



Joshua Tree Guide

A planning guide for visitors
to Joshua Tree National Park

Fall 2008

Planning Your Fall Visit

Entrance Fees

The park entrance fee is \$15 per vehicle. It is good for seven days. The cost of a Joshua Tree annual pass is \$30. If you plan to visit several parks or other federal lands this year, an interagency annual pass is available for \$80.

Campgrounds

Black Rock, Cottonwood, and Indian Cove campsites are \$15 per night; Belle, Hidden Valley, Jumbo Rocks, Ryan, and White Tank campsites cost \$10 per night. Reservations are available for Black Rock and Indian Cove and for all group sites. See page four for additional information.

Fall Weather

When we hear "desert," we often think "hot." That is not always the case however. Joshua Tree's fall and winter temperatures can be quite chilly, especially after the sun sets or on a windy day. So don't forget to bring your jacket, even for a day trip. And, if you will be attending an evening program or camping, you will want to have additional warm clothing to layer on, including gloves and a hat. A graph of the average monthly temperatures is located on page nine.

Ranger Programs

Ranger-guided walks, talks, and evening programs are a good way to increase your appreciation of the plants, animals, and natural and cultural features of Joshua Tree National Park. Weekly schedules are available at entrance stations and visitor centers and are posted on campground bulletin boards. We also post them on our website: www.nps.gov/jotr.

For Kids

Kids, stop at an entrance station or visitor center and pick up

a Junior Ranger booklet. Complete the activities inside and return it to a ranger at an entrance station or visitor center. When you've finished, you'll receive a Joshua Tree Junior Ranger badge.

Keys View

This popular destination, perched on the crest of the Little San Bernardino Mountains, provides panoramic views of the Coachella Valley and is well worth the 20-minute drive from Park Boulevard down Keys View Road. The lookout is wheelchair accessible, or take the .2-mile-loop trail up the ridge for especially nice views.



Datura wrightii, western Jimson-weed, spread to California's deserts from more coastal locations. Its huge (20 cm) white trumpet-shaped flowers are a common feature in Joshua Tree, where it grows to over one meter and has large, dense, dark grayish-green leaves.

IN THIS ISSUE

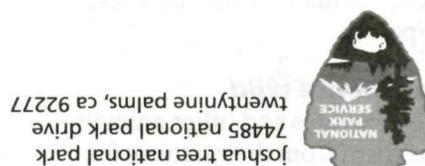
Information	2
Bats	3
Cryptobiotic Soil	3
Campgrounds	4
What To See And Do	4
Backcountry Roads	4
Backcountry Camping, Hiking, & Horseback Riding	5
Black Rock Canyon	5
Park Map	6
Self-guiding Trails	7
Hiking Trails	7
Desert Fan Palm Oases	8
Cottonwood Spring	8
Weather	9
Star Gazing	9
Rock Formations	9
Joshua Trees	10
Publications & Classes	11
Tarantulas	12
Cholla Cactus	12

VISITOR CENTER HOURS

Oasis	8 a.m. – 5 p.m.
Joshua Tree	8 a.m. – 5 p.m.
Cottonwood	9 a.m. – 3 p.m.
Black Rock	October – May
Daily (except Fridays)	8 a.m. – 4 p.m.
Fridays	Noon – 8 p.m.

EMERGENCIES

Call 909-383-5651 or dial 911 or contact a park ranger. Cell phone coverage in the park is spotty.



Important information

accessibility

The nature trails at Bajada, Cap Rock, and the Oasis of Mara are accessible. Keys View is accessible and Site 122 at Jumbo Rocks Campground is wheelchair accessible.

all terrain vehicles

ATVs may not be used in the park.

bicycling

Bicycling is permitted on public roads, both paved and dirt, but not on trails. There are no bicycle paths and many roads are narrow, so ride cautiously.

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 ranger station in Indian Cove and at Intersection Rock.

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 \$15 per vehicle and is good for seven consecutive days. A Joshua Tree Pass may be purchased for \$30 and a Federal Lands Pass, which is good for all federal recreation sites, costs \$80. Both are good for 12 months. A Senior 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 contact information is 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 publication 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 and other animals weans them from their natural food supplies and turns normally shy creatures into aggressive ones as they lose

their fear of humans. It is also illegal!

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, upsets delicate drainage patterns, compacts the soil, and leaves visual scars for years. Plants are crushed and uprooted. Wildlife shelters are destroyed, and food and water supplies are altered or obliterated.

overnight parking

There is no overflow parking in the park, at visitor centers, or park headquarters. Unattended vehicles may not be parked outside of campgrounds and backcountry boards between 10 p.m. and 6 a.m.

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.

Climbers may not initiate or terminate a climb in an occupied campsite without permission of the occupants.

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 just one rock or one plant, 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. Schedules are available at visitor centers, at entrance stations, and on campground bulletin boards.

visitor centers

The Oasis Visitor Center is located in Twentynine Palms and is open 8 a.m. to 5 p.m. The Joshua Tree Visitor Center, located in Joshua Tree Village, is also open 8 a.m. to 5 p.m. The Cottonwood Visitor Center serves the southern entrance to the park and is open from 9 a.m. to 3 p.m. and Black Rock Nature Center, located in Black Rock Campground, is open October through May.

wildflowers

Spring blooming periods vary with elevation, temperature, and the amount of moisture in the soil. You can get current information on the park website: www.nps.gov/jotr.

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. We are adding more information all the time.

you are responsible

You are responsible for knowing and obeying park rules. Check at visitor centers, at entrance stations, on bulletin boards, and on the park website: www.nps.gov/jotr to find out what they are. When in doubt, ask a ranger.

EARTH'S ONLY FLYING MAMMAL

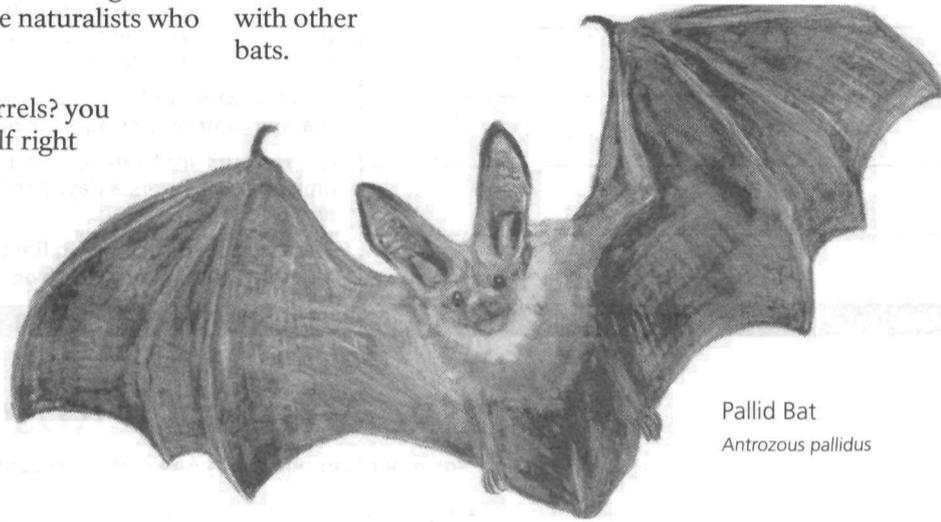
Here in the California deserts there are more than a dozen species of bat—Earth's only flying mammal. This oft-misunderstood animal has existed for approximately 55 million years, an estimate derived from the discovery of *Icaronycteris*, a fossil bat. Over that unimaginable period of time, bats have evolved a stunning array of adaptations that continue to dazzle the biologists who study them and the naturalists who observe them.

What about flying squirrels? you might be asking yourself right now. Aren't they mammals? Aren't they also able to fly? The answer is yes, squirrels certainly are mammals, and some species are able to soar. But no, those that glide are not equipped with wings that allow them to ascend—so it cannot be said that they are truly capable of flight.

There are almost 1,000 species of bat on Earth! They range from the palm-sized bumblebee bat weighing less than a penny, to the flying foxes of Asia, which boast an average three-foot wingspan.

Bats demonstrate surprising diversity in their diets. Most of our desert bats are insectivorous, gobbling up thousands of moths, mosquitoes and beetles during their nightly forages. Tropical bats, however, might subsist on a diet of fruit, nectar, pollen, or even frogs!

The pallid bat of the southwestern deserts favors an odd delicacy: scorpions. Apparently, pallid bats are immune to scorpion venom, so their culinary preferences help to keep that arachnid's populations in check without harming the bats. Bats whose diet consists of animal prey use echolocation to hunt, navigate and avoid collision with other bats.



Pallid Bat
Antrozous pallidus

Scientists are only beginning to decipher the banks of acoustic signatures, or bat calls they have collected, and it is often difficult to distinguish one bat's sounds from another, or one type of communication from another. The same species of bat, for example, might echolocate at different frequencies depending on whether it is looking for prey, engaged in a feeding frenzy, looking for a mate, or warning others of danger.

When we think of bats, we may picture millions of them emerging from a cave at sunset. Most of our local bats,

however, do not occur in such large numbers—nor do they inhabit caves. In general, bats choose dark, quiet, undisturbed places as their homes: caves, rock crevices, trees, abandoned buildings, abandoned mines, bridges and tunnels. Those that live here in the desert usually squeeze themselves inside a rock crevice, or perhaps roost in an abandoned mine. If they are disturbed while hibernating, bats may burn up their stored energy supplies and perish before the weather permits them to go out hunting again, so it is important to leave bats alone.

Most bats hang upside down when they roost, using their sharp curved claws to cling to roosting surfaces. How then, do they manage to nurse their young—or, for that matter, eliminate waste—without spilling, soiling themselves, or getting a headache? Several strategies help them stay dry and clear-headed: a system of valves controls the flow of blood; nursing is conducted through a kind of gravity-feed system; and a quick arch of the back at the appropriate moment keeps the bat's fur clean and silky. Bat biologists believe that their unique roosting posture and the ability to squeeze into narrow spaces have given bats an advantage by allowing them to

avoid competing with other animals for more conventional types of habitat.

Mother bats have a remarkably well-tuned reproductive system: they are able to re-absorb their embryo if the upcoming season looks unpromising due to a lack of sufficient food and water for their young. In addition, the development of the fetus can be delayed or sped up depending upon the maternity roost's temperature. Once they are born, the juveniles must develop enough fat in their first year to survive hibernation or migration, and they must learn to fly! No wonder nature has provided so many options in the bat's reproductive process!

As a family, bats are impressively diverse animals. They are found on every continent except Antarctica. Sadly, bats are often misunderstood, and their numbers are dwindling due to loss of habitat and misguided "pest control" programs. If you see a bat, please leave it alone. If it is lying on the ground, do not touch it: that is not normal behavior for a bat, and it may be ill. Here at Joshua Tree National Park all bat species are protected. Look for them at dawn or dusk in desert washes, which make up 80 to 90 percent of their foraging territory. Enjoy them, but respect them—they remain, in spite of their timid nature, wild animals.

Author: Park Ranger Caryn Davidson
Illustration from a painting by Andrea Peyton

Desert Glue

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 hiker.

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



Cryptobiotic crusts

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!

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.

Campgrounds	Elevation	Sites	Group Fee	Group Sites	Horse Camp Fee	Water	Flush Toilets	Chemical Toilets	Tables	Fire Grates	Dump Station
Belle	3800'	18	\$10					*	*	*	
Black Rock	4000'	100	\$15		\$15	*	*		*	*	*
Cottonwood	3000'	62	\$15	3	\$30	*	*		*	*	*
Hidden Valley	4200'	45	\$10					*	*	*	
Indian Cove	3200'	101	\$15	13	\$25/40			*	*	*	
Jumbo Rocks	4400'	125	\$10					*	*	*	
Ryan	4300'	31	\$10		\$10			*	*	*	
Sheep Pass	4500'			6	\$25/40			*	*	*	
White Tank	3800'	15	\$10					*	*	*	

Campsites are limited to six people, three tents, and two cars. Group sites accommodate ten to 60 people.

Obtain reservations up to six months in advance for sites at Black Rock, Indian Cove, and all group sites by calling 1-877-444-6777. 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 Keys 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 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 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 maps at the backcountry boards) and make certain to camp outside their boundaries.

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 a dump station are also available. For horse owners, a separate area is provided for camping or for 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 you plan a hike or other activity. Maps, books, nature guides, and children's activity books may be purchased there.

The hills behind the campground offer a variety of hiking

Washes may seem like 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 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 additional information be mailed to you.

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 Geronio. 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 could become aggressive and harm 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/

Mailing Address

74485 National Park Drive
Twentynine Palms, CA 92277

E-mail

jotr_info@nps.gov

Fax Number

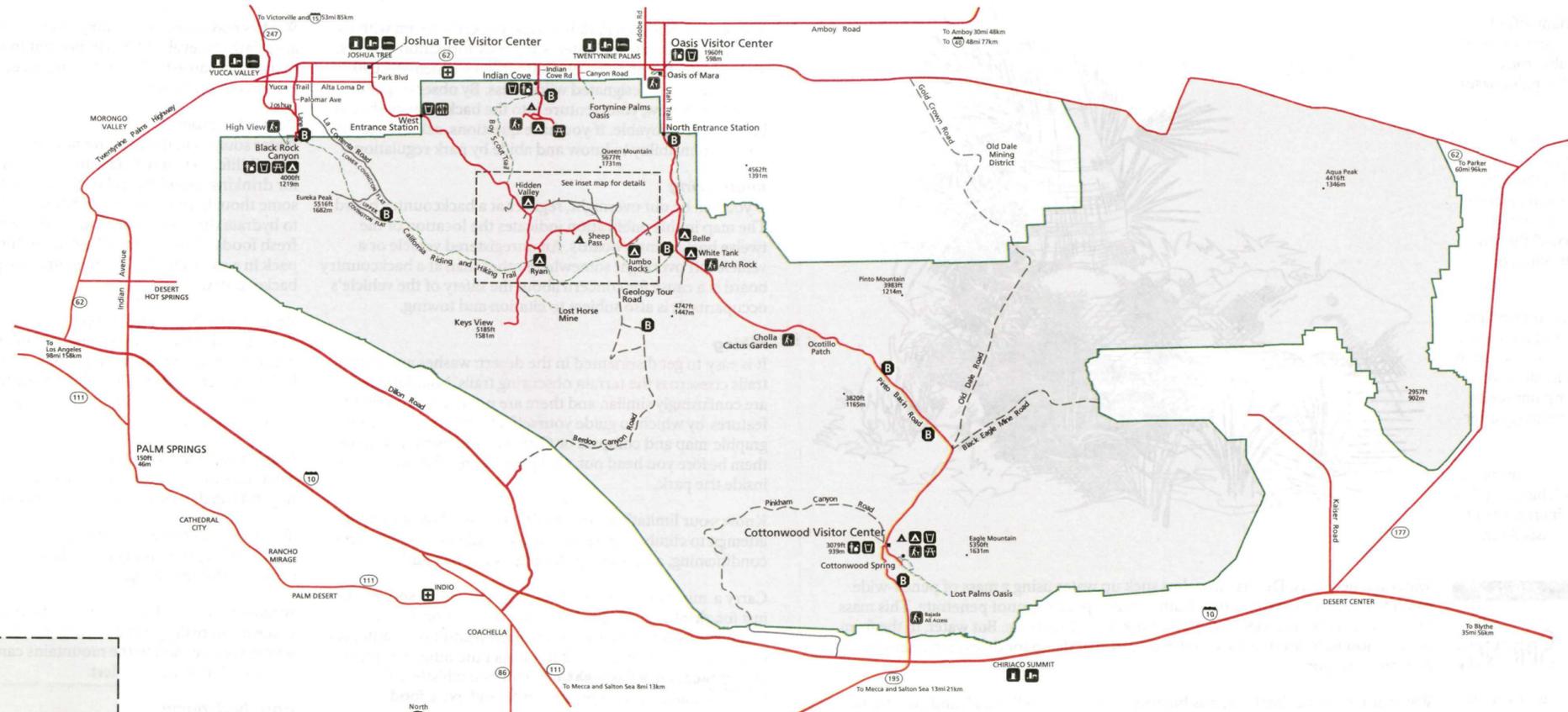
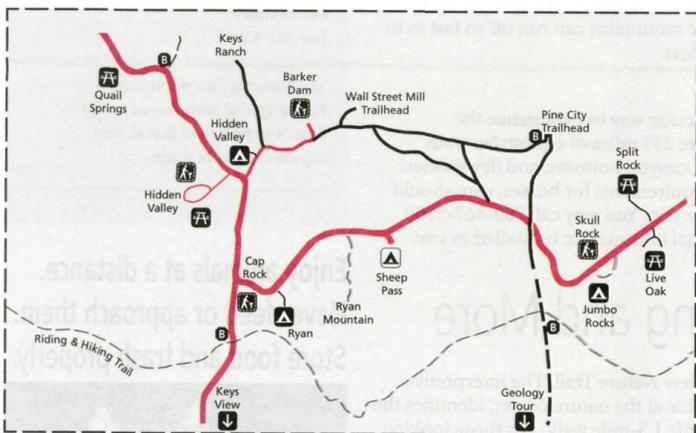
760-367-6392

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

Enjoy animals at a distance.
Never feed or approach them.
Store food and trash properly.



How Far Is It?	Oasis VC	Cottonwood VC	Joshua Tree VC
Belle Campground	9	28	28
Black Rock Canyon	25	65	9
Cap Rock/Keys View Road	19	40	16
Cholla Cactus Garden	18	20	36
Cottonwood Spring	38	0	56
Geology Tour Road	13	35	21
Hidden Valley	20	42	14
Indian Cove	10	48	8
Interstate 10	45	7	63
Jumbo Rocks Campground	12	34	23
Keys Ranch Tour	22	44	16
Keys View	24	45	21
Oasis of Mara	0	38	34
Pinto Basin Road/Park Blvd.	8	30	26
Ryan Campground	18	39	16
Sheep Pass Campground	16	37	19
White Tank Campground	11	27	29



North

0 5 Kilometers
0 5 Miles

- Unpaved road
- 4-wheel-drive road
- Hiking trail
- Ranger station
- Picnic area
- Medical facility
- Interpretive trail
- Campground
- Group Campground (reservations required)
- Restrooms
- Backcountry board
- Drinking water

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.



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	7.2 miles (11.6 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.

Area Information

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

- Indio**
82-921 Indio Blvd.
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

Ranger Programs

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

Pick up a current schedule at an entrance station or visitor center; or look on campground bulletin boards. We also publish program schedules on our website: www.nps.gov/jotr.

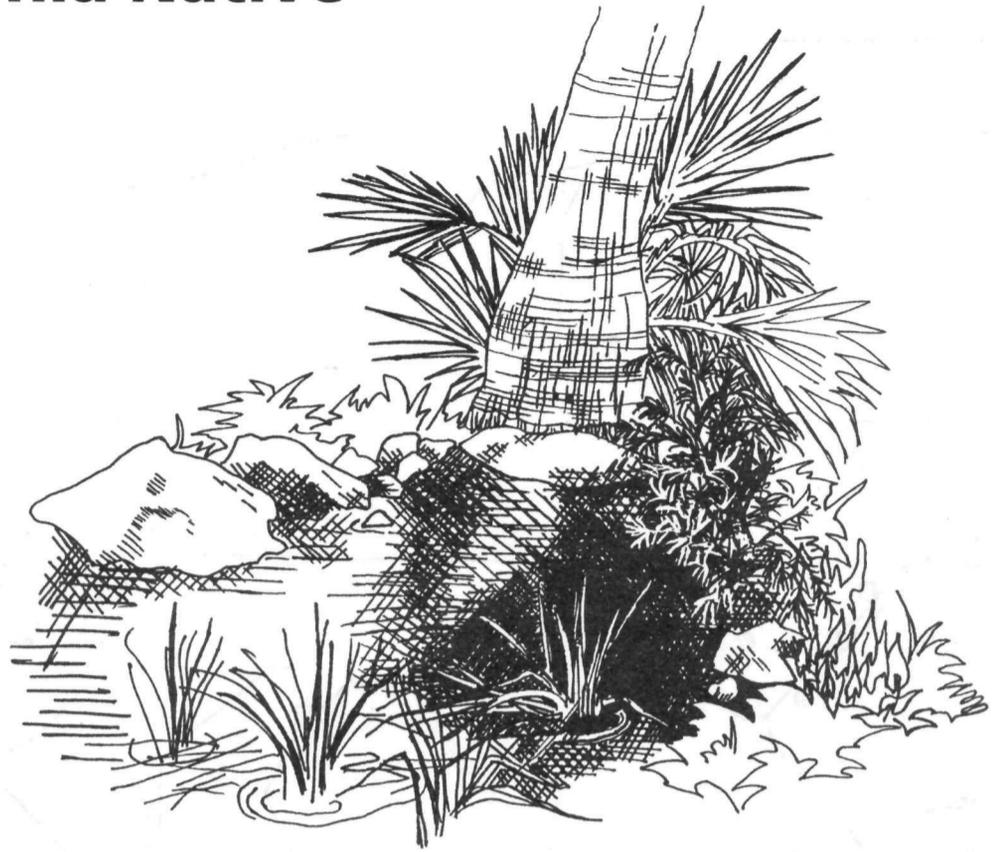
The Desert Fan Palm: A California Native

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.



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.

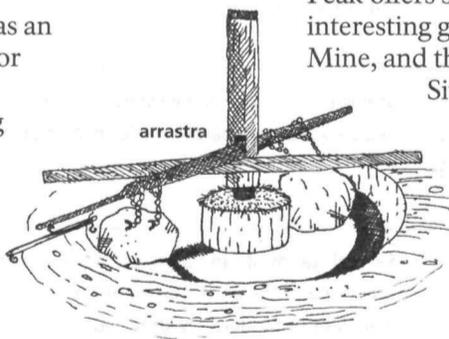
Cottonwood Spring was an important water stop for prospectors, miners, and teamsters traveling from Mecca to mines in the north. Water was necessary for gold processing, so a number of gold mills were located here. The remains of an arrastra, a primitive type of gold mill, can be found near the spring,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

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 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.

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.



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?

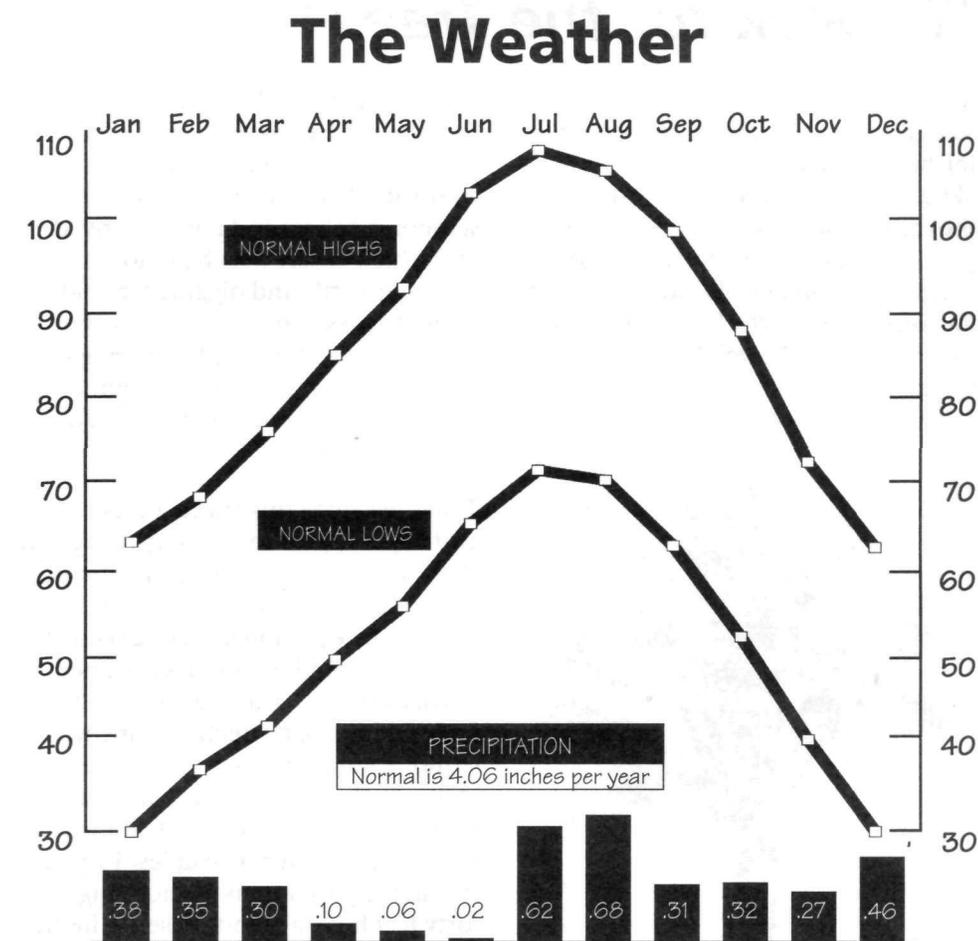
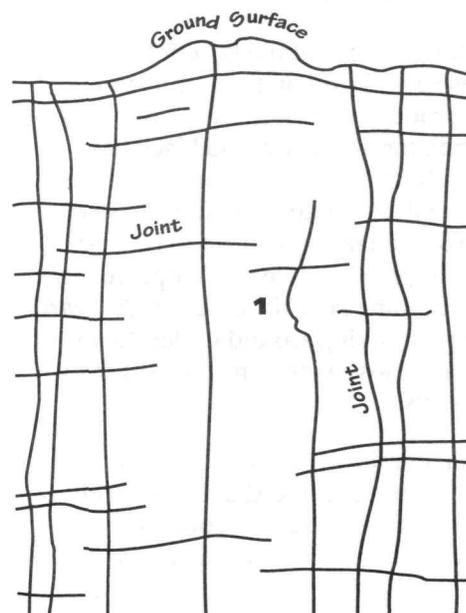
Geologists believe the face of our modern landscape was born more than 100 million years ago. Molten liquid, heated by the continuous movement of Earth's crust, oozed upward and cooled while still below the surface of the overlying rock. These plutonic intrusions are a granitic rock called monzogranite.

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



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.

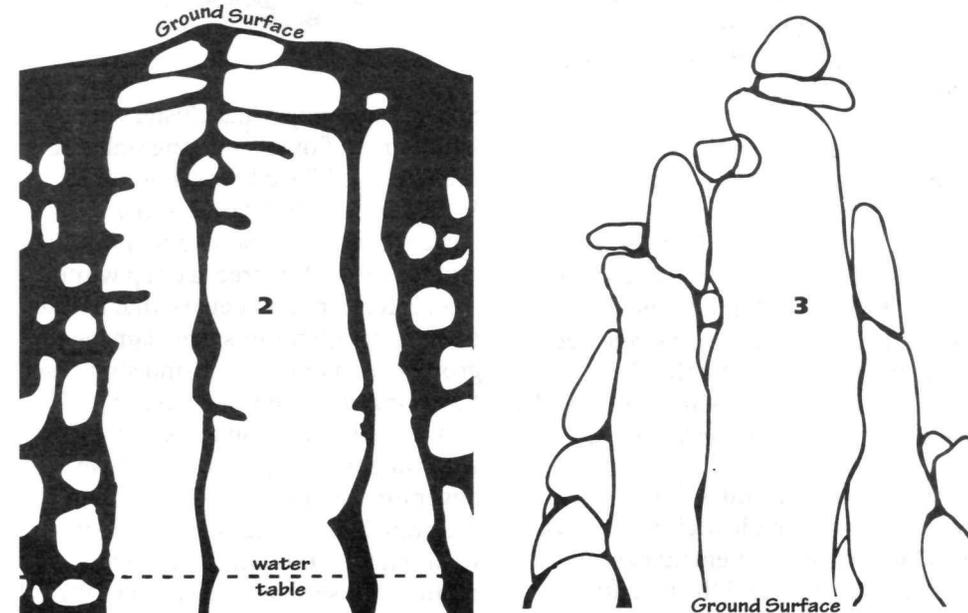
away the protective ground surface. As they were exposed, the huge eroded boulders settled one on top of another, creating those impressive rock piles we see today. (figure 3)

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.



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

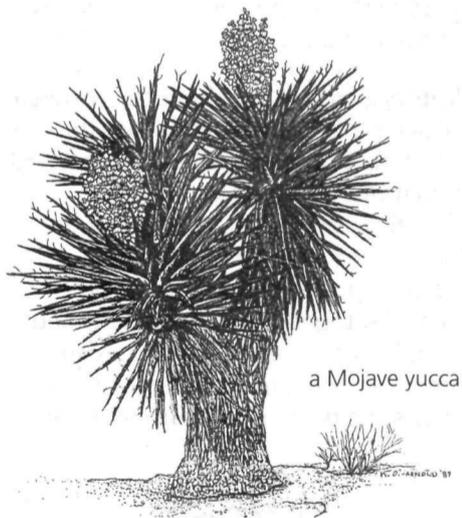
Surrounded by twisted, spiky trees straight out of a Dr. Seuss book, you might begin to question your map. Where are we anyway? In wonder, the traveler pulls over for a snapshot of this prickly oddity; the naturalist reaches for a botanical guide to explain this vegetative spectacle; and the rock climber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



a Joshua tree

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, and 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.



a Mojave yucca

Spring rains may bring clusters of 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.

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 "hunvat 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

Ladder-backed Woodpecker

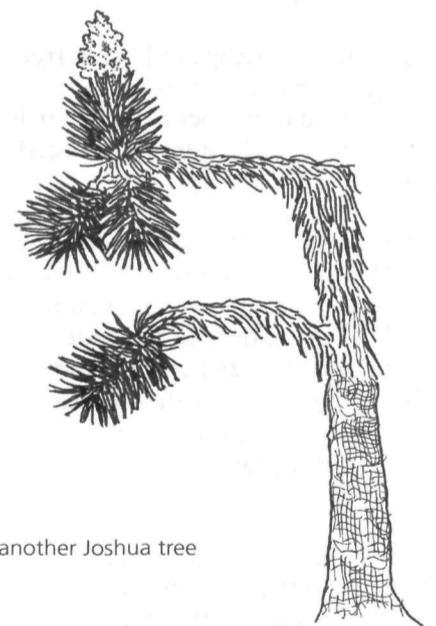
Family	Picidae
Genus	<i>Picoides</i>
Species	<i>scalaris</i>
Description	black back with white bands, streaked breast; males have a red cap; 13-inch wingspan; length: 7.25 inches
Voice	hammering or drumming sound made by pecking on tree trunks
Food	insects retrieved from wood
Life History	native, year-round resident; clutch size is 4 to 8
Habitat	Joshua tree forest; pinyon-oak and juniper woodlands
Status	fairly common
Where to look	Black Rock Canyon, Covington Flats, Juniper Flats, Lost Horse Valley
Notes:	This woodpecker's stiff tail is used as a prop as it "drums" with its beak on trees looking for food. Larger holes in tree trunks serve as nesting areas.



The moth collects pollen while laying her eggs 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



another Joshua tree

Mojave Desert ecosystem, providing habitat for numerous birds, mammals, insects, and 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 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 phone: 760-367-5539, or on the web at www.joshuatree.org. Or, stop by a visitor center bookstore. They are located in Joshua Tree, Twentynine Palms, and Cottonwood.

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

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.

On Foot in Joshua Tree, Furbush. A comprehensive hiking guide featuring 90 park hikes, 40 photos and illustrations, and 26 maps and reference charts. 173 pages PB \$14.95

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

Joshua Tree The Complete Guide, Kaiser. Filled with invaluable tips, maps, and trail descriptions to help you make the most of your time in Joshua Tree. 207 pages PB \$19.99

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

Desert Bighorn Sheep, Towell. The park's largest mammal is described in this 56 page book that includes 30 color photographs. PB \$9.95

The Easy Bird Guide, Western Region, Bull. A full-featured and colorful Falcon Guide for quick identification. 153 pages PB \$14.95

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

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

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

The Desert Tortoise, Cornett. Answers all questions commonly asked about longevity, reproduction, and where and how desert tortoises live. 32 pages PB \$7.95

Wildflowers of Joshua Tree National Park. Fifty-eight color photos of blooming wildflowers, shrubs, and cacti taken by park staff provide a handy reference for visitors. \$1.99



74485 National Park Drive
Twentynine Palms, CA 92277
voice: (760) 367-5525
fax: (760) 367-5583
www.joshuatree.org

Education to enhance your visit to Joshua Tree National Park

THE DESERT INSTITUTE AT JOSHUA TREE NATIONAL PARK 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 or Colorado Desert and is geared to teachers, volunteer interpreters, park visitors, and others interested in learning about the park and its deserts. College credit is available through University of California Riverside Extension for course titles followed by an asterisk (*). Course fees vary from \$45 to \$200.

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 760-367-5525.

ADDITIONAL INFORMATION ABOUT CLASSES OFFERED THIS FALL IS AVAILABLE ONLINE AT: www.joshuatree.org. You may register online or by telephone: 760-367-5535, fax: 760-367-5583, or e-mail: desertinstitute@zipnet.net.

Fall 2008 Class Schedule

Discover the Milky Way	Sept 27
Native American Pottery	Oct 4 & 12
Desert Snakes: Evolution & Ecology	Oct 5
Live Oak Inspired Monotypes	Oct 11
Native Plant Gardening	Oct 11
Night Photography	Oct 12
Biological Soil Crusts of Joshua Tree National Park	Oct 18
Native Californian Basket Weaving	Oct 18 & 19
Archeology of Joshua Tree National Park*	Oct 25 & 26
Edible Plants of the Desert	Oct 25 & 26
Painting the Joshua Tree	Nov 1
Literature of the California Desert Tribes*	Nov 1 & 2
Insects of the Desert*	Nov 2
Photographing the Joshua Tree Landscape	Nov 7 & 8
Geology: Creation of the Joshua Tree Landscape*	Nov 8 & 9
Explore a Desert Spring	Nov 9
Depression-Era Mining in Joshua Tree National Park	Nov 14 & 15
Native Californian Pigments & Paints	Nov 15
Discover the Hexie Mine Group	Nov 16
Watercolor Painting in the Park	Nov 16
Basic Map & Compass	Nov 21 & 22
Mystery of the Wonderland of Rocks	Nov 22
Advanced Map & Compass	Nov 23
Basic Desert Survival	Nov 23
Advanced Wilderness Navigation	Nov 30
Journey to Cary's Castle—Session 1	Dec 6
Journey to Cary's Castle—Session 2	Dec 7
Geology of the San Andreas Fault	Dec 7
Indigenous People of Joshua Tree National Park*	Dec 13 & 14

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 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 Mike Cipra

Cholla Is Pronounced "Choy-a"

OUCH! is often the greeting given by a visitor upon first encountering a cholla cactus plant. Cholla are shrubby cacti of the genus *Cylindropuntia*. They possess cylindrical stems composed of segmented joints that store water, carry on photosynthesis, and produce flowers.

Like most cacti, cholla have small, wart-like projections on their stems, called tubercles, from which sharp spines grow. The spines are actually modified leaves, more used to shade the stems than for protection. Papery sheaths that are often bright and shiny cover the spines and contribute to the cactus' over-all appearance.

Cholla require the coarse, well-drained soil of dry, rocky flats or slopes. Four species are widely distributed in Joshua Tree.

Teddy-Bear Cholla

The teddy-bear cholla (*Cylindropuntia bigelovii*) has the reputation of being the most formidable. Not only do its long, thin spines readily penetrate clothing, shoes, and flesh, but the tip of each spine is armed with tiny curved barbs that assure it remains anchored.

This species is sometimes called the "jumping cholla" because the joints appear to jump off the plant even if they are barely touched. The detached joints readily generate new plants by rooting and branching. Since the fruits rarely contain viable seeds, this species reproduces almost entirely by this asexual process, and dense stands of cloned cholla can form large gardens, such as the popular Cholla Cactus Garden.

The segments are usually tightly clustered near the top of the plant and the trunk is dark brown or black. It rarely grows above 3,000 feet in elevation.

Pencil Cholla

The pencil cholla (*Cylindropuntia ramosissima*) has stems that are only slightly larger in diameter than a pencil—hence its name. These slender joints are usually marked with diamond or heart shaped figures which give rise to the long yellow-sheathed spines, which are single instead of in

clusters as in the teddy-bear cholla. Pencil chollas can be found up to 4,500 feet in elevation.

Silver Cholla

The silver cholla (*Cylindropuntia echinocarpa*) grows on the slopes of our highest peaks, and is probably the most widespread species in the park. When back-lit by the sun, the spiny clusters take on a silvery or golden glow.

Buckhorn Cholla

The buckhorn cholla (*Cylindropuntia acanthocarpa*) is most common in the eastern half of the park. It is a much-branched, long-stemmed cactus. The tubercles bear eight to 25 spines, each less than an inch long.

Cholla flowers are mostly yellow or green, with reddish tinges in some species. Some have fleshy fruits, others have dry capsule-like fruits.

Chollas provide shelter for numerous animals. Wood rats, also known as packrats (*Neotoma spp.*), use cholla segments to build their nests, which provide good protection from coyotes and bobcats, but not from snakes. Rattlesnakes sometimes take up residence in such nests, usually after eating or evicting the rats. Cactus wrens prefer to build their nests among the stems of teddy bear or silver cholla.

The flower buds of some chollas were eaten by desert tribes. After rolling the buds on a rock with sticks to remove the spines, they would pit-roast them for a day. Afterwards the buds could be eaten immediately or dried and pickled for later consumption.

Dead, but still very potent, cholla segments are common along many park trails—another reason for not wearing sandals when hiking in the desert. Being impaled by a cholla leaves a lasting impression. The easiest way to remove a cholla

joint is to place a comb between it and your skin and quickly jerk it away. Because of the barbs it may take considerable force to dislodge it and the joint may fly several feet. Make sure none of your companions are in the line of fire!

by Harold De Lisle, Ph.D.



Blooming teddy-bear cholla