-grown bullsnakes have few predators.

The **racer** is a snake that got its name because it is a highly active, fast-moving snake. It can slither at a speed of up to 4 miles per hour.

As with all snakes, racers are carnivores that generally locate their prey by smell. Smelling sensors are located on the forked tongue, which the snake flicks in and out of its mouth.



Figure 55. Racers are snakes of the western North Dakota prairies. They have large eyes that aid them in finding prey during the day. Their color may vary slightly from green-blue to gray.

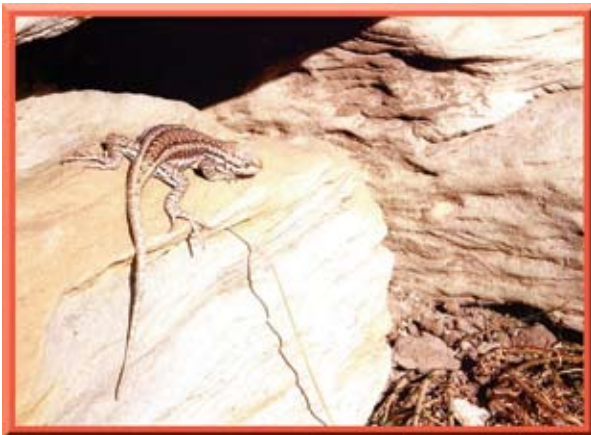


Figure 56. Sagebrush lizards live in extreme west and southwest North Dakota. They are small lizards that eat insects, and they are often found near sagebrush and rocky areas. (Courtesy of Wayne Vedvig)

Racers are **diurnal** (active during the daytime) and hunt rodents, frogs, lizards, birds, and insects. They are called “constrictors,” but they do not actually squeeze their prey. Instead, they press one or two coils against the victim to hold it in place. They usually swallow their prey alive.

When threatened, the racer makes use of its speed to escape. If it is cornered, it will bite, but the bite is non-venomous.

The **northern sagebrush lizard** is a small reptile that lives in areas that have sagebrush and large patches of bare ground. This lizard has a small, narrow body with overlapping scales. Its color is gray or brown with dark bands on the body and light stripes running from the head to the end of the tail. The male has some blue on its underside. The size of this tiny lizard ranges from less than 1 inch to 2½ inches.

Sagebrush lizards use rodent burrows, shrubs, logs, rock crevices, and other

protective places for cover. During the day, they often lie on rocks or logs to bask in the sun. If the temperature becomes hot, they move to the shade.

Female sagebrush lizards lay eggs that hatch in 45 to 75 days, depending on the temperature. The warmer the temperature, the faster the eggs mature.

The sagebrush lizard is a diurnal **insectivore** (in-Sek-tah-vor). An insectivore is a carnivore that eats only insects and spiders.

The **short-horned lizard** has a flat body and short legs. Pointed scales cover the body of the lizard. Females, which average about 3 inches in length, are slightly larger than males. Unlike the sagebrush lizard that lays eggs, the short-horned lizard gives birth to live young.

The “horns” of a short-horned lizard are not actually horns but rather large, spiky scales rising from the back of the head. Short-horned lizards are sometimes misnamed “horned toads”; however, this is incorrect because toads are amphibians, and lizards are reptiles.

Short-horned lizards live in dry habitats often consisting of bare clay buttes and sandstone outcroppings with protective cover. They are insectivores that prey on small ground insects. Ants are a primary food source, and the lizard often sits near ant trails or nests.

Predators of the short-horned lizard include snakes, birds of prey, badgers, and coyotes. The lizard will sometimes burrow into sand to hide from predators. Besides its protective camouflage coloring, the short-horned lizard also has a couple of other adaptations.

In order to appear larger than it actually is and to avoid being eaten, a short-horned lizard is able to inflate its body up to twice its size. It also has a very strange method



Figure 57. Short-horned lizards are often found soaking up the sun on clay buttes within the Badlands. They are 3 to 9 inches long but are hard to see because their color blends in well with their surroundings.

of defense—it can squirt blood from its eyes. This blood can travel up to 3 feet. It is meant to confuse predators, but it also contains a bad-smelling chemical.

A few amphibians make their homes in the Badlands. The most common are Woodhouse's toad, the plains spadefoot toad, and the Great Plains toad. These amphibians hibernate during the winter.

The **Woodhouse's toad** is greenish-gray or brown with dark spots. It grows up to 4 inches in length. These toads can live in drier areas and survive hotter temperatures than most other toads. They only return to the water to breed and lay eggs. They travel using short hops.

Woodhouse's toads are mainly nocturnal, but they are sometimes out during the daytime as well. They are insectivores that can eat about two-thirds as much as they weigh each day. The males have a call that sounds like the high-pitched bleating of sheep. It almost sounds like a scream. The females do not make this sound.

A protective adaptation of the Woodhouse's toad is a toxin in the skin that makes the toad taste bad to predators. It can even be harmful or fatal (cause death) to some animals. Fish, frogs, or predatory insects eat the tadpoles.

The **plains spadefoot toad** lives in loose or sandy soils. It can dig deep burrows with the use of a digging spur (spade) on the back legs. Most toads have horizontal eye pupils, but the plains spadefoot toad has vertical eye pupils.



Figure 58. Woodhouse's toads live in western and southern North Dakota. They like to be near sandy areas with water where they can find insects to eat. They are named after the fifteenth century explorer, Samuel Woodhouse.

The **Great Plains toad** makes its home in the sagebrush and short-grass areas of the Badlands, as well as throughout other grasslands of the state. It can be recognized by the large, dark, warty spots on its back.

Reptiles and amphibians of the Badlands serve as prey for coyotes, badgers, skunks, snakes, and raptors. Raptors are birds that hunt animals for food.



Comprehension

1. How are reptiles and amphibians alike?
2. What is the only venomous snake in North Dakota?
3. What can a snake do with its jaws? Why?
4. How does the bullsnake kill its prey?
5. Which snake moves very fast?
6. Which lizard lives in areas that have sagebrush and large patches of bare ground?
7. What two defense mechanisms does the short-horned lizard use?
8. Which toad has vertical eye pupils?

Critical Thinking

1. Explain why more reptiles than amphibians live in the Badlands.

Birds

A variety of unique (you-Neek) (rare and unusual) habitats make up the North Dakota Badlands; therefore, many species of birds are found in the region. They include upland game such as grouse and wild turkeys, as well as songbirds and raptors.

The Badlands is home to two species of the grouse family—the sage grouse and the sharp-tailed grouse. Extreme southwestern North Dakota is the only place in the state where sage grouse are found.



Figure 59. The sage grouse male on the right and the female on the left are on the spring dancing ground called a lek. Sage grouse live in extreme southwestern North Dakota.



Figure 60. Sharp-tailed grouse are native prairie birds that have developed many adaptations over thousands of years to withstand the harsh climate. These birds nest on the ground so they require areas of quality prairie to live.

Sage grouse are the largest grouse species found in North Dakota. They have brown, gray, and black feathers on their tops and sides, but their undersides are black. The males have spiked tail feathers that open into a large fan that can be seen when males dance in the spring.

These birds feed on sage leaves for most of the year; therefore, they must live in an area where sagebrush is abundant. They also use the sage plant for cover. Sagebrush habitat has been declining in many areas, and biologists are concerned about the future populations of this bird.

Sharp-tailed grouse are native to North Dakota and have evolved (changed) for thousands of years to live in cold, snowy climates. Their legs are covered with feathers to keep them warm, and their feet have small projections that act like snowshoes so they can walk on the top of snow.

In a snowstorm, sharp-tailed grouse will stay put and allow snow to fall on them, forming a snow shelter where they stay warm. After the snow stops falling, they burst out with no harm done.

An unusual mating behavior is displayed by males of the grouse family. Each spring, several males gather in an open area of high ground and perform a strange dance. The object of this dancing

is to impress the females who are watching from outside the circle of dancers. The same dancing area is used year after year. This dancing ground is called a **lek**.

The males fluff their feathers and fan their tails. The sides of their necks contain air sacs, which they inflate and deflate, resulting in a “booming” sound. They lower their heads as they strut, bounce, leap into the air, and rapidly stomp their feet. At the same time, their voices make a “hoot” sound, which can be heard up to 2½ miles away.

The **long-billed curlew** is a sandpiper. In fact, it is the largest sandpiper in North Dakota. Sandpipers, with their long legs and long bills, are usually thought of as shore birds. The long-billed curlew, however, makes its home in the dry grassland prairies of the Badlands.

Long-billed curlews have long legs and stand about 19 inches tall. They have small heads with extremely long, decurved bills. A **decurved bill** is a bill that is bent slightly downward. This adaptation enables the curlew to probe the soil for spiders, worms, and insects. Curlews also eat eggs, young birds, toads, berries, and seeds.

Both the male and female curlew incubate (warm) the eggs. Two to three weeks after the eggs hatch, the female usually abandons the brood. A **brood** is a group of young birds from the same nest. After abandonment by the female, the male takes over the care of the young birds.

Long-billed curlews migrate for the winter to the southern United States and northern Mexico. During migration and in their winter homes, curlews can be found along wetlands and on mudflats.



Figure 61. The long-billed curlew has characteristics of a shore bird, but it is actually a prairie species. It nests on the ground and can be identified by its long legs and decurved bill.

Several species of songbirds inhabit the Badlands. **Songbirds** are small, perching birds that sing a variety of different songs. Among the songbirds of the Badlands are the yellow-breasted chat, mountain bluebird, rock wren, western kingbird, and black-billed magpie, but there are many more.



Figure 62. Mountain bluebirds are sky-colored songbirds that build their nests within cavities of dead and dying trees such as the juniper.



Figure 63. Rock wrens are closely related to the common house wren which is found statewide. The rock wren has a more specific habitat of rock and sandstone outcroppings in the Badlands.

The **yellow-breasted chat** is a large songbird that measures 6 to 7 inches in length. It has olive-colored upperparts and lighter-colored underparts. The chest is bright yellow. Yellow-breasted chats build cup-shaped nests in thick shrubs and in trees in woody draws. The chat eats primarily insects but also wild grapes, junberries, and raspberries found growing in woody draws. During the winter, these birds migrate to Mexico and Central America.

The **mountain bluebird** has sky-blue feathers. The coloring of the female is slightly duller than that of the male. Mountain bluebirds prefer open habitats next to dead or dying trees where they build nests within tree cavities. Only the female builds the nest. The male sometimes tries to help, but he usually drops the nesting material on the way to the nest and shows up with nothing.

The **rock wren** is a small songbird that lives in association with sandstone and rock outcroppings. It builds its cup-shaped nest in a natural crevice or cavity created by these formations. After the nest is built, the rock wren uses small, flat stones to construct a walkway leading to the nest.



Figures 64 & 65. Both species of kingbirds can be seen in the Badlands. Kingbirds eat flying insects such as moths, so they can often be seen perched on tree branches or fence posts where they patiently wait for a meal to fly by. The western species (left) has a yellow belly and a brown back compared to the eastern species (right) which has a white breast and black body.

The rock wren eats mainly insects and spiders. It has a thin, slightly decurved bill that it uses to pick prey from spider webs and between rocks. The rock wren also hops up vertically to pluck flying insects from the air. Rock wrens do not drink water, even if it is available. The moisture they require comes from the insects that they eat.



Figure 66. The black-billed magpie is a colorful and vocal bird. Its presence often indicates a dead animal close by since it feeds on carrion as well as insects.

The **western kingbird** is a medium-sized songbird that is often seen perching on shrubs, trees, fences, or fence posts found throughout the grassland. It has grayish-olive upperparts with white outer tail feathers. The underside of the body is bright yellow, as are the undersides of the wings.

Flying insects make up the main diet of the western kingbird. The parents teach their young to hunt by bringing wounded insects back to the nest for the young to chase. The **eastern kingbird** can also be seen using the same habitats.

The **black-billed magpie** is found in several types of habitat, including sagebrush thickets. It is a large black and white songbird with a very long, black tail. This bird is a member of the crow family.

Deep within thick shrubs, the black-billed magpie builds a very large, egg-shaped nest. Both the male and female help with the construction of this dwelling that can take up to six weeks to complete. The nest often contains both an entrance and an exit hole.



Figure 67. Magpie nests are elaborate structures of twigs located in shrubs or trees.



Figure 68. Golden eagles are one of two eagle species found in North Dakota. The male and female are similar in appearance and can often be seen soaring over the rugged terrain of the Badlands.

Insects are a main food source for magpies. The black-billed magpie often lands on large mammals such as deer and farm livestock in order to remove ticks from them. The magpie eats some of the ticks and hides others for later use. Most of the ticks that are hidden are still alive, however, and end up walking away from the hiding place. Magpies also feed heavily upon carrion (dead animals) and are often a clear sign that there is a carcass of a dead animal close by.

A **raptor** is a predator bird that hunts animals for food. Raptors are also called “birds of prey.” Three unique raptors found primarily in the Badlands are the golden eagle, the prairie falcon, and the burrowing owl.

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.

The **golden eagle** is the third largest raptor in North America, after the bald eagle and California condor. It is dark brown in color with a golden tone on its neck and head. The golden coloring gave this species its name. The golden

eagle's legs are covered with dark feathers all the way to the feet. As with other raptors, the golden eagle has a large, hooked bill.

Golden eagles range in length from 28 to 33 inches. As with most raptors, the female is slightly larger than the male. The wingspan of golden eagles measures from 6½ to 7½ feet. This long wingspan makes it possible for eagles to soar for long periods of time without flapping their wings. They may ride on air currents that carry them high into the sky. If an eagle spots prey while soaring, it can tuck its wings and swoop at speeds of more than 100 miles per hour. With its extremely sharp eyesight, the eagle can spot prey from a great distance.

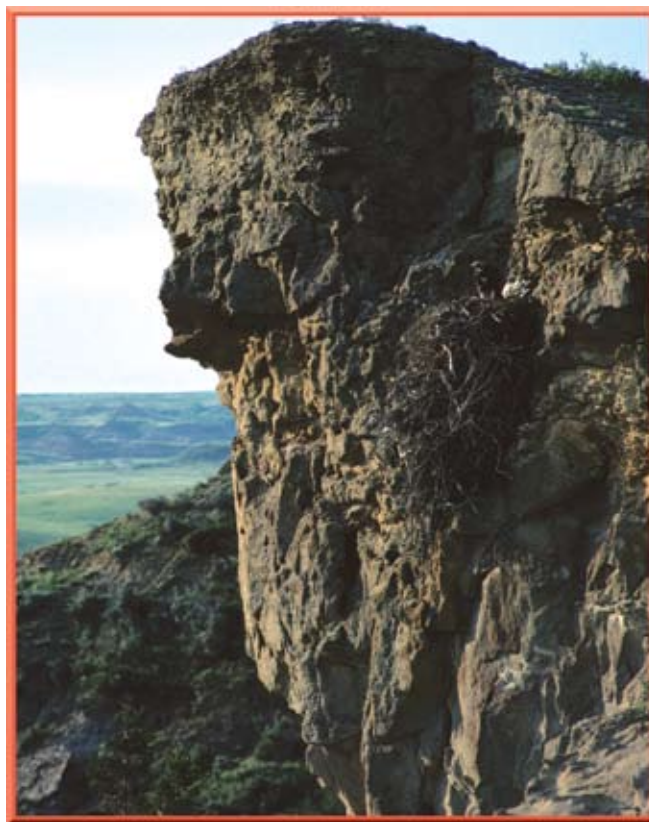


Figure 69. A golden eagle's nest is normally built on the side of a rocky cliff, steep butte, or hillside. The nests are built with sticks and can be used year after year.

Golden eagles prey mainly on small mammals such as black-tailed prairie dogs, ground squirrels, and cottontail rabbits. They also eat carrion. **Carrion** is dead animals that have been killed by other animals, by vehicles, or from other accidents.

The nests of golden eagles are huge, measuring 8 to 10 feet across and 3 to 4 feet deep. They are built on cliffs or high in trees. The eaglets (young eagles) weigh only 3 ounces when they hatch. They stay in the nest for 2 to 3 months before they are able to fly out.

In the United States, eagles are protected by law. It is illegal (against the law) to possess (own or have) an eagle feather or other body part. If convicted (found guilty) of this crime, a person could be fined up to \$10,000 and could serve up to 10 years in prison. There is an exception to this law, however. Members of American Indian tribes may possess eagle feathers to use in their traditional religious ceremonies.

The **prairie falcon** inhabits the dry prairies of the Badlands, especially areas having cliffs and buttes. This raptor ranges from 15 to 18 inches in length and has a wingspan of 3 feet or more. It weighs from 1 to 2½ pounds.

Prairie falcons nest on cliff ledges. As with most falcons, the female incubates the eggs, but the male brings food for her while she is on the nest. Both parents take care of the young until they leave the nest in about five to six weeks.

The prey of prairie falcons consists mainly of small mammals such as prairie dogs and young rabbits. These birds also chase and catch other birds in the air. Prairie falcons can fly at speeds up to 45 miles per hour.

The **burrowing owl** is a small, brown owl with white spots and a white underside. It has a short beak and very long legs. This bird is less than a foot tall and weighs only about one-fourth of a pound.

The burrowing owl was once common on the prairies. Loss of prairie habitat has decreased colonies of rodents like the Richardson ground squirrels that created the underground living quarters necessary for the burrowing owl. This loss of nesting habitat has greatly reduced the population of this bird. It is now found mainly

in the Badlands in association with prairie dog colonies where excellent underground nesting conditions can still be found.



Figure 70. This brood of young burrowing owls is huddled around the entrance to their underground home where they can escape from predators. They also have a distress call that sounds like a prairie rattlesnake. Mimicking a rattlesnake is another way that young owls are protected from being eaten at an early age.

Most owls are nocturnal, but burrowing owls are out during the daytime as well, particularly during dusk and dawn. These raptors prey on mice, voles, other mammals, and snakes. They also eat large insects such as grasshoppers, crickets, and beetles. Sometimes they collect mammal dung (manure) and put it near the burrow. This attracts dung beetles, which the owl then catches and eats.




















Comprehension

1. Name the two species of grouse that live in the Badlands. Which species is found only in the southwestern part of the state?
2. What is the largest sandpiper in North Dakota?
3. After the rock wren builds its nest, what else does it build?
4. How long does it sometimes take for a black-billed magpie pair to build a nest?
5. What makes it possible for eagles to soar for a long time without flapping their wings?
6. Who may legally possess eagle feathers?
7. Which raptor can fly at speeds up to 45 miles per hour? Which can dive at speeds of more than 100 miles per hour?

Critical Thinking



1. Explain how the population of burrowing owls is related to the population of prairie dogs.

BADLANDS WILDLIFE IN A NUTSHELL



-  Badlands habitats include native prairie, woody draws, sagebrush flats, caves, rock crevices, and trees.
-  Big game species in the Badlands include bighorn sheep, elk, mule deer, white-tailed deer, and pronghorn.
-  Bighorn sheep were extirpated from North Dakota for 50 years.
-  Several wildlife species, including burrowing owls, cottontail rabbits, and prairie rattlesnakes make their homes in prairie dog burrows.
-  Cottontail rabbits perform a courtship display in which they leap over each other.
-  Bobcats are the most common wildcats on the continent.
-  Mountain lions are the fourth heaviest felines in the world.
-  Bushy-tailed woodrats are sometimes called “packrats” because of their practice of storing objects in their nests.
-  Two of the smallest mammal species in the state are mice and voles.
-  Reptiles and amphibians are ectotherms that hibernate during the winter.
-  The only venomous snake in the state is the prairie rattlesnake; the largest snake is the bullsnake; the fastest snake is the racer.
-  To defend themselves against predators, short-horned lizards can inflate their bodies to twice their size and squirt blood from their eyes.
-  Male grouse perform an unusual courtship dance on a dancing ground called a “lek.”
-  Songbirds of the Badlands include the yellow-breasted chat, mountain bluebird, rock wren, western kingbird, and black-billed magpie.
-  Magpies often sit on large mammals to remove ticks from the animals.
-  Three unique raptors found primarily in the Badlands are the golden eagle, the prairie falcon, and the burrowing owl.
-  Members of American Indian tribes are the only individuals allowed to possess eagle feathers.

BADLANDS WILDLIFE VOCABULARY


Amphibians:

-  Ectotherms with smooth, moist skin and no claws on toes
-  Live part of their life in water and part on land

Antlers:

-  Bony and branched growths on the heads of members of the deer family
-  Shed every year

Big game animals:

-  Large animals that may be hunted

Brood:

-  Group of young birds from the same nest

Carnivore:

-  Meat eater

Carrion:

-  Dead animals that have been killed by other animals, by vehicles, or from other accidents



Decurved bill:

-  Bird's bill that is bent slightly downward

Diurnal:







-  Active during the daytime

Ectotherm:

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

Ewe:

-  Female sheep

Herbivore: Plant eater**Insectivore:** Carnivore that eats only insects and spiders**Lek:** Dancing area used by grouse year after year**Metamorphosis:** Process of changing from the larva stage to the adult stage Amphibians go through metamorphosis, changing from tadpole to adult**Nocturnal:** Active at night**Ram:** Male sheep**Raptor:** Bird of prey**Reptiles:** Ectotherms with dry, scaly skin and claws on toes Live their entire lives 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**Stotting:** Running with bouncing leaps

THE IMPORTANCE OF THE BADLANDS

A Hidden Treasure

The Badlands of North Dakota might be called a “hidden treasure.” Many people in the United States do not know about this unique (you-Neek) (rare and unusual) area tucked away in western North Dakota.

A large number of plant and wildlife species depend on the Badlands environment for life. Many of these species are not found anywhere else in the state.

Tourism is the second-largest industry in North Dakota, after agriculture. Millions of dollars are brought to the state every year by people who come here to enjoy the North Dakota Badlands.

The town of Medora, which is the gateway to the South Unit of Theodore Roosevelt National Park, is the number one destination for tourists in the state.

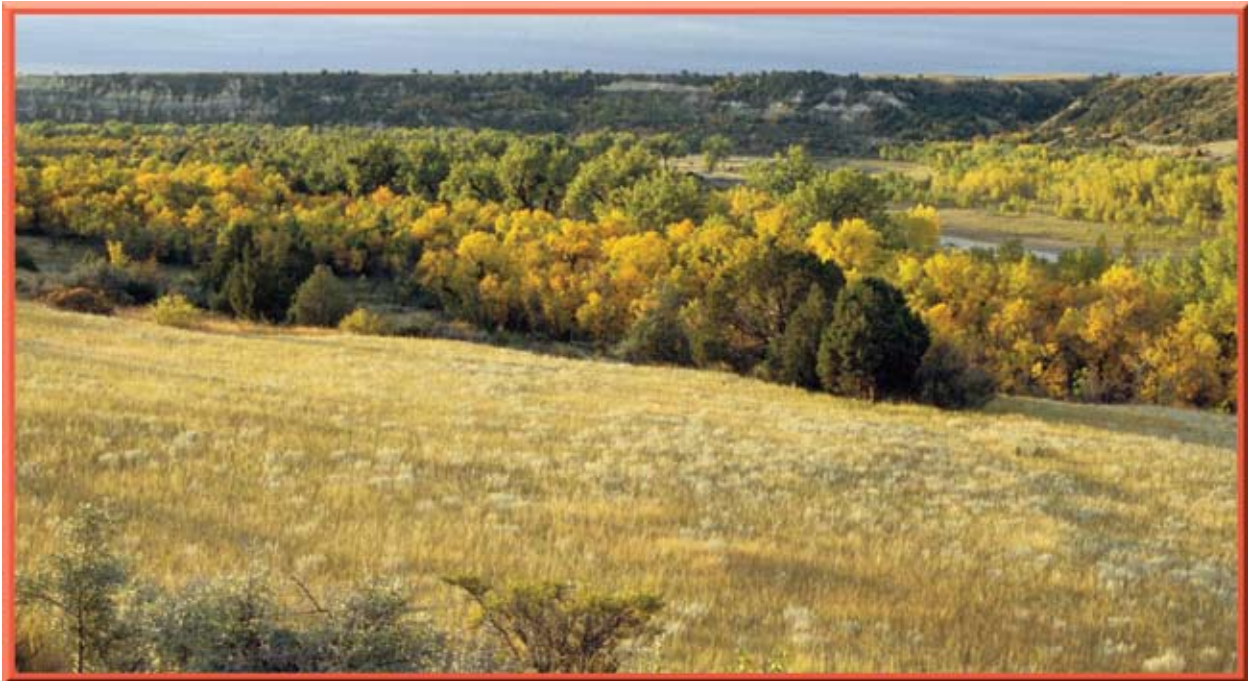


Figure 71. The Badlands is a beautiful landscape filled with a variety of habitats. The Little Missouri River, the prairie hillsides, the sagebrush, the buttes, and the rough cedar draws are attractions that draw many people to the Badlands. The vivid colors of fall make this season a great time to enjoy an outing in the Badlands.

The **Little Missouri River**, which formed the Badlands over millions of years, is one of the most outstanding features of the Badlands. The river flows through both the North and South Units of Theodore Roosevelt National Park. It is categorized as a “Wild and Scenic River.” A man-made trail called the **Maah Daah Hey Trail** connects these two parts of the national park. It allows mountain bikers, hikers, and horseback riders to see and enjoy this area.

Other recreational activities in the Badlands include hunting, camping, canoeing, picnicking, birdwatching, wildlife watching, sightseeing, and taking photographs. Tourism activities in the Badlands help the North Dakota economy. They also teach people to appreciate the importance of preserving this habitat and the diversity of wildlife living here.

The prairies of the Badlands help maintain clean air and water, and they help control erosion. Living plants have the ability to trap and remove pollutants, such as toxic chemicals, from the air; therefore, the grasses, forbs, shrubs, and other plants play an important role in maintaining good air quality.



Figure 72. The Little Missouri River, winding its way through the buttes and grasslands, is a great place for canoeing and sightseeing. It is a natural scenic wonder that had a major role in forming the Badlands. Today, it is categorized nationally as a “Wild and Scenic River.”



Figure 73. The Badlands offer a great place to enjoy the outdoors and other activities like hunting, camping, and hiking. The diversity (large variety) of wildlife, plants, and terrain make it a place for all to enjoy.

Plant roots hold down the soil, which helps control erosion. This saving of the soil keeps nutrients on the land. Prevention of soil erosion also helps keep rivers and lakes clean for use by people, livestock (farm animals), and wildlife.

Threats to the Badlands

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 Badlands ecosystem is habitat destruction. Human activity has caused widespread damage and loss of habitats. Among these activities are farming, ranching, construction, and energy development.

Some farming and ranching practices can lead to erosion, habitat loss, and decreased wildlife populations. Soil erosion can occur when native plant roots are not available to hold the soil in place. Exposed soil can blow away or be washed away by snowmelt and rain. Sometimes even parts of hillsides can break loose and be washed downhill. Exposed soil also allows **weeds**, or unwanted plant species, to take over an area.

Sagebrush ecosystems are in danger. Because cattle do not eat sagebrush, and sagebrush competes with grass for space to grow, it is sometimes burned, dug up, pulled out with chains, or sprayed with **herbicides** (chemicals that kill plants). When this happens, the species of wildlife that live in the sagebrush grasslands and depend on the sagebrush ecosystem disappear from the area.

Wildlife can also be in danger from **insecticides** (chemicals for killing insects). When insects are killed, some insect-eating species of wildlife lose their food supply. Also, birds and other wildlife may be poisoned by picking up and eating dead insects that have been poisoned by insecticides.

Other factors may also contribute to declines in wildlife populations within specific habitats. A survey conducted by the North Dakota Game and Fish Department in the spring of 2008 revealed that the population of strutting male sage grouse was at an all-time low.

The cause of the recent drop in the sage grouse population is not known for sure; however, wildlife biologists suspect that loss of sagebrush habitat is part of the cause.



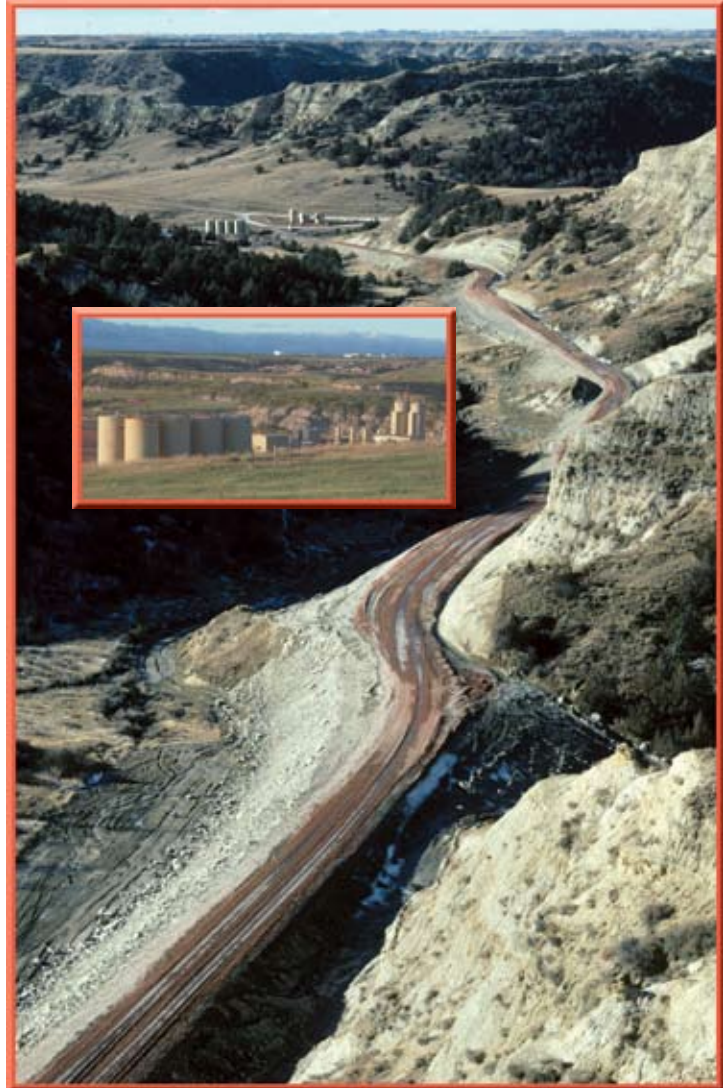
Figure 74. Some people in the Badlands make their living by cattle ranching. Cattle grazing in the Badlands, if done responsibly, can work in harmony with wildlife and leave enough grass and other plants for wildlife to nest, feed, and find cover. If too many cattle graze for too long, habitat can be damaged. On public lands, the number of cattle is regulated by government agencies such as the U.S. Forest Service.

Some people believe prairie dog towns compete with livestock for forage. Others believe large animals such as pronghorn or bison are attracted to prairie dog towns to eat the fresh green growth of new plants.

Prairie dog towns historically supported black-footed ferrets. With the loss of prairie dog habitat, the black-footed ferret was extirpated from the Badlands. Today, burrowing owls, golden eagles, and many other species of wildlife flourish on prairie dog towns. These populations of wildlife could be negatively affected if prairie dog towns are lost.

There is some concern that energy development might be a threat to Badlands habitats. Oil and gas companies are requesting permits to do even more drilling in the Badlands.

New roads are constructed with most new wells that are drilled. The roads cut through primitive areas, break up habitats, and increase traffic into areas, all of which can have negative impacts on wildlife populations. For example, bighorn sheep require specific quiet and secluded (private) habitats in which to raise their young. A disturbance that is close to bighorn sheep habitat can be a threat to the bighorn population. During lambing season, bighorn sheep may abandon their lambs if they are bothered too much.



Figures 75 & 76. New roads and activity produced by oil exploration damage habitat, displace wildlife, and break up large, undisturbed areas into smaller ones. Roads provide access for people to enjoy the Badlands, but too many roads hurt wildlife populations and take away the quality of experience for hunters and other outdoor enthusiasts. **INSET It is important** that well sites and access roads are removed after oil production ceases so that the landscape and habitat can be returned back to its original state.

Noxious (Nok-shus) (harmful) weeds can be a threat to the Badlands. Plants like spotted knapweed, leafy spurge, and hound's tongue will compete with beneficial (helpful) plants. They spread rapidly, do not provide food for wildlife, and in the case of hound's tongue can even be deadly if eaten by cattle or other animals.

Other threats to the Badlands ecosystem include constructing homes and cabins, putting up fences, and driving off-road vehicles or ATVs into primitive areas.



Figure 77. Noxious (harmful) weeds can compete with native plants which are beneficial to both wildlife and cattle. Noxious weeds include leafy spurge, Canada thistle, hound's tongue, and spotted knapweed.



Figure 78. Similar to disturbances caused by more roads and traffic as a result of energy development, off-road vehicles can impact wildlife. ATVs are able to travel farther into areas where wildlife find refuge; they also damage habitat.

When wildlife is disturbed or habitat is destroyed, the plants and wildlife that have occupied the area have no place to go. The resulting losses can be significant.

Protecting the Badlands

The forces of nature that keep ecosystems in balance are often upset by human activity. Humans also have the power to control their activities so that natural resources are preserved. Conservation and wise management are the keys to saving fragile ecosystems.

Several agencies are involved in educating the public about effects of insecticides, herbicides, and other chemicals that might cause harm to the environment. Many state and federal agencies, conservation organizations, and landowners are working to make sure that wildlife populations remain strong by taking measures to protect the Badlands habitat, but they can use help.



Figure 79. Preserving the wide open and peaceful atmosphere of the Badlands is important. In a world with big cities, heavy traffic, and a fast-paced life, there is a need for all of us to know there are places with beautiful natural surroundings, wildlife, and few disturbances.

Citizens, like you, can call or write to senators, representatives, and other government leaders to express concerns about the practices that tend to destroy habitats. The Badlands, which cover over 1 million acres, belong to all of us. It is every person's responsibility to help care for this land.

Becoming educated and educating others about conserving the Badlands ecosystem is very important. For example, many people do not know that wild animals should not be fed. Animals that eat from an unnatural food source may become sick or create an uneven distribution of wildlife, which can cause damage to the property of farmers or ranchers.

When Theodore Roosevelt lived in the Badlands, no laws protected wildlife and habitats. When he became President of the United States in 1901, he took action to put conservation measures in place. He wanted the Badlands and other wilderness areas saved for future generations to enjoy.

The rugged peaks, colorful valleys, native prairie, sagebrush flats, woody draws, riverbank trees, rocky cliffs, and all of the other features of the Badlands provide beauty and wonder. They also provide homes for countless forms of life. Each creature and plant of this landscape is a natural jewel with great value. For the enjoyment of people now and for future generations, the Badlands of North Dakota must be preserved!















Comprehension

1. What is the second largest industry in North Dakota? What is the number one tourist destination in the state?
2. What does the Maah Daah Hey Trail connect?
3. What is the greatest threat to the Badlands ecosystem?
4. When the prairie dog population in the Badlands declined, what mammal was extirpated from the state?
5. What are the keys to saving fragile ecosystems?
6. Whose responsibility is it to help care for public land?
7. Which U.S. President lived in the Badlands? When did he become President?

Critical Thinking

1. What can you as an individual do to help save the Badlands?

THE IMPORTANCE OF THE BADLANDS IN A NUTSHELL

-  Tourism is the second largest industry in North Dakota, after agriculture.
-  The Little Missouri River flows through the South and North Units of Theodore Roosevelt National Park.
-  Living plants have the ability to remove pollutants from the air.
-  Plant roots hold soil to prevent erosion.
-  Habitat destruction is the greatest threat to the Badlands.
-  When the population of prairie dogs declined significantly, the populations of many other species also declined significantly.
-  Disturbances to bighorn sheep habitat can cause the sheep to abandon their lambs.
-  Humans have the power to control their activities so that natural resources are preserved.
-  Conservation and wise management are the keys to saving fragile ecosystems.
-  Several species of wildlife that were extirpated from the Badlands have been re-introduced to the Badlands.
-  All wildlife, plants, and natural features in a national park are protected by law.
-  President Theodore Roosevelt took action to preserve and protect wilderness areas for future generations to enjoy.

THE IMPORTANCE OF THE BADLANDS

VOCABULARY

Ecosystem:



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

Herbicide:



Chemical that kills plants

Insecticide:



Chemical for killing insects

Weeds:



Unwanted plant species

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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.

