



Passages

A Visitor's Guide to Wind Cave National Park

2001

National Parks For Today and Tomorrow

On August 25, 1916, the National Park Service was established to "...conserve the scenery, natural and historic objects, and wildlife therein, and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The purpose of this historic legislation was to ensure the protection of our National Parks.

Before 1916, the parks were the responsibility of a hodgepodge of agencies such as the United States Army and the US Geological Service. Lacking unified leadership, the parks were vulnerable to competing interests, such as the challenge created in 1913, when the Hetch Hetchy dam in Yosemite National Park was built. San Francisco wanted the dam to provide water and power to the city.

The approval of that dam caused a public outcry. The many voices of concerned citizens and organizations united to demand that one standard be created for protecting our parks and one branch of the government have the responsibility to do that. Thus, in 1916, the National Park Service was created.



The mission of the Park Service is challenging. Protecting the natural resources or features of each park is an important job, but so is "...providing for the enjoyment..." If people could not visit parks, the reason to protect them might not be realized.

Why is it important to us to protect these areas? Part of what we are as a people is tied to the frontier and vast open spaces. We seek to explore, to see more. In 1870, explorers to the west were so taken with the measureless spaces and the unique geological wonders in the Yellowstone area that they proposed setting them aside as a national preserve. They proposed creating a place anyone could visit but no one could possess.

How do we determine what areas are significant enough to become part of the National Park System? Often they are places with beauty or grandeur beyond compare. But the most significant criteria for a national park is that it is one of a kind. There are no other Yellowstones, there are no canyons to compare with the Grand Canyon, and there are no caves like Wind Cave.

Some park areas are small, yet unique. Can we do without the Liberty Bell or the Statue of Liberty? Each of the 384 areas protected

within the National Park System was determined to be special and unusual.

In national parks, we can watch animals roaming freely in their natural surroundings. We can slow our pace and enjoy stunning sunsets or gaze up at towering trees. We can physically challenge ourselves by climbing the tallest peaks or scaling the highest cliffs. We can let our imagination take us back in time and fly with the Wright brothers, visit the homes of presidents, or learn about battles of past wars. The possibilities are endless.

National parks are national treasures. They uplift our spirits, delight our senses, and unify us as one nation. The American people are the owners and caretakers of each and every one. Investing our efforts, time, and talents, the National Park Service and the citizens of our country, together, can ensure that they will remain a significant part of our heritage.

To each of us, the answer to why we protect these areas is personal and different. But together, as a nation, we have done something extraordinary. We have set aside special places that we are willing to support and protect, not simply for us, but for the future, for the world.

Home on the Range at Wind Cave National Park

National Parks are great places to see wildlife. However, that has not always been the case. In the early 1900's many animal populations were nearing extinction because of habitat destruction or hunting pressures. You couldn't see them in the wild or in national parks.

At one time, more than 60 million bison



roamed this continent. By the early 1900's fewer than 1,000 were left. Some were in zoos, a scattering on private ranches and a few were still wild in places like Yellowstone, but most wild bison had been killed.

People noticed what was happening and took action. Ranchers started private herds and zoos began protecting species at risk. Conservationists and hunters realized that action must also be taken to protect the animals' habitat or we might never see them in the wild again.

In 1911, the American Bison Society looked for places to establish free roaming bison herds. They selected Wind Cave National Park as one of the first areas where these animals would be returned to the wild. The rolling mixed grass prairie is an excellent habitat for bison.

Other animals like pronghorn antelope and elk were reintroduced to the park at the same time. Because of this effort, we can see elk, bison, pronghorn, turkeys, and even prairie dogs. And, just as important, we can see the habitat that supports them.

Please Remember:

Animals in national parks are wild and unpredictable. Because they are, we find parks exciting places to visit. But, many animals and some visitors are injured each year because we forget the animals are wild. To help the wildlife survive and remain wild, we must remember a few things.

Don't feed the wildlife. When animals depend on handouts instead of their natural foods, they fail to store the fat reserves that they need to survive the winter. This can lead to their starvation. When you feed wild animals, they become attracted to the highways where they might be struck by passing vehicles.

When driving park roads please obey all speed limits. The 45-mph and 35-mph zones are designed to protect you and the wildlife. Please help protect the prairie, driving off road is not permitted.

Respect the animals by allowing them to remain wild and by protecting their habitats. Enjoy them from a distance.

Planning Your Visit

Check Out Our Website

If you are planning your visit or doing a project about Wind Cave, look for us at www.nps.gov/wica/ on the Internet. Our website has almost anything you might want to know about the park, the cave, the animals, or the plants. We have even included some animal sounds. If you want to know what's happening in the park, this is the place to be.

Food, Lodging and Gasoline

The park operates one campground and has limited food and beverage vending services in the visitor center. There are no lodging, gasoline, grocery, or restaurants available in the park. These services are available in the nearby towns of Hot Springs (15 minutes south) and Custer (25 minutes north). The town of Pringle (10 minutes west) has gasoline and limited food services. For information regarding services in Hot Springs, call 605-745-4140 or 800-325-6991. In Custer, call 605-673-2244 or out of state call 800-992-9818.

Custer State Park, bordering Wind Cave National Park on the north, has campgrounds, restaurants, motels, and some grocery services. Information about Custer State Park is available by calling 605-255-4515. For information about state park lodging, please call 800-658-3530.

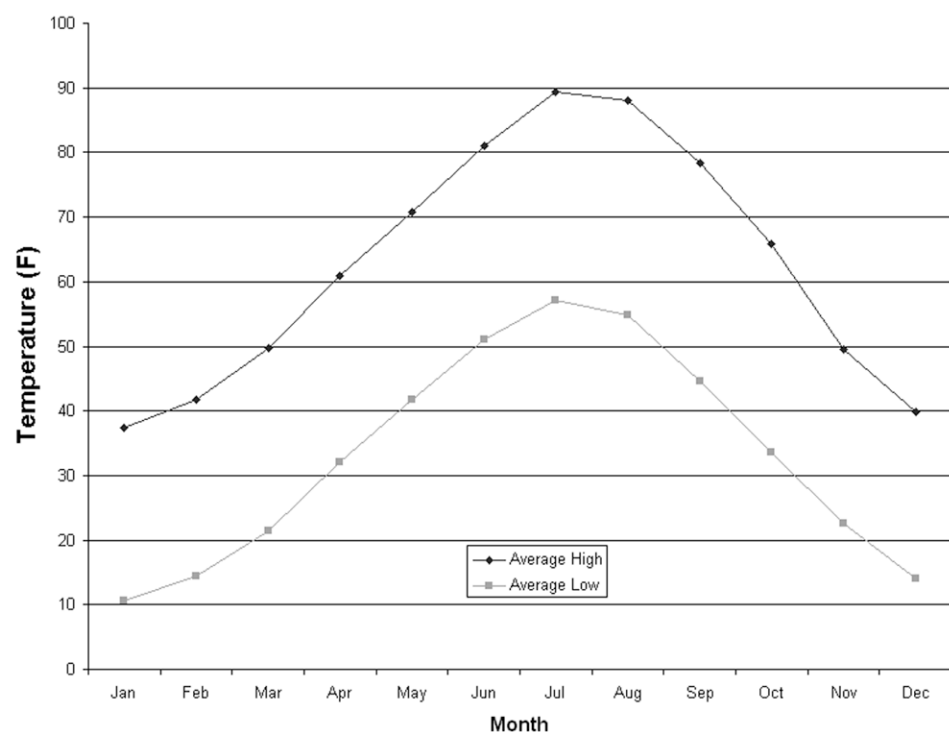


Weather

Wind Cave National Park and the rest of the southern Black Hills are much warmer and drier than the northern hills. Winter snowfall averages 30 inches annually. The spring and fall can be warm and sunny, or rainy and snowy with a chilly wind. Summer brings warm daytime temperatures with cool evenings.

Severe thunderstorms are common in June and July and occasionally in August. Thunderstorms can be dangerous and visitors should be prepared for them. Large hail is common and the storms can produce severe lightening. Slow moving storms can dump great amounts of rain over a small area. The steep canyons, rock cliffs, and small creeks of the Black Hills are prone to flash flooding. Be cautious when camping near a creek bed even if it is dry.

For current forecasts and warnings, listen to NOAA Weather Radio on 162.425 MHz in the southern Black Hills or 162.550 MHz in Rapid City.



Visitor Center Exhibits

The Visitor Center is a great place to start your park visit. Whether you are intrigued with the cave, prairie, or both, it is easy to discover more about the park by exploring the exhibit rooms. The upper exhibit room has displays with topics ranging from how the Plains Indians used the bison to how the park manages the prairie. The cave exhibit room explains cave formations and the colorful history of the park. A slide program explains the development of the cave.

Stop in the visitor center for information, cave tours, maps, exhibits, book sales, backcountry permits, and Golden Age and Golden Access Passports, or National Parks Passes.

Ranger Programs

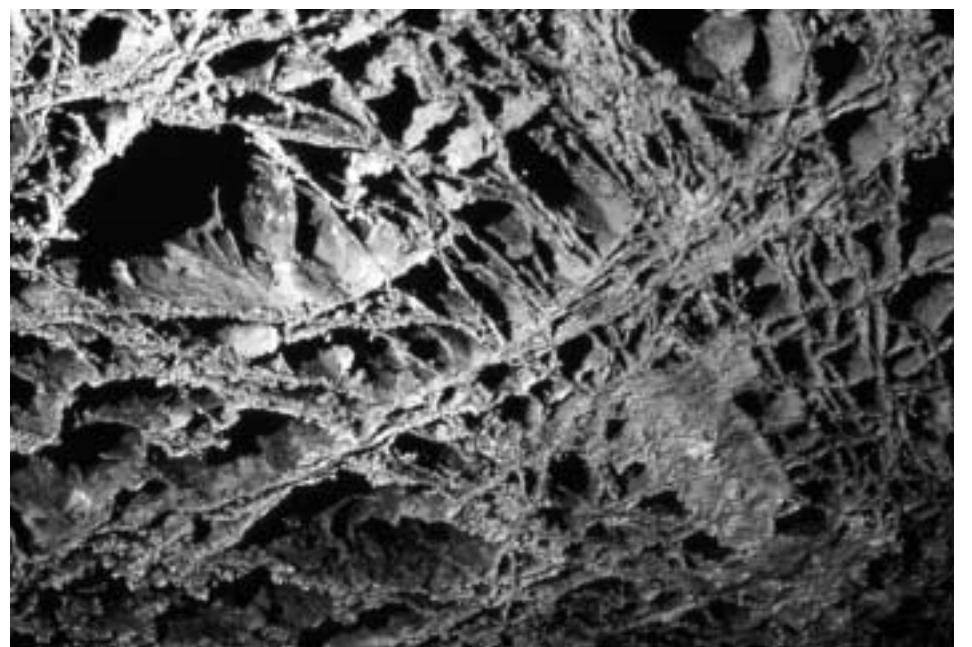
When you are planning your visit, plan to attend one of the ranger-led programs offered each day. There are many interesting programs, such as a hike on the prairie or in the forest investigating some aspect of the park. These might include edible plants, the relationships of the park's animals and plants, the effects of exotic plants, or the importance of fire to the park's ecosystems. For more information, please ask at the visitor center information desk.

Nightly, during the summer months, park rangers present campfire programs. These are great opportunities to learn about the park. Again, the topics vary. Check with the campground hosts or at the visitor center information desk for more information.

Cave tours are offered daily (except Thanksgiving and Christmas) throughout the year. Tours provide opportunities to discover new things about this unusual cave. Tour schedules vary throughout the year. Please check the schedule on page 5 for more information.



The Cave



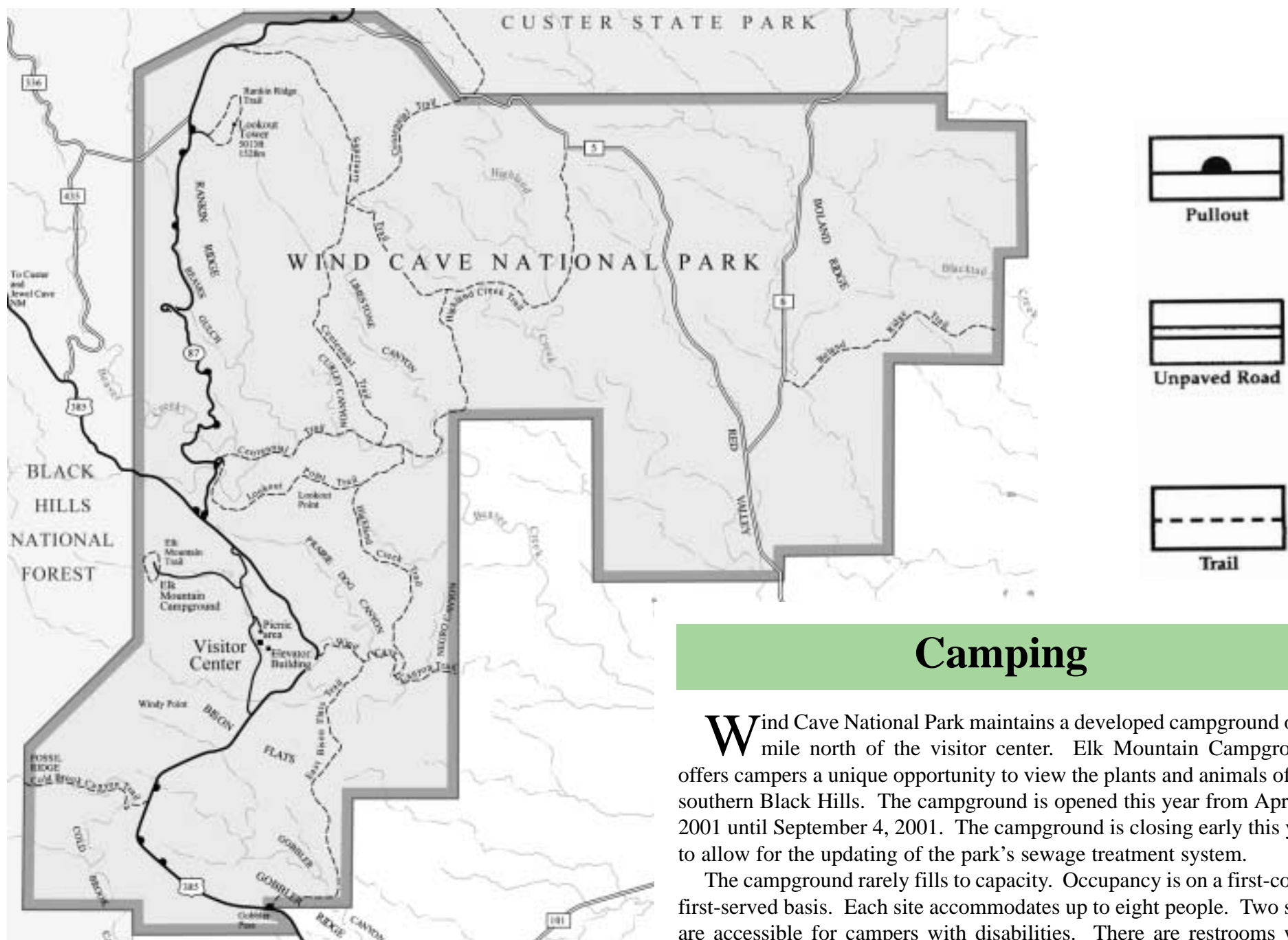
Boxwork, a rare formation, is one of the prominent features of Wind Cave.

Wind Cave is quite different from other caves. Instead of stalactites and stalagmites, the cave is decorated with boxwork. Boxwork is a crystalline formation that probably predates the cave. We believe that it formed in tiny cracks within the limestone. Later, when the cave formed, the limestone dissolved, revealing the delicate crystal fins that had filled the cracks.

Wind Cave is also known for the maze-like configuration of its passageways. Few caves on this planet are longer or more complex. All of the known cave passageways lie beneath a land area of about one-square mile.

To see the cave, stop at the visitor center. The newspaper has a complete schedule of available tours on page 5.

Planning Your Visit



Hiking

Wind Cave National Park includes 28,295 acres of prairie grasslands and ponderosa pine forest. The park is a fascinating combination of ecosystems where eastern habitats meet western ones. They support a diverse assortment of life. Hiking any of the 30 miles of trails can help visitors better understand the park. Many trails can be combined to create interesting round-trip hikes. You may want to leave the trails and travel cross-country along the ridges, through the canyons, or across the rolling prairie. A topographic map is recommended and is available at the visitor center. The Wind Cave Canyon Trail will be closed this summer to allow for the upgrading of the park's water supply system.

Centennial Trail

An excellent example of the diversity of the park is Wind Cave's six-mile section of the Centennial Trail. This trail crosses the prairie, climbs the forested ridges, and explores the wetter, riparian habitat of Beaver Creek. The 110-mile Centennial Trail meanders from Wind Cave National Park north through the Black Hills.

Nature Trails

There are three nature trails within the park. The Rankin Ridge Nature Trail leads to the highest point in the park, where the views are spectacular. The Elk Mountain Nature Trail explores an ecotone, or meeting zone, where the grassland and forest converge. The Prairie Vista Nature Trail starts at the visitor center and explores the prairie grasslands. Booklets are available at the trailheads. The trails are about one mile in length.

Backcountry Camping

The backcountry of Wind Cave National Park offers visitors an excellent opportunity to experience and enjoy the abundant resources of the park. Backcountry camping is permitted in the northwestern part of the park. Within this area are several different habitats - prairie, forest, and riparian - with a variety of plants and animals living there. Permits are required and are free. They can be obtained at the visitor center or at either of the Centennial Trailheads.

Camping

Wind Cave National Park maintains a developed campground one-mile north of the visitor center. Elk Mountain Campground offers campers a unique opportunity to view the plants and animals of the southern Black Hills. The campground is opened this year from April 2, 2001 until September 4, 2001. The campground is closing early this year to allow for the updating of the park's sewage treatment system.

The campground rarely fills to capacity. Occupancy is on a first-come, first-served basis. Each site accommodates up to eight people. Two sites are accessible for campers with disabilities. There are restrooms with cold water, but no showers or dump stations. Church services are offered in nearby towns. Please see the campground bulletin boards for information.

Group camping is available by reservation. Contact the park at 605-745-4600 for group camping information or reservations.

The fee for camping is \$10.00 per night from mid-May to September 4, 2001. From April 2 to mid-May, facilities at the campground are reduced. The fee is \$5.00 per night during these times. Visitors holding a Golden Age or Golden Access Passport pay a half price fee. The campground is closed from September 4 until the first Monday in April. For more information call 605-745-4600.

Protecting Park Resources

Park resources are for everyone to enjoy. Antlers, bones, rocks, and plants are part of the ecosystem and important for the survival of some animals. Please do not collect or remove anything.

Do not leave traces of your visit. Litter is unsightly and spoils the park experience for everyone.

Constant travel through prairie dog towns can cause erosion and destroy the grass, the prairie dog's main food source. Help them by not walking in the dog towns. Be aware that rattlesnakes are sometimes found in dog towns and in rocky areas of the park. Bison also frequent dog towns. They can run 35 mph and may weigh a ton! The animals of the park are wild and unpredictable. Respect them and give them plenty of space.



Opportunities to Learn about the Park

Wind Cave offers some wonderful opportunities to learn about the resources of the park. Ranger guided hikes, cave tours, or campfire programs provide interesting information about many different aspects of the park. Exploring the visitor center, participating in the Junior Ranger Program, or hiking park trails are also great ways to discover what is special about this national park.

Teachers wanting an opportunity for their students can participate in the park's Connections program. These hands-on learning programs help students understand the park's web of life and importance of each part of it. The Connections program is offered in May. The park also has a web-site program: Water in the Environment. This is a teaching unit that will help students understand water and its impacts underground. Teachers may call the park at 605-45-4600 for more information.



Cave Tours

Cave Tour Information

Many different cave tours are offered daily. All tours are ranger guided and leave from the visitor center. Tickets are sold on a first-come, first-served basis at the park. Tickets must be purchased at least five minutes before tour times.

Garden Of Eden

This 1-hour tour is our least strenuous tour. Almost all of the features of Wind Cave are seen on this tour. Samples of boxwork, popcorn, and flowstone are seen along the ¼ mile trail. The tour enters and leaves the cave by elevator and has 150 stairs.

Natural Entrance Tour

Visitors walk through the middle level of the cave where boxwork is abundant. This tour begins at the natural entrance where the cave was discovered and exits by elevator. This moderately strenuous, 1¼ hour tour has 300 stairs most of which are down.

Fairgrounds Tour

This tour includes some of the larger rooms found in the developed area of the cave. Visitors will see examples of many cave formations, including boxwork. The tour is moderately strenuous and enters and exits the cave by elevator. There are 450 stairs along the route with one flight of 90 up steps. The tour lasts 1½ hours.

Tours For Visitors With Special Needs

The visitor center and the cave are accessible to people with limited mobility. Please call ahead to make special arrangements or ask at the information desk for a special tour. Limited areas of the cave are accessible to wheelchairs. There are fees charged for these services. Please call the park (605) 745-4600 for more information. The park has a TTY for the hearing impaired.

Reservations

Most cave tours are first-come, first-served, however reservations are either strongly recommended or required for the Candlelight and Wild Cave Tours. Reservations may be made by calling the park at 605-745-4600. We begin taking reservations one month before the tour.

Ranger Programs

Discovery Activity

Daily, during the summer, ranger talks or demonstrations take place at the visitor center. These programs explain some facet of the park. Topics may include local wildlife, plants, geology, area history, and cave surveying. Check at the visitor center for meeting place and topic.

Prairie Hike

Explore the park's habitats with a ranger. This 2-hour activity begins at the visitor center. The group will then drive to a nearby trailhead. Hiking boots or sturdy shoes and water are advised. Check at the visitor center for details.



Fire Ecology Hike

Learn about the effects of fire on the habitats of the park. This 2-hour activity will meet at one of the park's trailhead. Check at the visitor center information desk for details. Hiking boots or sturdy shoes and water are advised.

Campfire Program

Become better acquainted with Wind Cave National Park. Evening campfire talks are presented nightly during the summer at the Elk Mountain Campground amphitheater. Topics may include wildlife, plants, geology, park management, and history. The programs last about 45 minutes.

Specialty Tours

Candlelight Tour

Experience the cave by candlelight. This tour takes place in a less developed, unlighted part of the cave. Each participant will carry a candle bucket. Shoes with non-slip soles are required. No sandals! This tour is limited to 10 people and the minimum age is 8. This more strenuous tour covers 1 mile of rugged trail and lasts 2 hours. Reservations are strongly recommended. We begin taking reservations one month before the tour. Please call the park (605) 745-4600 for more information.

Wild Cave Tour

Explore the cave away from the developed trails. On this 4-hour tour visitors will be introduced to basic, safe caving. Wear old clothes and gloves, as much of the trip will be crawling. Long pants, long sleeved shirts, and sturdy, lace-up boots or shoes with non-slip soles are required. The park provides hard hats, lights, and kneepads. Please do not bring jewelry, watches, or other valuables on the tour. This tour is limited to 10 people and the minimum age is 16. We require a signed consent form for participants 17 and under. Reservations are required for this tour. We begin taking reservations one month before the tour. Please call the park (605) 745-4600 for more information.

Tour Information and Safety

All tours are ranger guided and leave from the visitor center. Tickets are sold on a first come, first served basis, except for the Candlelight and Wild Cave Tours. During peak summer visitation, long waits for tours may be encountered. To avoid waits, the best time to visit the cave is during the early hours of the day. During the summer, weekends are good times to visit; Tuesdays and Wednesdays are the busiest days. Reservations for organized groups are available. For more information please call (605) 745-4600.

A light jacket or sweater is recommended for all cave tours, as Wind Cave is 53°F (11°C) throughout the year. Wear low-heeled shoes with non-slip soles. Cave trails are dimly lighted and trail surfaces may be uneven, wet, and slippery. Do not wear sandals. Ceilings along the tour route are low, requiring some bending.

Cave tours are moderately strenuous. Persons with claustrophobia, heart or respiratory conditions, or other physical limitations should reconsider. A tour is available, by request, for visitors with special needs. Please call 605-745-4600 or ask at the information desk.

For the protection of the cave, please do not touch or remove rocks or formations. No eating, drinking, chewing tobacco or gum while in the cave. Please do not step off the trail. Photography is permitted, but please no tripods. Pets are not allowed in the cave. There are no restrooms in the cave.



Tour Fees*

Tickets must be purchased at least 5 minutes before tour time.

	Garden of Eden	Natural Entrance	Fairgrounds	Candlelight	Wild Cave
Age 17-61	\$6.00	\$8.00	\$8.00	\$9.00	****\$20.00
Golden Age**	\$3.00	\$4.00	\$4.00	\$4.50	\$10.00
Age 6-16	\$3.00	\$4.00	\$4.00	***\$4.50	Not Permitted
Under 6	Free	Free	Free	Not Permitted	Not Permitted

- * Holders of a Golden Access Card receive a 50% discount on tours.
- ** Person must possess a Golden Age Passport to receive the discount.
- *** Minimum age for Candlelight Tour is 8.
- **** Minimum age for the Wild Cave Tour is 16. The fee is \$20.00.

Junior Ranger



The park's Junior Ranger Program is an exciting opportunity for children and their families to learn about the park. Becoming a Junior Ranger helps youngsters understand the park's ecosystems, the cave, and the animals. It also helps them learn how they can help protect all parts of our environment. Junior Ranger booklets are available for \$1.00 at the bookstore. There are activities for children up to age 12.

Program and Tour Schedule

January 2001 - April 7, 2001

Visitor Center Open daily 8:00 a.m. - 4:30 p.m.
Garden of Eden Tour 10:00, 1:00, & 3:00

April 8, - May 5, 2001

Visitor Center Open daily 8:00 a.m. - 5:00 p.m.
Garden of Eden Tour 9:30, 11:30, 1:30, & 3:00

May 6 - 25, 2001

Visitor Center 8:00 a.m. - 6:00 p.m.
Natural Entrance Tour 9:00, 10:30, 12:30, 1:30, 2:30, 3:30, & 4:30

May 26 - 28, 2001, Memorial Day Weekend

Visitor Center 8:00 a.m. - 6:00 p.m.
Garden of Eden Tour 11:00, 1:00, 3:00, & 5:00
Natural Entrance Tour 8:40, 9:20, 10:30, 11:30, 12:30, 1:30, 2:30, 3:30, & 4:30
Fairgrounds Tour 10:00, 12:00, 2:00, & 4:00
Campfire Program 8:30 p.m. Saturday & Sunday

May 29 - June 2, 2001

Visitor Center 8:00 a.m. - 6:00 p.m.
Garden of Eden Tour 12:30, 1:30, 2:30, & 3:30
Natural Entrance Tour 9:00, 10:00, 11:00, 12:00, 1:00, 2:00, 3:00, 4:00, & 5:00

June 3 - August 18, 2001

Visitor Center 8:00 a.m. - 7:30 p.m.
Garden of Eden Tour 8:40, 10:40, 12:40, 2:40, 3:30, 4:40, & 5:30
Natural Entrance Tour 9:00, 10:00, 11:00, 12:00, 1:00, 2:00, 3:00, 4:00, 5:00, 6:00, & 6:30.
Fairgrounds Tour 9:40, 10:20, 11:40, 12:20, 1:40, 2:20, 3:40, & 4:20
Candlelight Tour 10:30 a.m. & 1:30 p.m.
Wild Cave Tour 1:00 p.m.
Ranger led Hike 9:00 a.m.
Campfire Program 9:00 p.m.

August 19 - September 3, 2001

Visitor Center 8:00 a.m. - 6:00 p.m.
Garden of Eden Tour 8:40, 10:30, 11:40, 1:40, 3:40, & 4:30
Natural Entrance Tour 9:00, 10:00, 11:00, 12:00, 1:00, 2:00, 3:00, 4:00, & 5:00
Fairgrounds Tour 9:30, 11:20, 12:20, 1:20, & 3:20
Candlelight Tour 1:30 p.m.
Wild Cave Tour 1:00 p.m. **Weekends Only** Aug. 19, 25, 26, Sept. 1 & 2
Campfire Program 8:00 p.m.

September 4- September 22, 2001

Visitor Center 8:00 a.m. - 6:00 p.m.
Natural Entrance Tour 9:00, 10:30, 12:30, 1:30, 2:30, 3:30, & 4:30
Evening Program 7:00 p.m. Tuesday, Thursday, & Saturday beginning September 4.

September 23 - October 6, 2001

Visitor Center 8:00 a.m. - 5:00 p.m.
Garden of Eden Tour 9:30, 11:30, 1:30, & 3:30

October 7 - Spring 2002

Visitor Center 8:00 a.m. - 4:30 p.m. except: Thanksgiving & Christmas
Garden of Eden Tour 10:00, 1:00, & 3:00

Tour schedules are subject to change.

IN CASE OF AN EMERGENCY:
Contact any park ranger or call the visitor center at 745-4600. After hours call 911.

Fire - Friend or Foe?

The winds are picking up - a storm is coming. Thunder and lightning are crashing all around. Lightning strikes a tree on the hillside nearby. A small fire starts at the base of the tree. But it has been very dry and the small fire grows larger and larger...

In the heat of last summer's tumultuous fire season lightning did strike a tree on the northern boundary of Wind Cave National Park. A small flame soon turned into a large uncontrolled wildfire that burned for three days. Over 1,100 acres (about 1¾ square miles) of ponderosa pine forest burned. What should our reaction to this fire be? One of disappointment or one of approval-where does fire fit into today's National Parks and wild lands?

Fire has many uses in the ecological scheme of things and has been a major force on our planet for millions of years. Fire is the great cleaner of our wild lands. It removes dead litter from different habitats. It keeps forests from encroaching onto the prairie. It can be used to control some non-native plants from dominating an area where native species reside. And it provides a more diverse plant base that provides food for a diverse population of wildlife.

Fire can also be very destructive. If a fire burns too hot it can sterilize the soil so no plant life can take hold. This causes soil erosion when winds and rains come. In areas where the soil is singed the roots of native plants are damaged and non-native plants, like Canada thistle, take over. A fire can burn houses, cost the public a lot of money, and can kill people.

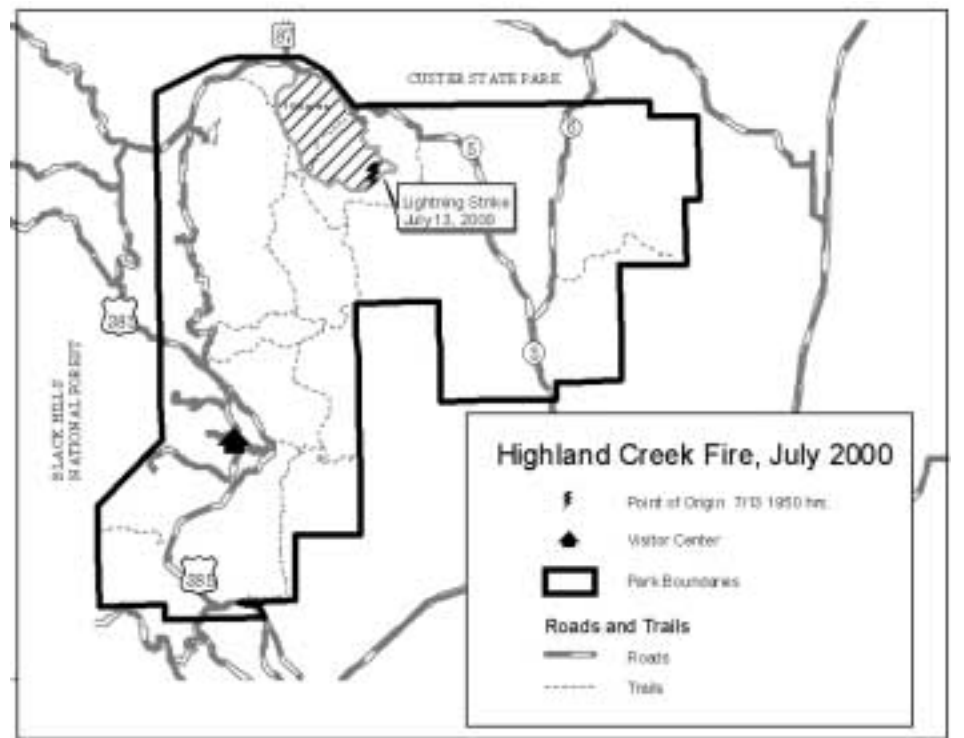
There is a fine line between these two arguments. Park managers know that fire has always been an integral part of America's wild places. Fire scientists determine that, historically, the prairie lands at Wind Cave National Park burned on an eight to twelve year cycle. These fires help protect the thriving prairie ecosystem. It keeps the trees from encroaching upon the prairie. Without fire, the prairie of Wind Cave National Park cannot be properly maintained and eventually there will be a forest where the rolling prairie once was.

Another park resource indirectly affected by fire is the cave. Fire limits the number of trees above the cave. This in turn influences the amount of water that seeps through the soil to underground passageways. A ponderosa pine can use 100 gallons of water on a warm summer day! Today where trees are overabundant the cave is not getting the water it historically has had.

One of the challenges of using fire as management tool is the growing number of people living on or near our wild lands. Whenever there is a fire near houses or structures there is always a chance of disaster. However, if we want to keep our wild lands wild we need fire to be part of the cycle.

Wind Cave National Park's fire management team must take into consideration all of the pros and cons of fire. People have only recently recognized the need for fire to maintain healthy ecosystems. However, more than 100 years of fire suppression combined with past land-use practices have resulted in heavy buildups of dead vegetation, dense stands of trees, and a shift to species that have not evolved and adapted to fire. Because of these conditions, today's fires tend to be larger, burn hotter, and spread farther and faster, making them more severe, more dangerous and more costly in human, economic, and ecological terms.

The heat of last summer's record fire season sparked the flames of discussion on how to best live and work with fire. Fire is paradox. It can cause new plants to sprout within days or cook soil to the point that it can't sustain life for decades. The more park managers and the public know about fire, its importance, and its dangers, the better prepared we will be to safely use fire as a land management tool.



A satellite identified the location of the lightning strike that started the Highland Creek fire and GPS units helped map the fire's perimeter.

Geographic Information Systems at Wind Cave National Park

Maps are one of the oldest, and most effective, tools used by humans. We use maps to find our way, plan for change, and to record how things are arranged. Maps provide a wealth of information.

Maps are important tools in managing the resources of Wind Cave National Park. Vast amounts of information are necessary to determine the best way to care for the park. In the National Park Service, a form of custom mapping, called Geographic Information Systems (GIS), is being used. GIS is a technology that organizes information. The main goal of using GIS is to develop a better understanding of park resources so they can be protected.

In the strictest sense, GIS is a computer system capable of assembling, storing, manipulating, and displaying geographically referenced information. In layman's terms, GIS takes information from a database and creates a map image that is used to understand the locations and relationships of park resources. GIS also allows resource specialists to make maps of what things might be like if certain decisions are made. This allows managers to compare alternatives and pick the best way to manage the resource.

A GIS system can create geographical representations of almost anything: rainfall, vegetative communities, prairie dog towns, and prescribed burning parameters just to name a few. It has been extremely useful in the park's efforts to control non-native and invasive plant species. There are over 90 non-native plant species in Wind Cave National Park, often these species compete with native plants for water, nutrients, and space. Before we can control these invaders, we must understand how they affect the ecosystem and where they thrive in the park. Much of this information can be illustrated on a GIS map.

Data about vegetative communities is gathered in the field using a hand-held global positioning unit (GPS). It is then entered into the GIS program. That data is used to produce a map showing the location of plant species, the size of their colonies, and if native plants are being displaced. These maps are used to see if invasive species are interfering with plants that make up forage for animals within the park. The system helps managers develop a plan for controlling non-native species and determine whether the strategies are working.

This powerful system can also use information from satellites that monitor the weather of the earth. Minutes after a lightning storm, the fire management team has a map accurately marking where and when each lightning strike touched the ground. This helps fire teams respond quickly to wild fires.

GIS also helps the fire management team use fire as a tool to maintain a healthy ecosystem. Before any prescribed fire, managers develop maps of fuels, terrain, and potential dangers to create the safest and most effective fire plan. This preplanning helps fire management officers determine what the wind speeds, humidity, and temperature must be in order for the prescribed burn to meet the management objectives.

GIS allows park managers to make better decisions. The National Park Service uses GIS as one of its most important tools in understanding and maintaining the resources in Wind Cave National Park.

Sometimes You Have to Turn Off the Lights to See

The night sky was exploding with light over my head, and my car would not climb out of the valley fast enough for me to get a better look at the show. Finally I reached the top of one of the rolling hills where the prairie yielded a view of its connection to the aurora borealis. The lights of the sky were dancing in rhythm with the waving prairie grasses.

I watched in awe as the yellow-green ribbons of light exploded into hues of orange and red. The show continued for some time, then the light slowly faded to the north. I watched dancing remnants hoping to see more, but the lights of a nearby city slowly overcame them. Every few minutes I could see the aurora trying to escape the pollution of the city, but each time it failed.

"Pollution?" you might ask. Yes, pollution. Light from a city that spills into the night sky is a form of pollution sometimes called "sky-glow".



The night sky is an important part of a Wind Cave National Park experience. The park has a class I sky. This means that there is little light or air pollution. Here as the day fades into night, stars and planets shimmer to life. The Milky Way sweeps a path across the sky intersecting Cassiopeia and Cygnus, meeting Sagittarius at the southern horizon. Even for those of us with limited knowledge of astronomy, the night sky is a part of the park experience. It gives us a place and time to sit back and peer into the endless unknown.

The darkness is part of nature's clock. The changes in light and dark trigger hormonal changes in wildlife. Elk notice the early fading of daylight into dark in the autumn. This triggers their mating season. The challenging bugle of the bull elk echoing through the hills and valleys introduces us to one of the amazing sounds of the wild.

However, no matter what the season, night is an active time in the park. Owls soar silently through the sky. Bats hunt insects, eating them by the thousands. Coyotes howl in harmony and bison bellow during their mid-summer mating season.

It is the mission of the National Park Service to protect the animals and culture of an area but this is only part of the mission. The environment in which these wonderful things are found must also be protected. That means that the night sky over the parks must be protected.

Protecting the dark is a challenge. In the park, we have eliminated lights that are not needed and shielded others whenever possible. Still, as the cities around us grow, so does the amount of light pollution they send into the sky. An awareness of light pollution is important and is growing. The Environmental Protection Agency has a program, Energy Star, which helps industry use appropriate lighting. Other non-profit organizations like the International Dark-Sky Association and the National Parks and Conservation Association are leading an effort to help raise awareness and eliminate lights that block the night sky. For more information see their website at <http://proxima.astro.virginia.edu/ida/darksky/>.

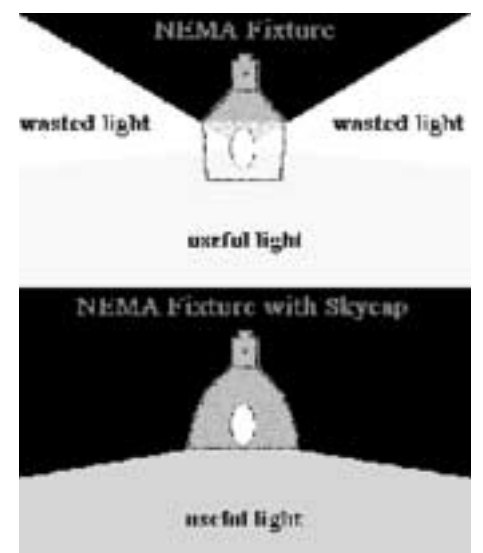
Security is important for everyone and lights provide security. Using energy efficient, shielded lights protect the night sky by directing light to the ground where it is needed rather than illuminating the sky. At least 30% of the energy that powers outdoor lighting is wasted. We could save money and energy if we eliminated that waste. Here are ideas:

- Consider motion detection lights on the outside of a structure instead of dusk to dawn lighting. They come on only when needed.

- Use light shields, high efficiency fixtures, and low-sodium lights. With correct fixtures you can use a lower wattage to achieve the same effect.

- All outdoor lights should have "Sky Caps" to focus light downward. Use fixtures that direct light down into a confined area; open-sided fixtures are usually inefficient and may create a dangerous glare rather than a safe highlight.

- Encourage your local government to look into energy-saving alternatives that protect the night sky.



Picture from International Dark Sky Assn.

By becoming aware of the situation, we can protect one of our greatest natural resources - the night sky. It is important to us as a culture, it saves energy and money, and it is critical to the science of astronomy.

Experiencing the prairie while surrounded by the inky blackness of the night interrupted only by the glow of the northern lights, a distant lightning storm, or the quick flash of a shooting star, is a tie to our past. It gives us insight into the moods of the world around us. It is part of what is special about this national park. Enjoy it!

The Expanding Wilderness

Why don't you check that lead?" asked the trip leader. As I blew the air out of my lungs, making my chest small enough to squeeze through the tight passage, my optimism wasn't real high. The most I was hoping for was a place to turn around so I wouldn't have to wiggle back out. But to my surprise, the confining walls disappeared. I found myself in a large room with passages going everywhere. As I shined my headlamp around the room, I wondered if this was the first time light had ever reflected off the glittering crystals. For the first time in my life, I truly understood what a wilderness is.

Wind Cave is an excellent example of the ideal wilderness. Unfortunately, as population trends and urban sprawls continue, America's wilderness areas are being pressured.

Amidst this turmoil of shrinking wild areas on the earth's surface, more of the underground frontier of Wind Cave National Park is being discovered. While still a long way from leaving park boundaries, last year the mapped length of the cave grew from 86.53 miles to 94.23 miles. This is the second largest increase in the history of the Wind Cave survey project and the project is far from being finished. In April 2001, the cave was 97 miles long. Research predicts that only 5% of the cave has been found.

With each new mile of cave that is mapped, there comes challenges to protect it. To preserve this expanding wilderness, the staff at Wind Cave has been busy identifying impacts on the cave. Cavers are required to follow strict guidelines to make sure they impact the cave as little as possible. While mapping and exploring, cave explorers keep a record that

inventories formations, as well as geological, biological, hydrological, and cultural resources encountered on each survey trip. This information, entered into a database, helps the cave management staff identify relationships that might be impossible to notice otherwise. Unusual or rare features are also identified and monitored to ensure their protection.

The protection of the Wind Cave wilderness is not limited to underground activities. Development above the cave can cause changes within the cave. Through a water quality study, park staff realized that pipes, responsible for transferring sewage from the visitor center to the treatment area, were leaking. While little evidence of pollution in the cave has been found, imagine the surprise of a caver surveying a new cave passage only to find sewage! Aesthetic problems aside, microbes and other life forms in the cave's fragile ecosystem could be affected. To remedy this, the old pipe system was replaced in the summer of 2000 with dual-lined pipes. The outer layer of the pipe has leak detection ports; if moisture is detected the system can be repaired before any sewage escapes.

A similar problem exists with the campground sewage system where septic tanks and leachfields are used. The campground system will be connected to the visitor center's system this year. These connecting lines will also have dual pipes with leak detection ports. Park visitors may notice construction areas near the visitor center and park entrance road.

Wind Cave is an incredible wilderness. These and many other projects ensure that this expanding wilderness will remain protected for future generations!



The Park Bookstore

The Black Hills Parks & Forests Association sells books, maps, and other park related publications in visitor centers at Wind Cave National Park, Jewel Cave National Monument, Custer State Park, and the Black Hills National Forest. The association also publishes interpretive books

and materials about these park and forest areas.

Cooperating associations are non-profit, tax exempt organizations authorized by congress to aid and promote "educational and scientific" activities within national parks. As such, all profits from

association sales support the educational, interpretive, and research activities of these agencies.

Some of the books that can be purchased in the Wind Cave National Park bookstore are shown below. There are many more titles available at the store, by mail

order, or from the association web site, www.blackhillsparks.org.

Membership in the Black Hills Parks and Forests Association supports the organization and entitles members to a 15% discount on all purchases. The membership is \$15.00 per year. For more information call 605-745-7020.

Wind Cave: An Ancient World Beneath the Hills - In this wonderful, easy to read book, Art Palmer explains the geology of Wind Cave and how it is related to the Black Hills. The charts and graphs help make the topic easily understood to people unfamiliar with geology. The pictures alone of the unusual Wind Cave boxwork, make this book well worth the investment. \$6.95



Jewel Cave: A Gift From the Past - Jewel Cave's geological history is traced by Art Palmer in this book about Jewel Cave National Monument. As in the Wind Cave book, Palmer uses charts and graphs to make the topic easily understood to people unfamiliar with geological terms and ideas. The color photos illustrate Jewel Cave well and make this an ideal gift or souvenir. \$6.95

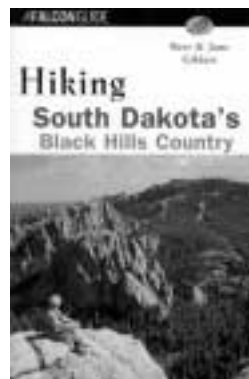


Wind Cave, The Story Behind the Scenery - If you are interested in learning more about the ecosystems, wildlife, and history of Wind Cave National Park, this book by Ron Terry is an excellent choice. It contains outstanding photographs and information about the cave and its unusual boxwork formation. This book goes beyond the cave, including photos and insights about the park's incredible prairie. This book is part of a series of books that explore the natural, geological, and cultural history of the national parks. \$7.95

Jewel Cave, The Story Behind the Scenery - This book by Karen Rosga is also part of the Story Behind the Scenery series. It is well illustrated and describes the natural, geological, and human history of Jewel Cave National Monument. The book contains remarkable photographs of the cave, its unusual features, and the surrounding landscape. The relationships of the cave, the landscape, and the plants and animals are skillfully presented in this interesting story of Jewel Cave National Monument. \$7.95



Trails Illustrated Map, Black Hills Southeast - If you are interested in hiking in Wind Cave National Park or Custer State Park, this is the trail map to have. This tear-proof, waterproof map details the hiking trails, campsites, roads, elevations, and many other standard features of a topographic map. Wind Cave National Park is illustrated on one side and Custer State Park and the Black Elk Wilderness are on the other side. The map is part of a series of National Geographic Trails Illustrated Maps. \$9.95



Hiking South Dakota's Black Hills Country - This hiking book by Bert and Jane Gildard helps visitors explore the hiking trails of the Black Hills. The book includes nearly all the trails in the area from Wind Cave, north to Devils Tower, and east to the Badlands. Detailed descriptions and maps help hikers get to the trailheads and describe what to expect on the trails. The guide also includes tips on safety, elevation charts, and tips about hiking with children. \$14.95

Name			
Address			
Phone			
Quantity	Title	Price	
	Member Discount		
Subtotal		_____	
Shipping		_____	
SD orders add 5%		_____	
Membership		_____	
Total		_____	

Mail to: Black Hills Parks & Forests Association
 RR 1 Box 190
 Hot Springs, SD 57747

I have enclosed my check payable to:

Black Hills Parks & Forests Assn.
 I would like to charge the order to my:
 Visa Discover Mastercard

Expiration Date _____

Signature _____

Postage and Handling Charges (Valid in U.S. only)	
Up to \$3.00	\$2.50
\$3.01 to \$10.00	\$3.00
\$10.01 to \$25.00	\$4.00
\$25.01 to \$50.00	\$5.00
\$50.01 to \$75.00	\$5.75
Over \$75.00	\$7.25
Mail tube (cave maps)	\$3.50