

Arches

National Park
Utah

National Park Service
U.S. Department of the Interior



Delicate Arch
Gordon Anderson

How Are Arches Formed?

1 As the Earth warped here, deep cracks penetrated to the buried sandstone layer. 2 Erosion wore away exposed rock layers

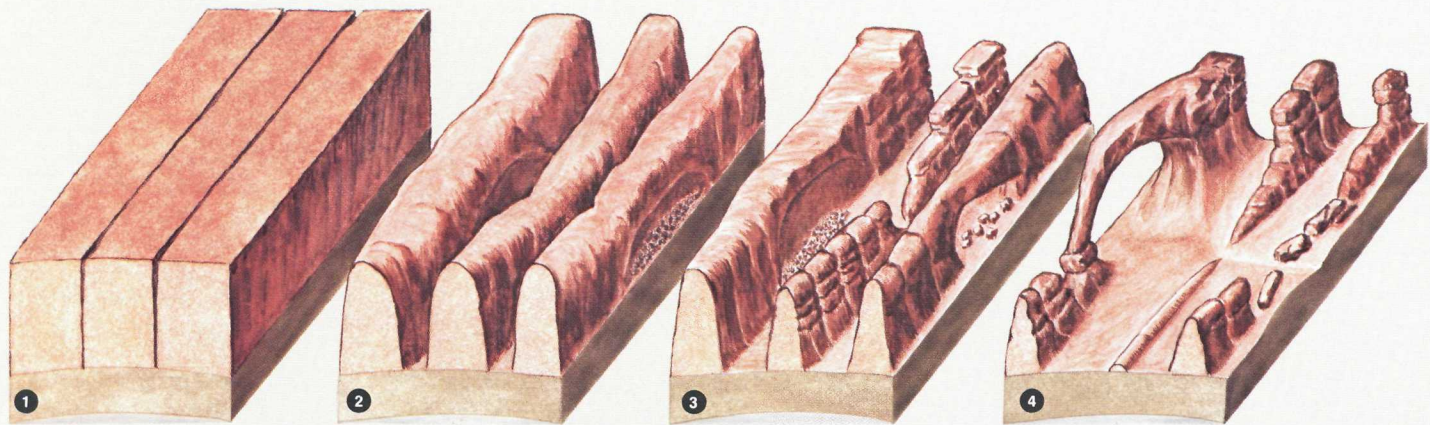
and enlarged the surface cracks, isolating narrow sandstone walls, or fins. Alternating frosts and thawing caused 3 crumbling and

flaking of the porous sandstone and eventually cut through some of the fins. 4 The resulting holes were enlarged to arch proportions

by subsequent rockfalls and weathering. The arches eventually collapse, leaving only buttresses. These, too, must in time succumb to

erosion. Some natural bridges may look like arches, but they are formed in the path of streams, which wear away and penetrate the

rock. We know of no true natural bridges in this park. Pothole arches, formed by the constant dripping of water on sandstone, are prevalent.



The Greatest Density of Arches in the World

Wind and water, extreme temperatures, and underground salt movement are responsible for the sculptured rock scenery of Arches National Park. On blue-sky days, it is hard to imagine such violent forces—or 100 million years of erosion of sandstone—creating this land that boasts the greatest density of natural arches in the world. The more than 200 catalogued arches range in size from a 1-meter (3-foot) opening, the minimum considered an arch, to Landscape Arch. This 32-meter- (105-foot) high ribbon of rock measures 89 meters (291 feet) from base to base. All stages of arch formation and decay are found here. Delicate Arch, an isolated remnant of a bygone fin, stands on the brink of a canyon, with the white-capped La Sal Mountains for a backdrop. Spires and pinnacles and balanced rocks perched atop seemingly inadequate bases vie with the arches as scenic spectacles. Early explorers thought the huge arches and monoliths in the Windows Section were, like Stonehenge in England, works of some lost culture.

Arches National Park lies in southeastern Utah's red rock country. For a short stretch the Colorado River borders the park. A bridge on U.S. Highway 191 connects the park with Moab, Utah. Near this bridge users of the Old Spanish Trail swam mules across in the 1830s. A remnant of the trail adds historical intrigue to Arches. So does Wolfe Ranch, the remains of a typical early-West cattle operation.

The Geologic Story. The national park lies atop an underground salt bed, which is basically responsible for the arches and spires, balanced rocks, sandstone fins, and eroded monoliths that make the area a sightseer's mecca. Thousands of meters thick in places, this salt bed was deposited over the Colorado Plateau some 300 million years ago when a sea flowed into the region and eventually evaporated. Over millions of years, the salt bed was covered with residue from floods and winds and the oceans that came in intervals. Much of this covering debris was com-

pressed into rock. The earth covering over Arches may have been 1.5 kilometers (1 mile) thick.

Salt is unstable, and the salt bed below Arches was no match for the weight of this thick cover of rock. Under such pressure it shifted, buckled, liquified, and repositioned itself, thrusting the earth layers upward into domes. Whole sections dropped into cavities. In places they turned almost on edge. Faults occurred. The result of one such 860-meter (2,500-foot) displacement, the Moab Fault, is seen from the visitor center.

As this subsurface movement of salt shaped the Earth, surface erosion stripped away the younger rock layers. Except for isolated remnants, the major formations visible in Arches today are the salmon-colored Entrada Sandstone, in which most of the arches form, and the buff-colored Navajo Sandstone. These are placed in layer cake fashion throughout most of the park. Over time the superficial cracks, joints, and folds of these layers were saturated with water. Ice formed in the fissures, melted under extreme desert heat, and winds cleaned out the loose particles. A series of free-standing fins remained. Wind and water attacked these fins until, in some, the cementing material gave way and chunks of rock tumbled out. Many damaged fins collapsed. Others, with the right degree of hardness and balance, survived despite their missing middles. These became the famous arches. This is the geologic story of Arches—probably. The evidence is largely circumstantial.

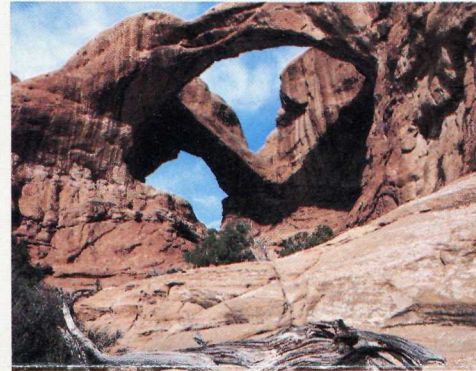
Wolfe Ranch. John Wesley Wolfe, a disabled Civil War veteran, and his son, Fred, settled here in 1888. A weathered log cabin, root cellar, and corral remain as evidence of their primitive ranch. What brought them here from Ohio and how they found this rugged land remains a mystery, but they managed a living with a small cattle operation for more than 20 years. A visit to Wolfe Ranch is a walk into the past.



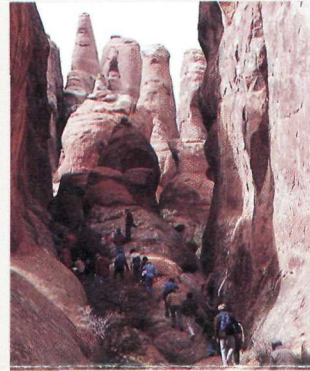
Wolfe Ranch



Balanced Rock
Gordon Anderson



Double Arch
Frank L. Mendonca



Fiery Furnace walk

Much More Life Than Meets the Eye

Pinyon pines and gnarled juniper trees add a splash of green contrast to the red sandstone terrain. Desert flora abound in the park. In spring, when conditions are right, wildflowers bloom in profusion. From May to August colorful displays carpet the moist places. The wildlife here is characteristic of the sparse pinyon-and-juniper forest communities of the Great Basin Desert. Most species are nocturnal, but you might sight a mule deer, kit fox, or more of-

ten, jackrabbits and cottontails, kangaroo rats and other rodents, and small reptiles. Flocks of blue pinyon jays reside here. Mountain bluebirds and many other species are migratory. Golden eagles and red-tailed hawks are among the resident birds. Bald eagle and peregrine falcon sightings have been reported.

Cryptogamic Soil
It's alive, so watch your step! But it won't bite you. If you step on cryptogamic soil, it will take years

to restore itself, and even longer to eradicate the scar of your footstep. This dark, "brown sugar" stuff covers much of the terrain of untrampled desert areas. Composed of several species of mosses, lichens, fungi, and algae, this covering protects against surface erosion, absorbs moisture, and provides nitrogen and other nutrients for plant growth. Its name comes from two Greek words, *kryptos* and *gamia*, "hidden marriage." This refers to the

lack of flowers for reproduction. These so-called lower plants reproduce by spores. The action and the nutrient contributions of cryptogamic soil make development of vegetation possible in areas that otherwise might very well remain barren.



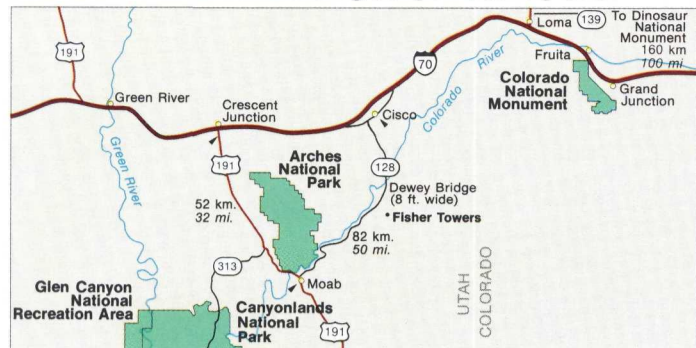
Golden Eagle
Gene Dieckhoner

Arches

National Park
Utah

National Park Service
U.S. Department of the Interior

What the Park and Surrounding Canyon Country Offer



Arches National Park is central to many scenic attractions of this semi-arid canyon country that is 25 percent exposed stone. Nearby are Canyonlands National Park, Deadhorse Point State Park, Colorado, Dinosaur, and Natural Bridges National Monuments, and Glen Canyon National Recreation Area. Scenic drives explore the Mormon pioneer town of Moab and environs. There are no food and lodging facilities in the park; find these in Moab. A tent and trailer campground (no reservations) is in the park's Devils Garden. Naturalists lead spring and summer walks through Fiery Furnace and give summer campfire talks. Foot trails lead to many impressive park features. You can see a lot from your car, but to grasp the aura of time and silence and the awesome scale so special here, get out of your car and walk.

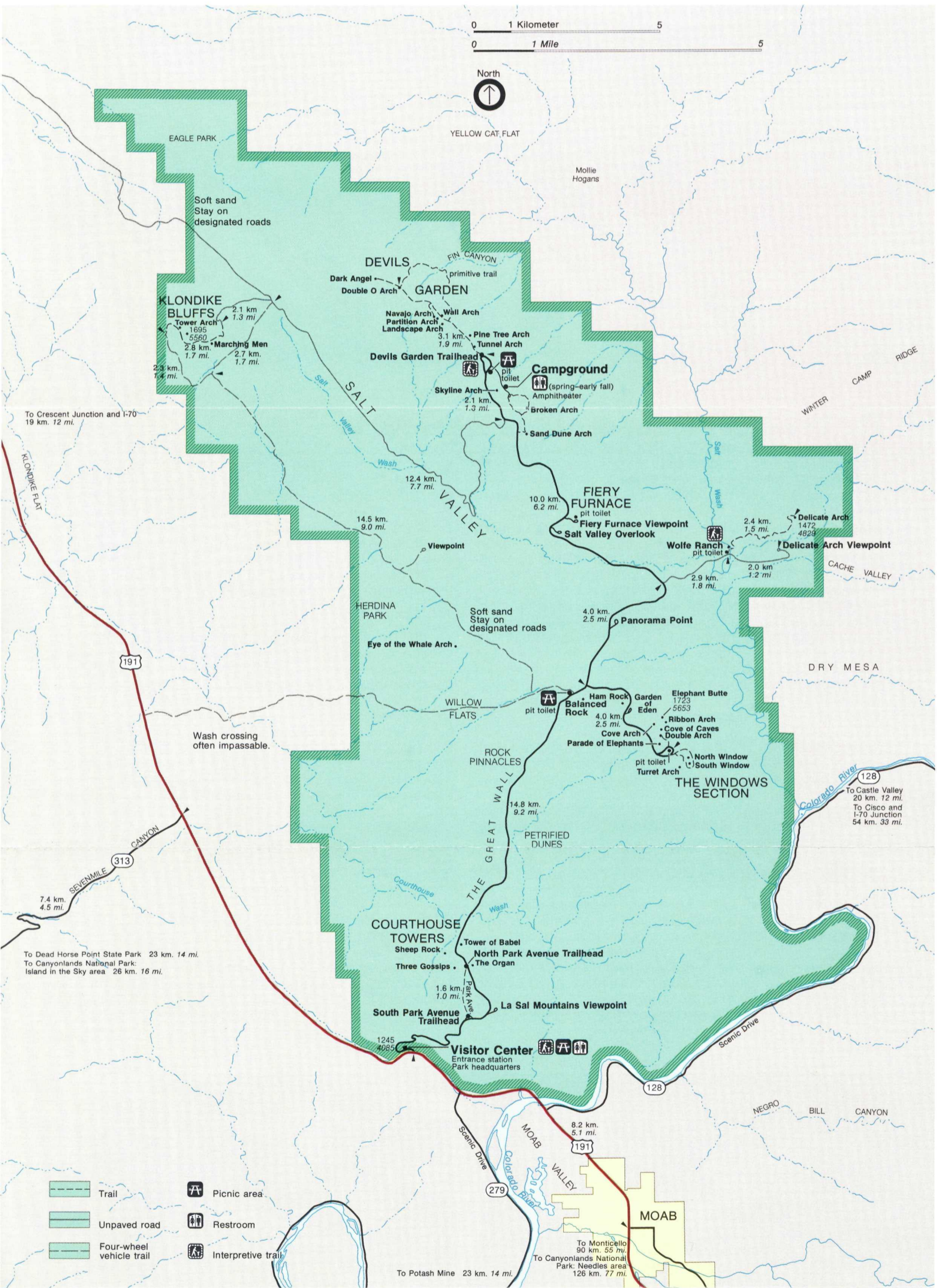
Points of Special Interest. Stop at the **visitor center** and ask advice on the best use of your time—whether an hour or a week—in the park and nearby areas. There you also can see a color slide orientation program, geology museum, history exhibit, and other maps and publications. In spring and summer, ask about the naturalist-led Fiery Furnace Walk, a popular two-hour activity. A self-guiding auto tour booklet coordinated with numbered stops along the park road is available. Popular park features are listed below.

Park Avenue, balanced rocks, spires, and eroded fins that resemble a city skyline. **Courthouse Towers**, photographic mecca that boasts huge monoliths: Sheep Rock; Three Gossips; and a small arch in the making. **Balanced Rock**, world famous. **The Windows Section**, four large arches seen from the roadway: Double and Turret Arches and North and South Windows; the latter two, seen from Turret Arch, are known as the Spectacles; the Parade of Elephants—*no matter how short your stay, at least go as far as the Windows Section*. **Panorama Point**, vista of Salt Valley and of the Fiery Furnace—sometimes illuminated by sunset. **Wolfe Ranch**, old log cabin and ranch. **Delicate Arch**, see cover photo! **Salt Valley Overlook**, collapsed salt dome. **Fiery Furnace Viewpoint**, dramatic overview of exposed sandstone fins; starting point for daily 2-hour guided walk in spring and summer. **Skyline**

Arch, doubled in size in the 1940s. **Broken and Sand Dune Arches**, short trails lead to a curiously eroded arch and to an arch beside a sand dune where children delight to romp.

Devils Garden Campground, some 50 tent and trailer sites, first-come, first-served, plus two walk-in group sites limited to tenting and available by reservation for 10 or more persons. Facilities include flush toilets and water until frost; chemical toilets and no water from November through mid-March. No fee is charged when the water is turned off. Campfire programs nightly in spring and summer at the amphitheater.

Devils Garden Trail, tremendously rewarding 3.2-kilometer (2-mile) walk from the trailhead to Double O Arch; ask about several other arches and about the new primitive loop trail. **Klondike Bluffs**, vast scenic area; magnificent Tower Arch; eroded fins of Marching Men; salmon-pink colored Entrada Sandstone features topped by white Moab Member sandstone; hikers should ask about the possibilities here. **Herdina Park**, primarily four-wheel drive access; also good for backpackers; Eye of the Whale Arch found here.



For Your Safety

The climate and landscape at Arches pose special problems you should be aware of for your safety and convenience. Summer daytime temperatures can reach 43°C (110°F). Carry 4 liters (1 gallon) of water per person per day, **minimum**. Dehydration and heat problems can be fatal.

Sandstone "slick-rock" is dangerous—it crumbles and breaks easily. Deaths from falls have occurred. Climbing *down* after an ascent may be impossible, leaving you rim-rocked. Technical

rescues are expensive and dangerous. Rock climbing is permitted, but climbing on any feature named on USGS maps is prohibited. If in doubt, ask a ranger.

Backcountry overnight hikers must get a free backcountry permit at the visitor center. There are no designated backcountry trails, so you need a USGS map. Designated trails are marked with rock cairns. Stay on these trails to protect fragile desert soils and plantlife. You must carry water and a camp stove. Do not

hike alone. If you become lost, stay where you are. Aimless wandering wastes precious survival energy and can confound searchers. All backcountry water should be boiled two minutes before drinking to destroy Giardia organisms. Chemical treatment is not considered effective.

Drivers please note. The scenery here can lead you astray. Save sightseeing for the turnouts provided. And watch for other drivers who may be awestruck!

And one last note. Don't walk off a

cliff while looking through your camera viewfinder or binoculars. We know, that sounds ridiculous, but . . .

Regulations

Regulations are designed for your safety and for the protection of natural resources for posterity. Do not take pets on trails or in buildings. They must be under physical restraint at all times. Wood gathering is prohibited. Bring fuel for the grills provided, or bring a stove. Do not litter; we are proud of our reputation for cleanliness. Do not deface or disfigure features.

Some of these magnificent sights exist on borrowed time as it is. Should you stumble across rare Anasazi Indian rock writings, leave them alone. Admire them. They are parts of a puzzle we hope to unravel someday.

Backpacking and rock climbing, only on unnamed features, are permitted in the park. Please read about these activities under Safety. If you have questions, ask at the visitor center, ask a ranger, or write the superintendent—address at right.

For Information

The park superintendent's address is c/o Canyonlands National Park, 446 South Main Street, Moab, UT 84532.

Preservation Plea

Please remember that this is a sanctuary for wildlife. Hunting and the use of firearms are prohibited. Do not disturb, deface, or destroy flowers, trees, wildlife, or other natural objects or artifacts.

Law enforcement activities are seldom necessary at Arches. We like that. Help us attain a perfect, no-citation year.