



Of Time and the Badlands

For centuries humans have viewed South Dakota's celebrated Badlands with a mix of dread and fascination. The Lakota knew the place as *mako sica*. Early French trappers called the area *les mauvaises terres à traverser*. Both mean "bad lands." Conservation writer Freeman Tilden described the region as "peaks and valleys of delicately banded colors—colors that shift in the sunshine, . . . and a thousand tints that color charts do not show. In the early morning and evening, when shadows are cast upon the infinite peaks or on a bright moonlit night when the whole region seems a part of another world, the Badlands will be an experience not easily forgotten." Paleontologist Thaddeus Culbertson had another reaction: "Fancy yourself on the hottest day in summer in the hottest spot of such a place without water—without an

animal and scarce an insect astir—without a single flower to speak pleasant things to you and you will have some idea of the utter loneliness of the Bad Lands."

The peaks, gullies, buttes, and wide prairies of the Badlands can be challenging to cross, yet they have long attracted the interest and praise of travelers. "I've been about the world a lot, and pretty much over our own country," wrote architect Frank Lloyd Wright in 1935, "but I was totally unprepared for that revelation called the Dakota Bad Lands. . . . What I saw gave me an indescribable sense of mysterious elsewhere—a distant architecture, ethereal . . . an endless supernatural world more spiritual than earth but created out of it."

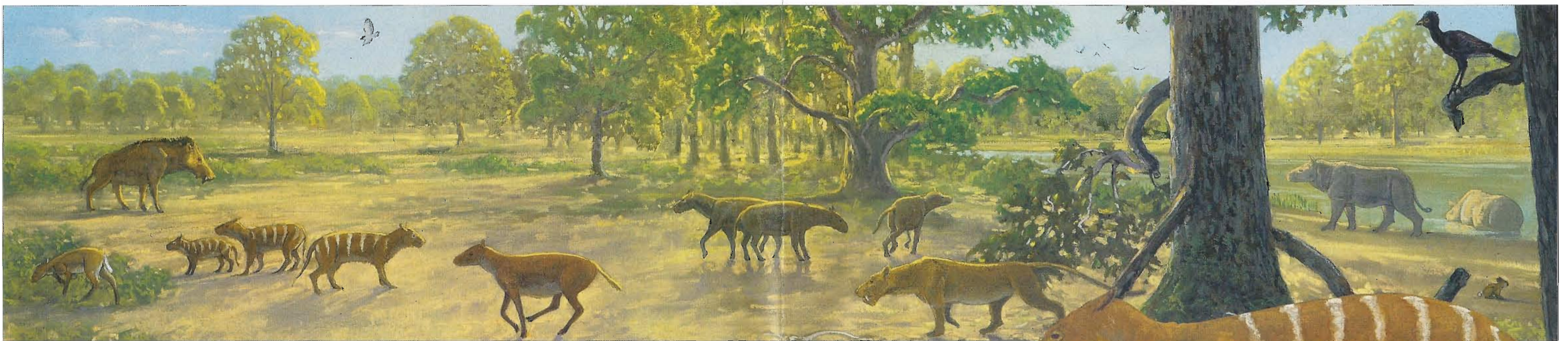
The Badlands are a place of extremes. Your travels here may produce conflicting responses. You may visit in summer and curse the heat and the violent lightning storms, yet be excited by the wildlife and wildflowers. You may come in winter, chilled by the cold and the winds that roar unhindered out of the north, and still marvel at the exquisite beauty of the moonlight glistening on the snow-dusted buttes. Whatever your feelings about the Badlands, you will not come away unaffected.

Stay awhile if you can, and let the Badlands reveal themselves to you. The so-called emptiness of the plains is full of traces of ancient life. You may see eagles hunt, wings outstretched over grasslands that seems to go on forever. Above all you will

experience quiet, the near absence of human noise. As you explore, keep in mind that this is a national park. All fossils, rocks, plants, and animals are protected and must remain where you find them.

The more you observe, the more accustomed you will become to the Badlands landscape. With this familiarity will come an appreciation of the park's biological diversity. There is a rich and varied plant community here, including the largest mixed-grass prairie in the National Park System. Wildlife abounds. Coyotes, butterflies, turtles, vultures, snakes, bluebirds, bison, and prairie dogs are just a few of the residents of the park's prairie. Approached with curiosity and care, the Badlands will provide you with endless pleasure and fascination.

Eroded Badlands formations near Cedar Pass ©JEFF GRASS



Creatures from left to right: *Leptomeryx*, *Archaeotherium*, *Oreodonts* (above and free-standing at right), *Mesohippus*, *Subhyracodon*, *Hoplophoneus*, *Metamynodon*, *Cracid* (in tree), and *Paleolagus*.

ILLUSTRATION: BOB GAGLIARDI

Shaping of the Land and Life

In the Distant Past About 75 million years ago the Earth's climate was warmer than it is now, and a shallow sea covered the region we call the Great Plains. Stretching from the Gulf of Mexico to Canada and from western Iowa to western Wyoming, the sea teemed with life. In today's Badlands the bottom of that sea appears as a grayish-black sedimentary rock called Pierre (peer) shale. This layer is a rich source of fossils, for creatures sank to the bottom of the sea when they died and over time became fossils. A variety of fossilized animals has been

found in the park. *Baculites*, an extinct cephalopod, had a squid-like body with a long cylindrical shell tightly coiled at one end. Chambers in the shell contained either gas or liquid for buoyancy control. Clams, crabs, and snails in great numbers have also been found. Outside the park, the Pierre shale has yielded abundant remains of ancient fish; mosasaurs, giant marine lizards; pterosaurs, flying reptiles; *Archelon*, enormous sea turtles; and *Hesperonis*, a diving bird something like a modern loon. Why have rocks inside the park, which are so rich



Turtle shell fossil

in invertebrate fossils, yielded so few marine creatures with backbones? Questions such as these puzzle paleontologists and earth scientists who continue to search, hoping to answer questions about the Earth's past.

Land Emerges Eons passed. Continental plates pushed and shoved, leading to an active period of mountain-building in the ancestral Rocky Mountains. This caused the land under the sea to rise, forcing the water

to retreat and drain away. In time, the area that we now call the Badlands was exposed to air and sunshine, yet it looked nothing like the landscape that we see today.



Two fossilized jaws from *Oreodonts* (sheep-like animals) found in the park.

The climate was humid and warm; rainfall abundant. A dark and dense subtropical forest developed on the land. It flourished for millions of years. Eventually, the climate cooled and dried. The forest gave way, first to savannah, then to the grassland much like the present landscape. Today, after a heavy rainstorm in the Badlands, vivid

red bands stand out against the buff tones of the buttes. These are fossilized soils that make up much of the Badlands rocks. Fossil soils tell us a great deal about the climatic history of the Badlands, and they also impart much of the colorful banding to Badlands rocks. The loose, crum-

bling rocks formed from these ancient soils hold one of the greatest collections of fossil mammals on Earth.

Badlands Fossils An array of extinct animals, from enormous to very small, once ranged the area now in Badlands National Park. Some



are based on scientific knowledge of the Oligocene, a geologic epoch that lasted from 23 to 35 million years ago. Our views of vegetation and animal structure will change as the fossil record reveals more about those bygone times.

Some of these creatures whose fossils have been found here appear in the illustration above. They

lived in the subtropical forests that flourished after the retreat of the inland sea; others inhabited the savannahs and grasslands that came in the years afterward.

Leptomeryx, small and deer-like, had even-toed hooves and browsed on stems and leaves of early Oligocene vegetation. Sheep-like *Oreodonts* were abundant—their name means mountain

tooth. *Archaeotherium*, a distant relative of modern pigs, had sharp canines and fed on plants

and carrion. *Mesohippus*, an ancestor of modern horses, had three toes instead of one hoof. *Hoplophoneus*, one of the earliest of the mammals to be called a saber-tooth cat, was the size of a leopard. *Subhyracodon*, an agile rhinoceros, ate plants. *Ischyromys*, a small squirrel-like rodent

probably lived in trees and ate fruits and nuts. *Metamynodon* was a massive rhinoceros that, like the hippopotamus, spent much of its time in water. *Paleolagus*, perhaps an ancestral rabbit, nibbled on plants.

The Prairie

The prairie is not forgiving. Anything that is shallow—the easy optimism of the homesteader . . . the trees whose roots don't reach ground water—will dry up and blow away.

Kathleen Norris, *Dakota*

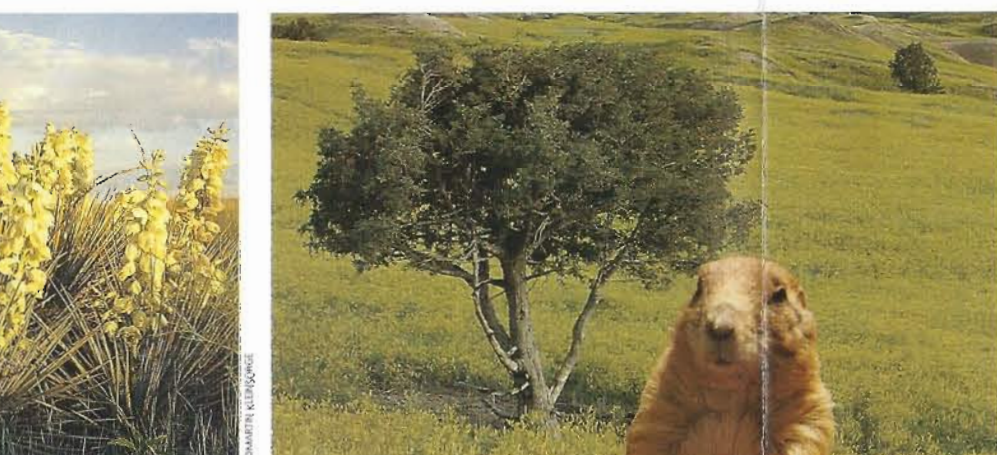
Badlands prairie contains nearly 60 species of grass, the foundation for a complex community of plants and animals. The prairie once sprawled across one-third of North America. Today patchwork remnants of native grasslands represent adaptations to millions of years of changing conditions and sustain a diverse citizenry. Grass-

lands (prairies) occur in areas that are too dry to support trees but too wet to be deserts. Badlands National Park contains mixed-grass prairie: tall-grass species such as big bluestem and prairie cordgrass, and short-grasses such as blue grama and buffalograss. Hundreds of species of wildflowers and forbs grow here too. The landscape, once a forest, now contains plants and animals uniquely adapted to what appears to be harsh and unforgiving conditions. Grasses, able to withstand high winds, long spells of dry weather, and frequent fires, thrived. Grazing animals



Narrow-leaf yucca

became abundant and grasses, better suited to withstand constant trampling and grazing, spread and overtook the ancient forests. Today, many ani-



Badlands Wilderness Area

Prairie dog

mals—black-tailed prairie dogs, muledeer, pronghorn (called antelope), bison (called buffalo), coyotes, and bighorn sheep—adapt to, and

even thrive under the protected conditions in Badlands National Park.

Return of a Native

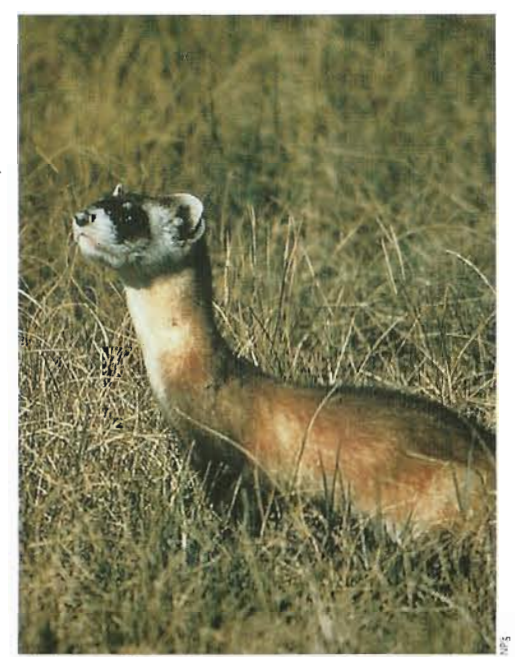
In 1981 the scientific community received astonishing news. Black-footed ferrets (*Mustela nigripes*), thought to be extinct since the last captive specimen died in 1979, were discovered alive and well in the wilds of Wyoming. The news was encouraging, but the long-term prognosis for the ferrets was not promising. Dependent on prairies as their prime habitat and prairie dogs as their food source, these relatives of weasels are among the rarest mammals on Earth.

Shrinking prairie habitat, destruction of prairie dog colonies by humans,

and spread of diseases left the ferrets one step away from extinction.

Soon after the Wyoming ferrets were discovered, disease ran through the colony. By 1985 only 18 ferrets survived. Braving controversy and accepting the risks accompanying intervention, U.S. Fish and Wildlife Service biologists and State of Wyoming authorities captured the ferrets and launched a campaign to save them. Success came quickly. At seven breeding facilities, the ferrets flourished and multiplied. With high hopes and little fanfare, 36 black-footed ferrets were

released in the park in the fall of 1994. A search in late summer of 1995 yielded two litters of ferret kits born in the wild, an important milestone on the road to recovery for this species. More captive-raised black-footed ferrets were released through 1999 with the goal of establishing a self-sustaining population. Today biologists are optimistic about the continued success of ferrets in the region. Like reintroduced bison and bighorn sheep, black-footed ferrets have once again taken their place and added influence to the northern prairies.



Black-footed ferret

Life and Death in a Hard Country

Though seemingly inhospitable at first glance, the Badlands have supported humans for more than 11,000 years. The earliest people to come here were ancient mammoth hunters. Much later they were followed by nomadic tribes whose lives centered on hunting bison. The Arikara was the first tribe known to have inhabited the White River area. By the mid-18th century, they were replaced by Sioux, or Lakota, who adopted the use of horses from the Spaniards and came to dominate the region. Though the bison-hunting Lakota flourished

during the next 100 years, their dominion on the prairie was short-lived. French fur trappers were the first of many European arrivals who, in time, would supplant the Lakota. Trappers were followed by soldiers, miners, cattle farmers, and homesteaders who forever changed the face of the prairie. After 40 years of struggle, culminating in the Wounded Knee Massacre in 1890, the Lakota were confined to reservations. Cattle replaced bison; wheat fields replaced prairies; and, in time, gasoline-powered vehicles replaced horses.



UPS COLLECTIONS HISTORIC PHOTOS AND BOTTOM PANEL



Both Lakota and homesteaders shaped this land. Lakota hunted and harvested what they needed to support their way of life. The bison that played such a vital role for the Lakota were eradicated by the arrival of non-Indian buffalo hunters. Only the Lakota paintings, drawings, and artistic crafts remained—tangible memories of their lost homelands and natural environment.

Late 19th-century photographers captured the images of these pioneers as they built new lives, showing the hardwork that typified the process.



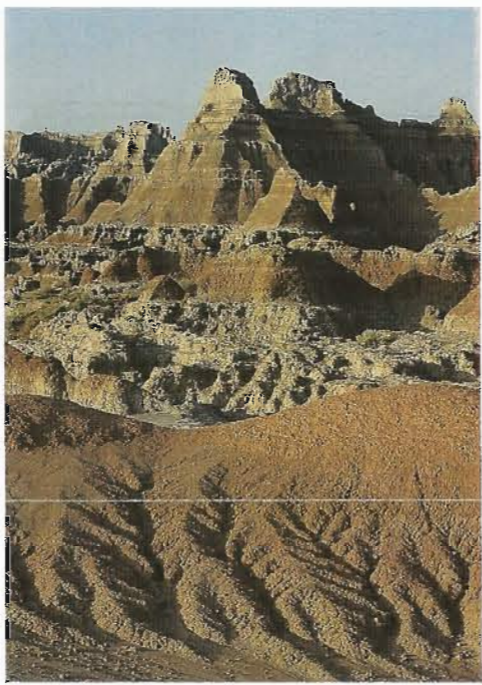
Building a log house, cutting sod bricks from the prairie, and collecting cow chips for fuel (photos left) were backbreaking tasks that homesteaders faced as they worked to make this land their own.

By contrast the Lakota touched the land differently. This painting on a bison robe (background) chronicles their life as nomadic hunters—a pattern soon extinguished by the new pioneers.

Exploring the Badlands



Bison near Sage Creek Rim Road.



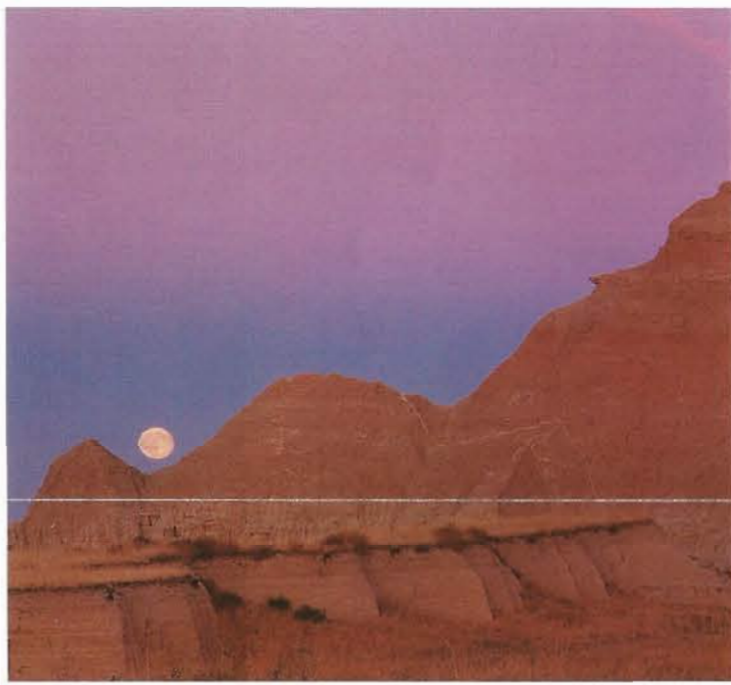
Sculpted spires rise above Door Trail.



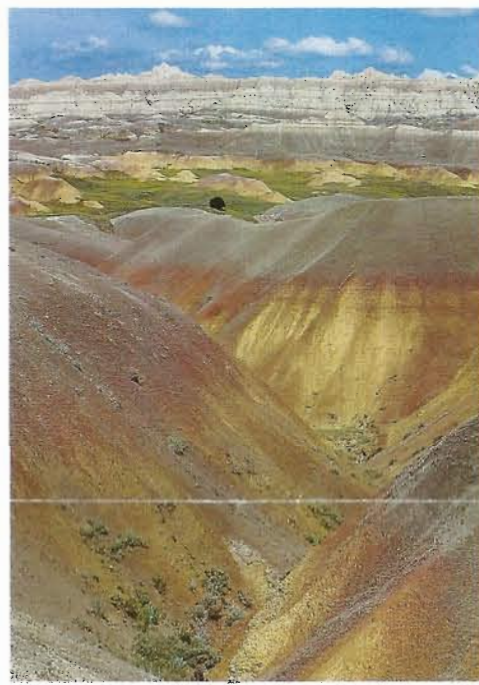
Toadstool rock northwest of Cedar Butte.



Suspended silt gives White River its name.



Setting moon from Badlands Loop Road near Cedar Pass Lodge.



Yellow mounds near Dillon Pass.

Colors, landforms, and wildlife always seem unexpected here. Just when you think you know what to expect, you round a bend—to find a surprise.

Visiting Badlands National Park

Travelers come to Badlands National Park for many reasons. Some are lured by the unusual rock formations, which reminded early explorer Dr. John Evans of "some magnificent city of the dead, where the labor and the genius of forgotten nations had left behind them a multitude of monuments of art and skill." Others come to camp, photograph wildlife, or search for birds or flowers. Many are professional or amateur paleontologists who come to study fossil remains of Badlands' ancient life. For all visitors there is much ground to cover, for the park consists of three units totaling more than 240,000 acres.

Three Park Units *North Unit*—This is the best known and most easily explored area. It includes the 64,000-acre Badlands Wilderness Area, Badlands Loop Road with scenic overlooks and trail-

heads, and Cedar Pass, where you will find the Ben Reifel Visitor Center, open year-round, and Cedar Pass Lodge, open seasonally. *Stronghold and Palmer Creek units*—These areas are located within the Pine Ridge Indian Reservation. The Stronghold and Palmer Creek units are managed under a cooperative agreement between the Oglala Lakota and the National Park Service. In the Stronghold Unit, White River Visitor Center is open seasonally. Contact the park for details.

Expect the Unexpected There is much to do in Badlands. When you drive the Badlands Loop Road, you will find overlooks and signs explaining the landscape. You may walk a self-guiding trail, set off cross-country with a backpack, or attend a summer evening amphitheater program. Bring your binoculars! If you are lucky, you may spot

bison or pronghorn grazing, spot a coyote stalking rodents, or catch a glimpse of bighorn sheep delicately picking their way across a steep slope. A visit to Roberts Prairie Dog Town, five miles west of the Pinnacles Entrance on the unpaved Sage Creek Rim Road, gives you a chance to visit a different "home town."

Help us Protect the Park More than one million visitors come to Badlands National Park each year. It is important to follow these few rules to preserve the wonders that you find here. Your care and thoughtfulness will help preserve the park for you and future generations. Be advised that all plants, animals, rocks, minerals, and fossils within Badlands National Park are protected by federal law. Observe, photograph, and admire everything you see, but do not collect, pick, or

disturb anything you find here. Do not feed wildlife. They can become dependent on human food and lose their ability to provide for themselves.

Safety and Regulations For a safe and successful visit, observe these precautions and regulations. • Weather can change rapidly in any season and can turn out quite differently from the forecast you saw posted in the visitor center. Dress appropriately, drive with extra caution during stormy or icy conditions, and seek shelter from the thunderstorms, hailstorms, and occasional tornadoes that sometimes descend on the Badlands with sudden fury. • Theft is uncommon, but it is a good practice to carry valuables in your pockets or backpack, or lock them in the trunk of your car. • Observing a bison up close in the wild may be a new and exciting experience for visitors—

but it is extremely dangerous. This is not a zoo. The animals are wild—and they can attack. Never approach a bison closely. They can run faster than 30 miles per hour. • Prairie rattlesnakes, spiders, and stinging insects are found within the park. Take proper care to avoid unpleasant encounters. • Hikers should carry maps, a compass, extra clothing, and lots of water. There is no source of potable water in the backcountry. • Protect yourself from the sun. Wear a hat and use sunscreen. The Sun's rays are strong here, even in winter. • Badlands rock is soft, and rockfalls are common. Admire the formations at a distance, and do not climb on them. Seemingly indestructible, these buttes are quite fragile. Enjoy the park—safely.

Badlands Weather Averages

Month	Temperature (F°)		Precipitation (inches)
	High	Low	
January	34	11	0.29
February	40	16	0.48
March	48	24	0.90
April	62	36	1.83
May	72	46	2.75
June	83	56	3.12
July	92	62	1.94
August	91	61	1.45
September	81	51	1.23
October	68	39	0.90
November	50	26	0.41
December	39	17	0.30

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Emergencies: call 911.

Travel in and about the Badlands

Westbound travelers on I-90 should use exit 131. S.D. 240 leads to the Ben Reifel Visitor Center and is the Badlands Loop Road. After passing through the park, S.D. 240 connects with I-90 at exit 110 in Wall. Eastbound travelers should do the reverse: begin in Wall and end at I-90 at exit 131.

derstorms, when roads may be slippery and maintaining control may be difficult.

Established hiking trails are short; they are easy to moderately difficult. Cross-country hikers should take water, a map, a compass, and wear or carry appropriate clothing. Ask a ranger about your route before starting out.

Nearby areas you may wish to visit: Mount Rushmore National

Memorial, Wind Cave National Park, Jewel Cave National Monument, Black Hills National Forest, and Custer State Park are in the Black Hills. Wounded Knee is 25 miles south of the White River Visitor Center. Buffalo Gap National Grassland borders the park.

For More Information Badlands National Park P.O. Box 6 Interior, SD 57750-0006 605-433-5361 www.nps.gov/badl



Cedar Pass Area

Most visitors stop in the Cedar Pass area. The Ben Reifel Visitor Center has an information desk, exhibits, a bookstore, and restrooms. It is open year-round. Park staff can answer questions and help you plan your visit.

Cedar Pass Lodge, near the visitor center, is open in the spring, summer, and fall months. The amphitheater and the Cedar Pass campground are also within walking distance. Ask at the visitor center for details.

Within five miles of Ben Reifel Visitor Center are scenic overlooks, several trailheads, and three self-guiding trails. Fossil Exhibit Trail is wheelchair accessible. Cliff Shelf Nature Trail and Door Trail are moderately strenuous explorations of Badlands rock formations. A pamphlet for Cliff Shelf Nature Trail gives an introduction to the plants and animals living in the Badlands rock formations.

