



# Joshua Tree Guide

A Planning Guide for Visitors  
to Joshua Tree National Park  
fall, 2005

## 24 Hours Photographing Joshua Tree National Park

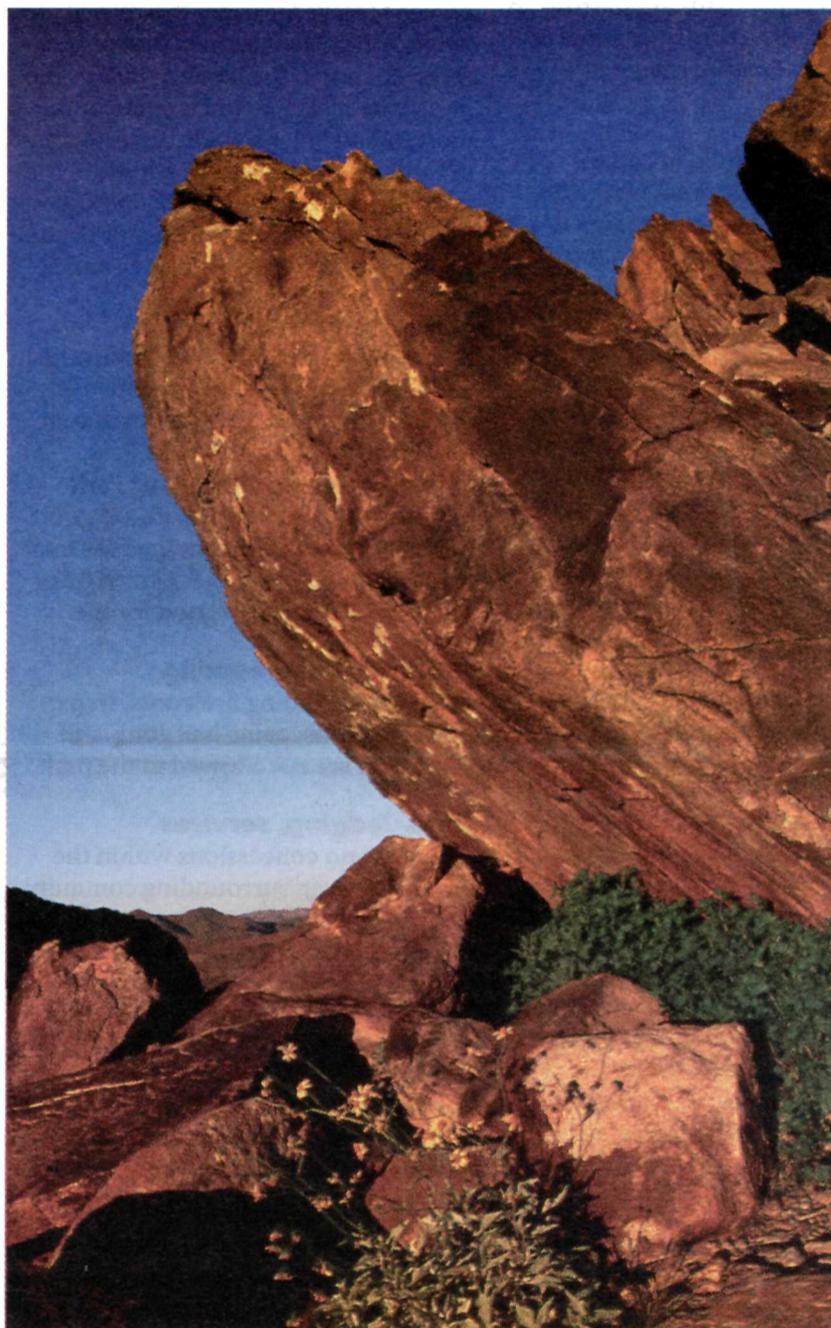
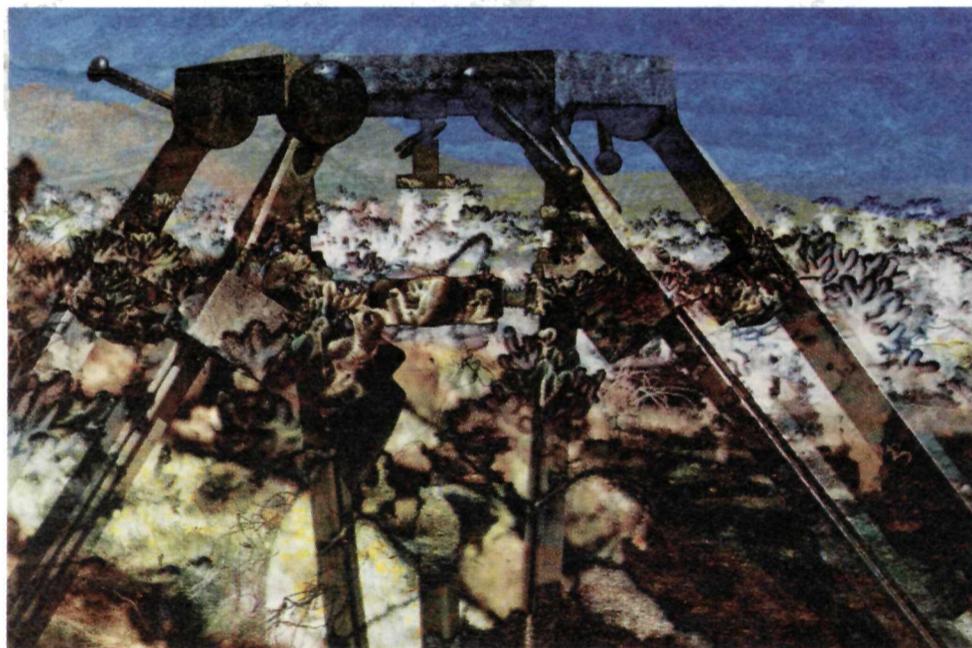
The splendor of Joshua Tree National Park went on the road this summer. UCR/California Museum of Photography has teamed up with Joshua Tree National Park, Parks Stewardship through the Arts, the National Parks Conservation Association, and the Bureau of Land Management to create a unique learning activity and art exhibit to encourage stewardship for public lands.

On April 2nd, the museum brought four artists and 20 community members from Riverside to camp in the park and photograph their experience there. The group received training in land conservation from Joann Schiffer-Burdett of the Leave No Trace program. After this, the 24 photographers spent 24 hours in the park savoring its natural beauty.

The four artists brought diverse perspectives to the project. Trish Tuley's work (right) explores the spiritual dimensions of natural landscapes. Matt Theilen (page 3) is an avid rock-climber as well as photographer. Scott Bradford Davis (page 3) uses large format photography on platinum prints to place the viewer in the space photographed. Nancy Macko (below) is a digital media artist who explores the connection between the natural world and technology.

The results of the photo shoot will be on exhibit at the museum through September. The California Museum of Photography is located in downtown Riverside. You may call 951-787-FOTO for questions or directions.

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

## — Important information —

### **accessibility**

The nature trails at Bajada, Cap Rock, and the Oasis of Mara are accessible. Assistive listening systems and sign-language interpreters are available for some programs with prior notice.

### **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 and many roads are narrow, so ride cautiously. Bikes are prohibited on backcountry and nature trails.

### **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 percent humidity. Temperatures are most comfortable in the spring and fall, with an average high/low of 85°F 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.

### **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. A pay phone is located at the visitor center in Twentynine Palms. You can find pay phones in the towns of Yucca Valley and Joshua Tree and at Chiriaco Summit (12 miles southeast of Cottonwood). Emergency-only

phones are located at the Indian Cove ranger station and at Intersection Rock parking area.

### **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 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, which 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 per vehicle and is good for seven consecutive days. A Joshua Tree Pass may be purchased for \$25 and a National Parks Pass, which is good for all National Park Service 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 the park.

### **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. Their telephone numbers and web addresses are listed on page six of this publication.

### **food storage**

Store food in hard-sided containers or in your vehicle to prevent ravens, coyotes, and other wildlife from eating it.

### **getting to the park**

The park is located about 140 miles east of Los Angeles via I-10. Entrances to the park are located off CA HWY 62 (Twentynine Palms Highway), at the towns of Joshua Tree and Twentynine Palms. A third entrance is located 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 areas, you will want to request the site bulletin on horse use before you come.

### **international visitors**

Park information is available at visitor centers and entrance stations in Dutch, French, German, Italian, Japanese, and Spanish.

### **keep wildlife wild**

Feeding coyotes, squirrels, and other animals weans them from their natural food supplies, causes overpopulation, and turns them into aggressive creatures as they lose their fear of humans.

### **leave no trace**

During your visit please pick up trash around campgrounds and trails. Your actions will inspire other park visitors.

### **lost & found**

Report lost, and turn in found, items at any visitor center or ranger station. Lost articles will be returned if found.

### **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 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, so wait until you get to one before stopping.

### **pets**

While pets are allowed in the park, their activities are restricted. They must be on a leash at all times and cannot be more than 100 feet from a road, picnic area, or campground; they are prohibited from trails, and they must never be left unattended—not even in a vehicle.

### **potable water**

Water is available at the visitor center in Twentynine Palms, at Black Rock and Cottonwood campgrounds, at the entrance station south of Joshua Tree, and at the Indian Cove ranger station.

### **rock climbing**

Climbers may replace existing unsafe bolts, and new bolts may be placed in non-wilderness areas using the bolting checklist. Bolting in wilderness requires a permit. Bolting checklists and permit applications are available at entrance stations and visitor centers.

### **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 and do not enter old mine workings.

### **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 creating an unsightly mess, and plastic six-pack rings can strangle wildlife. 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 a 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. Books, videos, maps, and related items are available, as well as cultural and natural history exhibits, and park rangers to answer your questions.

### **wildflowers**

Spring blooming periods vary with elevation, temperature, and the amount of moisture in the soil. You can get current information by calling the park.

### **wildlife viewing**

It is a thrill to see wild animals in the park, but remember: this is their home and they should not be disturbed. This includes the use of artificial light for viewing them.

### **world wide web**

If you are "connected," check out the National Park Service publications on the web at [www.nps.gov](http://www.nps.gov). We are adding more information all the time. For information about other desert attractions in California, surf over to [www.californiadesert.gov](http://www.californiadesert.gov).

### **you are responsible**

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

# Tarantulas

Autumn provides a brief glimpse into the workings of nature in the desert. At no other time is the intimate connection between life and death represented so clearly.

One of the species that best embodies this relationship between life and death is the desert tarantula, *Aphonopelma iodium*. Tarantulas, the largest spiders in North America, are typically two to three inches long and are covered with thousands of fine hairs ranging in color from tan to dark brown. Besides its eight legs, the basic sections of a tarantula's body are its cephalothorax (a fused head and thorax, or chest) and its abdomen.

Many tarantulas have a bald spot on the abdomen as a result of a unique defensive behavior. When cornered by a predator, the tarantula will rub its hind legs over its abdomen, brushing hairs into its enemy's eyes. Tarantulas have many natural predators including larger lizards, snakes, and birds. However, the most ferocious is the tarantula hawk, a large, metallic blue and orange wasp. A single tarantula hawk can sting and paralyze a tarantula, drag the spider back to a prepared burrow, and lay eggs upon the still-living creature's abdomen. The wasp then seals its paralyzed prey inside the burrow. Upon hatching, the wasp larvae will eat the tarantula alive. Although this outcome may seem grisly from our human perspective, nature knows only one standard: survival.



When a male tarantula reaches sexual maturity, between eight and ten years of age, he begins a journey that will both aid the survival of his species and cost him his life. Should you observe a desert tarantula in Joshua Tree National Park this autumn, it is likely to be a male in search of a mate. The male follows the scent of a female tarantula to the receptive female's burrow, which she has typically excavated in

dry, sandy soil and lined with silk webbing. Tarantulas are solitary animals; there is only one spider in this burrow.

To alert the female of his presence, the male taps one of his legs against the ground until the female emerges. The male must then participate in a dangerous mating dance, wherein he fends off the female, who wishes to devour him, by using hooks on his front legs. His death will give the female a needed boost of nutrition, as she must now produce 500 to 1,000 eggs and a silk cocoon where the eggs will be protected. Even if the male escapes being eaten by the female, he will still die within a few months. Females, on the other hand, often produce eggs for 25 years or more.

When not involved in the ritual of reproduction, tarantulas typically do not eat each other. Insects like beetles and grasshoppers make up a good portion of the tarantula diet, and tarantulas in the desert may also devour small lizards, mice, and even scorpions. Although tarantulas have the ability to spin silk, they chase down their prey rather than snaring it in webs. Their eight closely set eyes are not useful in hunting. Instead, thousands of sensitive hairs on the spider's body allow it to detect subtle movements in its immediate environment and "home in" on a victim. The tarantula strikes with its fangs, injecting venom. There is a struggle while the venom takes effect, and the tarantula must grasp its prey with the palps, two arm-like appendages between the mouth and legs. If successful, the tarantula wads up its semi-paralyzed victim, secretes digestive juices onto it, and sucks up the liquefied prey. One creature's death leads to another's survival; the pattern of life in the desert continues.

If you encounter a tarantula, take time to observe its body, its behavior, and its connection to the fabric of desert life, but please do not disturb this delicate connection. Wildlife should never be touched, chased, or fed, and the tarantula is no exception. Contrary to appearance and reputation, the tarantula is a timid creature and will not bite human beings unless seriously provoked. Like all animals in Joshua Tree National Park, the desert tarantula deserves our respect, not just for surviving, but for thriving in a place where the boundary between life and death is always shifting.

by Park Ranger Mike Cipra

continued from page 1: 24-hours photographing Joshua Tree National Park

Let these wonderful photographs inspire you during your visit to Joshua Tree. Consider taking an artistic approach, as opposed to a strictly documentary one, when you point your camera at some feature of the park that interests you.

For instance, you might want to take a photo from ground level looking up instead of from eye level. Or, take advantage of surrounding rocks and

trees to frame your shot.

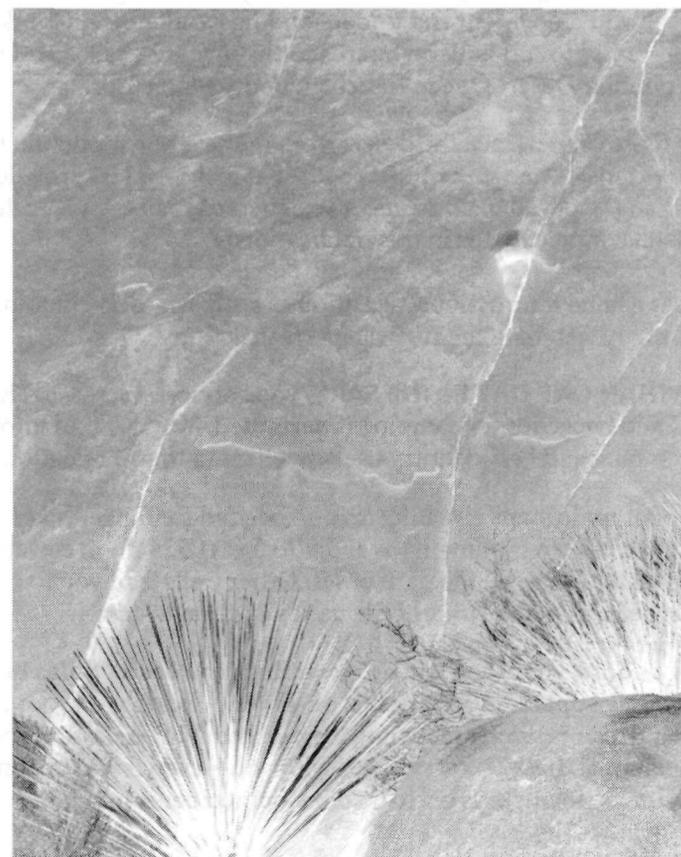
Even without a camera, you might wish to think about some aspect of the park as an artist might. Imagine a view in moonlight, or with a rust-colored wash. Create a mental movie of geological features returning to a previous state.

Whatever you choose to look at or photograph, there are many ways to picture Joshua Tree National Park.



photo by Scott Bradford Davis

photo by Matt Theilen



## Campgrounds

Campgrounds	Elevation	Sites	Fee	Group Sites	Group Fee	Horse Camp	Water	Flush Toilets	Chemical Toilets	Tables	Fire Grates	Dump Station
Belle	3800'	18	\$5						*	*	*	
Black Rock	4000'	100	\$10			\$10	*	*		*	*	*
Cottonwood	3000'	62	\$10	3	\$25		*	*		*	*	*
Hidden Valley	4200'	45	\$5						*	*	*	
Indian Cove	3200'	101	\$10	13	\$20/35				*	*	*	
Jumbo Rocks	4400'	125	\$5						*	*	*	
Ryan	4300'	31	\$5			\$5			*	*	*	
Sheep Pass	4500'			6	\$20/35				*	*	*	
White Tank	3800'	15	\$5						*	*	*	

Campsites are limited to six people, three tents, and two cars. Group sites accommodate ten to 60 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. Camp only in designated campsites.

There are no hookups for recreational vehicles. At Hidden Valley and group sites, recreational vehicles may not exceed 25 feet in length. At White Tank, the 25-foot limit includes the towing vehicle.

Water is available at Oasis Visitor Center, Indian Cove Ranger Station, West Entrance, and Black Rock and Cottonwood campgrounds. Showers are not available.

Store food in containers capable of preventing access by wildlife or in your vehicle. Any scented or odorous items must be similarly stored.

All vegetation in the park is protected. If you want to make a campfire, bring your own firewood.

Quiet hours are from 10 p.m. to 6 a.m. Generator use is limited to six hours a day: 7 to 9 a.m., noon to 2 p.m., and 5 to 7 p.m.

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

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

## What To See and Do

Viewed from the road the desert may appear bleak and drab. Closer examination reveals a fascinating variety of plants and animals and surreal geologic features. 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 these 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 or take a longer hike; several are listed on page 7 of this publication. A ranger-led program will add enjoyment and understanding to your visit. Check at visitor centers and on campground bulletin boards for listings. 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 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 give information needed for longer hikes. For "peak baggers," the park has ten mountains over 5,000 feet (1,524 m) 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 4-wheel drive vehicles

Mountain bikes and 4-wheel drive vehicles are welcome in the park. For your own safety and for the protection of natural features, 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 with soft 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 I-10.

### 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 nine 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. Use extreme caution when exploring old mines.

### 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 CA 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), crosses 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

An 18-mile motor tour leads through one of the park's most fascinating landscapes. The road turns south from the paved road two miles (3.2 km) west of Jumbo Rocks Campground. There are 16 stops and it takes approximately two hours to make the round trip. 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 descriptive brochure that highlights each stop 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, and pinyon pines. 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, HIKING, and HORSEBACK RIDING

Joshua Tree National Park is a back-packer's dream with its mild winter climate and interesting rock formations, plants, and wildlife. It embraces 794,000 acres of which 585,040 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.

### Hiking

It is easy to get disoriented in the desert: washes and animal trails criss-cross 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 or GPS unit and learn how to use them before you head out. Cell phones are often not usable inside the park.

Know your limitations and don't take risks. You should not attempt to climb 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.

### 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 areas in the vicinity (they are indicated on the topo maps at the backcountry boards) and make certain to camp outside their boundaries.

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 and the heftier weight of canned and fresh foods. 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.

### Coping with the weather

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

Temperature changes of 40 degrees within 24 hours are common. Bring a variety of clothes so 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.

### Horseback riding

Horseback riding is a popular way to experience the backcountry and there are 253 miles of equestrian trails and trail corridors that traverse open lands, canyon bottoms, and dry washes.

Because of the special requirements for horses, care should be taken in planning your trip. You may call 760-367-5500 and request that a horse bulletin be mailed to you.



National Park Service  
U.S. Department of the Interior

### Joshua Tree National Park

#### Designations

National Park - 1994  
Biosphere Reserve - 1984  
National Monument - 1936

#### Size

794,000 acres

#### Superintendent

Curt Sauer

#### Park Information

760-367-5500

#### Web Site

[www.nps.gov/jotr/](http://www.nps.gov/jotr/)

#### Mailing Address

74485 National Park Drive  
Twentynine Palms, CA 92277

#### E-mail

[jotr\\_info@nps.gov](mailto:jotr_info@nps.gov)

#### Fax Number

760-367-6392

The National Park Service cares for the special places saved by the American people so that all may experience our heritage.

## Black Rock Canyon Offers Good Hiking and More

Located in the northwest corner of the park, the road to Black Rock Canyon dead-ends 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 rest rooms 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 there.

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 ridge lines 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 the Black Rock Canyon area. Wildlife sightings are frequent in the campground. Visitors often encounter ground squirrels, jackrabbits, and cottontails. Frequent bird sightings include cactus wrens, Gambel's quail, great horned owls, scrub-jays, and roadrunners. A lucky birder might be rewarded with a glimpse of a Scott's oriole, pinyon jay, 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.

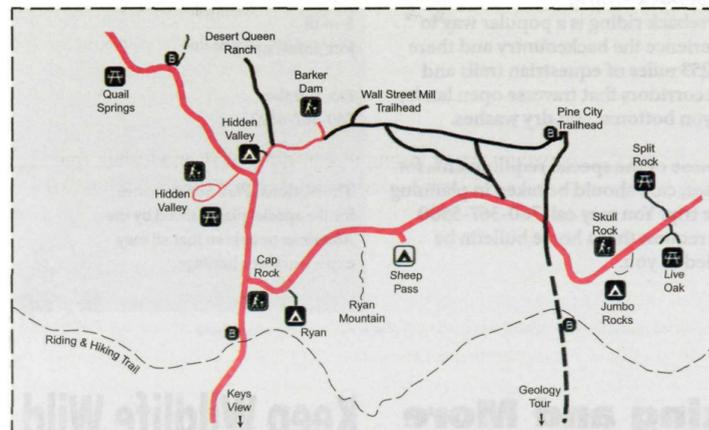
Please do not feed wild animals in Joshua Tree National Park. People food is unhealthy for them and they can become aggressive and harm you.

## Keep Wildlife Wild



**Don't feed coyotes!**  
People food is not healthy for them. It makes them into beggars, and they might bite you. Also, it is against the law, and a ranger will give you a ticket, then you will have to pay a big fine!

How Far Is It?	Oasis of Mara	Cottonwood Spring	West Entrance
Belle Campground	9	28	23
Black Rock Canyon	28	73	12
Cap Rock	19	40	11
Cholla Cactus Garden	18	20	31
Cottonwood Spring	38	0	46
Hidden Valley	20	42	9
Indian Cove	10	48	18
Interstate 10	45	7	35
Jumbo Rocks Campground	11	33	18
Keys View	24	45	16
Oasis of Mara	0	38	29
Ryan Campground	18	39	11
Sheep Pass Campground	16	37	14
West Entrance	34	51	0
White Tank Campground	11	27	24



## Area Information

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

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

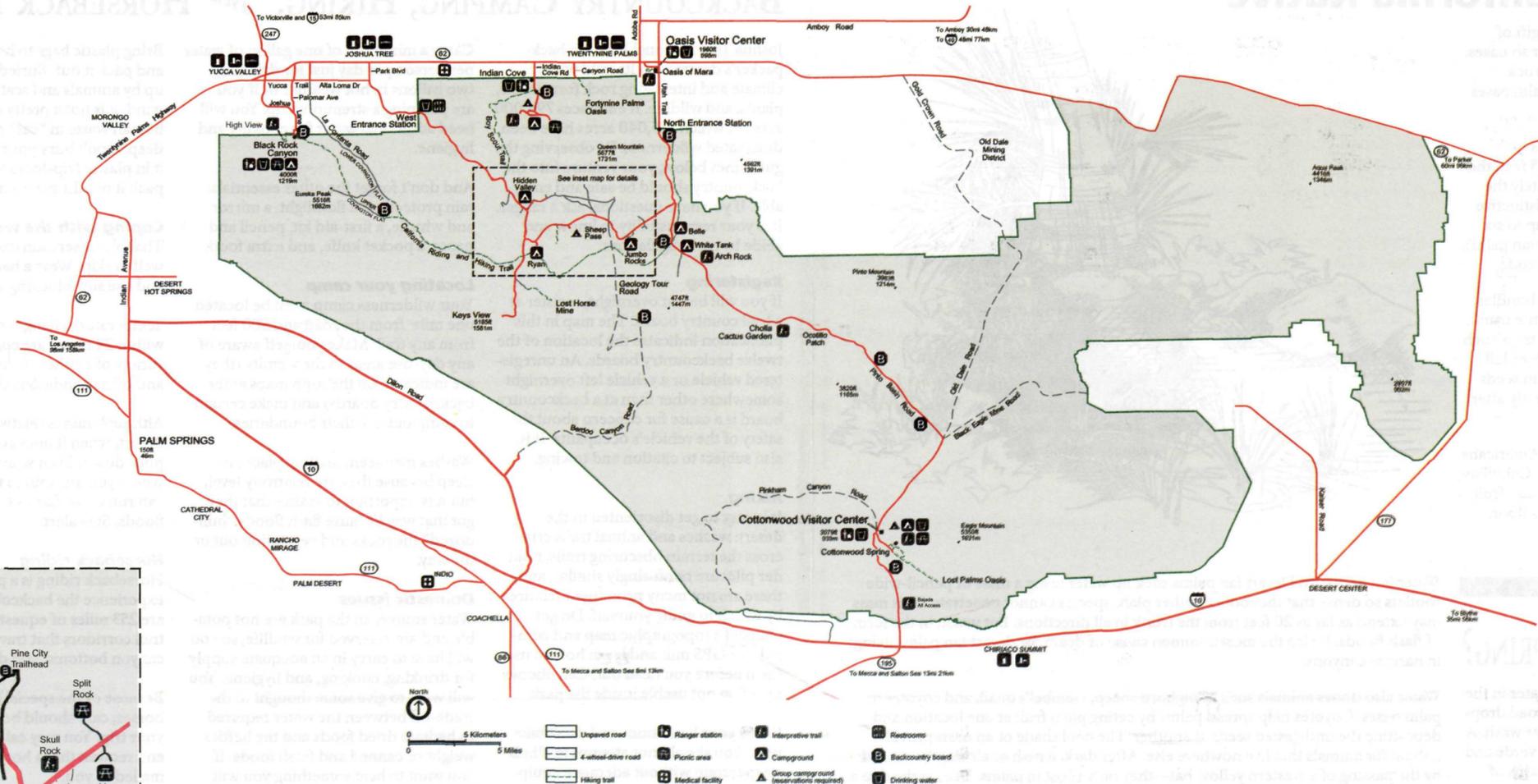
**Joshua Tree**  
P.O. Box 600  
Joshua Tree, CA 92252  
(760) 366-3723  
www.joshuatreechamber.org

**Palm Springs**  
190 W. Amado Rd.  
Palm Springs, CA 92262

(760) 325-1577  
PSChamber@worldnet.att.net  
www.pschamber.org

**Twentynine Palms**  
6455 Mesquite Ave. Unit A  
Twentynine Palms, CA 92277  
(760) 367-3445  
www.29chamber.com

**Yucca Valley**  
56300 29 Palms Hwy.  
Yucca Valley, CA 92284  
(760) 365-6323  
chamber@yuccavalley.org  
www.yuccavalley.org



## 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
Hi-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

The Joshua Tree Guide is produced by the employees and volunteers of Joshua Tree National Park and Joshua Tree National Park Association and is published by Joshua Tree National Park Association. It is printed on recycled paper.

## HIKING TRAILS



Trail	Round-trip Mileage	Time	Starting Point	Trail Description
Boy Scout Trail	16 miles 25.8km	1-2 days	Indian Cove backcountry board or Keys West backcountry board 0.5 mile (0.8km) east of Quail Springs Picnic area	Scenic trail through the western most 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/Mt.	4 miles (6.4 km)	3-4 hour	Parking area 1.2 miles (1.9 km) east of Keys View Road	Site of ten-stamp mill and foundations. Summit elevation: 5278 feet (1609 m). 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: 3371 feet (1027 m). 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: 5461 feet (1664 m). 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.

**Ranger Programs**

Desert Queen Ranch tours,  
Evening campground talks,  
Discovery walks,  
Star parties,  
And much more.

Pick up a current schedule at a visitor center or look on campground bulletin boards. We also publish program schedules on our website: [www.nps.gov/jotr](http://www.nps.gov/jotr).

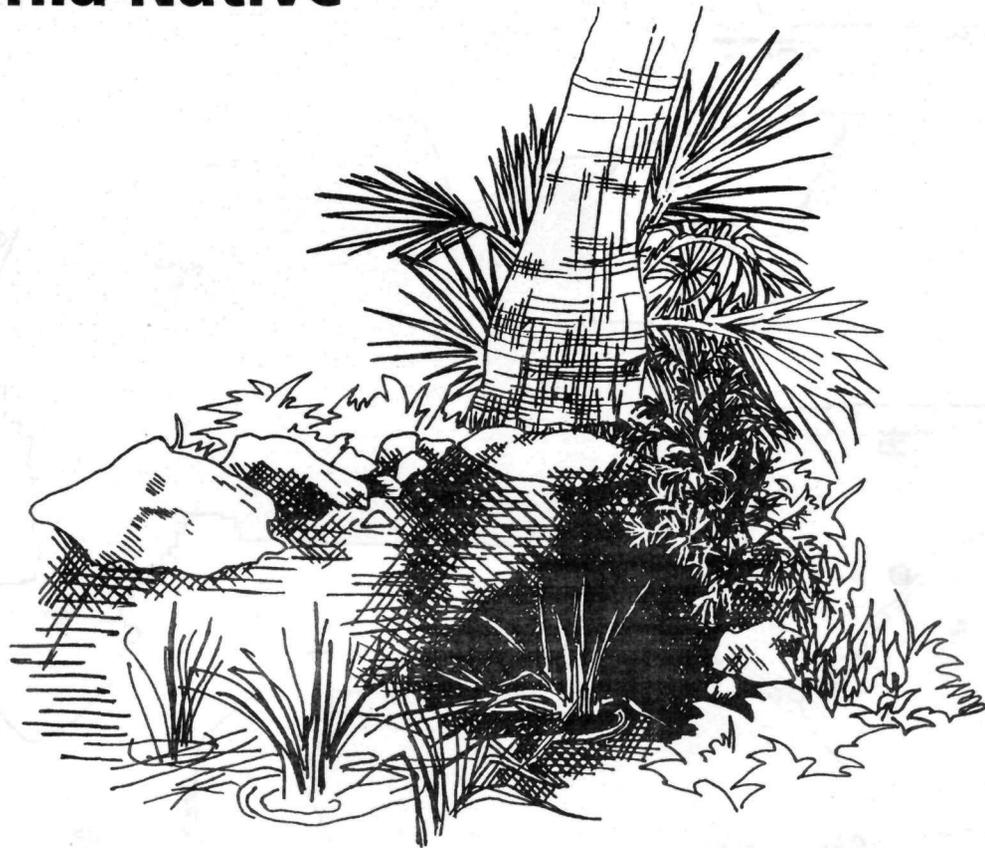
## The Desert Fan Palm: A California Native

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, 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 such as bighorn sheep, Gambel's quail, and coyotes to palm oases. 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—they only roost in palms. During the day, a flash of yellow-orange might be a hooded oriole preparing to build its woven sack-like nest under the large green leaves of a 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.

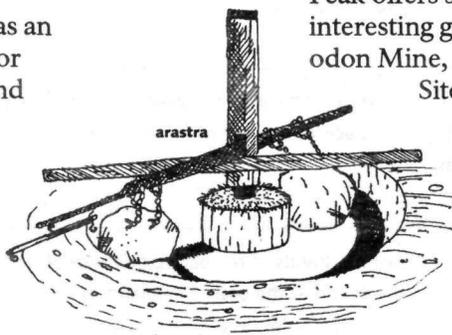
The larvae of the *Dinapate* beetle spend about five years chewing tunnels within the trunks of desert fan palms. The chewing is so loud that woodpeckers use the noise to locate the larvae. Successful larva pupate within the trunk then chew their way out. Because their rear end is wider than their front 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 overly 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.



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.

The three-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 rest rooms, is located one-half mile from Cottonwood Spring via a signed 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.

Cottonwood Spring was first mentioned in a gold mine claim filed in 1875, indicating that the trees are native. Fan palms first appear around 1920, perhaps growing from seeds deposited by a bird or coyote.

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



### Think Globally, Act Locally

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 in your community.

## 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 lie 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 of our galaxy, where the stars are richest. The constellations Sagittarius and Scorpio lie in this direction.

Just west of Sagittarius is Scorpio, one of the few constellations that looks like its name. Scorpio is distinguished 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 celestial 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?

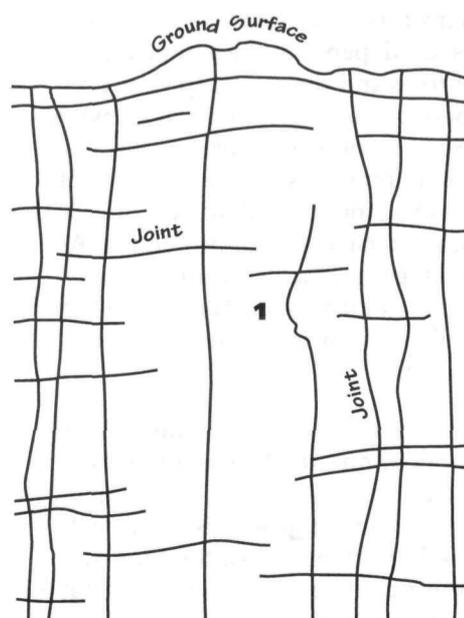
Geologists believe the face of our modern landscape was born more than 100 million years ago. Molten liquid, heated by the continuous movement of Earth's crust, oozed upward and cooled while still below the surface. These plutonic intrusions are a granitic rock called monzogranite.

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 gneiss (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

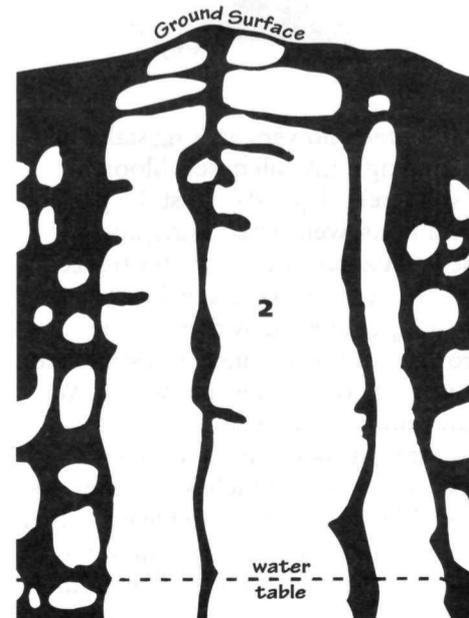
clay, while it loosened and freed grains resistant to solution. Rectangular stones slowly weathered to spheres of hard rock surrounded by soft clay containing loose mineral grains. Imagine holding an ice cube under the faucet. The cube rounds away at the corners first, because that is the part most exposed 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



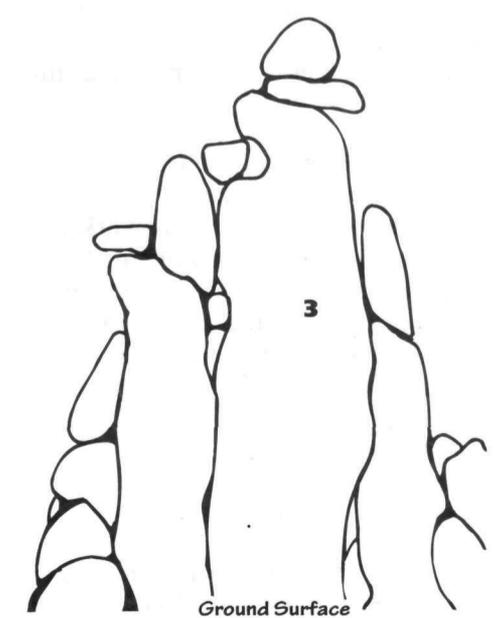
boulders settled one on top of another, creating those impressive rock piles we see today. (figure 3)

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.

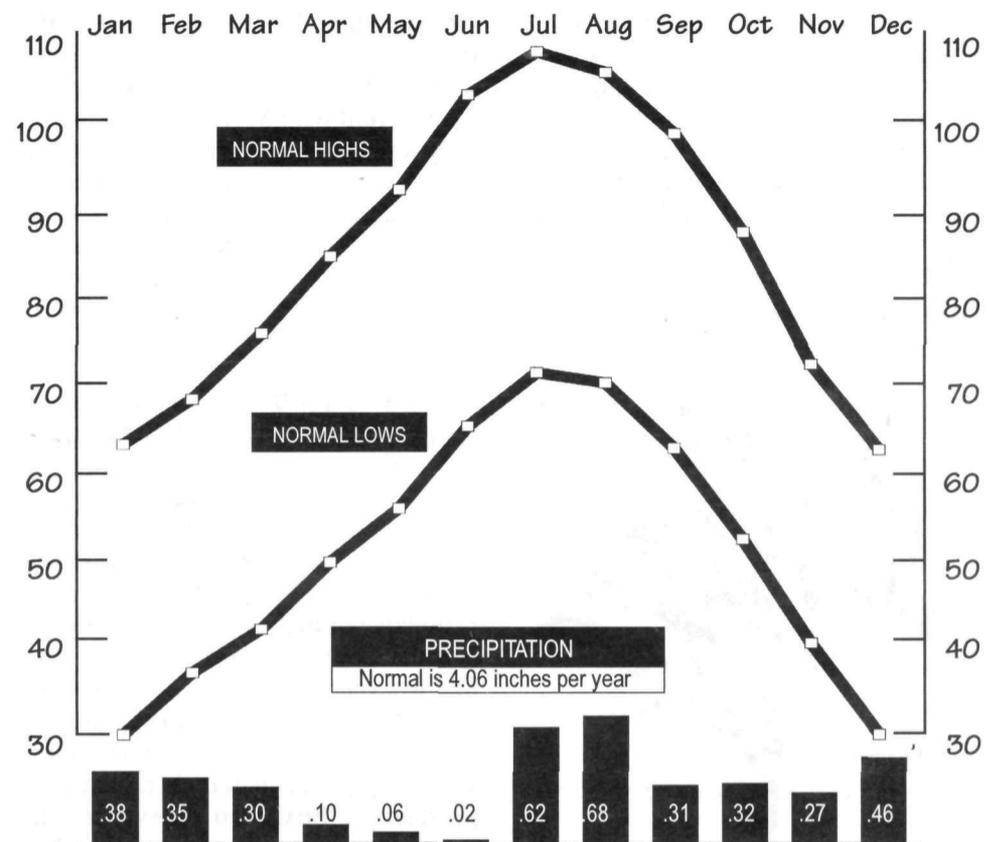


Of the dynamic processes that erode rock material, water, even in arid environments, is the most important. Wind action is also important, but less so than the action of water.

The 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 relic features inherited from earlier times of higher rainfall and lower temperatures.



## The Weather



Measurements were taken at 1,960 feet. You can expect seven to 12 degrees cooler temperatures and 3.5 inches more precipitation at higher elevations.

## "I Speak for the Trees" Dr. Seuss, The Lorax

Surrounded by twisted, spiky trees straight out of a Dr. Seuss book, you might begin to question your map. Where are we anyway? In wonder, the traveler pulls over for a snapshot of this prickly oddity; the naturalist reaches for a botanical guide to explain this vegetative spectacle; and the rock climber shouts "Yowch!" when poked by dagger-like spines on the way to the 5.10 climbing route.



a Joshua tree

Known as the park namesake, the Joshua tree, *Yucca brevifolia*, is a giant member of the lily family. Like the California fan palm, *Washingtonia filifera*, the Joshua tree is a monocot, in the subgroup of flowering plants that also includes grasses and orchids. Don't confuse the Joshua tree with the Mojave yucca, *Yucca schidigera*. This close relative can be distinguished by its longer, wider leaves and fibrous threads curling along leaf margins. Both types of yuccas can be seen growing together in the park. The Joshua tree provides a good indicator that you are in the Mojave Desert, but you may also find it growing next to a saguaro cactus in the Sonoran Desert in western Arizona or mixed with pines in the San Bernardino Mountains.

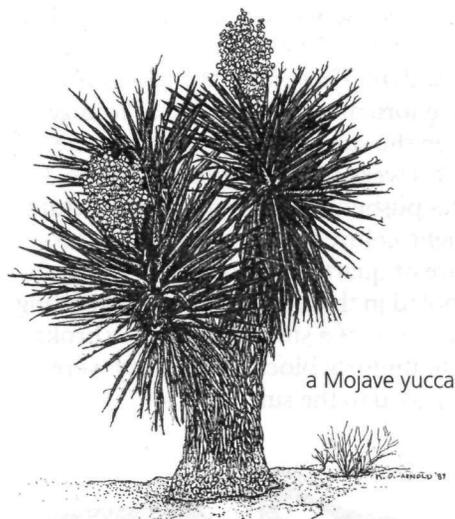
Years ago the Joshua tree was recognized by American Indians for its useful properties: tough leaves were worked into baskets and sandals, and flower buds and raw or roasted seeds made a healthy addition to the diet. The local Cahuilla have long referred to the tree as "hunuvat chiy'a" or "humwichawa;" both names are used by a few elders fluent in the language.

By the mid-19th century, Mormon immigrants had made their way across the Colorado River. Legend has it that these pioneers named the tree after the

biblical figure, Joshua, seeing the limbs of the tree as outstretched in supplication, guiding the travelers westward. Concurrent with Mormon settlers, ranchers and miners arrived in the high desert with high hopes of raising cattle and digging for gold. These homesteaders used the Joshua tree's limbs and trunks for fencing and corrals. Miners found a source of fuel for the steam engines used in processing ore.

Today we enjoy this yucca for its grotesque appearance, a surprising sight in the landscape of biological interest. The Joshua tree's life cycle begins with the rare germination of a seed, its survival dependent upon well-timed rains. Look for sprouts growing up from within the protective branches of a shrub. Young sprouts may grow several inches in the first five years, then slow down, averaging one-half inch per year thereafter. The tallest Joshua tree in the park looms a whopping forty feet high, a grand presence in the Queen Valley forest; it is estimated to be about 300 years old! These "trees" do not have growth rings like you would find in an oak or pine. This makes aging difficult, but you can divide the height of a Joshua tree by the average annual growth of one-half inch to get a rough estimate.

Spring rains may bring clusters of



a Mojave yucca

white-green flowers on long stalks at branch tips. Like all desert blooms, Joshua trees depend on just the perfect conditions: well-timed rains, and for the Joshua tree, a crisp winter freeze. Researchers believe that below freezing temperatures may damage the growing end of a branch and stimulate flowering, followed by branching. You may notice some Joshua trees grow like straight stalks; these trees have never bloomed—which is why they are branchless! In addition to ideal weather, the pollination of flowers requires a visit from the yucca moth. The moth collects pollen while laying her eggs

## Desert Institute

The Desert Institute, the educational field program sponsored by Joshua Tree National Park Association, a not-for-profit organization, offers outdoor classes related to Joshua Tree National Park and the California deserts. Taught by experts in their field, classes vary in length from one to three days. Optional college credit is offered through University of California Riverside Extension for course titles followed by an asterisk (\*). Course fees vary from \$45 to \$200.

### Fall Class Schedule

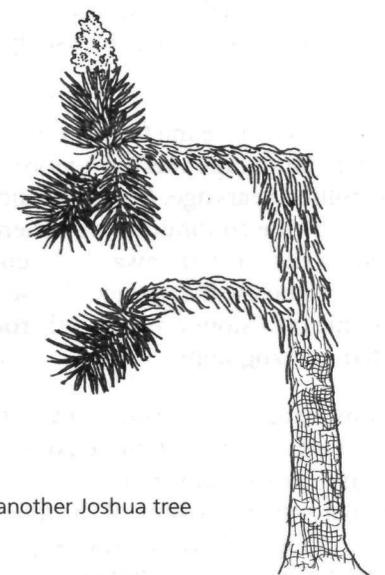
Desert Night Sky	Sep 24
Basic Desert Survival	Sep 25
Indians of the California Desert	Oct 1
Insects of the Desert	Oct 2
Native American Basket Weaving	Oct 8, 9
Drawing the Desert	Oct 15
Watercolor Painting in the Park	Oct 16
Photographing the Joshua Tree Landscape	Oct 21, 22
Explore Johnny Lang Canyon	Oct 23
Geology of San Andreas Fault	Oct 29
Mystery of Wonderland of Rocks	Oct 30
Archaeology of Joshua Tree National Park*	Nov 5, 6
Native American Pigments & Paints	Nov 12
Geology: Creation of the JT Landscape*	Nov 19, 20
Map & Compass Basic Skills	Dec 2, 3
Map & Compass Advanced Skills	Dec 4

Contact us for a brochure or to sign up for a course: [www.joshuatree.org](http://www.joshuatree.org) / tel. 760-367-5535 / fax 760-367-5583 / eMail [desertinstitute@zippnet.net](mailto:desertinstitute@zippnet.net).

inside the flower ovary. As seeds develop and mature, the eggs hatch into larvae, which feed on the seeds. The tree relies on the moth for pollination and the moth relies on the tree for a few seeds for her young—a happy symbiosis. The Joshua tree is also capable of sprouting from roots and branches. Being able to reproduce vegetatively allows a much quicker recovery after damaging floods or fires, which may kill the main tree.

Many birds, mammals, reptiles, and insects depend on the Joshua tree for food and shelter. Keep your eyes open for the yellow and black flash of a Scott's oriole busy making a nest in a yucca's branches. At the base of rocks you may find a wood rat nest built with spiny yucca leaves for protection. As evening falls, the desert night lizard begins poking around under the log of a fallen Joshua tree in search of tasty insects.

You may be at ease with pine or hardwood, or find shade under the domesticated trees in your city park, but in the high desert, Joshua is our tree. It is an important part of the Mojave Desert ecosystem, providing habitat for numerous birds, mammals, insects, and



another Joshua tree

lizards. Joshua tree forests tell a story of survival, resilience, and beauty borne through perseverance. They are the silhouette that reminds those of us who live here that we are home. Like the Lorax we speak for the trees, but often the trees speak to us.

By Vegetation Specialist Jane Rodgers

## Publications to help you plan a 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 at [www.joshuatree.org](http://www.joshuatree.org).

### 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. Enjoyable by desert rats and first-time visitors. 100 pages PB \$6.95

**Hiking California's Desert Parks**, Cunningham. Presents 111 hikes and backcountry trips in Anza Borrego, Joshua Tree, Death Valley, and Mojave. 373 pages PB \$16.95

**Joshua Tree Desert Reflections**, Trimble. Dazzling photos and lyrical narrative make this book both the perfect introduction to the park and a treasured memento. 40 pages PB \$9.95

**Joshua Tree Video**. Excellent introduction to Joshua Tree National Park. 30 minutes VHS \$13.95; 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. \$8.95

**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 \$9.95; \$10.95 for French or German.

**Joshua Tree National Park Geology**, Trent and Hazlett. Explores the geology and evolution of the Joshua Tree landscape. Includes sections on plate tectonics, regional geology, and seismic activity. PB \$9.95

**50 Best Short Hikes**, Krist. Covers Joshua Tree, Death Valley and Mojave. Hikes range from easy nature trails to more challenging routes suitable for a full day of hiking. 204 pages PB \$12.95

### On the Road in California

**California Deserts**, Schad. Takes you on a journey through the hottest, driest, lowest, and loveliest places in North America. 103 pages PB \$14.95

**National Audubon Society Field Guide to California**, Alden, Health. A complete overview of California's natural history including an extensive sampling of the state's parks, preserves, beaches, forests, islands, and wildlife sanctuaries. 450 pages \$19.95

**The Living Desert**, exploring national parks and monuments through natural sounds. Tape \$10.95, CD \$15.95.

**The Complete Guide to America's National Parks**, Fodor's. Up-to-date guide to all 384 National Park Service sites. 448 pages PB \$19.00

**California Roadmap**. Includes a list of public recreational areas and places of interest. \$3.95

### 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 \$8.95

**How Indians Used 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. 62 pages PB \$9.95

**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 southern Utah, including observations of the natural world. 269 pages PB \$14.00

**The Joshua Tree**, Cornett. Up-to-date information about this symbol of the Mojave Desert and namesake of our national park. 32 pages PB \$6.95

**Growing Up at the Desert Queen Ranch, Keys**, Kidwell. The true story of the Keys family and their struggle to survive on an isolated desert ranch in the 1920s and '30s. It is a look into a now lost American way of life. 118 pages PB \$14.95

**The Lizard-Watching Guide**, Sanborn. More than a typical field guide, Sanborn details seventeen common lizards found in the Mojave and Colorado deserts. 36 pages PB \$8.95

**Desert Palm Oasis**, Cornett. An exploration of the lush, water-loving fan palms that are such a wonderful surprise in arid desert environments. 47 pages PB \$10.95

**The Sibley Field Guide to Birds of Western North America**, Sibley. An indispensable resource for birders seeking an authoritative and portable guide to the birds of the west. 474 pages PB \$19.95

**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 \$7.95

**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 \$12.95

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

**Mojave Desert Wildflowers**, Stewart. Presents a condensed view of the nearly 2,000 species of plants known to occur throughout the Mojave Desert region. 210 pages PB \$14.95

**Poisonous Dwellers of the Desert**, Dodge. This classic provides accurate, useful information and debunks 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, two, and three day field classes on weekends from September to May. Each class examines a natural or cultural feature of the Mojave Desert and is geared to 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 \$10 discount on each Desert Institute class, as well as discounts on University of California Riverside Extension outdoor study courses. For information on becoming a Joshua Tree National Park Association member, call 760-367-5535.

**A CATALOGUE OF DESERT INSTITUTE CLASSES** is available at park visitor centers, or you may call 760-367-5535 and request one by mail. An on-line class catalogue is available on our website: [www.joshuatree.org](http://www.joshuatree.org).

#### 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](http://www.joshuatree.org).

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: \$7.00 for first item, each add'l. item \$0.50.  
Foreign airmail: actual cost plus handling.



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# Elemental Things: Air Quality in Joshua Tree National Park

*It is only with the heart that one can see rightly. What is essential is invisible to the eyes.*

~*The Little Prince*, by Antoine de Saint-Exupéry

Many visitors are drawn to Joshua Tree National Park because they want to experience its clear air, deep, panoramic views, and the famously dark, cloudless night skies that allow a glimpse into the universe beyond our planet. Sadly, this apparent clarity obscures another story: what is invisible is not always pristine. And the clarity sought by many is not always present in our skies. Once, this part of the Mojave Desert was a refuge for veterans of World War I who were recuperating from the effects of exposure to mustard gas. In the 1920s, Dr. James Luckie promoted the Twentynine Palms area because of its clean, dry air. Much has changed since that era.

Joshua Tree National Park's air quality is continuously monitored by National Park Service scientists and what they are finding is not good news. Due to its proximity to the greater Los Angeles and San Bernardino metropolitan areas, our park has some of the worst air quality in the National Park System. The park is situated downwind from various sources of pollution: vehicle emissions, bustling ports, power-generating plants, and manufacturing. Joshua Tree National Park's air, water, soil, flora, and fauna are being affected by chemical reactions related to these human activities. Some of the effects are visible; others are not.

## Ozone Levels

Ozone is an invisible, odorless, tasteless gas that occurs naturally in the Earth's atmosphere. Ninety percent of this ozone is found 10-30 miles above the Earth's surface in what is called the stratosphere. There, it forms a protective layer that absorbs a large amount of the sun's ultraviolet light, thus shielding organisms from potential damage. Closer to the surface, however, ozone does not play a protective role. From the surface to 5-10 miles beyond, it is naturally rare: normally there are about three ozone molecules to every ten million molecules of air. When the number of ozone molecules increases, the air contains more "surface ozone" and an imbalance exists that can damage living systems.

The main source of ozone-forming components is vehicle emissions. Prevailing winds transport these chemical components eastward to the desert where they are heated and exposed to ultraviolet radiation, react, and form ozone. During the cooler evening hours, the ozone lies at the lower elevations in the Coachella Valley south of the park. During the morning hours, the ozone rises from the valley floor due to convective heat. In the afternoon hours, the hot air mass is pulled toward the cooler, higher elevations of the park. The process of ozone production and transport continues on a daily basis during the summer months. At levels beyond 65-85 parts per billion (ppb), surface ozone may present a health risk to humans. Because inhaling elevated levels of ozone may damage the lungs, it is recommended that people—especially children, the elderly, and anyone with a respiratory ailment—limit their outdoor activities when there is an increase in surface ozone. This information is posted at the Oasis Visitor Center in Twentynine Palms and is updated daily.

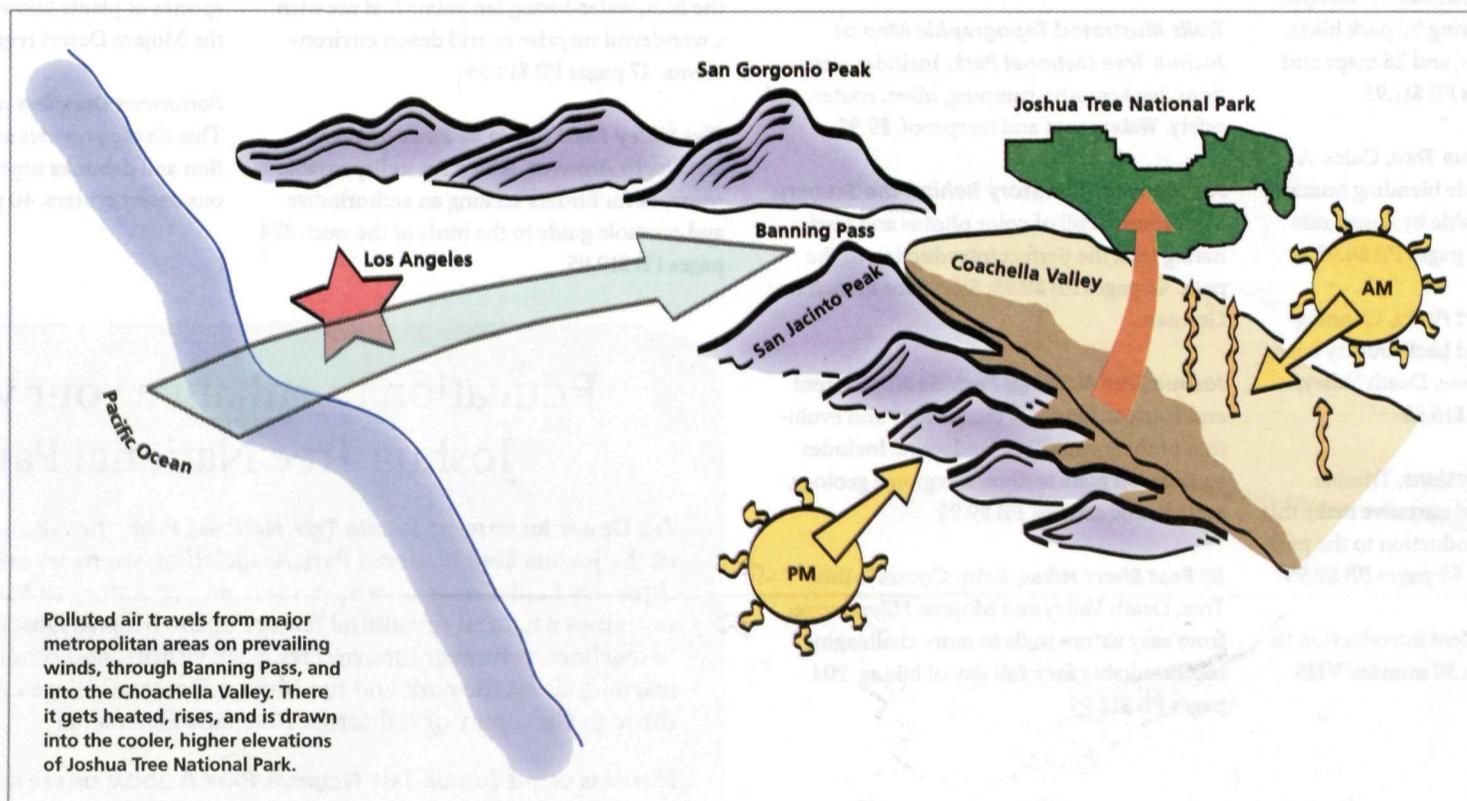
## Diminishing Visibility

Surface ozone is just one of several air quality issues challenging the park. Another is diminishing visibility, which could cause the Little Prince to reconsider his essentialist philosophy: sulfates and nitrates, along with ozone, drift in from the west and these tiny particles create photochemical air pollution, or smog. It was once fairly common to see Signal Mountain, 90 miles away in Mexico, from the vista point at Keys View. Today, especially during the summer months, it is often shrouded in smog. Visibility throughout the park has been impaired due to poor air quality. You can see the current view from Belle Mountain looking southeast, via a webcam, at [www.nps.gov/jotr](http://www.nps.gov/jotr). Look for the "weather webcam" link on the left side of the home page.

## Increasing Nitrogen

Another issue that concerns park scientists is the increase in nitrogen being deposited on the park's soils. Plants need nitrogen to grow and higher nitrogen

levels means a proliferation of some species of plants. Desert plants, however, are adapted to low-nitrogen soils and non-native invasive grasses are benefiting more from this chemical imbalance than are the native plants. What this translates into is a complex change in the distribution of vegetation in the park and an increase in the occurrence of wildfires. Cheatgrass, red brome, and other non-native invasive



grasses now grow where open space once separated the Joshua trees, black brush, junipers, and pinyon pines. Where lightning might have struck and burned a single plant, grass now also ignites and carries the fire to other vegetation. Once aflame, the grass fuels the wildfire and it spreads rapidly. There has been a significant increase in the frequency and breadth of wildfires in the park. Fire ecologists and other park scientists have not yet come up with a solution to this vexing problem.

## Clear Night Skies

On a brighter note, if you have never seen the Milky Way Galaxy, then come out to Joshua Tree National Park on a moonless night. The Milky Way is still visible, thanks to the clear night skies that remain relatively unsullied by haze or light pollution from neighboring communities. Every month, a star party sponsored by the Andromeda Society is held at the Hidden Valley picnic area. Amateur astronomers set up their telescopes and the public is invited to view some of the celestial objects still visible in the desert sky: our neighboring planets, nebulae, distant galaxies, and the craters of the moon. In order to retain this inspiring resource the park is working with the surrounding communities to ensure that light pollution does not drown out the darkness.

It is unlikely that the Little Prince's friend, the fox, was thinking of air quality when he reflected on the significance of the invisible, but his observation might inspire us to look beyond the obvious. Reliable air monitoring data shows us that we can no longer boast about our clear skies and clean air—there is more to the picture than meets the eye. We hope that our new awareness will allow us all to adjust to the emerging picture and make choices that will keep us safe and leave the park's resources unimpaired for the enjoyment of future generations.

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