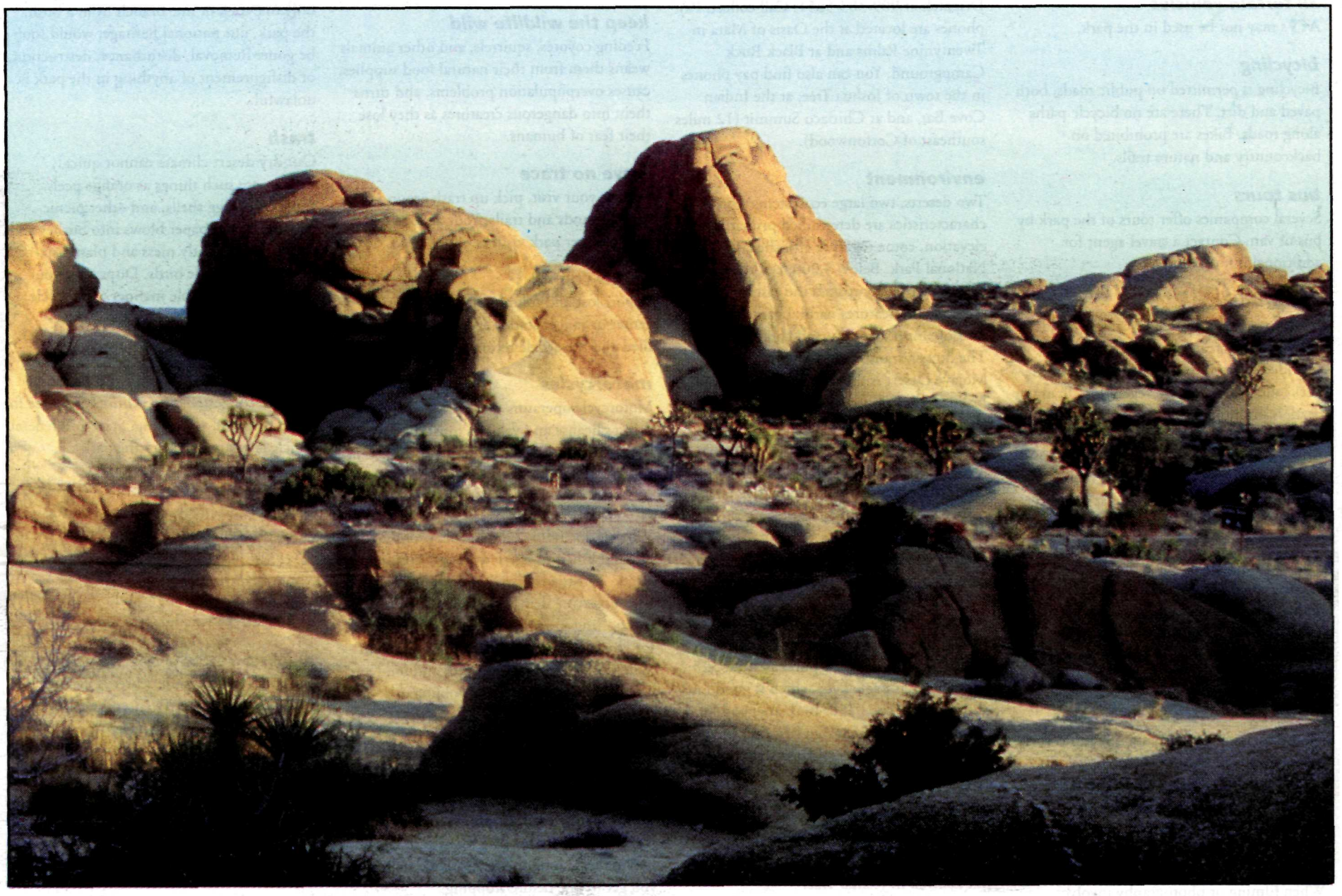
Joshua Tree Guide



Volunteer Richard Schendel made this photograph of the afternoon light at Jumbo Rocks

In This Issue

JOSHUA TREE NATIONAL PARK
74485 NATIONAL PARK DRIVE
TWENTYNINE PALMS, CA 92277

Important information

Emergency — dial 909-383-5651

accessibility
The nature trails at Bajada, Cap Rock, and the Oasis of Mara are accessible. An assistive listening system is available for use during ranger programs with prior notice. An audio description of the Bajada trail is available at the Cottonwood Visitor Center.

all terrain vehicles
ATVs may not be used in the park.

bicycling
Bicycling is permitted on public roads, both paved and dirt. There are no bicycle paths along roads. Bikes are prohibited on backcountry and nature trails.

bus tours
Several companies offer tours of the park by bus or van. Contact a travel agent for additional information.

campfires
Campfires are permitted in campgrounds and in picnic areas where fire grates are provided. Campfires are not allowed in the backcountry. Collecting vegetation, living or dead, is prohibited so bring firewood.

climate
Days are typically clear with less than 25% humidity. Temperatures are most comfortable in the spring and fall, with an average high/low of 85° and 50°F respectively. Winter brings cooler days, around 60°F, and freezing nights. It occasionally snows at higher elevations. Summers are hot, over—sometimes well over—100°F during the day and not cooling much below 75°F until the early hours of the morning.

climbing
Motorized drilling is prohibited within park boundaries, and bolting is not allowed in designated wilderness. All fixed protection found in place should be considered potentially unsafe.

commercial filming
When filming or photography involves advertising a product or service, the use of models, sets, props, or the use of a restricted site, a film permit is required.

day-use and restricted areas
Some areas within the park are privately owned; others protect wildlife or historical sites. Entering these areas is prohibited. Day-use areas are set aside to protect sensitive populations of wildlife. They are closed from dusk to dawn.

dehydration
It is easy to become dehydrated in arid desert environments. Even if you only plan to drive through the park, you should have some water with you. If you are going to camp, we recommend one gallon of water per person per day. If you are going to be hiking or biking, you will want to take along two gallons per person. Drink the water and do not economize. When the water is half gone, it is time to turn back.

emergency phones
In an emergency call San Bernardino Dispatch at 909-383-5651. Call collect. Pay phones are located at the Oasis of Mara in Twentynine Palms and at Black Rock Campground. You can also find pay phones in the town of Joshua Tree, at the Indian Cove Bar, and at Chiriaco Summit (12 miles southeast of Cottonwood).

environment
Two deserts, two large ecosystems whose characteristics are determined primarily by elevation, come together at Joshua Tree National Park. Below 3,000 feet, the Colorado Desert encompasses the eastern part of the park and features natural gardens of creosote bush, ocotillo, and cholla cactus. The higher, moister, and slightly cooler Mojave Desert is the special habitat of the Joshua tree. Joshua tree forests occur in the western half of the park. The western part of the park also includes some of the most interesting geologic displays found in California's deserts. In addition, five fan palm oases dot the park, indicating those few areas where water occurs naturally and where wildlife abounds.

entrance fees
Admission to the park is $10.00 per vehicle and is good for seven consecutive days. A Joshua Tree Pass may be purchased for $25 and a Golden Eagle Pass, which is good for all NPS sites, costs $50. Both are good for 12 months. A Golden Age Pass may be purchased by any U.S. citizen 62 or older for $10 and it is good for life.

firearms and weapons
Firearms, including fireworks, traps, bows, BB guns, paint-ball guns, and slingshots, are not allowed in Joshua Tree.

food, lodging, services
There are no concessions within the park. However, surrounding communities can fulfill most visitor needs. Contact local chambers of commerce for information.

getting to the park
The park is located about 140 miles east of Los Angeles via I-10. The west and north entrances to the park are off CA Hwy 62 (Twentynine Palms Highway), at the towns of Joshua Tree and Twentynine Palms. The south entrance is at Cottonwood Spring, about 25 miles east of Indio off I-10.

horses
Horseback riding is a popular way to experience the park. Because of the special requirements for stock in desert environments, you will want to request the site bulletin on horse use before you come.

international visitors
Information is available at visitor centers and entrance stations in Dutch, French, German, Italian, Japanese, and Spanish.

keep the wildlife wild
Feeding coyotes, squirrels, and other animals weans them from their natural food supplies, causes overpopulation problems, and turns them into dangerous creatures as they lose their fear of humans.

leave no trace
During your visit, pick up trash around campgrounds and trails. Your actions will inspire other park visitors.

lost & found
Report lost and found items to any visitor center or ranger station. A report will be filed and the article returned if found.

motorcycles
Motorcycle operators must carry a valid state driver's license and vehicles must display valid state license plates. No off-road or trail travel is allowed.

off-road driving
Vehicles, including bicycles, are prohibited off established roads. The desert ecosystem is fragile. Off-road driving and riding creates ruts, upsetting delicate drainage patterns, compacting the soil, and leaving visual scars for years. Plants are crushed and uprooted. Wildlife shelters are destroyed, and food and water supplies are altered or obliterated.

parking
Park roads, even the paved, main roads, are narrow, winding, and have soft, sandy shoulders. Accidents occur when visitors stop along the road to admire a view or make a picture. There are many pullouts and parking lots along the main roads; wait until you get to one before stopping.

pets
While pets are allowed in the park, their activities are quite restricted. They must be on a leash at all times, they must never be left unattended—not even in a vehicle, and they are prohibited on trails.

potable water
Water is available at the Oasis of Mara in Twentynine Palms, at Black Rock and Cottonwood Campgrounds, at West Entrance, and at Indian Cove Ranger Station. Water sources within the park are not potable and are reserved for wildlife.

stay out and stay alive
Mining was an important activity in this area and numerous mining sites can be found within the park. If you choose to visit them, use extreme caution in the vicinity of old mine workings. Mine shafts are unstable and are often filled with harmful gases.

take only pictures
Over 1.25 million people visit Joshua Tree National Park each year. If each visitor took only one rock or one branch from a bush, the park, our national heritage, would soon be gone. Removal, disturbance, destruction, or disfigurement of anything in the park is unlawful.

trash
Our dry desert climate cannot quickly decompose such things as orange peels, apple cores, egg shells, and other picnic remains. Loose paper blows into bushes and creates an unsightly mess and plastic six-pack rings strangle birds. Dispose of your trash in a responsible manner and recycle whatever you can.

vehicle laws
Park roads are narrow and winding. Some areas are congested. Speed limits are there for your safety and well-being. State and federal vehicle laws apply within the park.

visitor activities
Ranger-led programs are offered on the weekends from mid-October through mid-December and from mid-February through May. Check at visitor centers, at entrance stations, and on campground bulletin boards for the current schedule.

visitor centers
The park's main visitor center is located at the Oasis of Mara in Twentynine Palms. It is open 8 a.m. to 5 p.m. The Cottonwood Visitor Center is open from 8 a.m. to 4 p.m. A variety of books, videos, maps, and other park-related items are available as well as cultural and natural history exhibits.

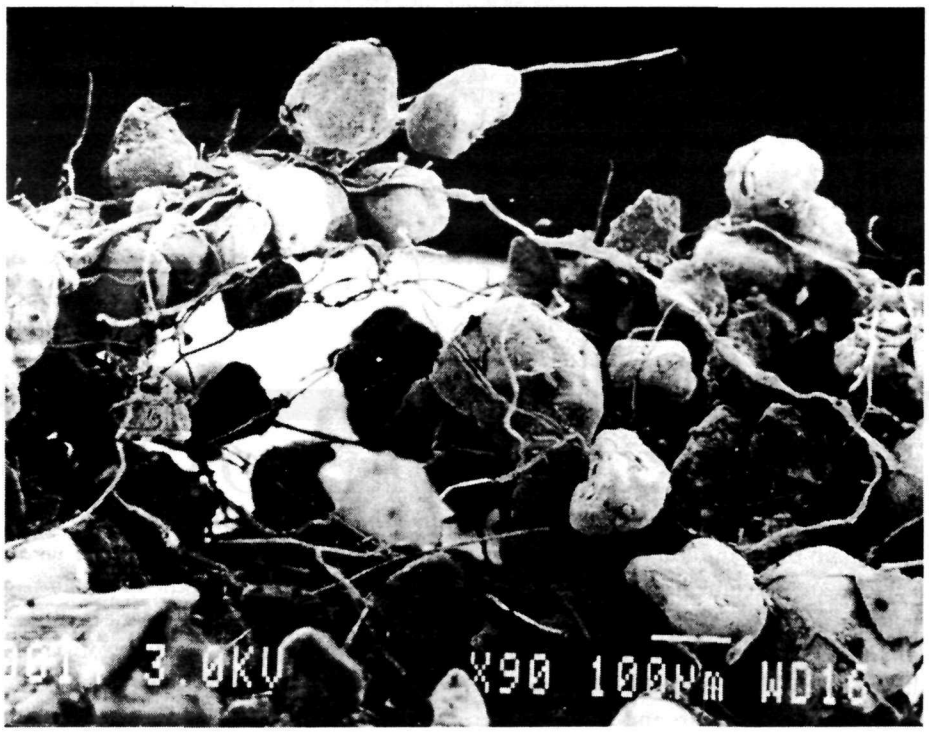
wildflowers
Spring blooming periods vary with the elevation, the temperature, and the amount of moisture in the soil. You can get up-to-date information by calling a wildflower hot line: Anza-Borrego (760) 767-4684; Living Desert (760) 346-5694.

world wide web
If you are "connected," check out the National Park Service publications on the web (http://www.nps.gov). We are adding more information all the time.

you are responsible
You are responsible for knowing and obeying park rules. Check at entrance stations, at visitor centers, and on campground bulletin boards to find out what they are. When in doubt, ask a ranger.

DESERT MAGIC

What has tentacles creeping through the ground around you, resists whipping winter desert winds, has watched the sun rise and fall over hundreds of cloudless days, and is invisible to the untrained eye? Cryptobiotic crusts! Otherwise known as "desert glue," this layer of biotic organisms "hidden" (crypto-) in the surface of park soils is rarely noticed by even the most active desert hikers.

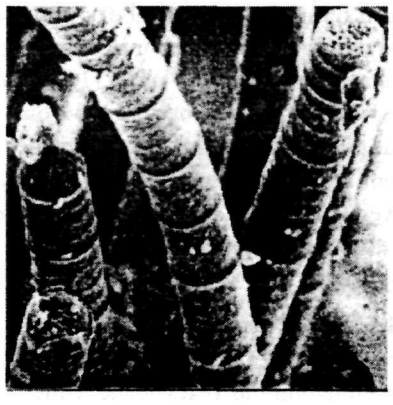


Magnified view of cryptobiotic crust structure

Living soil crusts are found throughout the world, from the hottest deserts to polar regions. In the desert, these crusts are dominated by *cyanobacteria* (blue-green algae), but also include lichens, mosses, green algae, microfungi, and bacteria.

So what's the big deal? Crusts play a vital role in desert health. *Cyanobacteria* in the desert form filaments surrounded by sheaths. With summer or winter rains, these filaments become moist and active, moving through the soils, leaving behind a trail of the sticky sheath material. The sheaths stick to surfaces such as soil particles, forming an intricate webbing of fibers. In this way, loose soil particles are joined together, and otherwise unstable, highly erosion-prone surfaces become resistant to both wind and water erosion. Basically, they hold the place in place!

These sheaths build up in the soil over long periods of time, up to 15 cm deep in some areas. Not only do they protect the soil from blowing away; they also absorb precious rainfall (reducing flash flood runoff) and provide a huge surface area for nutrients to cling to. They contribute nitrogen and organic matter to ecosystems which is critical in deserts where resources are few and far between. Unfortunately, many human activities are incompatible with these fragile crusts. The fibers that offer stability to the soil surface are no match for the boot of a hiker nor the weight of a tire. Crushed crusts contribute less nitrogen and organic matter to the ecosystem; under the best circumstances, a thin veneer may return in *five to seven years*!



Magnified view of a cryptobiotic sheath (left) and filaments (right)

So now what? Well, the best thing we can all do is try not to love our desert to death. Stay on established trails, and keep your vehicle on approved roads within the park. If you must walk through an area thick with crusts (you may see them as lumpy black bumps on the ground), walk in single file to destroy as small an area as possible. The desert will thank you for this in years to come, with bountiful wildflower displays in the crusted areas, as well as with land kept in place and a healthy ecosystem.

Author Jane Rodgers is the vegetation specialist at Joshua Tree.

Park Expands Services at Desert Queen Ranch

One of the park's most popular historic sites is the Desert Queen Ranch, known locally as Keys Ranch, after longtime park resident William "Bill" Keys. Originally an immigrant from Russia, Bill Keys arrived in the Joshua Tree area in 1910. He served for a while as the hired caretaker and assayer of the Desert Queen Mine. Eventually, he acquired the mine and a five-acre mill site as payment for back wages. He homesteaded additional acres and named his place the Desert Queen Ranch. Miner, rancher, farmer, engineer, handyman, and desert survivor, Bill Keys, along with his wife Frances, created a life and educated his children in this remote desert canyon.

Bill led a colorful life and is famous as the survivor of a gun battle with Worth Bagley over a disputed right-of-way. He also had small parts in two Disney films, *Chico, the Misunderstood Coyote* (1960), and *Wild Burro of the Desert* (1961).

Over the years, the ranch grew into a rambling collection of buildings, cabins, shacks, mining equipment, old cars, and the remarkable assortment of odds and ends needed to support Keys' many endeavors at his isolated desert homestead. Following Keys' death, the Desert Queen Ranch was added to the National Register of Historic Places.

The public may visit the ranch on ranger guided tours. Previously, these tours were offered only on weekends and during periods of peak visitation.

In 1996, Congress passed legislation that established the Federal Recreation Fee Demonstration Program (Fee Demo). Under this temporary program, 100 national parks, were allowed to increase entrance and other fees such as camping. In return, the participating parks are allowed to retain 80 percent of the funds collected for use in repairing and upgrading visitor facilities.

Through Fee Demo, an expanded program of guided tours of the historic ranch is now being offered three times daily, seven days a week. Tickets may be purchased up to five months in advance. Tours last 90 minutes and are offered at 10 a.m., 1 p.m. and 3 p.m. Additional tours will be added as needed.

Tickets for adults and children 12 years and over cost $5.00. Tickets for children 6 to 11are half price or $2.50, and children under six are free. Golden Age and Golden Access Passport holders will pay $2.50.

Tickets can be purchased by calling the park reservation office at 760-367-5555. Reservation are accepted Monday through Friday between 8 a.m. and 5 p.m. Tour tickets can also be purchased in person at the Oasis Visitor Center in Twentynine Palms from 8 a.m. to 5 p.m. It is recommended that you call ahead to ensure that tickets are available for your preferred date and time.

Visitor Center Face Lift

Regular Joshua Tree visitors will notice some changes at park headquarters when they visit this winter. The Oasis Visitor Center is getting a much needed overhaul, including the renovation of interior public spaces to accommodate new museum exhibits. The work is being funded by the Fee Demo Program (see related story above).

Beginning in June, park maintenance crews gutted the lobby and exhibit spaces. New walls, ceilings, floors, and lighting were installed. Old carpets were replaced with rubberized tiles that will hold up better than carpet but not carry noise as regular tile would.

Phase one of the project was installed in August. The new exhibits explore the park's major interpretive themes: geology, adaptations for desert living, the biologically rich environment of the Mojave/Colorado Desert transition zone, and preserving this area for the future. The visitor center lobby and book sales area also received new displays and cabinetry.

Two multimedia modules are scheduled to be installed by summer of 2000. Concrete walkways and covered patios will also be replaced and new stucco will be applied to exterior walls. Park visitors will soon have a more pleasing and educational experience when they visit the Oasis of Mara.

Campgrounds

Emergency — dial 909-383-5651

Campgrounds	Elevation	Sites	Fee	Group Sites	Group Fee	Horse Camp	Water	Flush Toilets	Chemical Toilets	Tables	Fire Grates	Dump Station
Belle	3800'	18							*	*	*	
Black Rock	4000'	100	$10			$10	*	*		*	*	*
Cottonwood	3000'	62	$8	3	$25		*	*		*	*	*
Hidden Valley	4200'	39							*	*	*	
Indian Cove	3200'	101	$10	13	$20/35				*	*	*	
Jumbo Rocks	4400'	125							*	*	*	
Ryan	4300'	31				*			*	*	*	
Sheep Pass	4500'			6	$20/35				*	*	*	
White Tank	3800'	15							*	*	*	

Camping Regulations

There is a 30-day camping limit each year. However, only 14 nights total may occur from October through May.

Campsites are limited to six people, two tents, and two cars. Group sites accommodate ten to seventy people.

Obtain reservations for sites at Black Rock, Indian Cove, and all group sites by calling 1-800-365-2267. Other campgrounds are first-come, first-served. It is wise to arrive as early as possible.

Showers are not available, and there are no hookups for recreational vehicles.

Water is available at Oasis Visitor Center in Twentynine Palms, Indian Cove Ranger Station, West Entrance, and Black Rock and Cottonwood Campgrounds.

If you wish to have a campfire, bring your own firewood as all vegetation within the park is protected.

Quiet hours are from 10 PM to 6 AM This includes generators and motors.

Be an inspiration to others; leave your campsite cleaner than you found it.

What to See and Do

For a first-time visitor the desert may appear bleak and drab. Viewed from the road, the desert only hints at its vitality. Closer examination reveals a fascinating variety of plants and animals. A rich cultural history and surreal geologic features add to the attraction of this place. Joshua Tree National Park offers visitors endless opportunities for exploration and discovery. Depending on the number of hours you have to spend, your interests, and energy, here are some ideas to consider:

IF YOU HAVE FOUR HOURS OR LESS, begin your tour at a park visitor center. Park staff will be happy to provide you with current information about conditions in the park as well as answers to your questions.

With limited time you may want to confine your sightseeing to the main park roads. Many pullouts with wayside exhibits dot the park roads. A list of nature trails and short walks appears in this publication. Consider experiencing at least one of these walks during a short park visit.

On clear days the vista from Keys View extends beyond Salton Sea to Mexico and is well worth the additional 20-minute drive.

IF YOU PLAN TO SPEND AN ENTIRE DAY, there will be time to walk several nature trails. A ranger-led program will add enjoyment and understanding to your visit. Check at visitor centers and on campground bulletin boards for listings.

If solitude is what you are after, plan an all-day hike. A list of hikes is included in this publication and trail information can be obtained from visitor centers or call ahead and reserve a spot on the popular Desert Queen Ranch guided walking tour.

Some visitors like to experience the desert from the seat of a mountain bike. The park offers an extensive network of dirt roads that make for less crowded and safer cycling than the paved main roads. A selection of road trips is included in the article titled Backcountry Roads in this publication.

Joshua Tree has gained international attention as a superb rock-climbing area. Many visitors enjoy just watching the rock climbers in action.

WITH MORE THAN ONE DAY IN THE PARK, your options increase. There are nine campgrounds and backcountry camping is permitted. You will find information concerning camping and backcountry use elsewhere in this publication.

Books and topographic maps, available at park sales areas, give information needed for longer hikes. For "peak baggers," the park has ten mountains over 5,000 feet (1,524 meters) in elevation. Or make it your goal to hike to all the park oases. Other trails lead you to remnants of the gold mining era, a colorful part of the park's cultural history.

Whatever you choose, your time will be rewarding. The desert holds much more than what is readily apparent to the casual observer. **A note of caution:** The desert, fascinating as it is, can be life-threatening for those unfamiliar with its potential dangers. It is essential that you carry water with you—even if you are only driving through. Cars break down; keys get locked inside; accidents happen.

BACKCOUNTRY ROADS

for mountain bikes and four-wheel drive vehicles

Mountain bikes and four-wheel drive vehicles are welcome in the park. For your own safety and for the protection of natural features please stay on established roads. Tire tracks on the open desert can last for years and will spoil the wilderness experience of future hikers.

Paved roads in the park are narrow without paved shoulders. Curves, boulder piles, and Joshua trees restrict the vision of bikers and motorists. The unpaved roads in the park are safer for bikes and offer many opportunities to explore the area. Here is a sampling:

Pinkham Canyon Road

This challenging 20-mile (32.4-km) road begins at Cottonwood Visitor Center, travels along Smoke Tree Wash, and then cuts down Pinkham Canyon. Sections of the road run through soft sand and rocky flood plains. The road connects to a service road next to I10.

Black Eagle Mine Road

Beginning 6.5 miles (10.5 km) north of Cottonwood Visitor Center, this dead-end dirt road runs along the edge of Pinto Basin, crosses several dry washes, and winds through canyons in the Eagle Mountains. The first 9 miles (14.5 km) are within the park boundary. Beyond that point is Bureau of Land Management land and a number of side roads. Several old mines are located near these roads but may be too dangerous to approach.

Old Dale Road

This 23-mile (37.3-km) road starts at the same point as Black Eagle Mine Road. The first 11 miles (17.8 km), cross Pinto Basin, a flat, sandy dry lake bed. Leaving the basin, the road climbs a steep hill, then crosses the park boundary. A number of side roads veer off toward old mines and residences. The main road leads to HWY 62, 15 miles (24.3 km) east of Twentynine Palms.

Queen Valley Roads

A network of roads, totaling 13.4 miles (21.7 km), cross this valley of boulder piles and Joshua trees. A bike trip can begin at Hidden Valley or the dirt road opposite Geology Tour Road. Bike racks have been placed in this area so visitors can lock their bikes and go hiking.

Geology Tour Road

The road turns south from the paved road 2 miles (3.2 km) west of Jumbo Rocks Campground. The distance from the junction to Squaw Tank is 5.4 miles (8.8 km) This section is mostly downhill but bumpy and sandy. Starting at Squaw Tank, a 6-mile (9.7-km) circular route explores Pleasant Valley. A guide is available at the beginning of the road.

Covington Flats

The dirt roads in Covington Flats offer access to some of the park's largest Joshua trees, junipers, pinyon pines, and the lushest vegetation in the high desert. From Covington Flats picnic area to Eureka Peak, is 3.8 miles (6.2 km) one way. The dirt road is steep near the end, but the top offers views of Palm Springs, the surrounding mountains, and the Morongo Basin. Your trip will be 6.5 miles (10.5 km) longer if you ride or drive over to the backcountry board, a starting point for excellent hiking.

Backcountry Camping *and* Hiking

Joshua Tree National Park is a backpacker's dream with its mild winter climate and interesting rock formations, plants, and wildlife. It embraces 794,000 acres of which 630,800 acres have been designated wilderness. By observing the guidelines below, your venture into the backcountry should be safe and enjoyable. If you have questions, ask a ranger. It is your responsibility to know and abide by park regulations.

Registering

If you will be out overnight, register at a backcountry board. The map in this publication indicates the location of the twelve backcountry boards. An unregistered vehicle or a vehicle left overnight somewhere other than at a backcountry board is a cause for concern about the safety of the vehicle's occupants. It is also subject to citation and towing.

Locating your camp

Your wilderness camp must be located one mile from the road and 500 feet from any trail.

Make yourself aware of any day-use only areas in the vicinity (they are indicated on the topo maps at the backcountry boards) and make certain to camp outside.

Washes may seem inviting places to sleep because they are relatively level, but it is important to realize that they got that way because flash floods bulldozed the rocks and vegetation out of the way.

Domestic issues

Water sources in the park are not potable and are reserved for wildlife so you will have to carry in an adequate supply for drinking, cooking, and hygiene. You will want to give some thought to the trade-off between the water required to hydrate dried foods versus the weight of canned and fresh. If you want to heat something you will need to pack in a stove and fuel as open fires are prohibited in the backcountry.

Bring plastic bags to hold your garbage and pack it out. Buried trash gets dug up by animals and scattered by the wind; it is not a pretty sight. Do bury human waste in "cat" holes six inches deep. Don't bury your toilet paper; put it in plastic (zip-locks work nicely) and pack it out. Leave no trace, as they say.

Hiking

It is easy to get disoriented in the desert; washes and animal trails crisscross the terrain obscuring trails, boulder piles are confusingly similar, and there are not many prominent features by which to guide yourself. Do get yourself a topographic map and compass and learn how to use them before you head out.

Know your limitations. You should not attempt to climb cliffs or any steep terrain without adequate equipment, conditioning, and training. Accidents can be fatal.

Carry a minimum of one gallon of water per person per day just for drinking; two gallons in hot weather or if you are planning a strenuous trip. You will need additional water for cooking and hygiene.

And don't forget the other essentials: rain protection, a flashlight, a mirror and whistle, a first aid kit, pencil and paper, a pocket knife, and extra food.

Coping with the weather

That old desert sun can damage eyes as well as skin. Wear a hat and sunglasses and use sunblocking lotion liberally.

Temperature changes of 40 degrees within 24 hours are common. Bring a variety of clothes that you can layer on and off as conditions change.

Although rain is relatively rare in the desert, when it does come it can really pour down. Even when it isn't raining where you are, rain in the mountains can run off so fast as to cause flash floods. Stay alert.

Stock animals

To minimize vegetation damage and soil erosion, stock animals are restricted to marked trails and washes.

Plan to pack along sufficient water and feed (pellet form only) as your animals are not allowed to drink from any of the water sources in the park nor graze the vegetation.

Call (760) 367-5541 to request a permit if you wish to camp overnight.

Welcome to Joshua Tree National Park, an increasingly popular destination for people from throughout the United States and the world. Some come seeking solitude, others recreation; some come to learn about the natural and cultural wonders of this desert region, still others to be reassured that there are still areas offering a glimpse of the natural world as it once existed.

During your visit, I encourage you to get out of your vehicle and take the opportunity to look, listen, smell, and explore. Rangers are available to assist you with questions about the many attractions and activities in this desert environment.

The future of the national park service is as strong as the support and commitment of the people we serve. With your assistance Joshua Tree will survive intact for the enjoyment of generations to follow. Rest assured that the staff and volunteers at Joshua Tree National Park are committed to doing our part to defend and protect this special place.

Should you have any concerns or recommendations for improving the management of your national park, please write me at 74485 National Park Drive, Twentynine Palms, CA 92277.

Ernest Quintana

Ernest Quintana, Superintendent

Black Rock Canyon Offers Good Hiking and Much More

Located in the northwest corner of the park, the road to Black Rock Canyon deadends at the campground. Campsites are located on a hillside at the mouth of the canyon surrounded by Joshua trees, junipers, cholla cacti, and a variety of desert shrubs. Spring blooms usually begin with the Joshua trees in late February followed by shrubs and annuals through May.

This quiet, family campground is a good introduction for first-time campers. Each campsite has a picnic table and fire ring with restrooms and water nearby. If you forget to bring your firewood, shopping facilities are only five miles away in the town of Yucca Valley. Campsites vary in size and can accommodate both tents and RVs. A day-use picnic area and dump station are also available. For horse owners, a separate area is provided for overnight camping or staging a ride.

Campers register and pay camping fees at the Nature Center located in the middle of the campground. The staff at this small visitor center can help plan your hikes and sightseeing. Maps, books, nature guides, and children's activity books may be purchased.

The hills behind the campground offer a variety of hiking trails including the Hi-View Nature Trail. The interpretive guide for this trail, available at the Nature Center, identifies the vegetation along this scenic 1.3-mile walk. For those looking for longer trails, Eureka Peak, Panorama Loop, and Warren Peak take hikers to ridgelines overlooking the often snowy peaks of San Jacinto and San Gorgonio. The trailhead for a 35-mile section of the California Riding and Hiking Trail is located at Black Rock. Backpackers can register at the backcountry board here for overnight wilderness trips.

But you don't have to hike to enjoy Black Rock! Wildlife sightings are frequent in the campground. Visitors often encounter ground squirrels, jackrabbits, and cottontails and frequent bird sightings include cactus wrens, Gambel's quail, great-horned owls, jays, and roadrunners. A serious birder might be rewarded with a glimpse of a Scott's Oriole or LeConte's thrasher. More elusive species such as bobcat, bighorn sheep, mountain lions, desert tortoises, and mule deer have all been seen in the area. As the sun sets, listen for the "singing" of coyotes living on the outskirts of the campground. Please do not feed wild animals in Joshua Tree National Park. People food is unhealthy for them and they can become agressive and harm you.

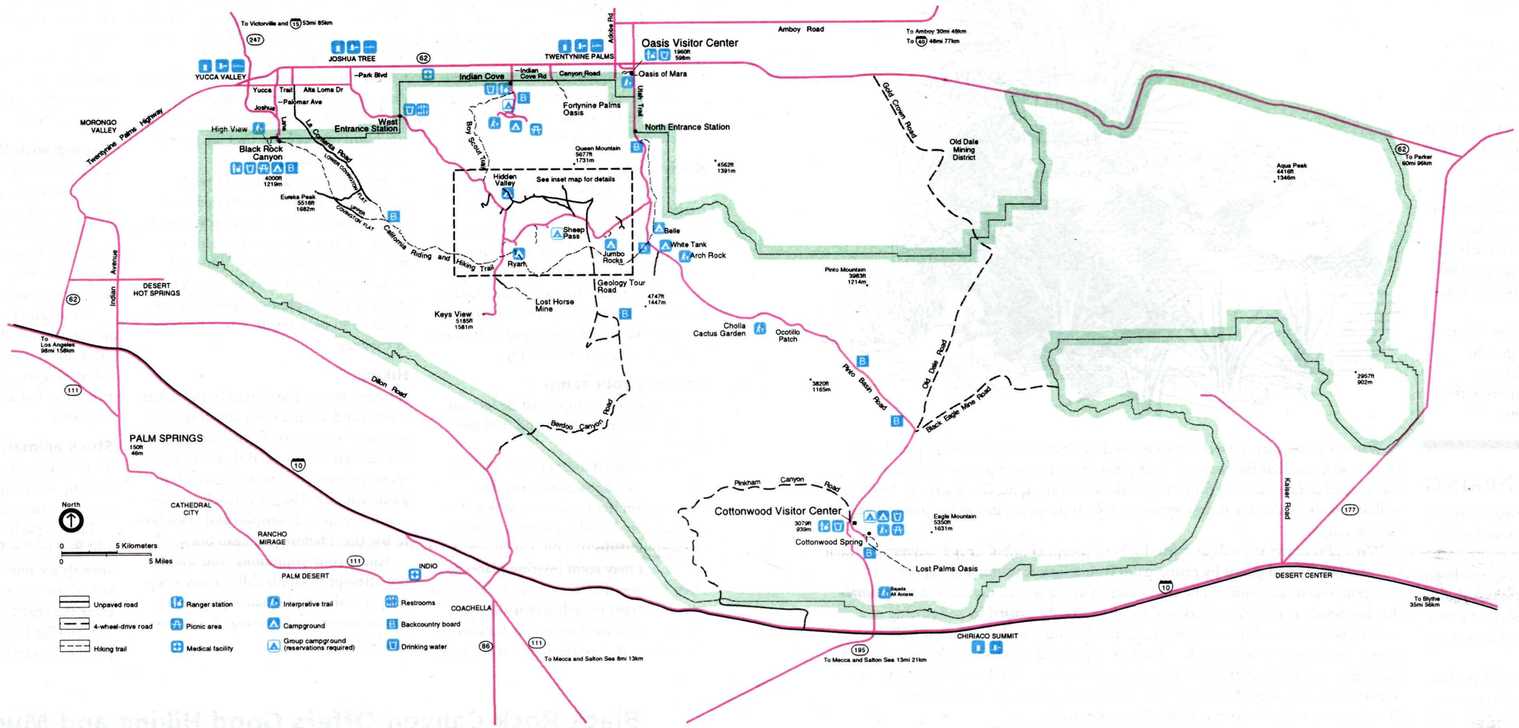
Ranger Programs Fall, 1999

Desert Queen Ranch Tours lasting 90 minutes will be offered three times daily, see story on page 3.

Saturday evening programs will be offered at Jumbo Rocks, Cottonwood, and Indian Cove campgrounds at 7 p.m. from October 16 through December 18. Programs last 45 minutes.

A number of hikes and walks will be offered throughout the fall, check bulletin boards and at visitor centers for a complete schedule

How Far Is It?	Oasis of Mara	Cottonwood	West Entrance
Belle Campground	9	28	28
Black Rock Canyon	28	73	17
Cap Rock	19	40	16
Cholla Cactus Garden	18	20	36
Cottonwood	38	0	56
Hidden Valley	20	42	14
Indian Cove	10	48	13
Interstate 10	45	7	35
Jumbo Rocks	11	33	23
Keys View	24	45	21
Oasis of Mara	0	38	34
Ryan Campground	18	39	16
Sheep Pass Campground	16	37	19
West Entrance	34	51	0
White Tank Campground	11	27	29



Area Information

For information about accomodations and attractions in surrounding communities, you may contact the following chambers of commerce:

Indio
82503 Hwy 111
Indio, CA 92201
(760) 347-0676
indiochmbr@aol.com
http://www.indiochamber.org

Joshua Tree
P.O. Box 600
Joshua Tree, CA 92252
(760) 366-3723
http://www.joshua-tree.com

Palm Springs
190 W. Amado Rd.
Palm Springs, CA 92262
(760) 325-1577
PSChamber@worldnet.att.net
http://www.pschamber.org

Twentynine Palms
6455 Mesquite Ave. Unit A
Twentynine Palms, CA 92277
(760) 367-3445

Yucca Valley
56300 29 Palms Hwy.
Yucca Valley, CA 92284
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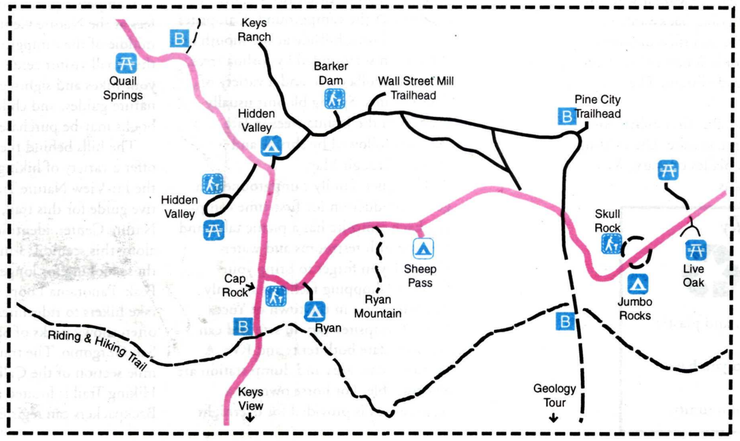


Emergency — dial 909-383-5651

NATURE TRAILS

Trail	Mileage	Starting Point
Arch Rock	.3-mile loop (.5-km)	White Tank Campground, opposite site 9
Bajada All Access	.25-mile loop (.4-km)	south of Cottonwood, one-half mile from the southern entrance to the park
Barker Dam	1.1-mile loop (1.8-km)	Barker Dam parking area
Cap Rock	.4-mile loop (.6-km)	Cap Rock parking area, at the junction of Park Blvd and Keys View Road
Cholla Cactus Garden	.25-mile loop (.4-km)	20 miles north of Cottonwood Visitor Center
Cottonwood Spring	1-mile (1.6-km)	Cottonwood Spring parking area
Hidden Valley	1-mile loop (1.6-km)	Hidden Valley picnic area
High View	1.3-mile loop (2.1-km)	Northwest of Black Rock Campground
Indian Cove	.6-mile loop (1-km)	West end of Indian Cove Campground
Keys View	.25-mile loop (.4-km)	Keys View
Oasis of Mara	.5-mile loop (.8-km)	Oasis Visitor Center, Twentynine Palms
Skull Rock	.25-mile (.4-km)	Jumbo Rocks Campground, just beyond loop E

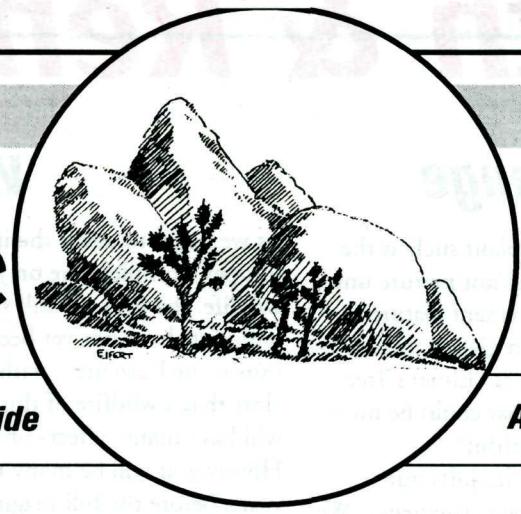
Joshua Tree Guide
Produced by the employees and the volunteers of Joshua Tree National Park and Joshua Tree National Park Association. Published by Joshua Tree National Park Association. Printed by Reed Printing on recycled paper.

HIKING TRAILS

Trail	Roundtrip Mileage	Time	Starting Point	Trail Description
Boy Scout	16 miles (25.8 km)	1-2 days	Indian Cove backcountry board or Keys West backcountry board 0.5 mile (0.8 km) east of Quail Springs picnic area	Scenic trail through the westernmost edge of the Wonderland of Rocks. See backcountry board for information on overnight use. Moderate.
49 Palms Oasis	3 miles (4.8 km)	2-3 hours	Parking area at end of Canyon Road, 4 miles (6.4 km) west of Twentynine Palms off Hwy 62	Several stands of fan palms, evidence of past fires, and pools of water are found at the oasis. The plants in this area are especially fragile, so walk lightly. Moderately strenuous.
Lost Horse Mine/ Mountain	4 miles (6.4 km)	3-4 hours	Parking area 1.2 miles (1.9 km) east of Keys View Road	Site of ten-stamp mill and foundations. Summit elevation: 5,278 feet (1,609 meters). Moderately strenuous.
Lost Palms Oasis	7.5 miles (11.2 km)	4-6 hours	Cottonwood Spring or Cottonwood Campground	A canyon with numerous palm stands. A side trip to Victory Palms and Munsen Canyon involves boulder scrambling. Moderate to oasis overlook, then strenuous.
Mastodon Peak	3 miles (4.8 km)	2-3 hours	Cottonwood Spring or Cottonwood Campground	Excellent views of the Eagle Mountains and Salton Sea. Summit elevation: 3,371 feet (1,027 meters). Moderate.
Ryan Mountain	3 miles (4.8 km)	2-3 hours	Ryan Mountain parking area or Sheep Pass Campground	Excellent views of Lost Horse, Queen, and Pleasant Valleys. Summit elevation: 5,461 feet (1,664 meters). Moderately strenuous.

Thirty-five miles of the California Riding and Hiking Trail pass through the park. Access to the trail is at its junction with Covington Flats, Keys View, and Squaw Tank (Geology Tour) Roads; at Ryan Campground; south of Belle Campground; and near the north entrance to the park. This allows for shorter hikes of 4, 6.7, or 11 miles (6.4, 10.7, or 17.6 km). Two to three days are required to hike the entire length of the trail.

Joshua Tree Fires 1999



Supplement to the Joshua Tree Guide ***A National Park Service Publication***

Park Superintendent's Message

The largest wildfire in the recorded history of Joshua Tree National Park occurred over the Memorial Day weekend in 1999. Four separate fires, all ignited by lightning, consumed over 13,000 acres in only 96 hours. We can take comfort from the knowledge that these fires resulted from natural causes and that no one was seriously hurt. Local residents and park visitors experienced an event that will shape areas of the park for generations. Certainly the visual impacts of these fires will be noticeable for many years to come.

Our understanding of the natural aspects of fire will be tempered by our emotional reaction to the "scars" we will see as we drive through the areas that were burned. Fire is both awe inspiring and frightening and, since the Juniper Complex Fire occurred on a holiday weekend, disruptive for a great many visitors. I know that many plans, hopes, and expectations were not realized. The sky filled with smoke, roads and trails were closed, and some campgrounds had to be evacuated. Despite the inconvenience, park visitors were understanding of the situation and exceedingly cooperative.

I wish to thank the members of the community who pulled with us during the fires, the government agencies that supported our efforts and provided assistance, and the hundreds of women and men who worked day and night to bring the fires under control. The primary objective of the fire suppression effort was public and firefighter safety. The secondary objective was to suppress the fires as quickly as possible and to do so with a minimum of damage from the suppression effort. Both of these objectives were met.

Parts of the park may look a bit scruffy for a while, but Joshua Tree is not a bit less magnificent because of the fires. The features that have attracted millions of visitors still delight: the always fascinating rock formations are unmoved, the forests of gangly Joshua trees still populate the landscape, the park's vast expanse of wilderness still dwarfs those who enter, and the star-filled night skies and natural quiet continue to provide relief from the lights and noise of urban life.

As we recover from the shock of the changes that occurred this last weekend, I invite community members and visitors to join with park staff as we learn more about the dynamics of wildland fires. Together, we will observe and learn as the plants and animals of this desert ecosystem regenerate—as they have countless times before.

Ernest Quintana

Ernest Quintana, Superintendent

PHOTOS

(clockwise above)

Fires often burn at a variety of intensities, which creates a mosaic of vegetation.

Wildflowers such as canterbury bells may become more common after a fire.

Bighorn sheep are not directly threadened by fire and may benefit from the regeneration of shrubs.

Assistant Superintendent, Mary Risser developed this supplement.

Joe Zarki, Chief of Interpretation, wrote "Coping with Cataclysmic Change" and "Wildlife Survival."

Supervisory Park Ranger, Cindy Von Halle wrote "Light on the Land," and Vegetation Specialist, Jane Rogers wrote about the role of fire in desert ecosystems.

Fire Manager, Tom Patterson and Mary Risser wrote about fire management policy.

Rebirth & Renewal

Coping with Cataclysmic Change

In the summer of 1988, wildfire swept across Yellowstone National Park and blackened millions of acres of trees. The Yellowstone fires also darkened the hearts and spirits of millions of Americans who felt a devastating sense of loss as they watched mature pine forests go up in flames. Having witnessed the awesome magnitude of fire in Yellowstone, I had a strong sense of *deja vu* when, from May 27–30, 1999, thousands of acres of Joshua trees, junipers, and cactus were transformed from living biomass into searing columns of flame and smoke. At the supermarket, the gas station, and the park visitor center, people expressed the same concerns: "Are the fires out yet?" "Isn't it a shame the park will never be the same." "It's so sad to see something like this happen."

We must all come to terms with the major landscape changes that result from natural cataclysms such as fires, volcanic eruptions, and floods. The beautiful landscapes, sweeping vistas, majestic vegetation, and abundant wildlife of national parks are all products of dynamic natural forces. Every landscape is in perpetual transition.

This is hard for most of us to accept. It's easy to view spectacular settings such as the Wonderland of Rocks and Keys Views as eternal and unchanging. With our short human lives, we see little if any change in these large natural features. A long-lived plant such as the Joshua tree, which may not mature until it is 150, seems a permanent feature of the landscape. We even gives names to the familiar ones such as "Elmer's Tree" and "Barber Pole." What could be more steadfast than Old Faithful?

A fast-moving wildfire jolts our perception of landscape permanence. We want very much to feel that certain things in this life are reliable and immutable. Fire and other natural events dramatically prove otherwise.

People question if it isn't the job of the National Park Service to preserve these familiar, iconic natural wonders unchanged so that all Americans can share a common natural heritage. The very mission of the National Park Service is to "conserve the scenery and the natural and historic objects and the wildlife therein and...leave them unimpaired for the enjoyment of future generations."

When speaking of natural ecosystems, "unimpaired" shouldn't be interpreted as unchanging. The natural processes that have built our beloved national park landscapes, though spectacular, are often chaotic and even dangerous. It is just as important for us to learn from these processes as it is for us to protect the landscapes, plants, and animals they produce. As one park superintendent put it, "Nature may be messy, but She never fails to be an inspiring teacher."

The Role of Fire in Desert Ecosystems

Most research projects studying wildland fire effects have focused on forests and grasslands; the role fire plays in the desert is not as well known. To understand how an ecosystem works, we must step back and take a good look at what surrounds us.

As you gaze across a desert landscape, what you are looking at are ancient plant communities. These plants have evolved slowly over time, adapting to dry climates. They are long-lived, much like the desert tortoise, growing slowly with little water and nutrients. As we look at how these plants survive, we see that they are unlike the plants in pine forests and chaparral. Ponderosa pine trees have cones that require fire to melt the sticky sap holding the seeds inside. Coastal manzanita burns hot; its seeds require fire to burn off their hard shells so they can germinate and produce new shoots.

Fire in the desert is not unusual. Summer thunderstorms cause frequent lightening-ignited fires. Usually a single Joshua tree or pinyon pine will alight then slowly burn out without spreading over a large area. Desert plants do not need fire to reproduce and they may not be able to survive frequent large fires.

Large scale fires, such as the Juniper Complex Fire that burned 13,890 acres over the Memorial Day weekend, are historically rare. However, desert fires have been increasing in size for the last 30 years, largely due to non-native grasses and weedy plants introduced from Eurasia. Exotic grasses now represent up to 60 percent of the biomass from annuals. SEE BACK PAGE

Wildlife Survival

As we begin to assess the impact of the Juniper Complex Fire on Joshua Tree's wildlife, the fires are still smoldering and biologists have not yet been able to canvas the burn areas with safety. It is clear that a wildfire of this magnitude will have many effects on park animals. However, it will be many months, even years, before the full magnitude of fire effects on park fauna can be fully appreciated.

Large animals are often not impacted by fire as it burns through an area. Ungulates such as mule deer and bighorn sheep continue to graze seemingly unconcerned as fire advances. Desert bighorn rarely stray far from their favored rocky escape so they have little to fear from fire.

Predators such as coyotes, mountain lions, and bobcats are also able to escape advancing flames. Rangers observed determined, roadside begging coyotes attempting to panhandle a meal from firefighters after park visitors had been evacuated from the active burn areas.

Many small mammals make homes in underground burrows to escape desert heat and predators. Most probably retreated to these familiar refuges to wait out the fire. Even hot wildfires rarely heat the ground more than a few centimeters below the surface. Underground animals, while safe from flames and heat, may be more vulnerable to smoke inhalation. We will probably never know how many rodents succumbed to smoke while underground. Many others will survive and reproduce rapidly so that effects on most small mammal populations should be short lived.

Reptiles that inhabit rocky habitats, such as spiny lizards and chuckwallas, should survive in good numbers.

Of great concern is the potential impact of the fires on desert tortoise. In a study of fire effects on desert tortoises in Saguaro National Park, it was found that 12 percent of tortoises in the study area were killed by fire. This was a rate six times higher than natural mortality. Surviving tortoises face uncertain prospects as fires remove the vegetation on which they subsist. On the positive side, tortoises are able to survive in a dormant state for long periods. To date, one fire-killed desert tortoise has been found by firefighters at Joshua Tree.

Birds are able to fly away from advancing fire and move to unburned areas. The timing of the 1999 Joshua Tree fires, in late May, came at the peak of the nesting season for many birds, especially summer residents such as ash-throated flycatcher and Bendire's thrasher. Many birds will attempt to nest yet again this year, in similar habitat outside of burn perimeters.

Predatory birds such as red-tailed hawks and loggerhead shrikes will probably benefit right away as their prey will find little cover in which to hide.

The recovery of wildlife populations in burn areas will be tied to the reestablishment of plant communities. In desert environments, plants normally grow slowly. Revegetation following the fires will be tied to rainfall, as many desert plants flower and produce seeds whenever moisture is present.

Wildlife species that favor open environments and grasslands will likely do well over the next two to five years, as grasses and annuals will be the first plants to regenerate in the burn areas.

A wildfire creates a disturbance to which resident animals are forced to adjust. Park wildlife has been making those adjustments for many thousands of years and will no doubt continue to do so far into the future.

Fire Management

National Park Service Policy...

In 1916, the United States Congress created the National Park Service and mandated the conservation and preservation of scenery, wildlife, and natural and historic objects in order to leave them unimpaired for future generations. At first reading, wildland fire appears to violate the intent of leaving parks "unimpaired for future generations," but the issue is far more complicated.

Traditionally, the National Park Service viewed fire as a negative force because of its association with the destruction of human-made structures. This perception carried over to wildland fires, which were thought to be a negative element in the natural world. Wildland fires were seen as a threat to the values expressed in the National Park Service mandate. The film "Bambi" and the "Smokey Bear" campaign molded more than one generation's view of fire as a bad thing, regardless of its cause or location.

Throughout the nation, land management agencies suppressed all fires. This led to an accumulation of unnatural levels of fuel on many public lands. After the fuel buildup, fires had more impact than the periodic, low-intensity fires that would have occurred naturally.

Ecologists advocated the theory that fire, rather than being a negative force, is itself a natural phenomenon and is, therefore, essential to the evolution of a natural setting. In many ecosystems, plant succession is stagnated and biological diversity reduced or altered without fire. Studies of tree rings show that fire has influenced ecological relationships for thousands of years. Past fires directly influenced vegetative distribution and abundance, which in turn affected wildlife. The role of fire in natural processes is continually being studied to increase our understanding of its vital role.

Fire removes "dead and down" plants and recycles important nutrients from plant tissues to the soil. It exposes seedbeds for plant reproduction, thins groundcover, kills the spores of fungi and other pathogens with smoke, and promotes a diversity of plants. The elimination of natural fire has altered plant succession and changed the mix of species.

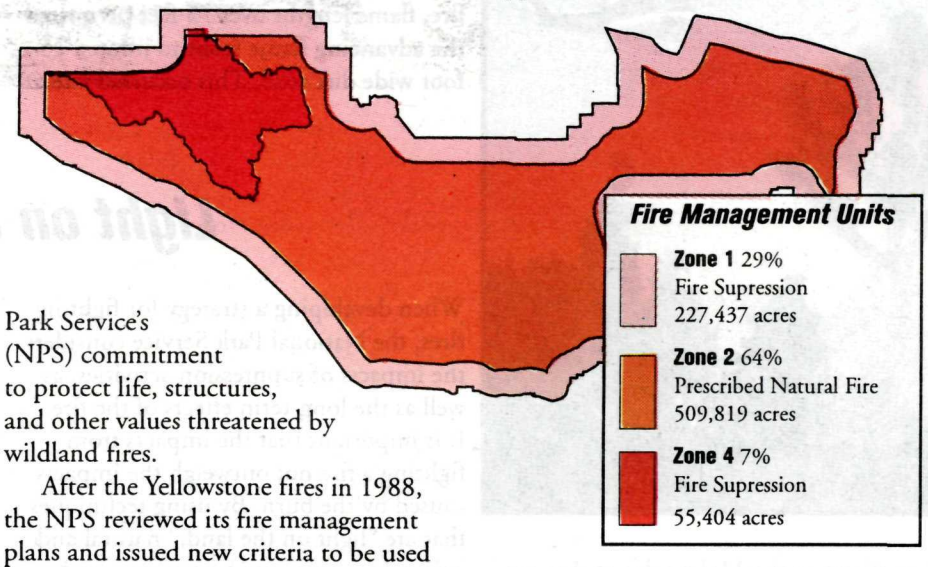
As evidence mounted about the important role fire plays in the maintenance of natural systems, park managers throughout the nation critically examined traditional suppression tactics. These tactics relied heavily on the construction of fire lines and the use of bulldozers and chemical retardant. Fire lines often resulted in erosion that impacted soil and water. Trees were cut to create helicopter bases, and camps were often established in fragile and pristine areas. The impacts on the environment from these suppression efforts often exceeded those from the fire. The ecological impacts and cost of fire suppression efforts began to be weighed against the effects of the fire itself and its possible value to resources management objectives.

These factors contributed to a major federal fire policy revision in the early 1970s. Because of the increased knowledge about the important role of fire in natural environments, the National Park Service adopted an ecosystem approach to fire management in the large, natural park units. Fire management strategies were aimed at achieving a more natural and diverse overall park environment, rather than managing for the benefit of a few species or activities.

Fire Management in Joshua Tree

Fire has played a role in shaping the landscape of Joshua Tree National Park for centuries. From the time this area came under federal stewardship in 1936 until the mid-1980s, the park's fire management policy consisted of complete suppression of all fires.

Joshua Tree implemented a complex fire management program in the mid-1980s. It's overall goal was to allow fire to continue its natural role in ecosystem dynamics, while upholding the National Park Service's (NPS) commitment to protect life, structures, and other values threatened by wildland fires.



After the Yellowstone fires in 1988, the NPS reviewed its fire management plans and issued new criteria to be used in determining whether to suppress lightning-ignited fires or allow them to burn. The revised criteria require careful consideration of environmental conditions such as location, weather, and air quality, as well as nation-wide fire fighting resource needs. The policy of suppressing human-caused fires did not change.

In response to the deadly fire season of 1994, when 34 firefighters died in incidents across the country, fire management plans throughout the NPS are undergoing another round of revisions. Firefighter safety has been identified as the first priority on all fires.

In early May, the NPS identified strategies to address any wildland fire that might occur in Joshua Tree National Park. The management objectives of this wildland fire strategy are to: protect human life and property, allow naturally-occurring fire to play its maximum role in influencing ecosystem dynamics, suppress human-caused fires, and suppress any naturally-started fire that does not continue to meet the prescribed criteria. While protection of resources is emphasized, firefighter safety remains the highest priority on all fires.

Natural resource and fire managers have recognized three fire management units in the park, each calling for a different approach to managing fires:

Fire Management Unit #1 provides for a two-mile buffer inside the entire park boundary. Any fire within the buffer zone, whether natural or human-caused, will be immediately suppressed to provide maximum protection to neighboring communities. (Fire Management Unit #3, a hazardous fuel reduction area in the vicinity of Black Rock Canyon, is now incorporated into Unit #1.)

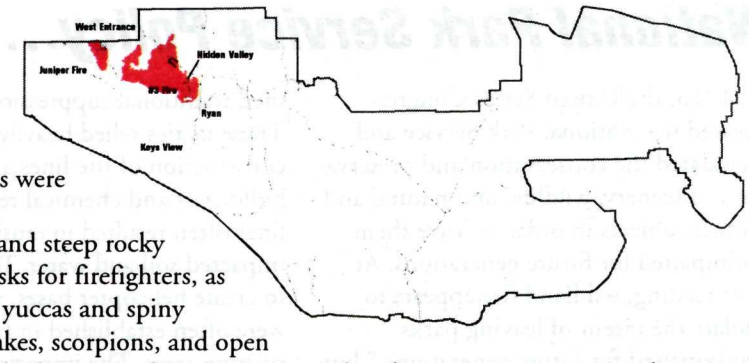
Fire Management Unit #2 comprises most of the park. The management goal for Unit #2 is to limit all naturally-ignited fires that occur within blackbrush or Joshua tree fuel types to less than 600 acres.

Fire Management Unit #4 includes the Quail Mountain watershed, the location of most of the park's pinyon-juniper woodlands. A review of fire effects in Joshua Tree indicates that about 40 percent of the pinyon-juniper stands have burned during the last 20 years. Since these species are fire intolerant and slow to revegetate, suppression will be initiated on any fire, whether natural or human-caused, within this unit.

All four fires in the Juniper Complex of 1999 occurred within Fire Management Zones #1 and #4. Therefore, suppression activities were initiated immediately. Nevertheless, heavy fuel loads and unusual fire behavior resulted in the complex becoming the park's largest recorded fire.

The Juniper Complex Fire

The Largest Fire in Joshua Tree's History



Shortly after noon on Thursday May 27, 1999, lightning from a passing thunderstorm ignited four fires within Joshua Tree National Park. Park firefighters were mobilized and directed to suppress the fires. By the end of the day, two of the fires had been contained, each within a one-quarter acre area.

A third fire, called #3, quickly grew to 25 acres in the Quail Mountain area, then became relatively inactive through the afternoon. Meanwhile, the fire named Juniper, which was centered in the Covington Flats area of the park, burned actively throughout the afternoon and into the evening.

The complexity of the fires and the number of personnel needed for suppression efforts quickly expanded beyond the capability of the park's firefighting resources. An interagency fire suppression team was ordered and assumed command of suppression operations.

By Thursday evening Juniper was growing in intensity and high winds had reactivated #3. Throughout Friday, both the Juniper and #3 outran suppression efforts. However, during the evening firefighters were able to get around Juniper, and it was contained on Saturday. Meanwhile #3 was at 7,500 acres and growing. By Sunday morning #3 had expanded to 11,100 acres. It was not contained until Wednesday morning, June 2.

At the height of fire activity during the busy Memorial Day weekend, three campgrounds were closed, 500 campers had to be evacuated, and thousands of visitors were redirected to other parts of the park. Because of the threat to human safety, the area west of Keys View Road was closed.

By 7:00 p.m. on Sunday May 30, the threat had been reduced so that most of the closed areas were reopened to the public.

More than 900 people, including 42 hand crews, worked on the fire. Ten different agencies contributed to the effort. Twenty-six fire engines, nine water tenders, six helicopters, and seven air tankers helped firefighters contain the fires as quickly as possible. As the fires were contained and fire crews became available, rehabilitation efforts were begun.

Flashy fuels and steep rocky terrain posed risks for firefighters, as did razor sharp yuccas and spiny cactus, rattlesnakes, scorpions, and open mine shafts. Dehydration is always a threat to fire fighters because of the heat and exertion of fighting a fire; it was especially so in this desert environment where the humidity was less than 25 percent. The primary objective of fire suppression efforts was to keep firefighters and visitors safe. No serious injuries occurred during the fire.

Several factors combined to create the severity of these fires. El Niño rains in 1998 produced one of the desert's showiest wildflower blooms and grass accumulations in years. By May 1999, the lush vegetation had dried to become a thick groundcover of flashy fuels. The primary carriers of the fire were non-native grasses less than two feet tall.

In areas of continuous stands of blackbrush, the fire produced 40 to 60 foot flame lengths. At one point during the initial attack phase of the Juniper fire, flame lengths over 75 feet permitted the advancing flame front to jump a 15-foot wide dirt road. This occurred late at night when temperatures were dropping and the humidity was increasing.

The fire complex created its own weather patterns. Towering smoke columns could be observed with ice caps at high altitudes. During the hottest time of the burning period, open fire was observed burning against the wind and down steep hillsides—exactly the opposite of normal fire behavior. In many circumstances wind will blow a fire back into itself and restrict the forward rate of spread; that did not happen on this fire.

By the time the four fires were contained, they had covered 13,894 acres, more acreage than any previous fire in the history of the park. The burn did not, however, affect all areas within the perimeter of the fire. Ground fires consumed much of the grasses and small shrubs, but a mosaic of unburned vegetation remains. Although the effects of the fires will remain visible for years to come, signs of regeneration will soon become apparent.

FROM PAGE 2 • **The Role of Fire in Desert Ecosystems**

Prior to this grass invasion, the space between native shrubs and trees was relatively open, and lightening-ignited fire would rarely spread from bush to bush because there was no fuel to carry it. Today, especially after the El Niño event last year, the space between shrubs is choked with clumps of weedy, dry grass. This grass is critical to spreading desert wildfires and is the primary reason for the shift in fire frequency. Where the desert would normally experience large fires perhaps every 200 years, there are now places in the Mojave desert that see fire as often as every five years.

Park fire managers and biologists are struggling to understand this new landscape. We expect to see increased numbers of large fires, removing large areas of pinyon pine and juniper. We may also see losses to our Joshua tree woodlands and blackbrush communities. By examining the role of exotics, and understanding how fire behaves under these new conditions, we can make biologically-based decisions with regard to fire suppression.

Light on the Land

When developing a strategy for fighting fires, the National Park Service considers the impacts of suppression activities, as well as the long-term effects of the fire. It is important that the impacts from fighting a fire not outweigh the impacts caused by the burn. By using techniques that are "light on the land," natural and cultural resources are better protected.

The fire suppression strategies adopted for the Juniper Complex Fire emphasized reducing impacts to fragile desert plants and animals. Hand crews, engines, retardant, and water drops were used extensively. In some locations, fires burned to the nearest natural fire break, so the impact of creating a man-made fire-break, that would have required trees and brush to be removed, was avoided. In other locations, small backfires were set to burn back into the main fire as a strategy to stop the fire from advancing.

Light on the land tactics limited off-road travel when transporting fire fighters and equipment to spreading wildfires. This prevented excessive tire tracks that leave visible scars for decades. Bulldozers were on standby but were not used. Dropping fire retardant in the Smith Water Canyon was rejected because the retardant would have impacted vital water sources.

The use of fire modeling and fire behavior analysis further aided fire managers in determining the best overall fire suppression strategies. When nature decides to put fire on the land, the park must think not only about the immediate impacts, but also about the ecosystem's ability to recover in the years to come. Using light on the land fire suppression techniques is an important component of a successful fire strategy.

The Desert Fan Palm: A California Native

In an otherwise hot and sparse environment, palm oases are a luxuriant gift of shade and solace. The verdant display requires a constant supply of water so oases often occur along fault lines, where uplifted layers of hard impermeable rock forces underground water to the surface. There are only 158 desert fan palm oases in North America. Five are located in Joshua Tree National Park.

The desert fan palm, *Washingtonia filifera*, is native to the low hot deserts of Southern California where it can live for 80 to 90 years. Towering up to 75 feet, the desert fan palm is among the tallest of North American palms. It is definitely the heaviest; a mature desert fan palm can weigh as much as three tons. Its distinctive leaves are shaped like a fan and folded like an accordion. They measure up to six feet in length and are nearly as wide. Looking much like "petticoats," the fan palm's dead leaves remain attached to its trunk until removed by fire, wind, or flood.

Fire is beneficial for palms and rarely kills an adult. In palms the vascular bundles, those tubes that transport water and nutrients, are scattered throughout the trunk. This arrangement provides insulation from the heat of a fire. In contrast, other trees such as oaks have all their vascular tissue in a ring just beneath the bark. Fire does kill young palms, but it also removes competitors and opens up space for palm seeds to germinate. In fact, desert fan palms increase seed production immediately after fires. A healthy palm can produce as many as 350,000 seeds.

People have been attracted to palm oases since prehistoric times. Native Americans ate the palm fruit and used the fronds to build waterproof dwellings. The Cahuillas (pronounced: Ka-wee-yahs) periodically set fire to oases in order to increase fruit production and to remove the sharp-edged palm fronds littering the oasis floor. The Cahuillas also planted palm seeds in promising locations.

Water is a necessity. Desert fan palms suck up water using a mass of pencil-wide rootlets so dense that the roots of other plant species cannot penetrate. This mass may extend as far as 20 feet from the trunk in all directions. But water, in the form of flash floods, is also the most common cause of death for desert fan palms living in narrow canyons.

Water also draws animals to oases: bighorn sheep, Gambel's quail, coyotes. Coyotes help spread palms by eating palm fruit at one location and depositing the undigested seeds at another. The cool shade of an oasis provides habitat for animals that live nowhere else. After dark, a rush of air may be caused by the passing of a western yellow bat, who roosts only in palms. During the day, a flash of yellow-orange might be a hooded oriole, who prefers to build its woven sack-like nest under the large green leaves of the desert fan palm. The dime-sized holes seen in the trunks of palms are exit holes of the two-inch, blue-black, giant palm-boring beetle, *Dinapate wrightii*, who lives exclusively in palm oases.

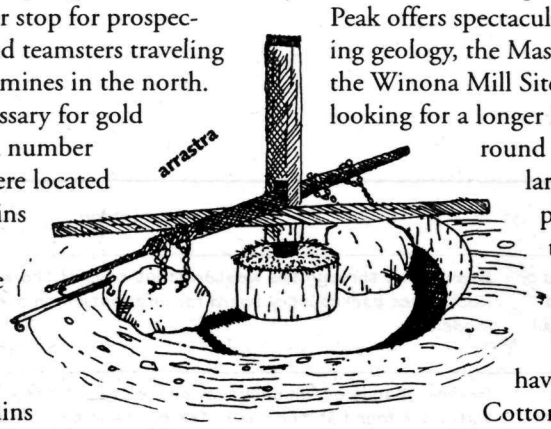
The larvae of the Dinapate beetle spends about five years chewing tunnels within the trunk of a desert fan palm. The chewing is so loud that flickers use the noise to locate the larvae. Successful larvae pupate within the trunk then chew their way out. Because their rear end is wider than their front end, they exit going backwards to avoid getting stuck. Emerging in June, males and females mate and then die within a few weeks. Eventually these beetles can kill a palm, but they only inhabit older trees. Giant palm boring beetles keep the palm population young and vibrant. The presence of these beetles is actually a sign of a healthy oasis.

Palms stand straight and tall, looking proud and invincible. But they aren't. Any place can be over loved. As you explore these oases of wonder, take care. Use existing paths. Watch out for young palms—seedlings look like thick blades of grass. We do not want the presence of people to be a sign of a declining oasis.

Where in the park is Cottonwood Spring

Cottonwood Spring Oasis, one of the best kept secrets in Joshua Tree National Park, is just seven miles from the southern entrance to the park. The spring, the result of earthquake activity, was used for centuries by the Cahuilla Indians, who left bedrock mortars and clay pots, or ollas, in the area.

Cottonwood Spring was an important water stop for prospectors, miners, and teamsters traveling from Mecca to mines in the north. Water was necessary for gold processing, so a number of gold mills were located here. The remains of an arrastra, a primitive type of gold mill, can be found near the spring, and concrete ruins mark the sites of two later gold mills in the area.



The cottonwoods that give their name to the spring are not native to this area. They were planted around the turn of the century by some early resident, and the palms were planted in the 1920s.

A number of hikes begin at Cottonwood Spring. A short, easy walk down Cottonwood Wash leads past a second oasis to a dry falls. In wet years, the falls can become a scene of rushing water and red-spotted toads. Bighorn sheep often come up the wash for water in the early hours. An old teamster road drops down past the falls to the lower wash. A short hike leads through palo verde and desert willow trees to the remains of Moorten's Mill Site.

The 3-mile loop trail to Mastodon Peak offers spectacular views, interesting geology, the Mastodon Mine, and the Winona Mill Site. And, for those looking for a longer hike—eight miles round trip—and the largest stand of fan palms in the park, the Lost Palms Oasis trail is a sure winner.

But you don't have to hike to enjoy Cottonwood Spring. This is one of the best birding spots in the park; so bring your binoculars and sit a spell.

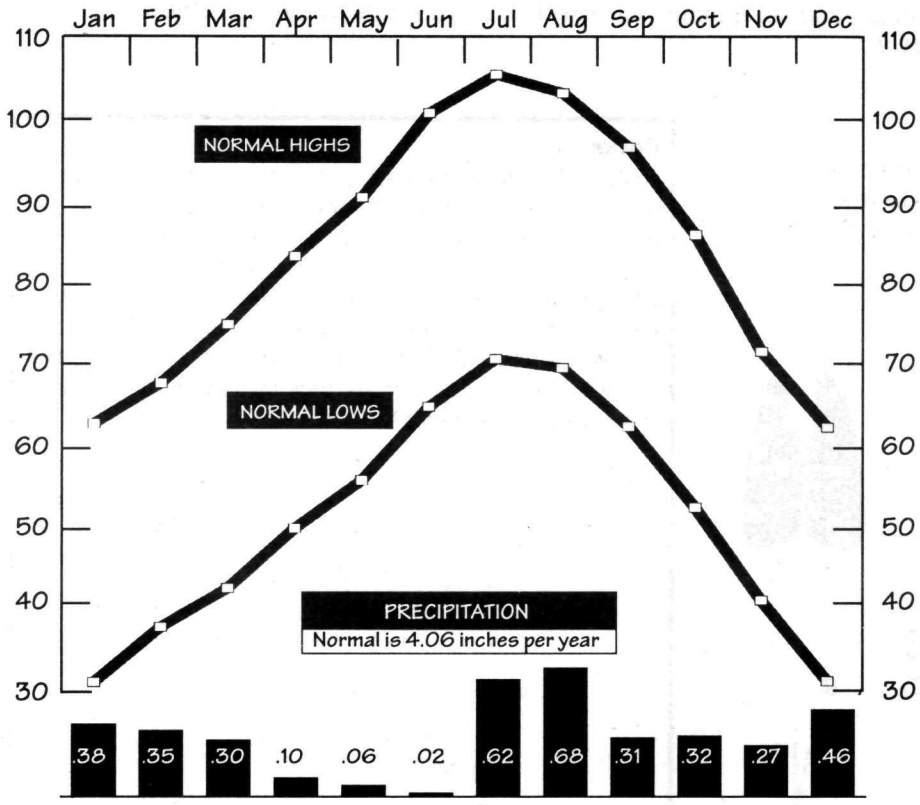
The campground, which has water and restrooms, is located one-half mile from Cottonwood Spring via a signed nature trail; there are also shaded picnic tables in the campground. To learn more about the plants, animals, and history of this fascinating place, join a ranger-led hike, walk, or campfire program, offered most weekends.

Think Globally — Act Locally

REDUCE
REUSE
RECYCLE

- **Bring your aluminum and metal cans, glass, and plastic to a campground recycling center.**
- **Share or recycle this *Joshua Tree Guide* when you have finished reading it.**
- **Participate in recycling programs in your community.**

The Weather



Measurements were taken at 1,960 feet (597 m). You can expect seven to twelve degrees cooler temperatures and 3.5 inches more precipitation at higher elevations.

CAMPGROUND ASTRONOMY

Camping away from city lights gives many of us city dwellers a chance to see the sky as we have never seen it. A great way to introduce someone to the "dark sky" is to tour the Milky Way with binoculars. First just lay back on the ground and gaze at the band of light. Notice how it is brighter in places, with clumps of light and dark streaks where stars seem to be absent. Realize that the glow of light is from stars so far away that we can't quite make them out. The dark lanes are actually interstellar dust that blocks our view. The clumps of light are clouds of stars.

Find one of those star clouds and, without taking your gaze away from it, raise your binoculars to your eyes. The cloud will resolve into hundreds of stars, with perhaps smaller clumps and hazy patches in the field of view.

Notice how the milky way seems to be very bright and dense to the south near the horizon? You are looking toward the center or our galaxy, where the stars are richest. The constellations Sagittarius and Scorpion lie in this direction.

Just west of Sagittarius is Scorpion, one of the few constellations that look like its name. Scorpion is noted by the bright red star Antares, located in the scorpion's neck. Look at Antares with binoculars. See the large fuzzy ball of light next to it? That is a large globular cluster.

Turn your attention northward, above and to the left of the stars of Sagittarius. You will see a large cloud of stars. This is the Scutum star cloud. With binoculars you should easily see a hazy patch of light. This is a beautiful open star cluster.

As we move farther north, higher in the sky, we see the star clouds in the constellation Cygnus, the swan. This constellation also looks like its name. We can see the neck pointing south, and the wings stretched east and west. The bright star behind the wings is Deneb, the "tail" of Cygnus.

To help identify the many objects you will find with binoculars, you will want a star chart. A circular "star finder", also known as a "planisphere", will show the location of many celestrial objects.

Rockpiles

The geologic landscape of Joshua Tree has long fascinated visitors to this desert. How did the rocks take on such fantastic shapes? What forces sculpted them?

Geologists believe the face of our modern landscape was born more than 100 million years ago. Molten liquid, heated by the continuous movement of Earth's crust, oozed upward and cooled while still below the surface. These plutonic intrusions are a granitic rock called monzogranite.

The monzogranite developed a system of rectangular joints. One set, oriented roughly horizontally, resulted from the removal—by erosion—of the miles of overlying rock, called gniess (pronounced "nice"). Another set of joints is oriented vertically, roughly paralleling the contact of the monzogranite with its surrounding rocks. The third set is also vertical but cuts the second set at high angles. The resulting system of joints tended to develop rectangular blocks. (figure 1) Good examples of the joint system may be seen at Jumbo Rocks, Wonderland of Rocks, and Split Rock.

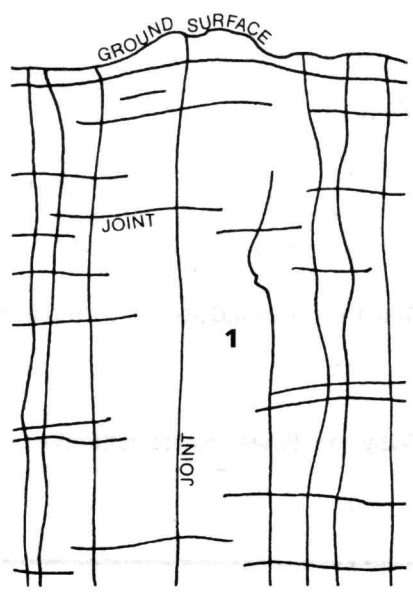
As ground water percolated down through the monzogranite's joint fractures, it began to transform some hard mineral grains along its path into soft clay, while it loosened and freed grains resistant to solution. Rectangular stones slowly weathered to spheres of hard rock surrounded by soft clay containing loose mineral grains. Imagine holding an ice cube under the faucet. The cube rounds away at the corners first, because that is the part most exposed to the force of the water. A similar thing happened here but over millions of years, on a grand scale, and during a much wetter climate. (figure 2)

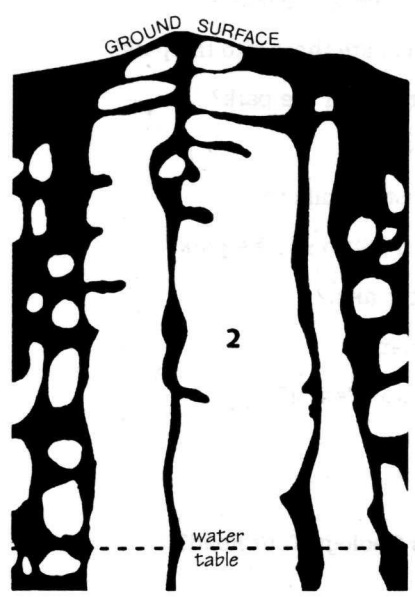
After the arrival of the arid climate of recent times, flash floods began washing away the protective ground surface. As they were exposed, the huge eroded boulders settled one on top of another, creating those impressive rock piles we see today. (figure 3)

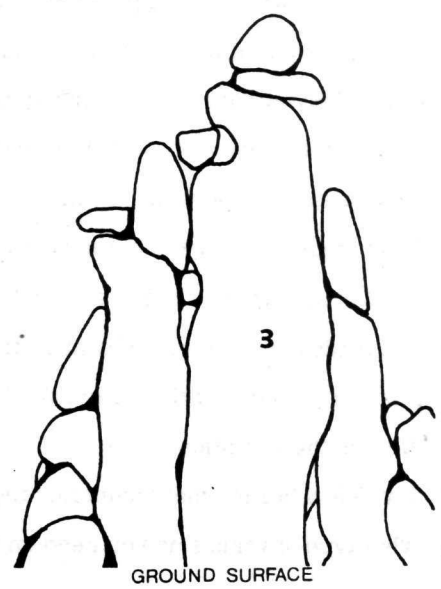
Visitors also wonder about the "broken terrace walls" laced throughout the boulders. These are naturally occurring formations called dikes. Younger than the surrounding monzogranite, dikes were formed when molten rock was pushed into existing joint fractures. Light-colored dikes formed as a mixture of quartz and potassium minerals cooled in these tight spaces. Suggesting the work of a stonemason, they broke into uniform blocks when they were exposed to the surface.

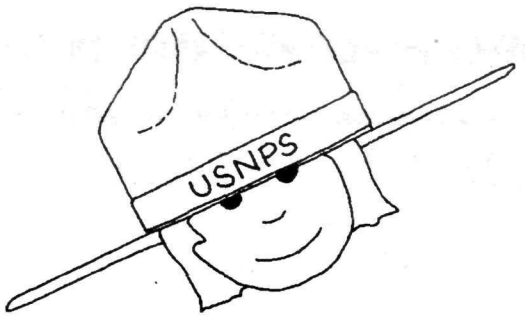
Of the dynamic processes that erode rock material, water, even in arid environments, is the most important. Wind action is also important, but the long-range effects of wind are small compared to the action of water.

The erosional and weathering processes operating in the arid conditions of the present are only partially responsible for the sculpturing of the rocks. The present landscape is essentially a collection of relict features inherited from earlier times of higher rainfall and lower temperatures.









Hey there, Junior Ranger!

Complete at least five of the activities below and become a Junior Ranger at Joshua Tree National Park. When you have completed your work, take this page to the Oasis or Cottonwood Visitor Center or to a ranger-led evening program. A ranger will check your work and give you an official Junior Ranger badge. ***Have fun!***

Terrific Tracks

Many animals live in Joshua Tree National Park. Read the clues below to help you unscramble a few of these animal names. Then draw a line between the animal names and the tracks they would make. HINT: You will have one extra track at the end. Do you know what animal makes it?

❶ It builds its nest of cholla cactus for protection and decorates it with shiny objects taken from campsites.
TAWODOR =

❷ This bird has a forward-curving topknot and would rather run than fly.
ULAQI =

❸ This large mammal has horns and is an excellent rock climber.
NRGOIBH EEHSP =

❹ Females of this animal produce 3–4 litters of 4–7 young each year.
IATOOCTNTL =

❺ The park is home to many species of this reptile.
DAZILR =

❻ This feline has a stubby tail and can be active both day and night.
TBBAOC =

❼ This animal does not drink water because its body is able to unlock the water stored in the dry seeds it eats.
GAROKNAO ART =

❽ This solitary hunter has bigger ears than its cousin, the gray fox.
TIK XFO =

Rocks

Joshua Tree National Park is famous for its rock formations. The *Wonderland of Rocks* has many of these large boulder piles. The rocks on the surface today were molten 83 million years ago! People come from all over the world to see, study, and climb on these rocks. People who study rocks are called geologists. Many of the rock formations have names due to their interesting shapes. Sketch your favorite rock formation in the park. What would you call it?

Map Mania

Get to know Joshua Tree National Park by playing "Map Mania." Using the official map and guide to the park (available at park entrance stations and visitor centers), answer the questions below by yourself or race friends and family members for the correct responses.

❶ How many campgrounds are in the park?

❷ Name the four mammals pictured on the back of the map.

❸ How many paved road entrances (red lines) are there into the park?

❹ What highway runs along the north boundary of the park?

❺ What can be seen at "Point of Interest #4?"

❻ Lost Palms Oasis is what "Point of Interest" number?

❼ What mountain range is in the far eastern portion of the park?

❽ What is the symbol on the map for a picnic area?

❾ Dirt roads are signified by what on the map?

❿ Is water available at the Cottonwood Visitor Center?

⓫ What is the transition zone?

⓬ Keys View lies in what mountain range?

⓭ What type of vehicle do you need on the Geology Tour Road?

Native Americans

Hike the Barker Dam trail with an adult and visit the rock art site. Sketch two of the designs you see on the rocks in this box. Remember not to do rubbings. Rock art is protected.

What sort of vandalism occurred at this site?

Why should we protect cultural sites?

Plant Sketching

Desert plants have many different adaptations to survive the summer heat. Some plants can store water. Some use little white hairs on their leaves or white spines to reflect back the sun's rays. Other plants have hairs, spines, or leaves that provide shade for their stems. Still others have a waxy coating on their stems and leaves to prevent water loss.

Draw plants that you find with these adaptations. You can use a plant guide or ask a ranger to help identify the plants you drew so you can label your sketches.

Remember not to pick any plants inside the park!

This plant stores water.

plant name =

This plant has a waxy coating.

plant name =

This plant reflects sunlight.

plant name =

This plant provides its own shade.

plant name =

Answers

TERRIFIC TRACKS:
1) woodrat, e
2) quail, c
3) bighorn sheep, f
4) cottontail, h
5) lizard, g
6) bobcat, d
7) kangaroo rat, b
8) kit fox, i
(mystery animal) coyote, a

MAP MANIA:
1) nine
2) bobcat, coyote, jackrabbit, kangaroo rat
3) six
4) Highway 62 or Twentynine Palms Highway
5) Barker Dam
6) i
7) Coxcomb Mountains
8) 74
9) gray lines
10) yes
11) where the Mojave and Colorado Deserts meet
12) Little San Bernardino Mountains
13) four-wheel drive

WATER:
1) five
2) flash floods
3) less than 5 inches
4) No, it's too salty
5) Loss of moisture from leaves/minimize loss of moisture
6) Barker Dam/to hold water for cattle and mining/wildlife uses it today
7) 1 gallon/2 gallons
8) personal answers

Wordseek

Find these words: Bats, Bighorn, Bobcat, Cholla, Coyote, Creosote, Hawk, Joshua Tree, Quail, Rabbits, Snakes, Tortoise, Yucca.

C	H	L	I	A	U	Q	B	C	J
H	R	N	E	D	H	A	W	K	O
O	F	E	R	A	B	B	I	T	S
L	S	G	O	O	H	A	I	J	H
L	E	K	B	S	H	C	T	L	U
A	K	C	M	P	O	G	N	S	A
Q	A	R	T	Y	S	T	I	U	T
T	N	X	O	L	V	J	E	B	R
Z	S	T	W	Y	U	C	C	A	E
Y	E	T	O	R	T	O	I	S	E

Clean up the Park

Help keep Joshua Tree National Park clean by picking up litter that you see. Show your bag of litter to a parent or a ranger and have them initial here to verify your hard work._____

Attend a Park Program

Ask at the visitor centers or look on park bulletin boards for the schedule of ranger-led programs offered by the park. Choose one that interests you and your family. When it is finished, have the ranger initial here to verify that you attended. What did you learn from the program?

Water in the Desert

Water is essential for survival in the desert. A palm oasis, with its huge fan palm trees, is a place where water occurs naturally at or near the surface of the ground. Visit one of the oases found on your park map to help you find the answers to the questions below. Be creative in where you look for information!

❶ How many fan palm oases are found within Joshua Tree National Park?

❷ What water event must you be aware of in Rattlesnake Canyon?

❸ On average, how many inches of rain does the Mojave Desert get per year?

❹ Will the water inside a barrel cactus quench your thirst? Why?

❺ What is transpiration? Why do desert plants have small leaves?

❻ What man-made water source inside the park was built around 1900? Why was it built then? What purpose does it serve now?

❼ How much water should a person carry on a day hike in mild conditions? In summer heat?

❽ Sit quietly in an oasis for 10 minutes. How does this places make you feel? What do you like about it? What don't you like? What did you notice that surprised you?

TAKING THE JUNIOR RANGER PLEDGE

"I,_____, promise to do my best to be a friend of nature. I promise that I will not intentionally pollute, destroy, frighten, or harm plants or animals, however big or small. I realize my actions will be an example to other people older and younger. I promise not to destroy nature while I enjoy nature."

AWARDING THE JUNIOR RANGER BADGE

I certify that _____ *completed at least five of the activities to become a Joshua Tree National Park Junior Ranger.*

signed by: Ranger _____

Publications to help you plan your visit to Joshua Tree National Park

The following publications have been selected for their value in planning your trip to Joshua Tree National Park. These items and many more may be ordered by mail, telephone, FAX, or on the web from Joshua Tree National Park Association.

Getting to know Joshua Tree National Park

Road Guide to Joshua Tree National Park, Decker. Guides visitors on a driving tour through the land where the Mojave and Colorado Deserts meet.
48 pages PB $5.95

On Foot in Joshua Tree, Furbush. A comprehensive hiking guide featuring 90 park hikes, 40 photos and illustrations, and 26 maps and reference charts.
152 pages PB $11.95

A Visitor's Guide to Joshua Tree, Cates. A delightful, informative guide blending human and natural history. Equally enjoyable by desert rats and first-time visitors. 100 pages PB $6.95

Hikes and Walks, Knapp. A pocket trail guide to Joshua Tree National Park with maps and descriptions of 26 trails.
34 pages PB $4.95

The Joshua Tree, Gossard. An easy-to-read book filled with fascinating facts and stories about the symbol of the Mojave Desert. 112 pages PB $9.95

Joshua Tree Video. An excellent introduction and overview to Joshua Tree National Park. 30 minutes VHS $12.95; PAL $15.95

Recreation Map of Joshua Tree, Harrison. Colorful map of Joshua Tree National Park highlighting points of interest, campgrounds, picnic areas, topographic features, and backcountry roads and trails. $7.95

Trails Illustrated Topographic Map of Joshua Tree National Park. Includes elevations, backcountry camping, hikes, routes, and safety. Waterproof and tearproof. $9.95

Joshua Tree, The Story Behind the Scenery, Vuncannon. Full of color photos and fascinating text, the perfect introduction to the park. 48 pages PB $7.95; $8.95 for French or German.

Wildflowers of Joshua Tree. Pocket guide to the common flowering plants of Joshua Tree National Park. Includes a map and over 50 color photographs to help with identification in the field.
PB $.95

75 Great Hikes in and Near Palm Springs, Ferranti. Covers Joshua Tree, Palm Springs, Indian Canyon, Mecca Hills, San Jacinto, and the Santa Rosas.
167 pages PB $14.95

On the Road in California

California Deserts, Schad. Color photographs of the California Desert Conservation Area, Mojave National Preserve, Joshua Tree National Park, Death Valley National Park, and Anza-Borrego Desert State Park.
103 pages PB $14.95

California Historical Landmarks. Lists the location and significance of each of the 43 historical parks and 1,000 historical landmarks established by the State of California.
318 pages PB $14.95

California Desert Byways, Huegel. Backcountry drives in California's desert area, includes Joshua Tree and Death Valley. 158 pages PB $18.95

California Roadmap. Includes a list of public recreational areas and places of interest. $2.95

Tapes and CDs Nature's sounds set to music with A) flute, B) guitar, or C) classical. Excellent mood-setter for your driving tour of the Southwest's desert areas. Tape $9.95/CD $15.95. Designate A, B, or C.

Life in the Desert

Desert Survival Handbook, Lehman. Explains how to deal with emergencies that might arise in a desert environment. Filled with examples, narratives, and illustrations to aid understanding.
91 pages PB $7.95

Indian Uses of Desert Plants, Cornett. An informative account of the ways early natives used a variety of desert plants for food, tools, building materials, and as an integral part of their daily lives. 38 pages PB $7.95

Geology Underfoot in Southern California, Sharp and Glazner. An inside view of the southland's often active, sometimes enigmatic, and always interesting landscape.
224 pages PB $14.00

Desert Solitaire, Abbey. The author's recollection of summers spent as a ranger in the canyon and rim country of sourthern Utah, including observations of the natural world.
269 pages PB $12.00

The Great Southwest Nature Factbook, Tweit. Everything you ever wanted to know about nature in the Southwest. 223 pages PB $14.95

Deserts, MacMahon. A National Audubon Society Nature Guide. A comprehensive field guide, illustrated with color photos, of the wildflowers, birds, reptiles, insects, and other natural wonders of North America's deserts.
478 pages PB $19.95

Southwest Desert Wildlife. The sixty-five exquisite color photographs in this volume will affect the way you see, hear, and experience the environment.
32 pages PB $4.95

Desert Palm Oasis, Cornett. An exploration of the lush, water-loving fan palms that are such a wonderful surprise in harsh desert environments.
47 pages PB $9.95

Watchable Birds of the Southwest, Gray. A full-color guide to 68 of the Southwest's fun-to-watch species, big and small. Organized by habitat.
187 pages PB $14.00

100 Desert Wildflowers, Bowers. Color photos and easy-to-read text highlight some of the most common wildflowers of the deserts in the southwest corner of America.
56 pages PB $8.95

Shrubs and Trees of the Southwest Desert, Bowers. An easy-to-use guide full of descriptions and line drawings of over 100 desert shrubs and trees.
140 pages PB $9.95

70 Common Cacti. Colorful photographs and easy-to-read descriptions demonstrate the unique beauty of the common cacti of the Southwest.
70 pages PB $7.95

Roadrunner!, Douglas. An avid roadrunner watcher takes a close look at the paisano, that wonderful, wacky symbol of the American desert.
48 pages PB $5.95

Poisonous Dwellers of the Desert, Dodge. This classic provides accurate, useful information and debunks the many superstitions about poisonous desert critters. 40 pages PB $6.95

Education to enhance your visit to Joshua Tree National Park

The Desert Institute at Joshua Tree National Park, the education program of the Joshua Tree National Park Association, sponsors one and two day field classes on weekends from September to July. Each class examines a natural or cultural feature of the Mojave Desert and is focused for teachers, volunteer interpreters, park visitors, and others interested in learning about the park and the Mojave Desert. College credit is available through University of California Riverside Extension.

Members of the Joshua Tree National Park Association are automatically enrolled in Partners in Nature Education (PINE), which qualifies them to receive a 20% discount on all Desert Institute classes, as well as, University of California Riverside Extention Outdoor Study courses. For information on becoming a JTNPA member, call (760) 367-5525.

A catalogue of Desert Institute classes will be available soon. It will be published on the association website at www.joshuatree.org. Catalogues will also be available at park visitor centers, or you may call 760-367-5525 and request one by mail.

Ordering Information

Telephone orders are encouraged to ensure that you are ordering the publications best suited to your needs or order from our website at www.joshuatree.org.

Visa, MasterCard, American Express, and Discover Card orders are accepted.

To order by mail, enclose check or credit card number and expiration date. CA residents include 7.75% sales tax.

Prices are subject to change without notice.

Postage & Handling Rates

U.S. & Canada: $6.00 for first item.
Each add'l item $0.50.
Foreign airmail: $8.00 for first item.
Each add'l item $2.00.

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