



CAVES OF SOUTH DAKOTA

What Are Caves?

Speleologists (or cave scientists) consider South Dakota to be one of the premier cave regions of the world! Located beneath South Dakota are some of the world's largest and most interesting caves. These caves are useful to both wildlife and humans alike.

Most of the caves in South Dakota are formed in *limestone*. Limestone is a *sedimentary* rock made of the shells and skeletons of animals which lived in seas that covered this area long ago. Limestone dissolves more easily in water than most rocks. If water enters cracks in limestone, it dissolves the rock to enlarge the cracks. If the cracks become large enough for humans to enter, we call them caves. Other types of caves exist, but none is as important to South Dakota, environmentally or economically, as limestone caves.

Where Are They Found?

All of South Dakota's limestone caves are found in or near the Black Hills. This is the only part of the state where limestone is found at the surface. The layer of limestone containing most of these caves is called the Paha Sapa limestone. This rock formation was deposited in a shallow sea between 330 and 360 million years ago. Paha Sapa limestone deposits vary from 300 to 600 feet in thickness.

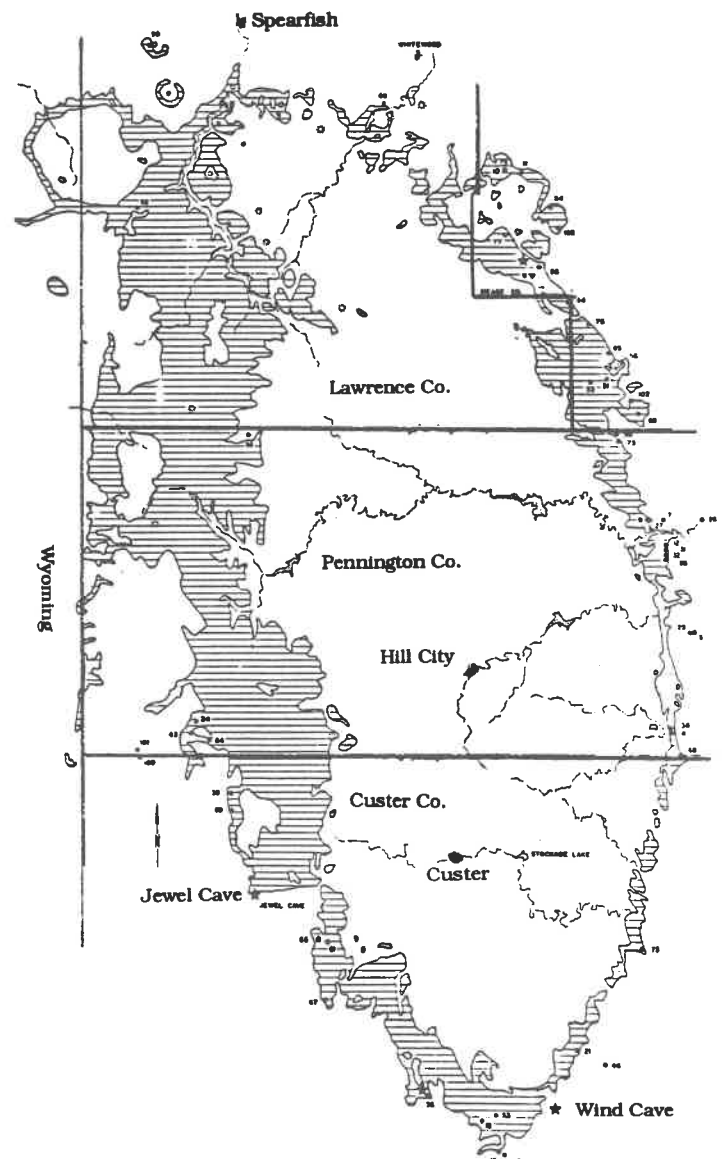


Figure 1: Paha Sapa Limestone Outcrop Belt Where S.D. Caves Can Be Found

Status

More than 100 caves have been explored in the limestone surrounding the Black Hills. Many of these caves are only a few hundred feet or less in length. Some are much longer. Jewel Cave, discovered west of the city of Custer in 1900, contains more than 84 miles of passages. This makes Jewel Cave the second longest cave in the United States (only Mammoth Cave in Kentucky is longer), and the fourth longest cave in the world. Wind Cave, discovered north of Hot Springs in 1881, is more than 65 miles in length. Wind Cave is the third longest cave in the United States and the seventh longest in the world. Studies of the wind, which is always present at the

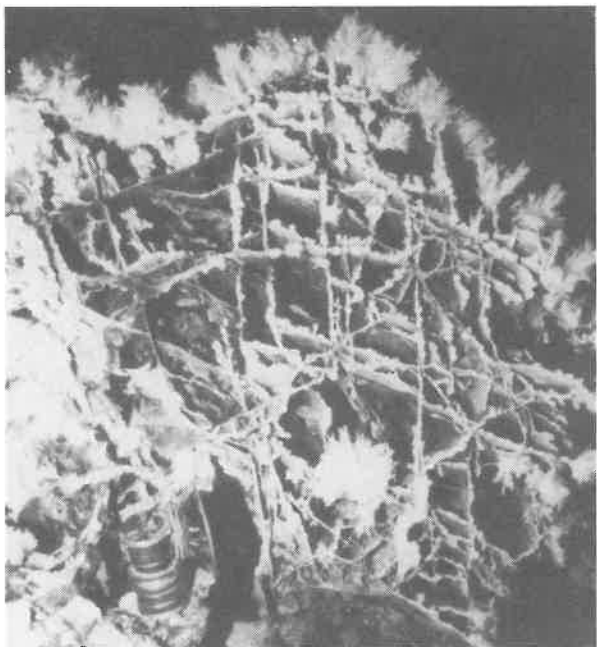


Figure 2: Boxwork Formation

cave entrances, indicate that less than 5% of both Jewel Cave and Wind Cave has been explored! These calculations are based on measurements of the volume of air entering and leaving the cave and the resulting estimation of the cave volume to be 2 billion cubic feet.

Black Hills caves are interesting for more than just their size. Most geologists consider the caves of the Black Hills to be among the world's oldest. Wind and

Jewel Caves are thought to have begun forming 40 to 60 million years ago. Some Black Hills caves are home to certain types of cave formations that are found in few other caves in the world. Wind Cave, for example, contains more displays of a formation known as *boxwork* than any other cave in the world (see Figure 2). Some of the caves in the Black Hills have been developed to allow easy access for humans. Trails have been constructed to make walking easier, and electric lights have been installed to illuminate the caves, which are naturally very dark. For a fee, visitors are taken through the cave by a tour guide. There are currently eight caves in the Black Hills that offer tours: Black Hills Caverns, Crystal Cave, Jewel Cave, Rushmore Cave, Sitting Bull Caverns, Stagebarn Crystal Cave, Wind Cave, and Wonderland Cave.

Why are Caves Important?

Wildlife Habitat: Caves are a valuable habitat for a variety of animals. Most caves have remarkably constant temperatures. This makes them attractive to animals such as bats, who often use caves for hibernation. Bats also roost in caves during the day and use them as nurseries for their young. Some caves, such as Wind Cave, have few bats. Other caves, especially Jewel Cave, house thousands of bats at some times of the year. Bats have developed a bad reputation over the years. This is unfortunate, because bats are extremely important to the environment as important predators of insects.

Caves are dark places. This makes it impossible for plants to grow in caves. Without plants, there is very little food available for animals. Because of this, the number of animals living in caves is relatively small. The ones that do live there are often highly adapted to the special cave environment. For example, many are blind, since there is little use for sight in a perfectly dark cave. A number of caves in the Black Hills contain species of blind insects. Some of

these species, such as a springtail found in Wind Cave, may be unique to Black Hills caves!

Human Shelter: Caves are valuable to humans as well. Some caves in the Black Hills served as shelter for thousands of years. Others may have religious significance to local Native Americans.

Scientific Study: Caves serve as important natural laboratories where scientists may study simple ecosystems. By understanding these simple ecosystems, we may be able to gain a better understanding of life on the surface of our planet. Caves also provide unique opportunities for geologists to study ground water or rare minerals.

Economics: Caves are economically important to the Black Hills region. Each year, millions of dollars are spent by the visitors who come to see the developed caves.

Things work very slowly in caves. A careless action, such as breaking a formation or disturbing a cave's native animals, can undo thousands of years of nature's work. As far as humans are concerned, once a cave is changed, it is changed forever. For this reason alone, we must work to preserve caves wherever they are found.

Caves on federal lands are now protected by law. Both Jewel Cave and Wind Cave are administered by the National Park Service. The Federal Cave Resources Protection Act of 1988 requires government agencies such as the United States Forest Service, Bureau of Land Management, and National Park Service to protect the significant caves contained on the lands they administer. This act makes it a crime to disturb any of the features of caves found on federal land. Several states also have cave protection laws. South Dakota currently has no laws directly devoted to the protection of caves.

Conservation Measures

Glossary

- Boxwork** - An unusual formation, resulting from weathering, that is composed of thin, intersecting blades of calcite.
- Limestone** - A sedimentary rock consisting mainly of calcium carbonate crystals. This rock is formed by the accumulated deposits of dead invertebrates.
- Sedimentary rock** - One of the major types of rocks; formed from the matter that settles to the bottom of a body of water.
- Speleology** - The science of exploring caves.
- Spelunker** - One whose hobby it is to explore caves.

Reference Materials

- Moore, G.W. and G.N. Sullivan, 1978. Speleology, The Study Of Caves, 150 pp. A very good brief introduction to speleology for the layperson.
- Kerbo, R., 1981. Caves. Children's Press, Chicago, 48 pp. Possibly the best book on caves for very young readers. Kerbo writes with the young audience always in mind but uses geologically correct terminology and explanations.
- Halliday, Dr. W.R. , 1976. Depths Of The Earth, 432 pp. Hair-raising stories of American caving and a fair account of the history of caving in America.
- Conn, H. and J., 1977. The Jewel Cave Adventure, 240 pp. The fascinating story of two people exploring and mapping in what is now the second longest cave in the U.S.

Jackson, D.D., 1982. *Underground Worlds*, 177 pp. Part of the Time-Life Planet Earth series. Many photographs and illustrations in color.

Hassemer, J., Editor, 1982. *Caving Basics*, 125 pp. Chapters written by various authors (all experienced cavers). Writing style varies considerably and some of the chapters are excellent.

Mohr, C.E. and T.L. Poulson, 1966. *The Life Of The Cave*, 232 pp. A popular book devoted to cave life. Many fine photographs and illustrations. Directed to the high school level.

Palmer, A.N., 1984. *Jewel Cave, A Gift From the Past*. Fenske Printing, Rapid City, 41 pp. This book provides a beautifully illustrated and detailed discussion of the history and geology of Jewel Cave.

Palmer, A. N., 1988. *Wind Cave, An Ancient World Beneath the Hills*. Pixel Corp., Denver, CO., 49 pp. This book provides a detailed and illustrated discussion of the history and geology of the Wind Cave.

South Dakota Caves with Tours

Black Hills Caverns, located 4 miles west of Rapid City on Hwy. 44. Rt. 8, Box 570, Rapid City, SD 57702. Phone: 343-0542

Crystal Cave, located 1 mile west of Rapid City on Hwy. 44. Rt. 8, Box 280, Rapid City, SD 57702. Phone: 342-8008.

Jewel Cave, located 13 miles west of Custer on Hwy. 16. RR 1, Box 60AA, Custer, SD 57730. Phone: 673-2288.

Rushmore Cave, located 6 miles east of Keystone. Keystone, SD 57751. Phone: 255-4467.

Sitting Bull Caverns, located 9 miles south of Rapid City on Hwy. 16. Phone: 342-2777.

Stagebarn Crystal Caves, located 16 miles south of Sturgis. Phone: 787-4505.

Wind Cave N.P., located 13 miles north of Hot Springs. RR 1, Box 190-WCNP, Hot Springs, SD 57747. Phone: 745-4600.

Wonderland Cave, located north of Nemo off Hwy. 135. Box 83, Nemo, SD 57759. Phone: 578-1728.

Cave-related Organizations

The National Speleological Society, Cave Avenue, Huntsville, AL 35810
American Cave Conservation Association, P.O. Box 409, Horse Cave, KY 42749

Written by:

Jim Nepstad, Wind Cave National Park, Hot Springs, SD. © 1992.

Reviewed by:

Martin Ott, Superintendent, Wind Cave National Park, Hot Springs, SD.

The boxwork photograph was provided by Dave Springhetti of the Paha Sapa Grotto organization, a Black Hills caving group.

The Paha Sapa limestone map is a modification of a map drafted by Mike Hanson in 1992 based on information taken from USGS map #1910.

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