



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*, a Hebrew word for refuge, 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!



Green canyons, red cliffs, blue skies: Zion's colors can stop you in your tracks (photos at left). Water enables greens rare amidst otherwise desert landscapes. Visible or not, water forcefully shapes these stalwart walls. Trickling falls summon emerald growth in nooks and crannies. Sculpted evidence testifies to the carving of red slot canyons. Winter's icy-blue snow-melt feeds anew the rushing, scouring river torrents of 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 180,000-square-mile rock chunk, more than 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; others will form. All it takes is time.



The Vermilion, White, 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.

Water-carved Kolob Canyons and Hurricane Cliffs (photo above and diagram at left) are at the 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.

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Navajo sandstone's sweeping lines of contrasting color record the movements of sand dunes.

Kayenta mudstone commonly 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.

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

In a Haven of Habitats

Almost 12,000 years ago Zion's first peoples, who are now almost invisible, tracked mammoth, giant sloth, and camel across southern Utah. Due to climate change and overhunting these animals died out about 8,000 years ago. Humans adapted by focusing on mid-size animals and gathered foods. As resources dwindled 2,600 years ago, people tuned lifeways to the specifics of place. Such a culture, centered on Zion, differentiated over the next 1,500 years into a farming tradition archeologists call Virgin Anasazi. Zion's geology provided these and later pioneer farmers

a combination rare in the desert: a wide, level place to grow food, a river to water it, and an adequate growing season. On the Colorado Plateau crops grow best between 5,000 and 7,000 feet, making Zion's elevations—3,666 to 8,726 feet—almost ideal. Differences in elevation also encourage diverse plants and animals: mule deer and turkey wander forested plateaus; bighorn sheep and juniper prosper in canyons. The Anasazi moved southeast 800 years ago, due probably to drought and overuse. Soon after, Paiute peoples brought a lifeway fine-tuned to

desert seasons and thrived. In the 1860s, just after settlement by Mormon pioneers, John Wesley Powell visited Zion on the first scientific exploration of southern Utah. By hard work and faith pioneers endured in a landscape that hardly warranted such persistence. Flash floods destroyed towns and drought burned the crops. Only the will to survive saw Paiute, Anasazi, and European descendants through great difficulties. Perhaps today Zion is again a sanctuary, a place of life and hope.



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



Popular 19th-century artist Thomas Moran captured the majesty of Zion Canyon (left) that sparked the park's creation and has made it a premier American vacation destination (far left in 1929). Water both fashions beauty and invites the richness that makes Zion such a haven of habitats.

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Mukuntuweap's Rich Mix of Life

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 this place originally called Mukuntuweap. 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, 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 more than 500 times more species congregate 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 box elder. 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 flashfloods roaring downcanyon, it's a testimony to evolution that anything survives.

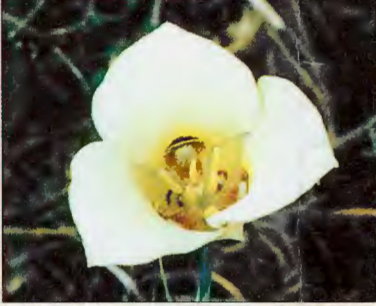
That's also true away from the river, where aridity has real meaning. Zion Canyon annual precipitation may total a mere 14 inches.

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. But Zion's biotic diversity far exceeds that found in these nearby desert ecosystems.

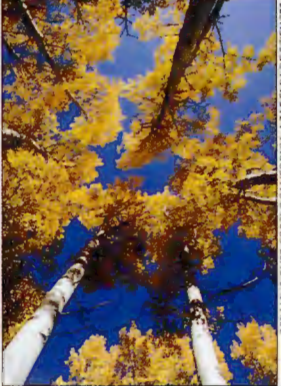
Part of Zion's uniqueness comes from its substrates. Great Basin and Mojave Desert soils tend to be monotonously similar over great distances. But Zion's stacked prehistoric environments erode into many soils. For example, the Chinle Formation's ancient lakes and volcanic ash corrode into a soil rich 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 as isolation creates new 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 cheat grass 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



Sego lily



Quaking aspen



Steller's jay



Elk



Peregrine falcon

CANYON



Pallid bat with scorpion



Prince's plume



Mountain lion



Desert tortoise



Tarantula

RIVER



Colorado columbine



Maidenhair fern



Canyon tree frog



Fremont cottonwood



Black-chinned hummingbird

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

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Be Prepared, Plan Well, Live Long



- 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.

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.



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 (below) or park Guide for dates and times. Two newspapers, Zion Map and Guide and Backcountry Planner, are available on request.

Zion is one of more than 380 parks in the National Park System. The National Park Service cares for these special places saved by the American people so that all may experience our heritage. For more information about parks and National Park Service programs in America's communities, visit www.nps.gov.

More information
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