Zion

Zion National Park
Utah

National Park Service
U.S. Department of the Interior

All this is the
music of waters.

John Wesley Powell, 1895

Large photo: Towers of the Virgin and The West Temple
© TOM BEAN

Wrought by Water

Immutable yet ever changing, the cliffs of Zion stand resolute, a glowing presence in late day, a wild calm. Melodies of waters soothe desert-parched ears, streams twinkle over stone, wren song cascades from red-rock cliffs, cottonwood leaves jitter on the breeze. But when lightning flashes waterfalls erupt from dry cliffs, and floods flash down waterless canyons exploding log jams, hurling boulders, croaking wild joyousness, and dancing stone and water and time. Zion is alive with movement, a river of life always here and always changing.

Everything in Zion takes life from the Virgin River's scarce desert waters. Water flows, and solid rock melts into cliffs and towers. Landscape changes as canyons deepen to create forested highlands and lowland deserts. A ribbon of green marks the river's course as diverse plants and animals take shelter and thrive in this canyon oasis. From the beginning people sought this place, this sanctuary in the desert's dry reaches. The very name Zion, meaning "promised land," evokes its significance.

More than the river's music and the soaring heights alone, Zion's nature multiplies with each slope, aspect, and soil type, with each minute change in precipitation or temperature. Add to these influences species from nearby ecosystems, and Zion becomes an assemblage of plants, and thus of animals, found nowhere else exactly like this. Although the southwestern desert may look homogeneous, each fold, wrinkle, bend, slope, mesa top, and canyon bottom creates its unique conditions. This unlikely desert harbors a mosaic of environments, each fine-tuned to place. Welcome to the one called Zion.

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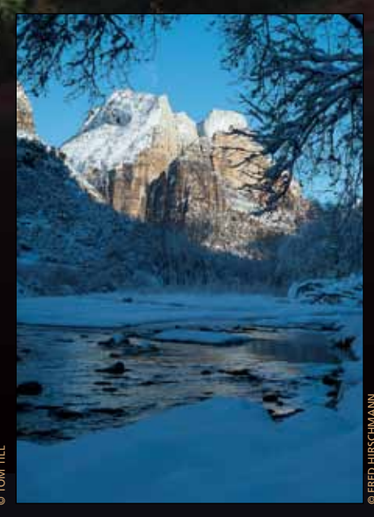

© FRED HIRSCHMANN

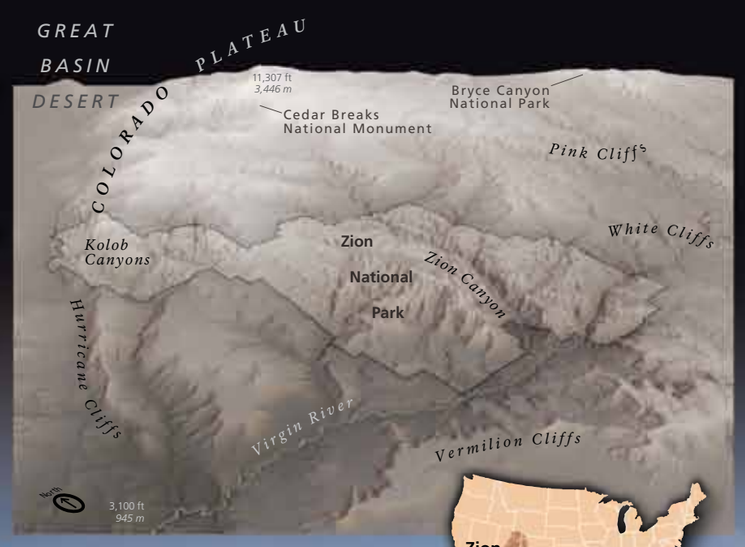
Green canyons, red cliffs, blue skies: Zion's colors can stop you in your tracks , as the three photos at left show.

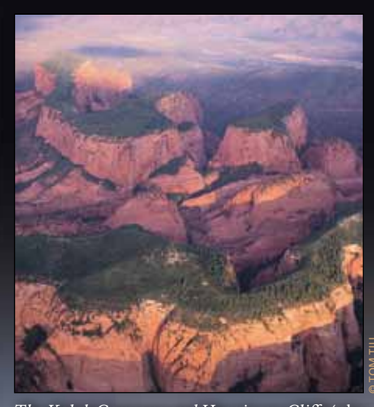
Water creates emerald oases of lush plants in an otherwise red desert landscape. Red rocks of a remarkable slot canyon reveal how rushing waters forcefully shaped its narrow and twisting walls. Tinted blue by sky, winter's snow highlights the landscape, and then melts to feed scouring river torrents in spring.

Geologic Contrasts Create Diversity

It's ironic, in this seemingly unending desert, that water creates most of what we see. North of Zion, rain falling on the 11,000-foot-high Colorado Plateau races downhill, slices Zion's relatively soft layers, and pushes its debris off the Plateau's southern edge. This edge is not abrupt, but it steps down in a series of cliffs and slopes known as the Grand Staircase. Above Zion, topping the Staircase, Bryce Canyon's crenellated edges form as water trickles off the Plateau. Below Zion, Grand Canyon forms the lowest rung into which 90 percent of Colorado Plateau waters run. Zion's gathered waters, known as the Virgin River, traverse Mojave Desert lands and join the Colorado River in Lake Mead's handmade basin before completing their Pacific-bound journey.

Long before today's landscape even appeared, streams, oceans, deserts, and volcanos deposited thousands of feet of mud, lime, sand, and ash. The immense pressure and heat of accumulating sediments turned lower layers to stone. Later, underground forces uplifted the Colorado Plateau, a 130,000-square-mile mass of rock, over 10,000 feet above sea level. Rain's watery fingers then worked the Plateau's minute cracks, loosening grains and widening fractures—and eroding today's mighty canyons. These processes continue; rivers still deposit sediments that turn to stone, earthquakes still punctuate the Plateau's upward journey, and erosion pries rockfalls from Zion's seemingly immutable cliffs. Eventually, this beautiful canyon will melt away and others will form. All it takes is time.

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The Vermilion Cliffs, White Cliffs, and Pink Cliffs (diagram at left) *are part of the Grand Staircase, the southwestern edge of the Colorado Plateau. The Bryce Canyon and Cedar Breaks amphitheaters are etched into the Pink Cliffs at the top of the Grand Staircase.*

The Kolob Canyons and Hurricane Cliffs (photo above and diagram at left) *are at the western edge of the massive, uplifted Colorado Plateau* (map at left).

Stratigraphy,

the study of rock layers, reveals the relative age of the rocks before you at Zion. These rocks formed in environments as varied as sand dunes and shallow sea bottoms.

© DAVID PETTIT

TEMPLE CAP FORMATION
NAVAJO SANDSTONE
KAYENTA FORMATION
MOENAVE FORMATION
CHINLE FORMATION
PETRIFIED FOREST MEMBER
SHINARUMP CONGLOMERATE
MOENKOPI FORMATION

Zion Canyon

Virgin River

Navajo sandstone s sweeping lines of contrasting color record the move ments of sand dunes.

Kayenta mudstone features dinosaur tracks.

Lower Moenave deposits testify to pooling waters; upper ones indicate swift moving floods.

Chinle Formation shales are soft and contain petrified wood.

Shinarump Conglomerate is composed of varied sizes of eroded Moenkopi rubble.

The Moenkopi Formation records a shallow sea withdrawing, so the marine fossils differ in its bottom and top layers.

In a Haven of Habitats

People have occupied the landscape of what is now Zion National Park for thousands of years. Zion's first residents tracked mammoths, camels, and other mammals though open desert and sheltered canyons. With climate change, disease, and overhunting, these animals died out 8,000 years ago. Hunters adapted by hunting smaller animals and gathering food. As resources kept diminishing, people adjusted to suit their location. One desert culture, evident here still, evolved over the next 1,500 years as a community of farmers now known as Ancestral Puebloans. The diverse geological setting gave them a combination rare in deserts: terraces to grow food, a river for water, and an adequate growing season. On the Colorado Plateau, crops grow best between 5,000 and 7,000 feet of elevation, which makes Zion's elevations nearly ideal. But drought, resource depletion, and migrations eventually decreased the Ancestral Puebloans' dominance. The Southern Paiute people who followed brought traditions suited to the harsh desert climate and thrived here.

Westward expansion eventually brought new settlers to the canyon. In the 1860s, early Mormon pioneers came to the region and built small communities and farmed the river terraces. Through hard work and faith, the new residents endured in a landscape where flash floods destroyed towns and drought burned crops. The same threats exist today, but Zion daily draws new explorers to experience the beauty and the sanctuary of this place that countless generations have considered home.

NPS

Zion's beauty and bounty have beckoned to humans over a great span of time. This corn and its storage jar, found in the park, are over 1,000 years old.

NPS

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In the 1800s, popular artist Thomas Moran captured the majesty of Zion Canyon (left) *that sparked making it a park and a premier American vacation destination* (far left in 1929). *Water both fashions beauty and supports the richness that makes Zion such a haven of habitats.*

Zion's Natural Diversity

The Nature of Sanctuary

Tucked in niches, hidden in soil, peeking from cliffs, or scampering between our feet, an amazing array of plants and animals thrive in Zion National Park. Tiny piñon mice, golden eagles, mountain lions—all thrive in Zion's many habitats. Park elevations range from 3,600 to 8,700 feet and provide vastly different environments. Fir, ponderosa pine, and aspen prefer snowy highcountry winters, while piñon, cliffrose, and mesquite flourish in the desert's heat.

Water, and the lack of it, decides what grows where. On the plateau, above the canyon rim, annual precipitation tops 26 inches. In this relatively cool and moist environment, sego lilies sprout under greenleaf manzanita, yellow-bellied marmots scurry between white fir, and elk mix with an occasional black bear. Here the Virgin River begins in an underground cavern of melted snow.

In the desert over 500 times more species are found at water sources than in the surrounding arid country. The Virgin River's perennial waters give life to an overstory of Fremont cottonwood, singleleaf ash, and boxelder. The rare Zion snail lives only in Zion's isolated hanging gardens that grow lush with maidenhair fern, scarlet monkeyflower, and golden columbine. Canyon treefrogs bleat while campers sleep, and great blue herons wade the river's currents. When summer monsoons send flash floods roaring down canyon, it's a testimony to evolution that anything survives.

That's also true away from the river, where aridity has real meaning. Zion Canyon's annual precipitation may total a mere 15 inches.

At the lowest elevations, Mojave Desert species—desert tortoise and honey mesquite—infiltrate Zion's dry, south-facing canyons. At mid-elevations, Great Basin Desert species like shadscale and big sagebrush mingle with the Colorado Plateau's bigtooth maple and Utah juniper. Zion's biotic diversity is the result of these three communities coming together in one location.

Part of Zion's uniqueness comes from its geology. Great Basin and Mojave Desert soils tend to be similar over great distances. But Zion's stacked prehistoric environments erode into many soils. The Chinle Formation's ancient lakes and volcanic ash, for example, corrode into a soil rich in the poisonous mineral selenium. Specialized plants like prince's plume and milkvetch (also known as locoweed from the effects of its selenium-infused leaves) grow on such odd soils and increase Zion's diversity. Individual and unconnected canyons also increase diversity because isolation can lead to variation among species.

This national park is beautiful but not pristine. Research shows that 150 years of farming, grazing, and recreation changed Zion's environment. Exotic species like tamarisk and cheatgrass replace native willow and native grasses. It is the mission of the National Park Service to provide sanctuary for and reinvigorate Zion's remaining diversity. Although most park species are not unusual and much has changed, these unique assemblages create and sustain the relevance and sanctity of this wondrous place called Zion.

RIM

NPS
Sego lily

GERALD & BUFF CORSI © CALIFORNIA ACADEMY OF SCIENCES
Quaking aspen

DR. LLOYD GLENN INGLES © CALIFORNIA ACADEMY OF SCIENCE
Steller's jay

GERALD & BUFF CORSI © CALIFORNIA ACADEMY OF SCIENCES
Elk

GERALD & BUFF CORSI © CALIFORNIA ACADEMY OF SCIENCES
Peregrine falcon

CANYON

© MERLIN TUTTLE, BAT CONSERVATION INTERNATIONAL
Pallid bat with scorpion

© LARRY ULRICH
Prince's plume

© GEORGE H.H. HUEY
Mountain lion

RED CLIFFS DESERT RESERVE
Desert tortoise

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Tarantula

RIVER

ROBERT POTTS © CALIFORNIA ACADEMY OF SCIENCES
Colorado columbine

LARRY BLAKLEY © CALIFORNIA ACADEMY OF SCIENCES
Maidenhair fern

© FRED HIRSCHMANN
Canyon treefrog

GERALD & BUFF CORSI © CALIFORNIA ACADEMY OF SCIENCES
Fremont cottonwood

© STEPHEN O. MUSKIE
Black-chinned hummingbird

A crack in Navajo sandstone affords a home for this blooming Indian paintbrush (background photo).

© WILLIAM NEILL / LARRY ULRICH STOCK

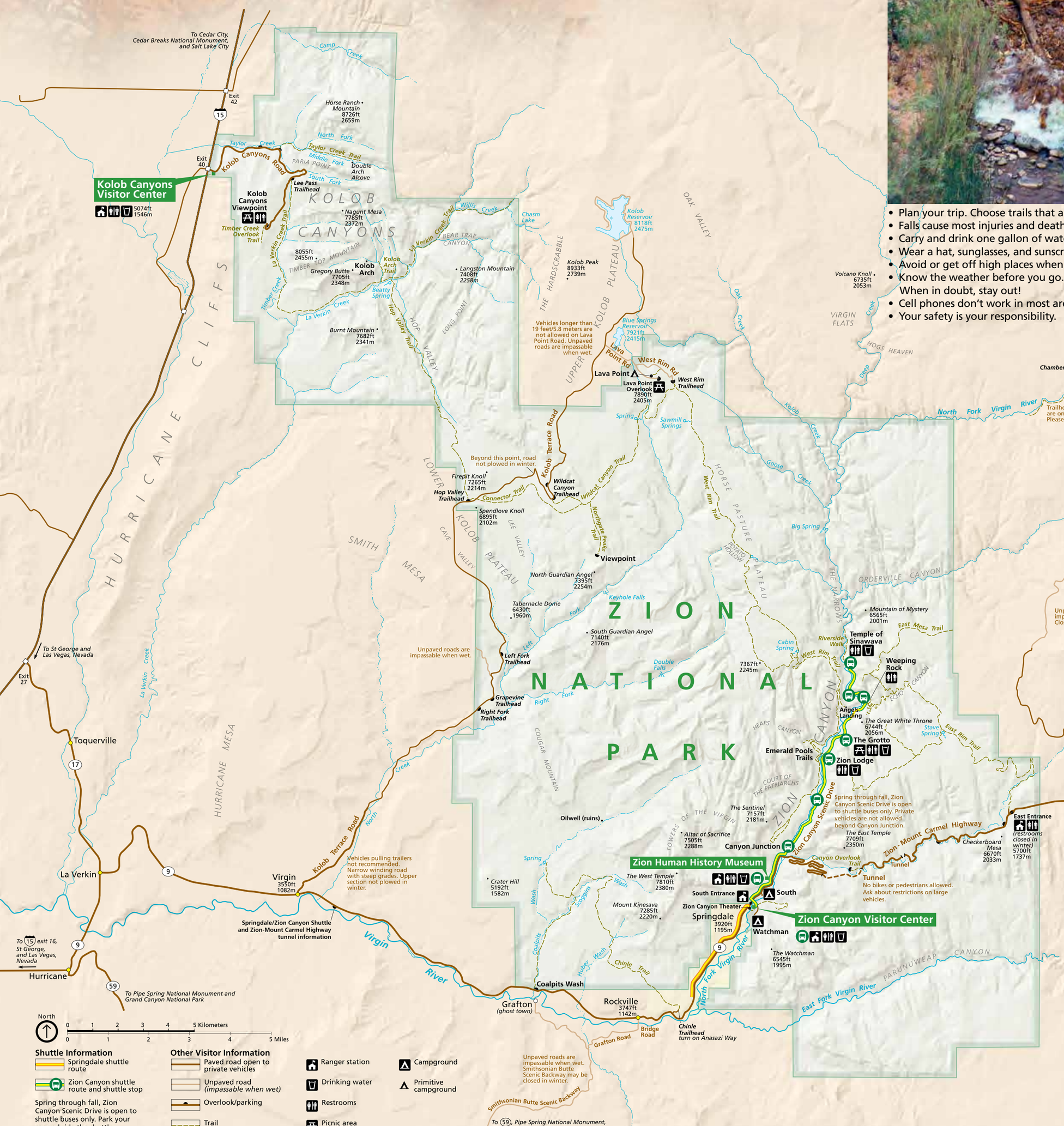
Be Prepared, Plan Well, Live Long

NPS

A human body is no match for floodwaters that rampage through narrow canyons, pushing a raft of boulders and logs (left).

Know the weather and flash flood potential before your trip. If bad weather threatens, do not enter narrow canyons.

- Plan your trip. Choose trails that are within your ability.
- Falls cause most injuries and deaths at Zion.
- Carry and drink one gallon of water per person per day.
- Wear a hat, sunglasses, and sunscreen.
- Avoid or get off high places when lightning threatens.
- Know the weather before you go. Distant storms can cause flash floods. When in doubt, stay out!
- Cell phones don't work in most areas and don't make you invincible.
- Your safety is your responsibility.



Wilderness

In 2009, Congress protected nearly 84 percent of the park as wilderness under the 1964 Wilderness Act. Wilderness designation protects forever the land's wilderness character, natural conditions, opportunities for solitude, and scientific, educational, and historical values.

Visiting the Park

Zion Canyon Visitor Center is open year-round. A 22-minute orientation film is shown regularly at the Zion Human History Museum. Spring through fall, Zion Canyon Scenic Drive is open to shuttle buses only. Check the park website *(see below)* or the park newspapers for dates and times: *Map and Guide* and *Backcountry Planner* are available at the entrance gate, visitor centers, and on the park website. Service animals are welcome. For firearms regulations visit the park website or ask a ranger.

Zion is one of over 390 parks in the National Park System. To learn more about parks and National Park Service programs in America's communities, visit www.nps.gov.

More Information
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