



Calcite Chronicle

The official newspaper
of Jewel Cave National Monument

Gold Fever Leads to Crystal Discovery

OVER A HUNDRED MILES OF MAZE-LIKE PASSAGES LAY HIDDEN BENEATH the ponderosa pine covered Black Hills. Yet, this mysterious crystal landscape sat undiscovered until modern times. The gold rushes of the late 1800s would change this, bringing modern equipment and explorers with a curiosity for geology to crack open this vast treasure of scientific discoveries.

Except for the occasional fur trapper, European-American presence in the Black Hills remained non-existent until Lt. Colonel George A. Custer's expedition into the hills in 1874. Upon returning, Custer reported finding gold along French Creek, near present day Custer city. News of the gold spread throughout the East, and prospectors flooded the Hills. This was in violation of the Laramie Treaty of 1868, which ceded the Black Hills to the Lakota Sioux.

At first, the U.S. Army acted to remove the invading prospectors, but the 11,000 new residents of the Black Hills overwhelmed the army's limited abilities. These prospectors, who lived in tents and shacks, soon found that French Creek offered poor panning. The hopeful gold diggers remained, their population shifting toward reports and rumors of other gold finds in the northern Hills. After the first year, only 250 remained in Custer. These pioneers took permanent residence in the area and shifted from gold to timber and ranching.

Following the rumors of gold, Felix Michaud, a French Canadian, traveled with the 1874 gold rush to Custer. As gold fever died, he took residence in the new town of Custer and ran a livery near Lightning Creek Pass. His sons, Frank and Albert, inherited their father's gold fever and made their way to the Klondike in 1897. Like their father, they found the tales of gold better than reality and soon returned to the Black Hills.

In the spring of 1900, as the Michaud brothers rode from Newcastle in present day Wyoming, up Hell Canyon to their father's ranch on Lightning Creek Pass, they heard a strange noise. When they investigated, they found a strong wind blowing from a hole in the canyon wall. Curious, they continued on to Felix Michaud's ranch, only to return a few days later with tools and blasting charges to widen the passage. Inside, they found a cave filled with dazzling calcite crystals, creating the name Jewel Cave.

The brothers filed a mining claim for the site and began a process of widening the passageways and constructing navigable paths in the cave. Few could mistake their intention to open their find to the public as a place for tourism.



Top: Jewel Cave's famous nailhead spar glows beneath a caver's head lamp (NPS Photo). Bottom: A ranger and a family stand outside the newly constructed Ranger Cabin in 1936 (NPS Photo).

News of Jewel Cave's crystal passages reached President Theodore Roosevelt who declared the site a national monument on February 7, 1908. This distinction preserved the cave for scientific and public interest. Management of the cave and its tours would change hands several times over the years before the National Park Service took over tours, conservation, and exploration of the cave in 1940.

Welcome from the Superintendent

The employees of Jewel Cave National Monument are pleased to welcome you! As a unit of the National Park Service, we invite you to explore the unseen world that lies below.

With more than 150 miles surveyed, Jewel Cave is recognized as the second longest cave in the world. Airflow within its passages indicates a vast area yet to be explored, and exploration continues.

Our variety of cave tours provide opportunities for you to view this pristine cave system and its wide array of rare formations: calcite crystals, stalactites, stalagmites, draperies, frostwork, flowstone, boxwork, and hydromagnesite balloons. The cave is also an important hibernaculum for several species of bats.

Established in 1908, Jewel Cave provides a glimpse into the inner geological workings of the Earth. By going on a guided cave tour with a Park Ranger, you can experience the wonders of nature for yourself.

Topside, the scenery is spectacular as well, and by hiking the surface trails, you will witness great views of the Black Hills. Here, you can feel like you are part of the natural world. Ponder your surroundings, such as the effects of fire on the forest. Capture a glimpse of the native wildlife which includes mule deer and elk. Or, step back in time by going on the Historic Lantern Tour.

Welcome to Jewel Cave!

Larry Johnson,
Superintendent

153 Miles of Charted Passages

Mile after mile of maze-like corridors make Jewel Cave the second longest cave in the world; yet, the survey is far from complete. Volunteer teams continue to enter the cave each month to explore and map out uncharted passages. During your visit, ask a Park Ranger about the current known length.

Surface Opportunities

Jewel Cave National Monument is more than just an underground resource. Park Rangers offer daily programs covering wildfires, bats, and animal tracks. With ten miles of trails in or adjacent to the Monument, even more opportunities expand your experience of the surface features.

Guided Tours of Jewel Cave

Access to Jewel Cave is only available by our extremely popular ranger guided tours. A wide range of tour options are available to accommodate most any level of physical activity or adventurous spirit. Reservations are strongly recommended for all tours at all times of the year.

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The National Park Service cares for the special places saved by the American people so that all may experience our heritage.

Rules and Regulations

PETS

Do not leave your pet in your vehicle while visiting the cave or for any length of time during the summer. Temperatures in the vehicle can become extremely dangerous.

Pets are only permitted in the visitor center parking lot. They are not permitted on any trails or picnic areas. We ask that you abide by these rules to protect your pet and Monument wildlife.

kennel space is available in the nearby town of Custer.

TRAVELING IN THE MONUMENT

Off-road driving or bicycling is prohibited in the Monument and on its trails.

Deer frequent Monument roadways; be aware of their presence, as collisions are possible.

UNDEVELOPED CAVES

Entrance into undeveloped caves is not allowed without a special use permit. Untrained, ill-prepared, and ill-equipped exploration of caves can damage cave formations and is a major reason for cave-related injuries and deaths. These resources are protected by federal law for future visitors to view in their natural state.

WILDLIFE, PLANTS, ARTIFACTS, AND OTHER NATURAL RESOURCES

Please help keep the Monument in its natural state. Removing or disturbing any natural resources on the surface or in the cave is illegal. Please do not remove artifacts, bones, rocks, or cave formations. Each aspect of the cave plays an important role in the Monument's history.

Many surface features are fragile. Please do not disturb wildflowers, plants, or wildlife. Feeding of wildlife is not allowed. Furthermore bats are common at Jewel Cave and can be found on the Historic Lantern Tour or in the surrounding forest. Please do not disturb any bats.

WEAPONS

Federal law allows people who can legally possess firearms under federal, state, and local laws to possess firearms while visiting Jewel Cave National Monument. However, firearms are not permitted in any Monument facilities or on cave tours.

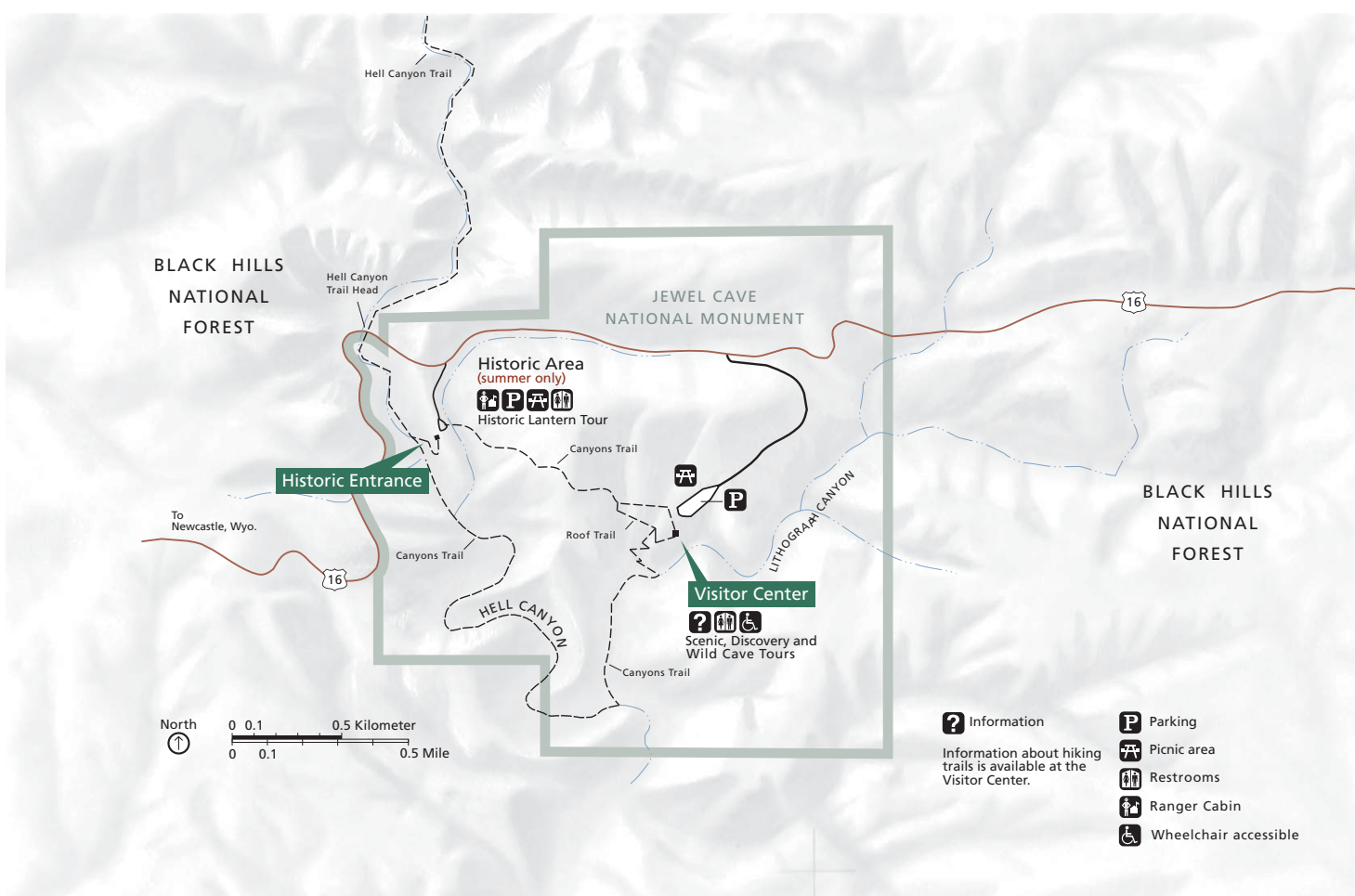
Hunting and trapping are not permitted in any part of Jewel Cave National Monument.

Left: A Park Ranger leads a guided trip along the Roof Trail (NPS Photo).



Hiking on the Cave

	Length	Conditions	Description
Roof Trail	0.25 miles (30 minutes)	Moderate inclines	Explore the relationship between the surface and subsurface resources of Jewel Cave National Monument by walking this self-guided trail. The trail begins at the covered patio area outside the visitor center lobby and returns to the north end of the visitor center.
Canyons Trail	3.5 miles (2 - 4 hours)	Moderate to steep inclines	Explore the surface resources and geologic features of the Monument by hiking in the backcountry. The trail begins at the covered patio outside the visitor center lobby and winds its way down Lithograph Canyon. Turning right at the fence, enter Hell Canyon, and stroll along a combination of unpaved roads and open meadows to a sign that leads to the Historic Entrance of Jewel Cave.
Hell Canyon Trail	5.5 miles (2 - 4 hours)	Easy to fairly strenuous inclines	Trek along limestone cliffs with outstanding views of Hell Canyon and the surrounding area. From Jewel Cave, the trail head is approximately one mile west of the visitor center entrance on the north side of Highway 16. The trail begins just west of the parking area, and the first 1/2 mile climbs at a steep pitch. From there, grades are level to easy. The last two miles follow a two-track road along the bottom of Hell Canyon, returning to the trail head.



THINGS TO REMEMBER

- Always inform someone of your whereabouts and hiking plans.
- Have water and food with you at all times when on trails.
- Stay on designated trails and do not cut switchbacks.
- Be aware of frequent thunderstorms and lightning during summer afternoons.
- Watch for poison ivy, rocks, roots, and other hazards along the trail.
- Pack out your trash, and if trash is found along the trail, please pick it up.
- Please do not feed the wildlife.
- Please do not pick the wildflowers.
- In summer, check your body and clothing frequently for ticks.
- Cell service is not available and nonexistent at the Monument. Do not rely on cell phones or GPS for directions or assistance.

Surface Programs

ALTHOUGH OFTEN FORGOTTEN, THE SURFACE of Jewel Cave also provides a unique experience within the Black Hills. A guided hike along the Monument's trails, or a chance to speak one-on-one with a Park Ranger, will awaken a deeper understanding of the ponderosa pine forest and the open meadows of the Jasper Fire area. Guided ranger programs are offered throughout the summer months.

GUIDED ROOF TRAIL HIKES

A 40 minute guided hike along the Roof trail departs daily at 2:00 p.m. Rangers discuss the native flora, fauna, forestry, and the interconnection between the cave and surface resources.

GUIDED CANYONS TRAIL HIKES

A three hour guided hike along the 3.5 mile Canyons Trail departs daily at 10:30 a.m. Hike the two canyons to Jewel Cave's historic entrance and learn about the native flora, fauna, and important roles the canyons play in the development of cave formations deep beneath the surface. Visitors should bring a light snack and extra water.

PATIO TALKS

Join a Park Ranger on the visitor center patio for an interactive demonstration. Patio talks occur throughout the summer days, with topics ranging from caving techniques to fire-fighting.

Volunteer Opportunities

NUMEROUS VOLUNTEER OPPORTUNITIES are available at Jewel Cave for all walks of life and age groups. Assist resource management by removing invasive plants, cleaning cave tour routes, and restoring historic sections of the cave. Groups are welcome to participate.

Experienced cavers can contribute many volunteer hours to Jewel Cave as they assist with surveying, exploring, and performing resource management activities.



To learn more about volunteer opportunities, visit nps.gov/jeca and click on Support Your Park. Volunteer opportunities may be available on a requested basis. Group reservations are strongly advised to be made at least thirty days in advance. Interested groups or individuals can contact Jewel Cave's Volunteer Coordinator, at (605) 673-8300.



Boy Scouts from Troop 62 of Colorado volunteered at the Monument in 2010. They restored a portion of the Historic Area of the cave by removing accumulated candle wax, lint, and other litter (NPS Photo).

Great Days to Visit the Cave

NATIONAL TRAILS DAY®

June 4, 2011: join the National Park Service and outdoor enthusiasts across the country in participating with the American Hiking Society's 19th annual National Trails Day®. Help celebrate America's 200,000 miles of trails by hiking at Jewel Cave. Immerse yourself within the scenery. Listen as Park Rangers tell the story of Jewel Cave's unique surface environment on a variety of ranger guided trail hikes. No pre-registration is required for the hiking events.

FEE FREE DAYS

Fee Free days allow families to explore parks and monuments they have never visited before. All Jewel Cave tours will be free on these days. The tours will be on a first-come, first-serve basis and will only include regularly scheduled tours. Veterans Day in November is always a Fee Free day for active and retired service personnel and National Public Lands Day in September is a Fee Free day for all visitors. Keep an eye out for announcements by the Secretary of the Interior for Fee Free Days throughout the year.

Schedule of Summer Surface Programs (Early June - Late August)		
Activity	Times	Descriptions
Patio Talk	11:00 am, 1:00 p.m. and 3:00 p.m.	Join a Park Ranger for a 30 minute interactive discussion about the surface and cave environments.
Roof Trail	2:00 p.m.	Learn about the relationship between the surface and cave as a Park Ranger guides you on an easy quarter-mile trail.
Canyons Trail	10:30 a.m.	Hike with a Park Ranger through the back country, learning about the geological features of the Monument

Patio talks and surface hikes offered from early June through late August. Availability may change depending on weather and extenuating circumstances. Off-season programs may also be available. Speak with a Ranger to discover what is offered today!

Become a Jr. Ranger

The National Junior Ranger Motto is "Explore. Learn. Protect." These three words capture much of the history of the National Park Service, and our goal is to engage young people in the stories embodied in their national heritage. Geared for kids ages 5 to 12, the program exposes participants to various learning opportunities that complement the significant features of Jewel Cave National Monument. Kids have the choice to work toward a certificate, badge, or embroidered patch. Each award offers a series of requirements, which include pages from the activity booklet or taking an active part in a ranger guided program. The Monument is confident that successful participants make more meaningful connections to the resource. On a personal level, Junior Rangers often develop a sense of stewardship for the protection and preservation of other natural and cultural treasures.



Pee Wee Ranger

The Pee Wee Program is for kids ages 3 to 4. With help from parents, families, and park staff, eager participants explore the Monument through a fun and interactive booklet. Ranger guided activities also provide hands-on opportunities. Upon completion of the program requirements, participants earn a badge and embroidered patch. The program is informal, yet challenging. This program teaches participants about the purpose and meanings within Jewel Cave National Monument. Most importantly, young enthusiasts learn more about our nation's history, their own cultural heritage, and the stories within the natural world - creating the next generation of park supporters.



The Scout-Ranger Program

Boy Scout troops are welcome to visit Jewel Cave National Monument and take part in the ever-popular Scout Ranger Program. Through the completion of an activity booklet, taking part in a half-day volunteer service project, and participating in a guided cave tour, scouts can earn an embroidered patch. This unique partnership allows scouts to work alongside park staff in the field of resource management and interpretation. Dedicated scouts may also use their visitor experiences toward the completion of several merit badges. Reservations for this program are required and must be made at least three weeks in advance.



BIRDS OF PREY PRESENTATIONS

June 25 and July 30, 2011: at 1:00 p.m., Wildlife Experiences, Inc., a non-profit organization dedicated to improving the lives of animals and people through wildlife education, raptor rehabilitation, and avian conservation programs, will hold a Birds of Prey program on the Monument's visitor center patio. These ever popular talks introduce families to owls, falcons, and buzzards. Visit with avian specialists and learn about their conservation efforts.

NATIONAL PUBLIC LANDS DAY

September 24, 2011: help celebrate service and recreation on public lands by being a part of the 170,000 people who will make a difference at more than 2,300 public land sites. At Jewel Cave, a variety of volunteer assistance is appreciated. By helping remove invasive plants, maintaining hiking trails, or assisting with cave restoration, volunteers on National Public Lands Day can help the National Park Service in the preservation of their cave. To learn more about other events, visit www.publiclandsday.org.

The Fight Against Invasive Species Continues

JEWEL CAVE IS ONE OF THE MANY PUBLIC LAND SITES struggling to prevent some of America's 5,000 invasive plants from spreading across its 1,274 acres of landscape. These species compete against native plants, depriving them of nutrients and sunlight. Left unattended, the lush tapestry of native grasses that flourish in the Monument would become a monoculture of invasive plants.

Perhaps the most common invasive species in the Monument is Canada thistle, which immigrants introduced to North America in the 1700s. Now spread throughout the country, this thistle covers over 90 acres of the Monument's land.

Preserving Jewel Cave is not as easy as spraying pesticides and moving onto the next affected area. There is a cave to protect and "Everything we do on the surface has the potential to affect the cave," according to Physical Science Technician, Rene Ohms. To combat the invasive plants, a three-member vegetation crew uses an Integrated Pest Management approach, which combines chemical, mechanical, and biological controls.

Among those approaches is the use of pesticides; however, Monument staff take special consideration when using chemicals. Jewel Cave is in a karst environment causing ground water to quickly seep into the cave through permeable layers. Use of pesticides can affect cave formations, and water quality can cause the cave to be in an unnatural state.

In 2007, an Environmental Assessment was completed, which established pesticide use zones based on the known geology and hydrology of the cave environment. Results showed pesticides could be used on half of the Monument without hurting the cave. To verify that pesticides are not seeping into the cave, Resource Management staff collect and test water samples from the cave.

Each fall, Jewel Cave's vegetation crew and a specialized Exotic Plant Management Team based out of Theodore Roosevelt National Park spray areas that need intensive work. In 2010, staff tested acetic acid, in limited quantities, on Canada thistle. Using acetic acid in a few areas will allow the Monument to test first before expanding. The acetic acid breaks down very easily, and almost immediately, will turn into carbon dioxide and water. Because of this, it is not expected to have any effect on water quality in the cave. The results will be seen during the summer of 2011.

When Canada thistle grows above permeable layers of rock,



Jewel Cave's vegetation crew fights Canada thistle by cutting the seed heads off the plants before they spread (NPS Photo).

where water seeps into the cave, other techniques must be used. In these "no-pesticide treatment zones," areas larger than 500 Canada thistle plants, the biological control technique is used. Ohms states, "Insects, such as gallflies and weevils, will be introduced into the environment in the spring and fall." In smaller areas where insects cannot be supported by Canada thistle, the vegetation crews' primary technique of hand pulling and cutting is used. Devin McGinty, a member of the vegetation crew, explained, "Canada thistle's seed head is cut, then bagged, so that the possible 5,000 seeds in the seed head do not spread. Then, the rest of the plant is pulled, stressing the root system for future growth." This is an ongoing challenge because about 200 out of 800 Canada thistle sites are treated with this method each year.

Although fighting invasive plants is a never ending battle, Ohms believes "Jewel Cave is doing its' best to eliminate small sites and manage large ones to keep the surface resources in the most natural environment possible." Everyday, seeds from invasive plants often migrate from visitors walking on trails, driving on the highway, and visiting the visitor center. As these seeds spread, the Resource Team will strive to preserve Jewel Cave National Monument and to protect its natural resources.

Top: Invasive thistle species plague disturbed soils in the Monument (NPS Photo). Middle: Houndstongue's sticky burs travel on the clothes of unsuspecting hikers (NPS Photo). Bottom: The dried seedpods of last year's black henbane line common hiking trails (NPS Photo).



White-Nose Syndrome Moves West, Threatens Bats

WHAT IS WHITE NOSE SYNDROME?

White Nose Syndrome (WNS) is a disease that has decimated bat populations in the eastern United States. It was first discovered in 2006 at Howe Caverns in New York, and the mortality rate at many of the affected sites has reached nearly 100%. More than one million bats have died from WNS. At this time, little is known about the disease, but it has been linked to a white fungus, *Geomyces destructans*, which is found on the noses of infected bats. The fungus has been found as far west as the Oklahoma panhandle; however there has been no deaths recorded in Oklahoma.

WHAT IS BEING DONE TO PREVENT WNS?

It has been shown that bat-to-bat transmission is the primary mechanism by which WNS spreads; however, evidence suggests the possibility that humans could also carry the disease from one site to another on their clothing and caving gear. Prevention of this potential human transmission has been the focus of efforts to slow the spread of the disease, and many caves throughout the country have been closed to the public. Although the caves within the Black Hills National Forest are officially closed to the public for one year by the U.S. Forest Service, this closure does not affect National Park Service such as Jewel Cave National Monument and Wind Cave National Park.



Over 600 Townsend's Big-Eared bats hibernate through the winter in the Historic Lantern Tour route of Jewel Cave (NPS Photo).

WHAT IS THE NATIONAL PARK SERVICE DOING ABOUT IT?

On April 17, 2009, the NPS issued a statement that all WNS management decisions in parks should be based on the best-available science, and in accordance with the NPS mission, policies, and the enabling legislation of the individual park units. The NPS statement also recommended that entrance to caves where bats hibernate be tightly controlled, and that permits be approved only for uses whose educational or scientific benefits outweigh the risk of potentially spreading WNS.

WHY IS JEWEL CAVE NOT CLOSING?

At Jewel Cave National Monument, bats inhabit only the cave passages nearest the Historic Entrance. The historic area is closed in the winter to protect over 1,000 bats that use it as a winter hibernaculum. Most park visitors go on cave tour routes that start at the visitor center, more than one mile from the historic entrance. This area is accessible only by elevator and has no bat population. The majority of the cave exploration trips begin at the elevators as well.

In working with experts across the country, the park has determined that at this time it is unnecessary to close Jewel Cave or to cancel tours. A full closure would have limited benefit because the bats move freely between other Black Hills caves and mines, as well as attics and abandoned buildings.

The Park Staff monitors bat populations annually to ensure early detection of any changes in population trends. They also will study all new information concerning WNS and remain protective of Jewel Cave. For more information please visit: www.fws.gov/WhiteNoseSyndrome/cavers

Cave Exploration Continues ...

ALTHOUGH JEWEL CAVE ACHIEVED its status as the second longest cave in the world many years ago, the approach of the 150th mile of surveyed passage was an accomplishment early in 2010. Dan Austin, Lead Cartographer and volunteer explorer for Jewel Cave, recalled the events leading up to the historic survey, "We sent out an announcement that the 150th mile was imminent, and we thought it would be nice to have more than one team. It ended up being sixteen cavers split into three teams – probably the most cavers in the cave in the same day. Because of this, no one team surveyed the 150th mile."

Completed on February 27, 2010, the 150th mile survey was a unique experience. Volunteers from Colorado, Kansas, New Mexico, Utah, and the local community heeded the call. The teams made their way through the cave with one team in the Cloudy Sky Room, another in the Hobgoblin's Ballroom, and the third team traveling through the Miseries to the Ant Farm area. By the close of the day, the three teams surveyed 3032.65 feet of passageway, tipping Jewel Cave over the 150th mile mark.

As each survey team completes their trip reports, Resource Management staff enters their survey data into computers, and the map of the cave grows. Completing the puzzle pieces of the cave opens up new areas, and the discovery of new short cuts creates challenging new areas to explore.

As an example, the trek to the Ant Farm area is a very long day trip. Exploration trips rarely venture to this section of the cave, due to its difficult terrain. To get to the Ant Farm, explorers have to go south toward the cave's base camp. Then, they circle north and backtrack to the Ant Farm. An unique feature along this route is the I40 pit, which comes close to the Ant Farm.

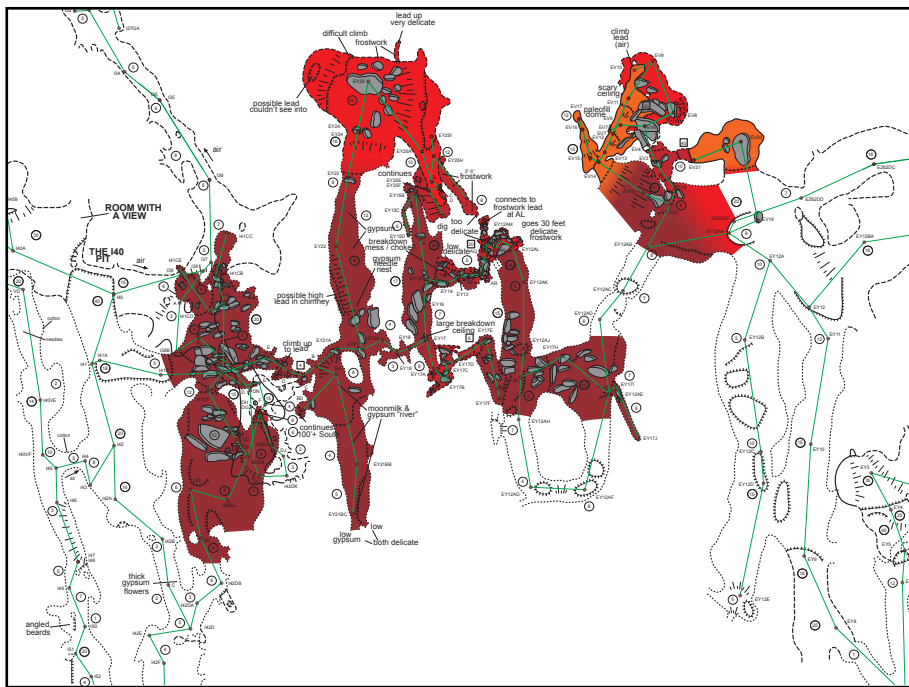
In 2009, Kelly Mathis, one of Jewel Cave's volunteer explorers, became curious about the I40 pit and its possible connection to the Ant Farm. On one of his camp trips, he decided to study the area further. His team found a lead (an unexplored passage) that led them westward. Upon exploring and mapping this new area, they found themselves at the bottom of the I40 pit. This critical find drastically shortened travel time to the Ant Farm.

Mathis was still interested in the Ant Farm, and he led another team back there in the spring of 2010. The previous survey had not found any new leads in the area; however, the caving team did find some amazing new passages. Mathis described his trip, "I'm thinking we could be here for awhile. We mapped about a half mile of passage off one lead, and we found even more leads. We thought this trip would be a wrap-up for the Ant Farm area, but so far, it's been keeping everyone busy."

(Continued at top of page)



On the opposite side of the map, Austin led a survey into Coyote Flats, a short spur, just before the western most edge of the cave that turns sharply south. This is an interesting turn for the western wing of the cave, which tends to jut far outwards with little north or south variation. This difference, according to Austin, is because the area "... is constrained by faults or some geographic anomaly



Top: The discovery of the I40 connection (shaded areas), cut travel to the Ant Farm, allowing easier day trips to the area. Bottom: Cavers gather around the 150th mile marker (NPS Photo / Dan Austin). Bottom Page: Cavers consult the maps to determine where to explore (NPS Photo).

that doesn't allow the cave to cross into more productive limestone."

"The nature of the west," says Austin, "is very difficult. There are no drinking water refill spots except for an hour from the entrance, so the west makes for much more demanding day trips."

Austin went on to talk about his trip to Coyote Flats, "The team aimed for leads as far south as you can go. I found a lead going south – a big tube going straight down that led into a lot of mazy passages with some air movement."

Coyote Flats is under a ridge, and it is difficult to know where it will go because there is no pattern to the passages – unlike other areas, such as Main Cave or out east, where the passages are very linear. Since Coyote Flats is pushing south over a fault or geologic anomaly, it has a different feel and different orientation than before. Once it is crossed, there could be a whole new section of cave to discover and map.

A lot more cave exists in each of these areas, and Austin, Mathis, and Jewel Cave's other volunteer surveyors plan more trips into the cave during 2011. Until all of the branches of their areas are thoroughly mapped, explorers will continue to discover new features within the second longest cave in the world.

Jewel Cave is Going Green

IN 1908 PRESIDENT THEODORE ROOSEVELT CREATED JEWEL CAVE National Monument when he set aside Jewel Cave to be preserved for its scientific research opportunities. In recognition of this vision, Jewel Cave National Monument began an effort in 2010 to evaluate its current practices, and revise them to better promote sustainable environmental actions.

The newly created Environmental Management Team is looking at all of the Monument's functions to see where they can create greener practices. "It is important for the Monument to go green so that we can reduce our impact to the environment, conserve natural resources, and set an example of sustainability," says Rene Ohms, a member of the Environmental Management Team. Each division plays a part in this conservation effort. The Resource Management Division began evaluating LED (light-emitting-diode) lights in the cave; the Maintenance Division began an overhaul of the vehicle fleet; and, the Interpretation Division focused on increasing the use of recycled paper in publications and reducing oil use on the Historic Lantern Tour by incorporating LED lights.

The current cave lighting on the Scenic Tour route uses 108 incandescent and 14 mercury vapor lights. These lights are inefficient and heat the Scenic Tour passages, causing an increase in the cave's temperature. The staff hopes that a newer lighting system will solve this problem. The key advantage of an LED-based system is its lower energy usage, lower heat output, and wider spectrum of visible light.

Like other lighting devices, LED performance is temperature dependent. Most manufacturers publish ratings of LEDs for an operating temperature of 77°F – 61°F, which is warmer than Jewel Cave's ambient temperature of 49°F. The Environmental Management Team is looking closely at this temperature difference, since if used in temperatures above or below their operating temperature, LED lights could fail.

To test the effect of lights on the cave temperatures, this past year, staff placed several panels of LED lights along the Scenic Tour route. The lights were evaluated on their aesthetic impact, sustained light output, heat output, total energy use, and ability to handle the humid and cool cave environment. This information is necessary before updating the entire lighting system.

The Maintenance Division replaced some of their four-wheeled gasoline powered John Deere Gators with two electric powered golf carts. A fuel efficient Chevrolet HHR also replaced the Monument's Ford Taurus. These cleaner vehicles help reduce the carbon footprint on the environment. A carbon footprint is the total amount of greenhouse gas emissions caused by an organization or individual. It is expressed in terms of carbon dioxide emitted. By reducing the Monument's use of carbon dioxide via alternative fuels (electricity) and more efficient vehicles (Chevrolet HHR), the overall gasoline usage at the Monument has dropped.

This newspaper is yet another example of the Monument's focus on enacting better environmental practices. This paper, as well as future editions, use recycled newsprint with biodegradable ink.

With these greener policies and procedures, Jewel Cave sets an example to surrounding agencies and the public toward the creation of sustainable environmental practices.

Explore the “Wilderness” of Jewel Cave

LEAVE THE STAIRS AND RAILS BEHIND AND experience Jewel Cave’s “wilderness”. Take one the most challenging public tours offered by the National Park Service. The Wild Caving Tour takes visitors into the undeveloped sections of the cave, passing by some of the world’s rarest cave formations, while learning safe, low-impact caving techniques.

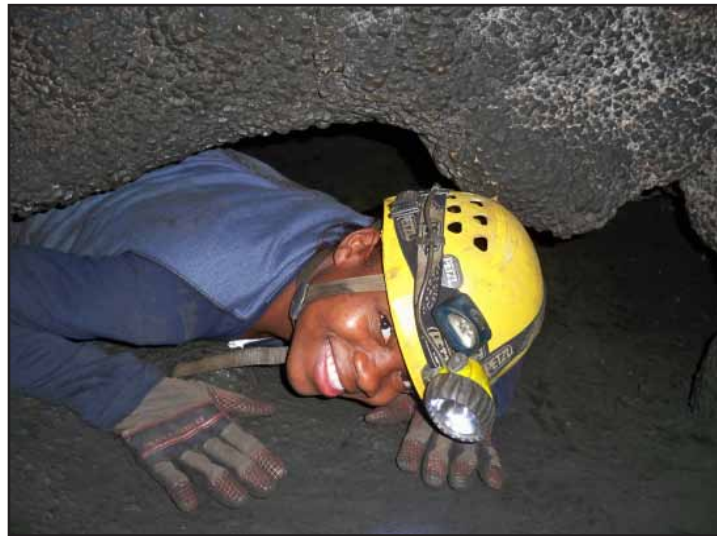
Throughout the tour, participants see a variety of formations, including various forms of calcite crystal, frostwork, flowstone, boxwork, gypsum needles, and rare hydromagnesite balloons.

Anyone having claustrophobia (fear of tight spaces) or acrophobia (fear of heights) should not attempt this tour. Participants must be 16 or older and provide proof of age. A parent or legal guardian must sign a waiver of responsibility on the day of the tour for any 16 or 17-year-old participant.

The tour is not for the faint of heart. The tour lasts 3-4 hours and is extremely strenuous. All participants should be in excellent physical health and be able to fit through an 8.5” by 24” crawl space before beginning the tour. Participants climb a 30 foot nearly vertical wall with the assistance of a hand line, chimney

between cave walls, and crawl through tight passages. The Monument provides hard hats and head lamps for each participant on the Wild Caving Tour. Participants must provide the following: sturdy, lug-soled boots; long pants or coveralls; a long-sleeved shirt; gloves; knee and elbow pads. Clean clothes and shoes must be brought to the visitor center as well for after the tour. Clothing and footwear will be permanently stained by black manganese deposits encountered during the tour.

Reservations are required and can be made over the phone up to 28 days in advance. Tour size is limited to a minimum of 2 participants and maximum of 5 participants. The tour ticket must be paid for at the time you make the reservation. Tours may be canceled due to the lack of the required number of participants. For more information about this tour, call the visitor center 1-605-673-8300.



Rare hydromagnesite balloons are seen covering some of the passages on the Wild Caving Tour (NPS Photo).

Guided Cave Tours

Scenic Tour

As Jewel Cave’s most popular tour, the Scenic Tour route provides an opportunity to visit chambers decorated with calcite crystals and other speleothems as you walk along a paved trail with electric lighting. This moderately strenuous tour lasts 1 hour and 20 minutes. The tour enters and leaves the cave by an elevator inside the visitor center.

The Scenic Tour route involves walking up and down 723 stair steps along a 1/2 mile loop (equivalent to 40 flights of stairs). See the “jewels” of Jewel Cave - calcite crystals, called dogtooth and nailhead spar. Also, see boxwork, cave popcorn, flowstone, stalactites, stalagmites, draperies, and cave bacon.

Historic Lantern Tour

Step back 70 years into the past. The Historic Lantern Tour is a 1940s-style adventure that gives a sense of what it was like to tour the cave in earlier days. Visitors enter and leave through the historic entrance and view the cave from an unpaved trail. Lanterns carried by visitors light the way on this trip.

The tour route is approximately 1/2 mile long, and includes steep wooden steps, uneven rocky terrain, and areas of bending and stooping. This tour is considered moderately strenuous. The tour lasts approximately 1 hour and 45 minutes. Participants must be at least 6 years old.

Discovery Tour

This 20-minute interpretive talk is an introduction to the heritage of Jewel Cave. Participants view one large room of the cave. This easy tour enters and exits the cave by an elevator in the visitor center and involves walking up and down fifteen stair steps. The Discovery Tour is handicapped accessible.

Visitors on the Discovery Tour see two types of calcite crystal, as well as manganese and paleofill, which are not cave formations, but are important to the geology of Jewel Cave. Park Rangers discuss the cave’s discovery, exploration, and the on-going efforts to protect this valuable resource.

Wild Caving Tour

This strenuous tour is a 3 to 4 hour caving adventure. It takes participants into the undeveloped sections of the cave. Refer to our brochure or the “Explore the Wilderness of Jewel Cave” article for full details.

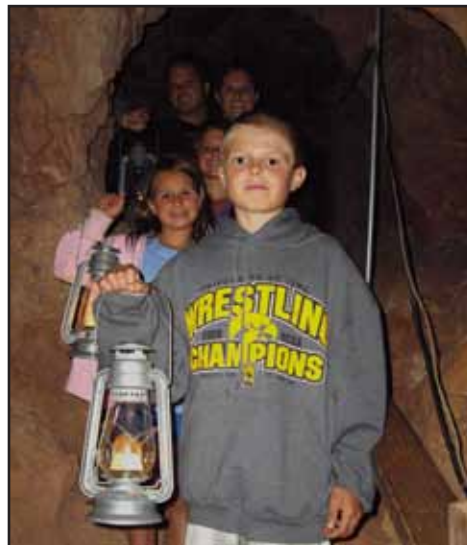
Your Cave Tour Fees at Work

RECREATIONAL FEES STARTED WITHIN THE NATIONAL PARK Service in 1996. The effort was made to allow park sites the ability to collect fees for tours and visitor services. The added revenue assisted with decreased funding issues. Fifteen years later, the program continues at many sites and has enhanced the quality of visitor experiences and improved resource protection, through the implementation of the Federal Lands Recreation Enhancement Act.

Fee revenues are often used toward visitor-related deferred maintenance projects, such as the upgrading of restrooms, paving roads, building trails, and repairing infrastructure. In 2010, the National Park Service spent between \$80 to 100 million dollars of fee revenue toward various projects. Each site that collects fees is required to have a recreational fee spending plan that provides guidance toward the use of revenue. Rather than carry large balances, planned projects use fee revenue for their intended purpose, as required by law.

The Monument is excited for the use of its fee revenue over the next two years. First, several interpretive panels are being planned for installation in the fall or early winter of 2011. The placement locations of nearly twenty wayside exhibits consist of the Roof Trail, Historic Cabin Area, Visitor Center patio, and parking lot. Second, the Visitor Center will witness new displays and exhibits in 2012. The initial planning process begins in 2011, with installation planned for the following year. Both projects are geared toward provoking visitors into even more connections with the heritage stories of the Monument.

Each year, fee revenues routinely pay the salaries of fee collectors at the Monument. Cave technicians within the resource division are also funded from fee monies. In general, 100 percent of all fee revenue stays within the Monument for use toward projects and staff salaries. At times, visitors inquire about ticket prices and free access to public lands. Granted, the observation is warranted. Yet, without fee revenue coming into the Monument, many visitor services would not be available.



Top: A visitor squeezes through the Brain Drain on the Wild Caving Tour (NPS Photo).

Above: Lanterns light the way into the cave on the Historic Lantern Tour (NPS Photo / Lydia Austin).



Above: Visitors on the Scenic and Discovery Tours begin with a visit to the Target Room (NPS Photo).

Tour Reservations

CAVE TOUR RESERVATIONS ARE STRONGLY RECOMMENDED when planning a visit to Jewel Cave. Tours often fill ahead of time throughout the year. Calling ahead for a reservation allows visitors to plan their day around their tour time, rather than waiting for the next available tour.

- Advanced tour tickets must be purchased 3 days prior to visit: limited on-site tour tickets may be available daily on a first come, first serve basis.
- Wild Caving Tour participants and groups 10 or larger can reserve tickets up to 28 days in advance.
- To purchase tickets over the phone, you must speak directly with a ticket sales staff member and have a major credit card available.
- No messages or voice mail will be taken for the purpose of making a reservation.

- Please plan ahead when making reservations. All reserved tickets must be picked up at least 30 minutes prior to the tour time.
- Cell phone coverage in the Black Hills is very limited. Dropped calls do occur. Please call back if this happens during your reservation.
- Educational groups may qualify for an academic fee waiver.
- Holders of the Golden Age, Interagency Senior, or Access Passes should call Jewel Cave National Monument for additional information. 1-605-673-8300.
- Please contact Black Hills Central Reservations for advanced tour tickets at www.blackhillsvacations.com or 1-866-601-5103. For more information contact Jewel Cave National Monument at 1-605-673-8300.



A Park Ranger leads the way down the Scenic Tour (NPS Photo / Dan Austin).

Cave Tour Safety

MONUMENT STAFF ENDEAVOR TO ENSURE ALL tours are conducted in a safe manner that protects both the visitor and the resource.

- All cave tours are ranger-guided and require a minimum of 2 participants.
- The following items are NOT allowed on any cave tours: food, gum, candy, drinks, tobacco products, tripods, walking sticks, weapons, pets, and backpack baby carriers.
- Dimensions of all items (purses, handbags, cameras, etc.) carried on the Scenic and Discovery Tours must be less than 10" by 6" by 5". Items carried on the Historic Lantern Tour must be smaller than a deck of cards.
- The Scenic and Historic Lantern Tours are considered moderately strenuous. These tours are not recommended for

anyone with heart, respiratory, or lower joint conditions.

- The cave temperature is 49°F (9°C). A light jacket, sweater, or sweatshirt is recommended.
- Low-heeled, closed-toed, rubber soled shoes are highly recommended on the Scenic and Discovery Tours.
- Close-toed shoes are required for the Historic Lantern Tour.
- Flash photography is only allowed on the Scenic and Discovery Tours. Photographers are asked to be respectful of their fellow visitors and avoid blinding flashes or delaying the tour group.
- Service dogs trained to mitigate the effects of a disability are allowed on the Scenic and Discovery Tours.

Cave Tour Fees

Tours	Fees	Tour Lengths
Scenic Tour	\$8 - Adult \$4 - Youth (6 - 16) Free - Children (0 - 5)	1 hour and 20 minutes
Historic Lantern Tour	\$8 - Adult \$4 - Youth (6 - 16) Minimum Age - 6 years old	1 hour and 45 minutes
Discovery Tour	\$4 - Adult Free - Youth (6 - 16) Free - Children (0 - 5)	20 minutes
Wild Caving Tour	\$27 - Adult Minimum Age - 16 years old	3 - 4 hours
Interagency Access Pass	Free	Valid for pass holder and 3 persons on the Discovery Tour Only.
Interagency Senior Pass	\$10	Other cave tour fees are half price for the pass holder only.
Interagency Annual Pass	\$80	Valid for pass holder and 3 persons on the Discovery Tour Only.

Cave Tour Program Schedule

Spring Tours : April 11 - May 8		Visitor Center Hrs. 8:30 a.m. to 4:30 p.m.	
Scenic Tour	10:00 a.m.	12: 40 p.m.	2:40 p.m.
Discovery Tour	11:35 a.m.	1:35 p.m.	3:35 p.m.
Late Spring Tours : May 9 - May 27		Visitor Center Hrs. 8:30 a.m. to 4:30 p.m.	
Scenic Tour	9:20 a.m. 10:00 a.m.	11:20 a.m. 12: 40 p.m.	2:00 p.m. 2:40 p.m.
Discovery Tour	11:35 a.m.	1:35 p.m.	3:35 p.m.
Early Summer Tours : May 28 - June 4		Visitor Center Hrs. 8:30 a.m. to 5:30 p.m.	
Scenic Tour	9:20 a.m. 10:00 a.m. 10:40 a.m.	11:20 a.m. 12:40 p.m. 1:20 p.m.	2:00 p.m. 2:40 p.m. 3:00 p.m. 3:40 p.m.
Discovery Tour	11:35 a.m.	1:35 p.m.	4:25 p.m.
Summer Tours : June 5 - August 20		Visitor Center Hrs. 8 a.m. to 7 p.m.	
Scenic Tour	9:20 a.m. 10:00 a.m. 10:20 a.m. 10:40 a.m. 11:00 a.m. 11:20 a.m. 12:00 p.m.	12:20 p.m. 12:40 p.m. 1:00 p.m. 1:20 p.m. 2:00 p.m. 2:20 p.m. 2:40 p.m.	3:00 p.m. 3:20 p.m. 4:00 p.m. 4:20 p.m. 4:40 p.m. 5:00 p.m. 5:20 p.m.
Historic Lantern Tour Beginning June 12	9:45 a.m. 10:45 a.m.	12: 45 p.m. 1:45 p.m.	3:30 p.m. 4: 30 p.m.
Discovery Tour	9:35 a.m. 11: 35 a.m.	1:35 p.m. 3:35 p.m.	6:05 p.m.
Wild Caving Tour <i>Beginning June 12</i>	Must call ahead for reservations. 12:30 PM daily, except for Tuesdays and Fridays.		
Late Summer Tours : August 21 - September 10		Visitor Center Hrs. 8:30 a.m. to 5:30 p.m.	
Scenic Tour	9:20 a.m. 10:00 a.m. 10:40 a.m.	11:20 a.m. 12: 40 p.m. 1:20 p.m.	2:00 p.m. 2:40 p.m. 3:00 p.m. 3:40 p.m.
Historic Lantern Tour Until August 27	9:45 a.m. 10:45 a.m.	12: 45 p.m. 1:45 p.m.	3:30 p.m.
Discovery Tour	9:35 a.m. 11: 35 a.m.	1:35 p.m. 4:25 p.m.	
Wild Caving Tour <i>Starting August 28</i>	12:30 p.m. daily, except for Tuesdays and Fridays. 11:30 a.m. three days a week. Call Ahead for Reservations and dates		
Early Fall Tours : September 11 - October 9		Vistor Center Hrs. 8:30 a.m. to 4:30 p.m.	
Scenic Tour	9:20 a.m. 10:00 a.m.	11:20 a.m. 12: 40 p.m.	2:00 p.m. 2:40 p.m.
Discovery Tour	11:35 a.m.	1: 35 p.m.	3:35 p.m.
Wild Caving Tour	May be offered through out the off-season depending on staff availability. Call ahead for scheduling and reservations.		
Fall Tours : October 10 - 22		Vistor Center Hrs. 8:30 a.m. to 4:30 p.m.	
Scenic Tour	10:00 a.m.	12: 40 p.m.	2:40 p.m.
Discovery Tour	11:35 a.m.	1: 35 p.m.	3:35 p.m.
Winter Tours : October 23 - April 8		Visitor Center Hrs. 8:30 a.m. to 4:30 p.m.	
Scenic Tour	10:00 a.m.	2:00 p.m.	
Discovery Tour	9:05 a.m.	12:45 p.m.	3:45 p.m.

For information about advance tickets, call 605-673-8300 between 8:30 a.m. and 4:00 p.m. Mountain Time.

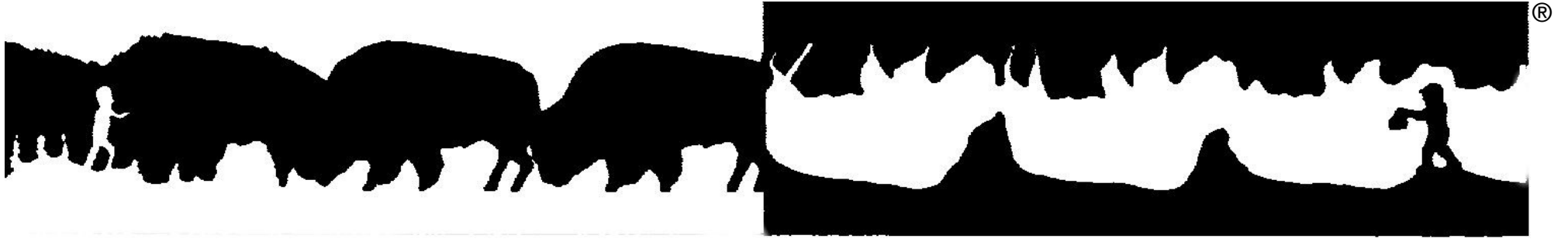
The program schedules listed above are subject to change due to emergency situations, weather conditions, staffing limitations, or other extenuating circumstances.



National Park Service
U.S. Department of the Interior

Jewel Cave National Monument
11149 U.S. Hwy 16 Building B-12
Custer, SD 57730

EXPERIENCE YOUR AMERICA™



Black Hills Parks and Forests Association

The Black Hills Parks and Forests Association cooperates with state and federal partner agencies in promoting public understanding, appreciation, and stewardship of the Black Hills natural and cultural heritage. The Association operates several sales outlets throughout the Black Hills, including the bookstores at Jewel Cave National Monument, Wind Cave National Park, Buffalo Gap National Grassland, Custer State Park, and Black Hills National Forest.

The Association uses the proceeds from its sales to provide financial aid to its partner agencies. The monetary donations are used to print interpretive publications, fund

internship positions, purchase educational supplies and equipment, serve as matching funds for grant requests, and provide assistance toward research projects.

Many different types of products are available in the bookstore, including Jewel Cave National Monument specific publications. These publications, maps, and items are available at the bookstore, 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 discount at National Park Service sites. The membership is \$29.95 per year. For more information, please ask park staff or call 605-745-7020



THE JEWEL CAVE ADVENTURE

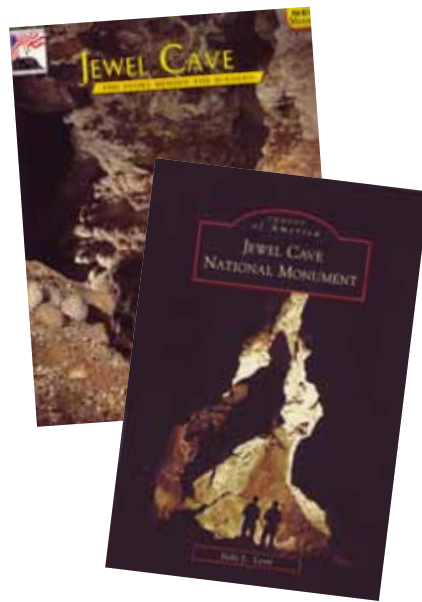
This is the story of how Herb and Jan Conn got involved in the exploration and mapping of Jewel Cave. Years ago, it was labeled as just a "small" cave. Jewel Cave became a world class cave. Even if you have never met them, you will know Herb and Jan after reading this book.

\$11.95

JEWEL CAVE: A GIFT FROM THE PAST

At over 150 miles, Jewel Cave is the second longest cave in the world and is known for its extensive display of calcite crystals and other rare formations. Art Palmer tells the geologic story of Jewel Cave in terms anyone can understand, but technical enough to be of interest to professionals. Informative tables, charts, and interesting photography, along with Palmer's easy reading text, make this book a wonderful addition to the library of anyone interested in caves or geology.

\$8.95



JEWEL CAVE: THE STORY BEHIND THE SCENERY

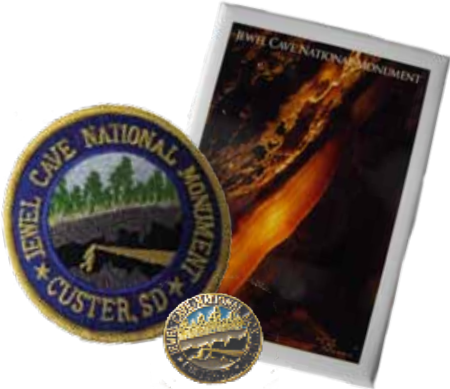
With 48 pages of text mixed with over 70 photographs, this book joins the ever popular "Story Behind the Scenery" series from KC Publications. Exciting color photographs by various photographers give the reader a feeling for what is to be found in the cave and on the surface.

\$11.95

IMAGES OF AMERICA: JEWEL CAVE NATIONAL MONUMENT

This is the story of Jewel Cave National Monument as told through the photographs that document its history. Judy Love traces the development of this hidden gem, from its humble beginnings as a small cave, to the explosion of exploration brought about by area legends Herb and Jann Conn, and finally to current complex surveying methods and meanderings by area adventurers.

\$19.99



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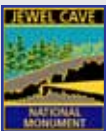
Including books, postcards, lapel pins, hiking medallions, magnets, and patches, the Visitor Center bookstore offers memories of Jewel Cave National Monument.



PASSPORT TO YOUR NATIONAL PARK

Since 1986 the Passport To Your National Parks® program has become a commemorative phenomenon. The program has assisted millions in commemorating their trips to America's National Parks.

Purchase your supplies and make Jewel Cave National Monument your first stamp entry.



Quick Facts

- Established as a National Monument in 1908.
- Acreage: 1,274
- As of 2011, registered 2nd longest cave in the world.
- Average High Temperature 86 °F / July
- Average Low Temperature 12 °F / January
- The cave is one of the largest hibernaculas for Townsend's Big-Eared Bat Species.
- Tour Reservations are strongly recommended.

South Dakota National Park Neighbors



Mt. Rushmore National Memorial

Mount Rushmore is located approximately 35 miles from Jewel Cave. Carved from 1927-1941 by Gutzon Borglum, the memorial depicts the portraits of George Washington, Thomas Jefferson, Theodore Roosevelt and Abraham Lincoln. Today, Mount Rushmore is host to almost three million visitors each year from around the world. Over the decades, Mount Rushmore has grown in fame as a symbol of America - an image of freedom and hope.
(605) 574-2523 www.nps.gov/moru



Wind Cave National Park

Wind Cave is a 35 mile drive from Jewel Cave. It is one of the world's longest and most complex caves. It is famous for its boxwork, an unusual calcite cave formation resembling honeycomb. The park's surface area contains 28,295 acres of mixed-grass prairie, ponderosa pine forest, and related wildlife. Numerous hiking trails offer visitors the opportunity to explore the surface environment of this unique national park. Bison, pronghorn antelope, and prairie dogs all make their home here.
(605) 745-4600 www.nps.gov/wica



Badlands National Park

Badlands National Park is located approximately 118 miles from Jewel Cave. The park consists of 244,000 acres of sharply eroded buttes, pinnacles, and spires. It protects the largest mixed-grass prairie in the United States. Its wilderness area covers 64,000 acres and is the site of the reintroduction of the black-footed ferret, the most endangered land mammal in North America.
(605) 433-5361 www.nps.gov/badl

Enjoy the natural beauty, history, culture, attractions, and outdoor recreation of western South Dakota & eastern Wyoming on your Great American Road Trip.
www.blackhillsbadlands.com

