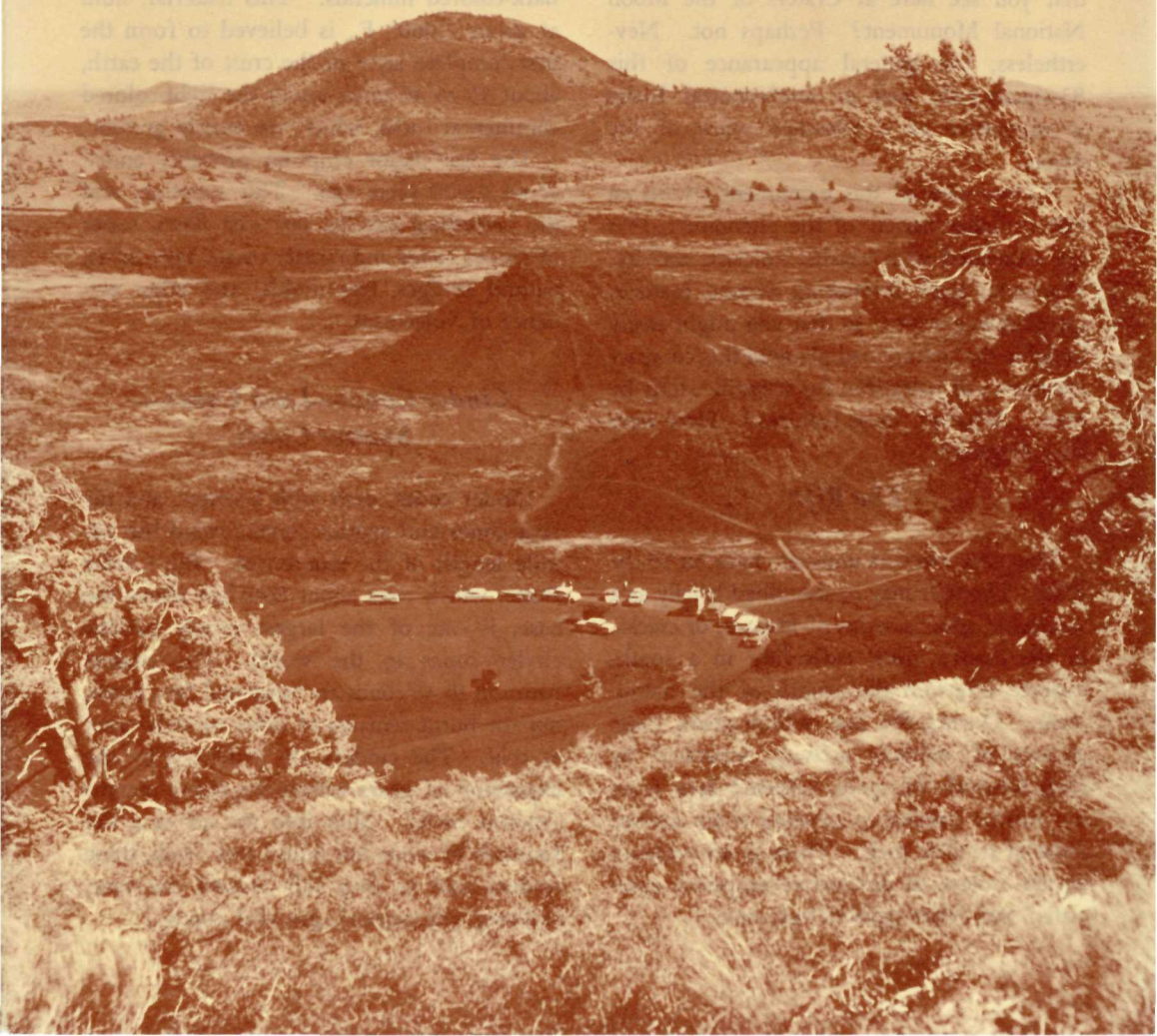


# Craters of the Moon

NATIONAL MONUMENT

*Idaho*



# Craters of the Moon

## NATIONAL MONUMENT

*Spectacular display of lava flows, cinder cones, and other products of volcanic activity*

When astronauts return from their first landing on the moon and report their findings, will they describe the sort of terrain that you see here at Craters of the Moon National Monument? Perhaps not. Nevertheless, the general appearance of this 83-square-mile part of south-central Idaho is suggestive of a telescopic view of the moon.

A close view of this monument reveals an extraordinary variety of the phenomena that are associated with basaltic volcanic activity. Moreover, these interesting natural features are closely grouped, so that you might easily imagine that nature had planned this compact laboratory of volcanism for scientific study by man. What are these features? How were they formed?

### *The Rift*

This area owes its unusual character to the Rift. The Rift may be described briefly as a weakened zone, a series of fissures, or cracks, in the earth's crust, extending in a southeasterly direction the length of the monument. During the last million years, three periods of volcanic activity, separated by long intervals of quiet, released lava from the earth's interior, producing every known form of basaltic rock. There is no evidence of the violent or destructive eruptions associated with other types of volcanoes.

Basaltic lava, which in geologic epochs past flooded much of northwestern United States, is a heavy rock composed chiefly of dark-colored minerals. This material, fluid at about 2,000° F., is believed to form the first complete layer of the crust of the earth, about 35 to 40 miles under the light-colored continental rocks, which are mostly granitic.

The last major eruption probably ended about 2,000 years ago. This eruption, and the preceding activity, left vast flows, series of cinder cones and spatter cones, lava tubes, natural bridges, tree molds, and other evidence of volcanism.

### *Cinder Cones—Lava Cones—Spatter Cones*

Cinder cones, each with a crater, and the lava cones and spatter cones extend the 12-mile length of the monument. Big Cinder Butte, which rises about 800 feet above the base, is one of the largest purely basaltic cinder cones in the world. The cinders forming these cones are hardened lava froth, *not* the burnt remains of other material such as coal. The cinders are produced by the expansion of gases within the rising magma (molten rock). Shot into the air as a fire fountain of white-hot liquid-rock froth, these cinders cool as they fall around the vent, building symmetrical, graceful cones.

Lava cones are produced by nonviolent flows of lava from a fissure opening. The quiet welling out of the molten rock produces low, rounded forms more accurately described as lava domes.

Spatter cones are formed when blobs of liquid lava are thrown into the air from a bubbling pool of molten rock. These blobs cool as they fall, forming a coarse-textured, typically bell-shaped cone. Snow drifts into the craters of these cones, where it may remain throughout the summer.

### *Lava Flows—Lava Tubes*

It is evident that many of the flows covering large parts of the monument oozed from the scores of fissures along the Rift and did not erupt from cinder cones.

The two general types of basaltic lava are aa (pronounced ah-ah) and the pahoehoe (pah-ho-ay-ho-ay). The clinkery aa is extremely rough and is broken into irregularly shaped blocks with jagged corners and sharp

spines; thus it is very difficult to traverse. Pahoehoe has a smooth, billowy, or ropy surface. It is comparatively easy to walk across, notwithstanding a wide variety of twists, folds, pleats, ruffles, bumps, and holes. Both flow types are dark; but some pahoehoe flows, notably the Blue Dragon, show a glossy surface, iridescent in sunlight. Pahoehoe covers nearly half the monument, and from a higher elevation some of these flows look like smooth ribbons.

The very recent flow from North Crater is of special interest because it shows so clearly how the side wall of a cinder cone gave way before the lava pressure. It also shows how the collapsed segments of the cone dropped upon the moving lavas and were carried away, piece by piece, floating on the lava stream for several miles. In the monument are many lava tubes and several natural bridges. How did they form?

Occasionally, the exposed surface of a flow lobe hardens while the lava continues to flow inside the stiffened tube. As the eruption



Pahoehoe lava flow near Indian Tunnel.

diminishes or the source flow is diverted, the lava stream drains out of the tube. Subsequently, parts of the roof may sink or collapse, allowing access into the tube.

Small natural bridges are formed by the collapse of most of a tube roof, leaving only a narrow segment across the old tube.

Some caves, with single small openings, become natural iceboxes as melting snow and rain seep into them. In the caves, cooled to a subfreezing temperature by the long winters, ice floors and icicles form.

### *Lava Bombs—Tree Molds—Pit Craters—Waterholes*

Among the curious lava features are the bombs that are scattered about the cinder and spatter cones. They were formed when sputtering vents ejected blobs of magma that ranged in diameter from a quarter of an inch to several feet. These blobs hardened suffi-

ciently while in the air to retain a globular or spindle shape. Some of them had long slender tails that generally broke off and formed ribbon bombs.

Tree molds were formed by hot lavas flowing about the trunks of trees, cooling and hardening sufficiently upon contact with the moist wood so as to leave molds in the form of cylindrical cavities as the trees were consumed by heat.

Pit craters (sinks) are common over lava tubes along the Rift. When the lava subsided after a period of flow, parts of the surface collapsed, leaving craterlike depressions. In these depressions, clear cold water is sometimes found. The water comes from melting snow and ice and from rain. The insulating quality of the rock, plus evaporation, aids in retaining ice deep in some holes and in keeping the water cool throughout the warm summer days. You should not drink this stagnant water because it may be polluted.

### *Flora—Fauna*

Contrary to the general impression, considerable vegetation grows here, principally upon the cinder cones and older lava flows. From the loop drive, limber pine appears to be the only tree, but juniper, aspen, cottonwood, and Douglas-fir are also present—but in fewer numbers. About 200 species of plants are native to this small area. Big sagebrush, antelope bitterbrush, rabbitbrush, and mockorange cover both flows and cinder. In spring, silvery pads of dwarf eriogonum (or buckwheat) leaves, topped with yellow or pink pompon flowers, dominate the open cinder slopes. Dwarf monkeyflowers add a magenta cast to wide areas of cinder in June and early July.

Large mammals found in the monument, though rarely seen, are mule deer, pronghorn ("antelope"), black bear, coyote, and bobcat. Formerly, mammal inhabitants included American elk, bighorn, grizzly, and bison.

Small mammals are represented by the chipmunk, golden-mantled ground squirrel, red squirrel (chickaree), marmot, weasel, and badger.

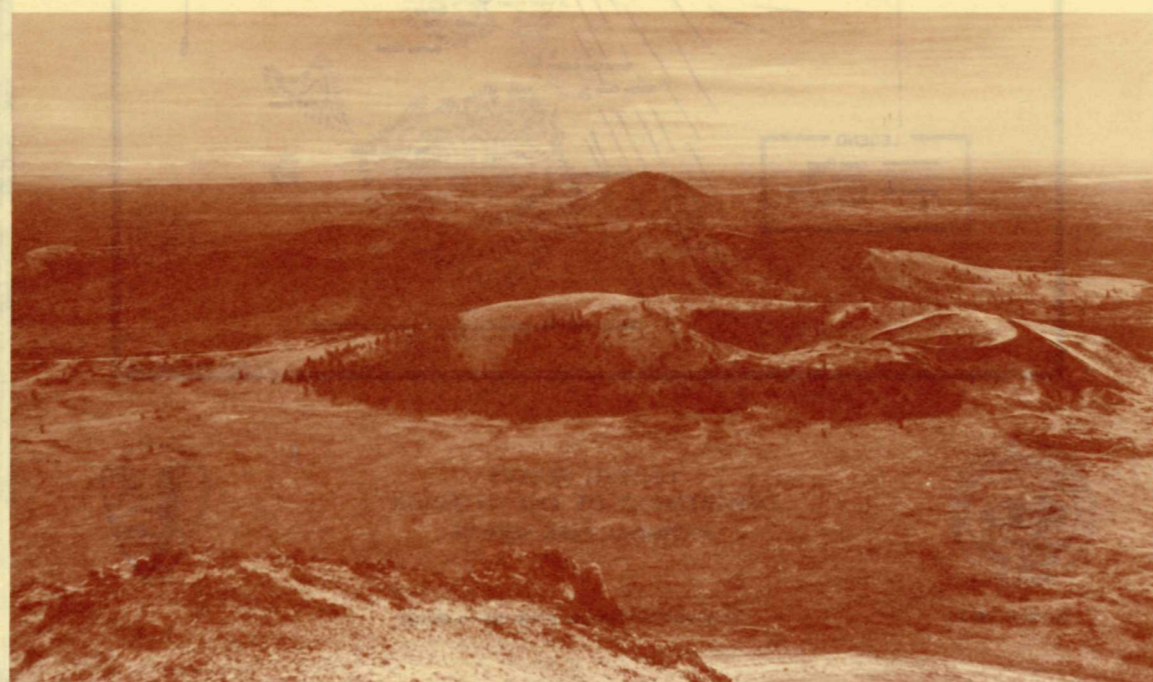
Many birds migrate through the monument. The golden eagle, several species of hawks, Clark's nutcracker, gray (Canada) jay, mountain bluebird, robin, barn swallow, violet-green swallow, sage grouse, night-hawk, and others nest in the area.

### *Prehistory—History*

Following the Rift was an ancient Indian trail. Caves along the route were used as temporary habitations and probably at times as strongholds. At Indian Tunnel there are several semicircular arrangements of stone, the use for which is not known. Arrowheads and other types of stone implements were previously found in this vicinity.

The lava fields in general, and the rugged area of Craters of the Moon in particular,

Aa lava front on Great Owl Cavern Trail.



The Rift, from the Pioneer Mountains.



The stop of a naturalist-conducted auto caravan at Big Craters.

have been barriers to the westward migration and to local settlement. All early travelers avoided crossing the rougher areas. The old wagon road from Arco to Carey, having to skirt the lava flows at the base of the mountain front, was 76 miles long. Today's route, which crosses some of the most rugged parts of these flows, is only 43 miles long.

It was not until about 1925 that these awesome lava formations attracted other than local visitors. Since then, thousands of people have come from all parts of the world to enjoy and study a once-shunned place.

### Facilities

A campground, a short distance inside the monument entrance, is open from about April 15 to October 15. It has fireplaces, tables, drinking water, and flush toilets. Campsites cannot be reserved.

The visitor center contains a series of fine exhibits explaining the volcanic features, plants, and animals of the monument. This

building also has the administrative offices and restrooms and is open to the public the year round. A 7-mile loop road is open from about mid-May to November, depending on snow conditions.

Gasoline, food, and souvenirs are not available in the monument.

### VISITOR-USE FEES

Vehicle permit fees are collected at the entrance station from June to September. Fees are not listed herein because they are subject to change, but the information may be obtained by writing to the superintendent.

Fee revenues are deposited in the U.S. Treasury; they offset, in part, the cost of operating and maintaining the National Park System.

### Monument Regulations

**Automobiles.** The maximum speed permitted on monument roads is 35 miles per hour. Signs indicate where lower speeds are required.

**Caring for the monument.** Picking or damaging flowers, trees, or other vegetation, or damaging and disturbing volcanic formations, is prohibited. Rocks and minerals, or anything native to the monument, may not be taken away. Defacing of signs, buildings, or other structures is punishable by law.

**Wild animals.** Feeding, teasing, or molesting animals is not permitted.

**Hunting** within monument boundaries is not allowed. Firearms must be cased, broken down, or sealed to prevent their use.

**Pets** are allowed in the monument if physically restrained at all times. They are not permitted on any of the trails or in public buildings.

**Camping.** Parking of vehicles overnight along roadsides or at other *undesigned places* is not permitted. Camps must be kept clean; please place rubbish and garbage in cans provided for this purpose. Other visitors will follow *your* example.

**Housetrailer.** The campground is not a trailer camp, but space is available at most campsites for parking housetrailer. There are no utility connections. Waste must not be spilled on the ground—the camper must provide suitable containers and make proper disposition of waste in the campground comfort station.

**Fires** are permitted only in the fireplaces provided in the campground, or under special permission at places designated by the park ranger. Be sure your campfire is out before you leave it!

### Administration

Craters of the Moon National Monument, established on May 2, 1924, is administered

by the National Park Service, U.S. Department of the Interior.

The National Park System, of which this area is a unit, is dedicated to conserving the scenic, scientific, and historic heritage of the United States for the benefit and enjoyment of its people.

The development of this area is part of MISSION 66, a 10-year program to develop and staff the areas of the National Park System so that they can be used and enjoyed by both present and future generations.

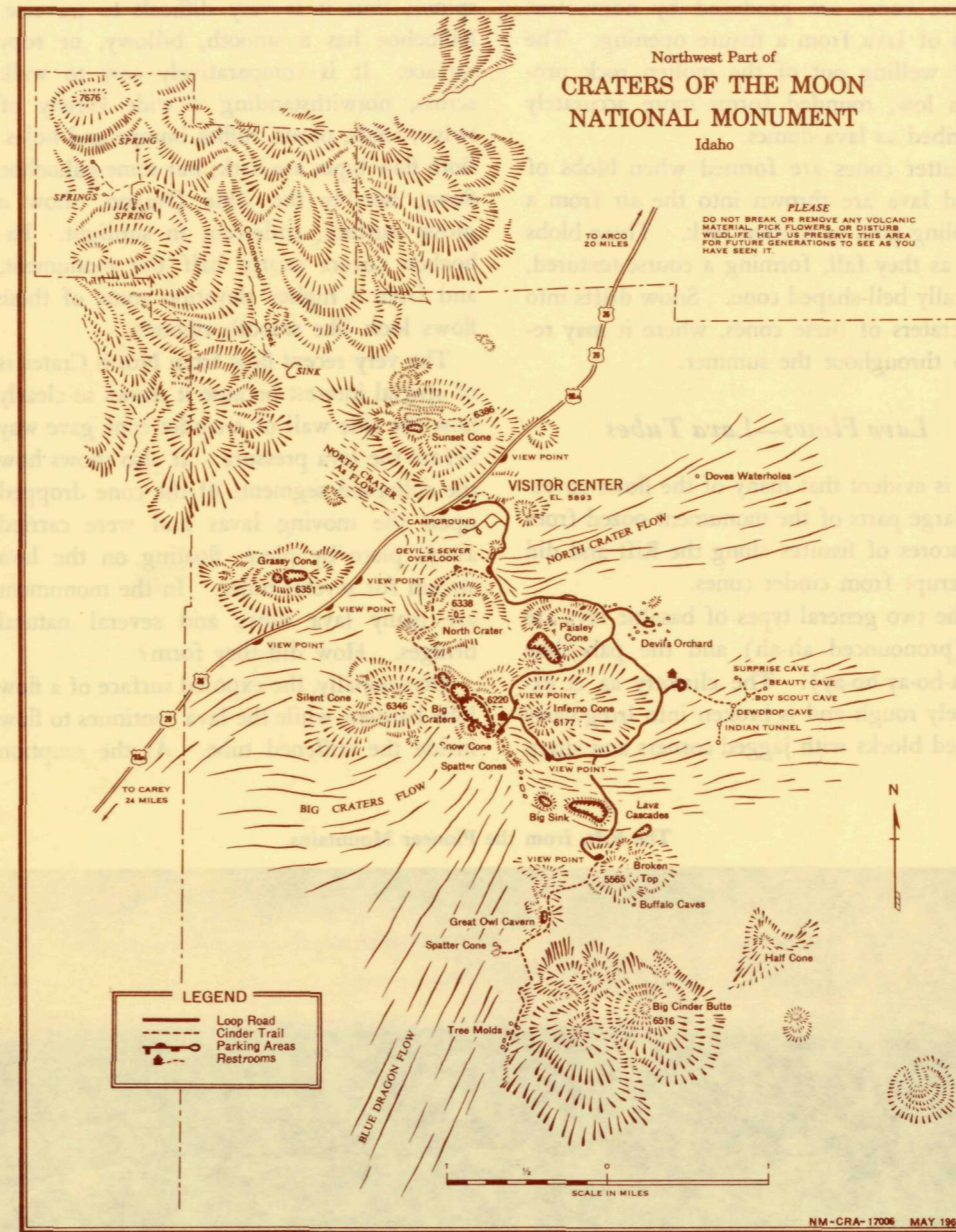
A superintendent, whose address is Arco, Idaho, is in immediate charge of the monument.

### America's Natural Resources

Created in 1849, the Department of the Interior—America's Department of Natural Resources—is concerned with the management, conservation, and development of the Nation's water, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.

New visitor center—a MISSION 66 project.



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