

## The Future

Sadly, many important lava tubes and their contents have been destroyed or badly damaged by human activities. Unique cave habitats as well as geological and archaeological features have been ruined forever. Water quality in aquifers is diminished. Fortunately, there is time to protect our remaining caves and their valuable resources.

When venturing into lava caves, it is important to respect their geological features, archaeological artifacts, and ecology. What took centuries to develop can be destroyed by a single careless or malicious gesture. Once damaged or destroyed, cave formations, ecosystems, and artifacts can never be replaced. To preserve this fragile resource, Congress passed the Federal Cave Resources Protection Act in 1988 to “secure, protect, and preserve significant caves on Federal lands for perpetual use, enjoyment, and benefit of all people.” Many states also have laws protecting caves and their contents.

### *How you can help protect and preserve lava tubes and their contents for the future*

- Keep skylights and lava tubes free of garbage, sewage, oil, and other pollutants
- Never start fires in caves or near the entrances.
- Do not damage formations, and do not deface or write on the cave walls.
- Leave artifacts or bones as you find them.
- Respect all cave dwelling animals, and do not disturb their habitats.
- Report vandalism and unauthorized entry to proper authorities. The NSS offers a reward for information leading to the successful prosecution of cave vandals
- Play an important role in conservation and education by contributing to the NSS Save the Caves Fund or a cave conservancy in your state.

## Cave Safely

The best way to experience a cave or lava tube for yourself is by visiting one of the many “show” caves developed privately or by the National Park Service. Undeveloped, or “wild”, lava tubes should be entered and explored only by experienced cavers who have the proper safety training and equipment. Even experienced cavers inform others about where they are going and their expected time of return.

Photos courtesy of Dave Bunnell, Ron Simmons & Stephen Smith  
Produced by Michael Dale and Cheryl Jones  
NSS Conservation Committee

### Suggested Reading:

*Available from the NSS Bookstore*

*Vulcanospeleology*,  
6th International Symposium Proceedings  
edited by G. Thomas Rea  
*Cave Minerals of the World II*, by Carol Hill & Paolo Forti  
*A Guide to Responsible Caving*  
(available on the NSS website)

### Young Readers:

*Caves! Underground Worlds*, by Jeanne Bendick  
*Stellaluna*, by Janel Cannon

### On the Internet:

*The Virtual Lava Tube:*  
[www.goodearthgraphics.com/virtual\\_tube/virtube.html](http://www.goodearthgraphics.com/virtual_tube/virtube.html)  
*National Park Service Caves:*  
[www2.nature.nps.gov/grd/tour/caves.htm](http://www2.nature.nps.gov/grd/tour/caves.htm)  
*USGS: Lava Tube:*  
[www.vulcan.wr.usgs.gov/Glossary/LavaTubes](http://www.vulcan.wr.usgs.gov/Glossary/LavaTubes)  
*National Speleological Society:*  
[www.caves.org](http://www.caves.org)

The National Speleological Society (NSS) is the largest organization in the world dedicated to protecting, conserving, exploring, and studying caves. The **Save the Caves Fund**, supported solely through donations, provides essential funding for cave conservation and restoration, karst resource management training, and educational programs. For more information visit the NSS website or contact the NSS office.

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# Lava Tube Caves

**Lava tubes play important roles in our ecosystem, our history, and our culture.** Caves formed in lava are found where volcanoes have produced certain types of flowing lava--western United States, Canary Islands, Italy, Japan, Korea, Kenya, Australia, Pacific Ocean islands, and other volcanic hot spots. The islands of Hawaii harbor some of the world's most spectacular lava tubes.

A lava tube's spacious passageways and unusual, fragile, formations offer extraordinary scenery and scientific opportunities. Underground passages provide unique and fragile habitats for organisms and vegetation. On its way to becoming our drinking supply, water often travels through lava caves into wells, springs, and aquifers. Since prehistoric times, lava caves also have served as homes, as burial grounds, and sites for religious practices.

Lava tube caves however, are threatened by human activities both underground and on the surface. Carelessness and ignorance, as well as intentional vandalism, can quickly—and permanently—damage a lava tube cave for all time: its formations, its fragile archaeological records, its environment, and the plants and animals that live there. We need to work together to manage lava cave systems responsibly, and to protect them from damage. Once destroyed, a lava cave and its contents cannot be recovered.

## Origin of Lava Tubes

Because lava tubes are formed by volcanic processes, they are very different from the more common and better known limestone caves. Magma, super-heated deep in the earth, rises through overlying material that forms the earth's crust. Eventually this molten rock may reach the surface and erupt as lava. Fluid lava flows onto the surface, and acting like a stream of water, works its way downhill. Soon the surface of the lava flow cools and hardens. However, beneath the hardened surface, fluid lava continues to flow. If the molten lava flows out of a large tube, the outer crust that remains forms the walls, ceiling, and floor of a lava tube cave.

These caves can vary from a simple tube to a complex labyrinth that extends for miles. As in limestone caves, the range of features in lava caves is remarkable. However, speleothems formed in lava tubes tend to be much more fragile than those found in limestone caves.

Lava tubes contain primary lava formations as well as secondary speleothems. Primary formations include lava stalactites, stalagmites, columns, soda straws, and helictites. Some are especially beautiful with spectacular displays of volcanic red, yellow, and orange, as well as the more common gray or black of ordinary pahoehoe lava--features that developed early in the cooling stage, while the lava tube was still forming. Secondary minerals form as speleothems after the walls have cooled.

## Fragile Habitats

As with other types of caves, lava tubes provide unique and fragile ecosystems for many creatures and a variety of vegetation. When a lava tube's thin roof collapses into the cave below, an entrance or skylight is created. The soil that collects below the skylight is protected from the extremes of weather, and it can support a variety of plants and animals not found on the surface nearby. Pack rats and other rodents, squirrels, owls, birds, and colonies of bats can be found living in lava cave entrances, skylights, and passages.

Lava tubes generally form close to the surface, so the roots from trees growing above the passages may extend into the cave. These roots may form a feathery jungle in the cave passage, which becomes host to a complex and fragile community of cave-adapted -- *troglobitic* -- insect life. Troglobites are organisms that spend their entire lives underground, and are specially adapted for living in total darkness. Troglobites include species of crayfish, salamanders, insects, fish, and spiders. When visiting lava caves, care must be taken not to damage the roots that offer habitats for organisms.

## Our History in Lava Tubes

Caves offer valuable clues to significant geologic events, as well as to our prehistoric and historic past. Lava tubes have served as homes, hiding places, and water sources throughout our history, and are important for archaeological studies. Some contain notable petroglyphs and pictographs, created on cave walls by our ancestors. Lava tube caves have also been used as burial grounds and for religious ceremonies. In some cultures, it is forbidden to enter certain sacred lava tubes.

