



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 longest and most spectacular lava tubes.

A lava tube's often spacious passageways and unusual, fragile, formations offer extraordinary scenery and scientific opportunities, and they 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 have served as homes, burial grounds, and sites for religious practices.

However, lava tube caves 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, fragile archaeological records, and environment, as well as 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.

Origins

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, may rise through the earth's crust and reach the surface to erupt as lava. Thick, fluid lava flows onto the surface, perhaps filling a fissure or gully, and works its



way downhill. Soon the outside of the lava flow cools and hardens, forming a tube. Beneath the hardened surface, hot lava continues to flow. When the eruption stops and the molten lava flows out the lower end of the tube, the remaining outer crust forms the walls, ceiling, and floor of a lava tube cave.

These caves can vary from a simple, long passage to a complex, multilevel labyrinth with miles of passages. As in limestone caves, the range of features 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 develop early in the cooling stage, while the lava tube is still forming. These 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. Secondary minerals, such as gypsum and calcite, may be deposited 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 the cool, moist environment can support a variety of plants and animals not found on the surface nearby. Pack rats and other rodents, owls and other birds, and colonies of bats can be found living in entrances, skylights, and passages.

Roots from trees growing above the passages often extend into the cave through its thin ceiling. These roots may form feathery jungles that become hosts to complex and fragile communities of cave-adapted – troglobitic – and microbial life. Troglobites are organisms that spend their entire lives underground, and are specially adapted for living in total darkness. Troglobites include species of spiders, insects, crayfish, salamanders, and fish. When visiting lava caves, care must be taken not to damage these root habitats and their inhabitants.

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. Our ancestors created petroglyphs and pictographs on lava tube walls and used the dark, secluded passages for burials and religious ceremonies. In some cultures, entering sacred lava tubes is forbidden.





The Future

Sadly, many 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, and water quality in aquifers diminished. However, you can play an important role in protecting our remaining lava tubes and their valuable resources.

When venturing into lava caves, 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 help 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 have additional laws protecting caves and their contents. Join others in educating landowners, developers, and cave visitors about the value of lava tubes and the importance of protecting them.

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. You should only enter undeveloped, or “wild”, lava tubes with experienced cavers and with the proper equipment. Because of the sharp lava rock and very dark walls, increased care and strong lights are required. Always inform others about where you are going and when you expect to return.



You can help protect lava tubes and their contents

- 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 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.

Find Out More

The Virtual Lava Tube

www.goodearthgraphics.com/virtual_tube/virtube

National Park Service Caves and Lava Tubes

www.nps.gov/subjects/caves/index.htm

Caves of Fire 2: Inside America's Lava Tubes

by Dave Bunnell (2013)

Available from the NSS bookstore

A Guide to Responsible Caving

Available on the NSS website

Cave Conservancy of Hawaii

www.hawaiicaves.org

Longest Lava Tubes

www.caverbob.com/lava

Books on caves and caving from the NSS Bookstore

www.NSSbookstore.org



The National Speleological Society (NSS) is the largest organization in the world dedicated to exploring, studying, and protecting 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.

National Speleological Society

6001 Pulaski Pike
Huntsville, AL 35810
Telephone: (256) 852-1300
E-mail: nss@caves.org
www.caves.org

The NSS is a 501(c)(3) nonprofit organization. Donations are tax-deductible.

*Produced by Cheryl Jones and Mike Dale, 6/18
Photo Credits: Aerials, USGS Hawaiian Volcano Observatory;
All other photos by Dave Bunnell, davebunnell@underearth.us*

Discovering Caves

Lava Tube Caves

