



# Jewel Cave Journal

## Tight Spaces and Amazing Places

Imagine yourself crawling through a tight passage with 500 feet of rock overhead. Your only light is a headlamp sending a thin beam of color into the darkness. At the moment, it's not doing you much good, because your head is turned to the side, and the ceiling is much too low to turn your head. You pull yourself forward inch by inch, digging your gloved fingers into the soft dirt to keep moving. All of a sudden you feel the passage open up, you move your head and realize you have made it to the end of The Miseries.

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**At over 151 miles long, Jewel Cave is the second longest cave in the world, and it can take a long time to reach the end of the cave.**

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**Park Ranger, Lydia Austin, strikes a manganese-covered pose in front of a wall of frostwork. (Derick Bristol photo)**

This is the life of a cave explorer. It's a life of very small and almost impassible passageways and rooms that can fit two football fields. It is where you get to see fragile crystals, where one simple breath may destroy them. It is one of the last frontiers on earth.

You may be wondering, who is a cave explorer? For starters, you are a volunteer at Jewel Cave National Monument and are driven by the mystery of that simple question, "What is around the next corner?"

Because of the challenges it presents, there is nothing quite like a Jewel Cave trip. It is not a simple crawl, climb, or traverse; it is everything in one, and the cave seems to be endless.

At over 151 miles long, Jewel Cave is the second longest cave in the world. It may take a long time to reach the end of the cave. Because of this simple fact, the National Park Service has set up a base camp in the southeast corner of the cave. Camp is found in an underground room called the Big Duh, roughly five miles from the visitor center.

An explorer must prepare in various ways, such as taking part in long cave trips, working out, and eating healthy. Often the night before the trip, the group will meet for a huge spaghetti dinner. The next morning begins at 6 a.m. with a drive to the cave. You begin to worry if the packs are ready. One is a "camp" pack with warm clothes, food, bathroom equipment, and extra medical supplies

needed to restock rescue stashes along the way. It weighs about ten pounds. In a side pack you carry snacks, water, and extra items like batteries. You are now ready to put on a helmet, knee pads, elbow pads, and three light sources.

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**This is the life of a cave explorer. It's a life of very small and almost impassible passageways and of rooms that can fit two football fields.**

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The first big obstacle of the trip is the Miseries. This passage starts off with roughly a half-mile crawl on your hands and knees while shoving a camp pack in

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# Off-season Field Trips Offered at the Monument

Jewel Cave National Monument is expanding its programming efforts to include opportunities for extended on-site field trips, as well as classroom activities throughout the Black Hills. The focus of the programs is geared toward elementary and middle school grade levels. It is hoped that the enhanced activities will engage students beyond the cave tours and increase awareness of the significance of the Monument.

On-site field trips require program reservations at least three weeks in advance. The reservation process for the current academic year begins on Monday, November 1, and closes on Friday, April 15, 2011. On-site field trips are available Tuesdays through Fridays from mid-December through mid-May. All classroom activities will be limited to Tuesdays, Wednesdays, and Thursdays from mid-December through late April. All program requests will be considered. Nonetheless, staff limitations, extensive reservations, and special events may prevent some dates from being available. Off-site classroom activities will be restricted to schools within 75 miles of the Monument.

Current program listings are available online at [www.nps.gov/jeca](http://www.nps.gov/jeca). Interested educators should click the For Teachers link and review the program descriptions for additional information. The programs are currently not aligned with any specific state standards; on the other hand, the objectives of each program are clearly identified and can be incorporated as supplemental activities for existing curriculum.

Jewel Cave National Monument is excited for the academic season and is eager to work with a variety of students. With active and creative learning opportunities, the National Park Service is connecting our national heritage with tomorrow's youth.



## Black Hills Parks and Forests Association

*Featuring merchandise geared toward park enthusiasts that wish to promote understanding, appreciation and stewardship of the Black Hills natural and cultural heritage.*

Visit the outlet store at  
Jewel Cave National Monument or at  
[www.blackhillsparks.org](http://www.blackhillsparks.org)

# Out on the Porch with a 1940s Park Ranger

War rages on in Europe, and on the home front, the "Great Depression" seems to be waning with a glimmer of economic recovery. A new era of technology looms on the horizon with the advances of television. The sports world is facing change as night baseball becomes a reality and travel becomes easier with commercial air lines. The world is changing as we step back into 1940.

Are you ready for a Historic Lantern Tour? Yes, the Park Ranger is dressed in the military-like uniform of the era. The wool, military green uniform and the felt flat hat appear uncomfortable, but at the same time shows a pride in what he represents – a 1940s Park Ranger. This is your guide to adventure into the unknown world of Jewel Cave.

Immediately upon your entry into the historic entrance, you return to 1940 where you carry a flame lit lantern into the black recesses of discovery. As your eyes adjust, you begin to experience the wonders of the cave. You are challenged physically to enter small passages, and

duck walk through rooms with low ceilings, and climb wooden ladders that seem to go straight up or down into nothingness. You work to follow the light of the person ahead of you, all the time learning about the beauty and formation of the cave.

The Park Ranger shares the current events of 1940, as you go deeper and deeper into the wonder of the cave. To your amazement, you begin to contribute with words of acknowledgement as if you are really on a 1940s adventure. Someone then shares an event he had either experienced or heard of from that period of time. Within your imagination, you are walking back into the 1940s, enjoying the challenges and beauty of the cave as your grandparents may have done.

Are you ready for a Historic Lantern Tour?

NOTE: Historic Lantern Tours are only available during the summer season. Tours will resume in June 2011. Contact the Monument for more details.



The Historic Ranger cabin, built in the 1930s by the Civilian Conservation Corps stands as a window to the past and as a testament to further exploration of the Monument. (NPS photo)

# Underground Treasures Abound

Jewel Cave is a solutional cave, having dissolved from the inside out. The process to create this geologic beauty started approximately 40 million years ago and took millions of additional years to create the cave as we see it today.

Jewel Cave is found in the Paha Sapa limestone layer of the Black Hills. Limestone, a very soluble rock layer made up of compressed shells, sediments, and marine skeletons, is where the large chasm beneath the ground is housed. Creation of the cave is formed by tiny raindrops on the surface which collected some carbon dioxide (CO<sub>2</sub>) in the soil to create a weak acid called carbonic acid (H<sub>2</sub>CO<sub>3</sub>), also found in soda.

An impermeable layer, the Minnelusa Formation, comprised of limestone, sandstone, and shale, prevents acidic water to pass through to the layers underneath. During the uplift of the Black Hills, fractures in the limestone



**Nail-head spar is just one of the calcite features found within Jewel Cave. (NPS photo)**

allowed carbonic acid to enter. This process dissolved the limestone, creating the second longest cave in the world. The acidic water continued dissolving the limestone and flooded the cave passageways. This continued until the acidic water reached a point of supersaturation and could not hold any more dissolved limestone. This limestone

was then redeposited back onto the walls in the form of calcite crystals. Over 90% of Jewel Cave's known passageways are covered with calcite crystals. Although very beautiful, these crystals hold no monetary value; they fracture when polished for jewelry.

Over time, the water drained out of the natural springs near the bottom of the cave, leaving behind the cave as we see it today.

Caves are one of the last frontiers. Unlike the ocean or outer space, caves can be easily accessed by people of all abilities. While it is not recommended that anyone enter a cave without proper training, guided cave tours at Jewel Cave provide a glimpse into the subterranean maze currently known as the second longest cave in the world. Inside Jewel Cave, mystery abounds and adventure beckons you onto new discoveries.



National Park Service  
U.S. Department of the Interior

## COMING SOON! Educational Backpack Program

Perfect for school field trips, home school groups, and families, backpacks are being designed to enhance other academic activities offered at the Monument. It is expected that the backpacks will be available in the late summer of 2011.

Featured backpack topics include:

- Caving
- Geology
- Forestry
- Bats
- Nature Appreciation
- Fire Forestry

For more information:  
Jewel Cave National Monument  
Chief of Interpretation  
605-673-8300  
[www.nps.gov/jeca](http://www.nps.gov/jeca).

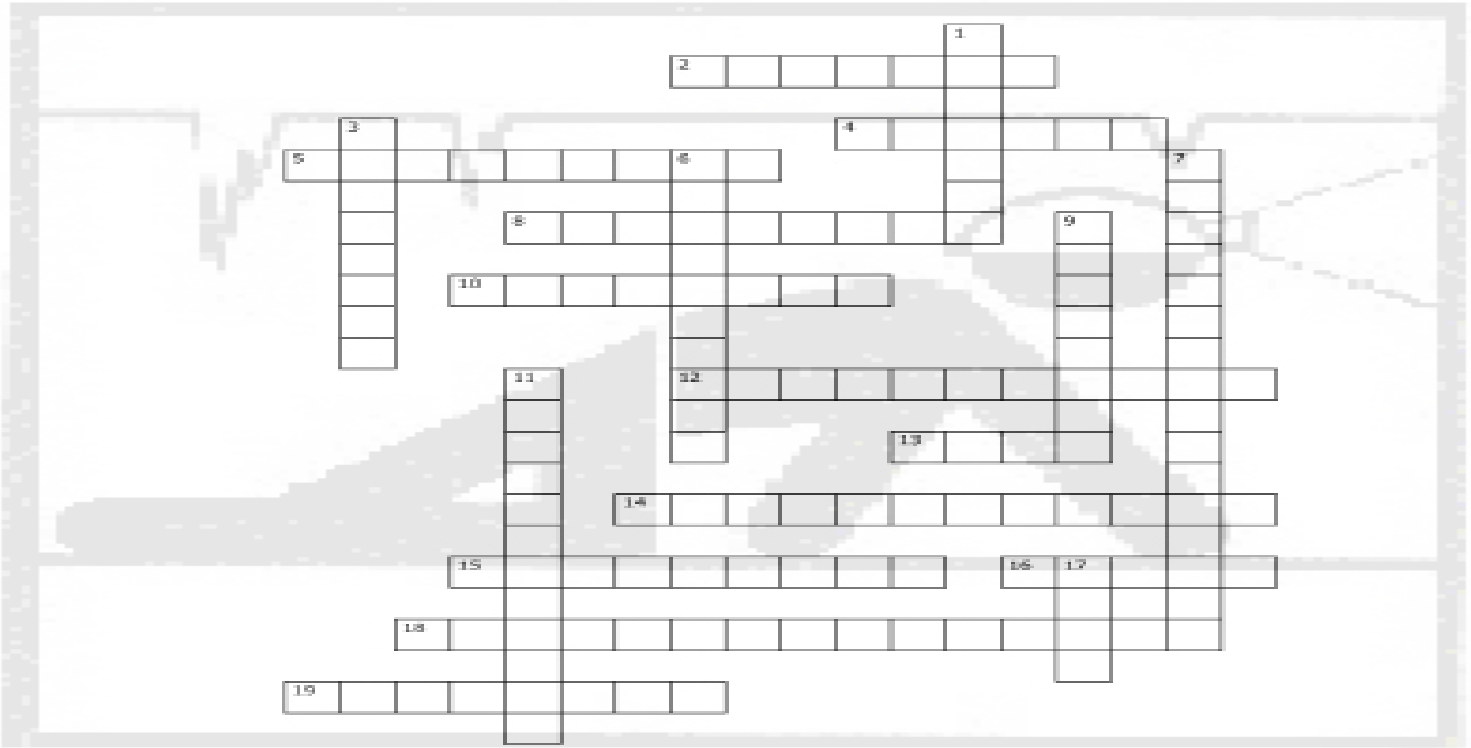
## Bat Hibernation

Jewel Cave is one of the largest hibernaculum (hibernating places) within the Black Hills and supports one of the largest known hibernating colonies of the Townsend's Big-Eared Bats (shown below). Bats represent about 17% of all mammal species in the Black Hills. Nine species, including the Townsend's Big-Eared Bat, Big Brown Bat, Hoary Bat, Silver Haired Bat, Long-legged Bat, and four different Myotis Bats, use Jewel Cave National Monument for hibernation, food, and water. They access the cave through the historic entrance. Most bats are not year-round residents. Many come for the summer months, with only a couple species such as the Townsend's Big-Eared bats, using in the cave through the winter. Caves are often used during the warm months for day and night roosts, but not all species can adapt to the seasonal changes of the Monument.

Bats all over the world are being protected by conservationists by preserving bat habitat and educating people on the bats' importance to a healthy ecosystem. According to the Bat Conservation International, insect-eating bats like those found at Jewel Cave National Monument, can eat 500-1000 pest insects an hour. For more information about bat conservation, visit [www.batcon.org](http://www.batcon.org).



# Caving Crossword



## ACROSS

- 2** A solid substance that occurs naturally in the earth
- 4** A space or opening
- 5** A scientist who studies the natural history and structure of the earth
- 8** A soft rock that dissolves in acidic water
- 10** To move or pass along or through
- 12** Not allowing entrance or passage
- 13** A natural space under the earth's surface that is large enough to hold a person
- 14** A shelter occupied during the winter by bats
- 15** Crystal formations that resemble snowflakes
- 16** A person who explores caves; also called a spelunker (Most cavers prefer to be called a "caver")
- 18** A person who advocates of natural resources
- 19** Something that impedes progress

## DOWN

- 1** A mineral deposit in limestone caves
- 3** A light with a reflector and special lens mounted on a helmet
- 6** A person that explores and studies caves
- 7** A place of historic, scenic, or scientific interest set aside for preservation
- 9** Something possessed as a tradition or legacy
- 11** An area under the surface of the earth
- 17** A chemical substance that eats away solid materials

Word bank: calcite, geologist, acid, limestone, mineral, cave, caver, heritage, National Monument, recess, headlamp, traverse, obstacle, impermeable, frostwork, hibernaculum, coinservationist, speleogist, subterranean

## Create a Cave

Answers for the crossword  
can be found on page 5

A cave is any hollow place in the earth that is either natural or man-made. It can also be called a cavern or den. Perhaps your students would like to make a cave?

Materials per student:

Six ounces of clay

1 dozen cubes of sugar

Newspaper

Give each student clay and a dozen sugar cubes. The clay represents sandstone and the sugar serves as limestone. Cover a table with newspaper. Allow students to mold the clay around the sugar cubes; be sure to leave at least part of a sugar cubes exposed. The sugar cubes will be determining the shape of their caves. While the caves dry for several days, ask students to name the cave system and describe the cave's story of discovery. Once dry, soak the caves in water. As the sugar dissolves, the hollow caves will appear.

Activity modified from Scholastic.com

For more information about caves including cave exploration and preservation, visit [www.caves.org](http://www.caves.org).

# Schedule of Events

## Winter Tour Schedule (October 24, 2010 - April 10, 2011):

Visitor Center hours - 8:30 a.m. to 4:30 p.m.

Scenic Tour offered daily at 10:00 a.m. and 2:00 p.m.

Discovery Tour offered daily at 9:05 a.m., 12:45 p.m., and 3:45 p.m.

Wild Caving (Spelunking) The off-season tour dates are November 13 and 28, December 11 and 26, January 2 and 8, February 12, March 13 and 20, and April 9. The tour begins at 11:30 a.m. Interested cavers should contact the visitor center at 605-673-8356 after November 1st for additional details.

### Driving Directions:

Jewel Cave National Monument is located thirteen miles west of Custer, South Dakota and 24 miles east of Newcastle, Wyoming on U.S. Highway 16. The Monument is about 53 miles from Rapid City, South Dakota via U.S. Highway 16/ 385.

### Cave Tour Descriptions:

**Scenic Tour Details:** Scenic Tours are offered year-round. This popular tour is moderately strenuous and lasts 1 hour and 20 minutes. The tour enters and leaves the cave by elevator in the visitor center. The tour route involves walking up and down 723 stair steps along a half-mile loop. The tour provides an opportunity to experience the underground beauty of Jewel Cave along a developed trail. Scenic Tours are limited to 30 people per tour.

**Jewel Cave Discovery Tour Details:** This 20-minute 'Discovery' program is an introduction to Jewel Cave's natural and cultural history. The Discovery Tour is offered year-round, and is limited to 20 people. Participants view one large room of the cave. This cave visit enters and exits the resource by elevator, and involves walking up and down 15 stair steps. It provides accessibility to visitors with limited mobility. The Jewel Cave Discovery Tour is recommended for families with young children and visitors with limited time or health concerns.

**Wild Caving Tour Details:** Wild Caving (Spelunking) Tours are offered during the off-season on scheduled dates. Interested cavers should contact the visitor center at 605-673-8356 for additional details. Reservations are required and can be made up to 28 days in advance. Participants scramble over cave "breakdown," chimney between cave walls, climb semi-vertical rocks (rope-assisted climbs), and belly crawl through tight passages. Participants are required to fit through a passage 8 1/2 inches high by 24 inches wide before attempting this tour. Along a 2/3 mile route, visitors learn about low-impact caving, caving techniques, safety, and caving equipment. Other wild caving tour requirements can be found at [www.nps.gov/jeca](http://www.nps.gov/jeca).

## Cave Parks Offer Fee Free Tours on Veterans Day

Jewel Cave National Monument and Wind Cave National Park will offer free cave tours on Thursday, November 11, in honor of Veterans Day.

Jewel Cave visitors may choose the Scenic Tour or the Discovery Tour. The Scenic Tour offers an opportunity to view a variety of beautiful, colorful, and rare cave formations for which Jewel Cave is famous. The Discovery Tour is a 20-minute introduction to the natural and cultural heritage of Jewel Cave. Cave descriptions and times are listed to the left.

Wind Cave will offer tours at 10 a.m., 1 p.m., and 3 p.m. Visitors will walk along the Natural Entrance Tour route and view the boxwork formations for which the cave is famous. This 1/2-mile tour is moderately strenuous with approximately 300 stairs, most of them going down. This tour lasts approximately 1 hour and 15 minutes.

Tickets are limited and available on a first-come, first-serve basis. Cave temperature in both caves is approximately 50 °F. A light coat or sweater and sturdy walking shoes are highly recommended. All tours begin at the respective visitor centers.

For more information, please contact Jewel Cave National Monument at 605-673-8300 or Wind Cave National Park at 605-745-4600.

**\*\*Due to elevators being off-line at Jewel Cave National Monument, cave tours may not be available. Please call for more information.\*\***



### Crossword answers:

Across- 2 mineral 4 recess 5 geologist  
8 limestone 10 traverse 12 impermeable  
13 cave 14 hibernaculum 15 frostwork  
16 caver 18 conservationist 19 obstacle

Down- 1 calcite 3 headlamp 6 speleologist  
7 National Monument 9 heritage  
11 subterranean 17 acid



**National Park Service**  
**U.S. Department of the Interior**

**Jewel Cave National Monument**  
 11149 US Highway 16, Bldg. B12  
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November/December 2010 Issue

## Tight Spaces and Amazing Places

(continued from page 1)

front of you. Following this adventure is the Mini-Miseries, an area consisting of a series of belly crawls. The smallest area is the Calorie Counter, which is 6 feet long, 7.5 inches tall, and 24 inches wide. Beyond this crawl, you pass through many rooms, and their names began to blur, Metrecal Cavern, Mind Blower, Point of No Return.

Cloud Nine is considered the “half way point” for a camp trip. By this point of the trip, you need water and fill up at the Sidetrack Bar where water drips into the cave. It has a mineral taste, but it is cold. Most importantly, there is a lot of it.

There is more cave to travel, but it is much easier; imagine subway tunnels following the darkness. Through these tunnels, you see amazing things, such as frostwork- delicate as a snowflake but as big as

your fist, and white calcite rafts daintily suspended in the air.

Finally, the Big Duh comes into sight. You are exhausted but marvel at the room’s size, about the length of two football fields and 50 feet tall. Very tired, you stumble over to base camp where a sleeping bag awaits. Tonight, your dreams are filled with tomorrow’s caving adventures.



**It is a tight squeeze through the Funny Little Hole for Park Ranger, Lydia Austin. (Derick Bristol photo)**