Planning Your Summer Visit

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. Black Rock, Cottonwood, and Indian Cove campsites are $15 per night and Belle, Hidden Valley, Jumbo Rocks, Ryan, and White Tank campsites cost $10 per night. Reservations are not needed during the summer.

During the off-season months of summer, Belle, Ryan, and White Tank campgrounds will be closed. Black Rock, Cottonwood, and Indian Cove will be partially closed, and Hidden Valley, Jumbo Rocks, and Sheep Pass will remain fully open.

Due to construction, Keys View Road will be closed Monday through Friday until the end of September, 2007. The road will be open for visitor traffic on weekends and federal holidays. See page 3 for a map of the closed area.

Summer temperatures can be hot, over 100°F (38°C) during the day and not cooling much below 75°F (24°C) until the early hours of the morning, so come prepared with a hat, sunscreen, and lots of water to drink. We recommend at least one gallon per person, per day, more if you will be hiking or biking. For advice about summer hiking, see page 3.

Joshua Tree's five fan palm oases offer shade and cooler temperatures on those hot, sunny afternoons of summer. Oases are also good places to view wildlife, especially birds. For more information about desert fan palm oases, see the article on page 8.

Snakes and other reptiles are most often seen during mornings and evenings when the sun isn’t too intense. Do be aware of where you put your hands, your feet, and your seat. If you encounter a snake, stop then slowly back away. If your party includes small children or a pet, watch them closely.

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're finished, you'll receive a Joshua Tree Junior Ranger badge.
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 campground and in picnics where fire grates are provided. Campfires are not allowed in the backcountry. Collecting vegetation, living or dead, is prohibited, so bring firewood.

climbing
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.

deforestation
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, including 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. Entances to the park are located off CA HWY 62 (Twenty Nine Palms Highway), at the towns of Joshua Tree and Twenty Nine Palms. A third entrance is located about 25 miles east of Indio off I-10.

horses
Horsback 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, squirrels, and other animals weakens them from their natural food supplies, causes overpopulation, and turns them into aggressive creatures 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 Twenty Nine 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 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 near Twenty Nine 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.
Summer Desert Hiking

Joshua Tree National Park offers hiking opportunities even in summer's hottest months. The key to a pleasant experience is anticipating your body's requirements during a hike and being prepared before you set out.

On average, we perspire up to a quart of liquid an hour when exercising in a hot environment. Low humidity promotes rapid evaporation of perspiration, which adds to our comfort but also makes it easy to overlook how much fluid we are losing.

When our bodies are hard at work eliminating the excess heat that is being generated through exercise, we may not realize that we are thirsty until we have begun to dehydrate. Early stages of dehydration are characterized by dizziness and an increasingly severe headache and can progress to heat exhaustion, which is characterized by nausea, vomiting, and diarrhea.

Hikers who are not drinking enough are invariably not eating either. Not eating denies the body the energy it needs to effectively eliminate excess heat and to continue exercising.

**Hike Smart**

Just as desert residents, both human and animal, are most active in the mornings and evenings, plan your hike to start early so that you will be off the trail before the hottest hours of the day. Or, wait until the sun sets to enjoy an early evening hike.

Wear a hat and apply sunscreen prior to and during your hike. A sunburn can hinder your body's efforts to manage and eliminate heat.

**Bring Food and Water**

Most people need at least a quart of water an hour while hiking in heat. Some "sports" drinks replace a small percentage of the electrolytes that are lost during perspiration and provide sugars and calories, but they often don't taste good when warm so don't rely exclusively on them. Avoid anything that will increase dehydration, such as alcohol and caffeine.

When exercising in a hot environment, food requirements increase significantly. A rule of thumb is to carry double the amount of food that you would normally eat.

Bring easily digestible foods such as fruits and vegetables. Avoid high fat foods such as cheese and sausages, which are difficult to digest.

**Pay attention to your body**

You need to know how your body reacts to exercise and heat normally so that you can recognize what your body is telling you while you are hiking. Generally you should not wait until you are thirsty before drinking liquids, but you also don't want to drink excessively.

Watch your urine output. A typical hiker should be urinating every 1½ to two hours. If you are not, then either increase or decrease your fluid intake.

Make it a point to eat a small snack several times during your hike. If you feel weak, dizzy, or nauseous, stop hiking and find a shady place to rest. Eat and drink until your condition improves.

**Prepare in advance**

The terrain in Joshua Tree is rugged—deceptively so. Visitors typically underestimate the time required to complete a hike. Plan on your desert hike taking twice as long as a hike of similar distance and elevation gain in a cooler environment. For example, if you normally take an hour to hike a mile and a half, plan on spending two hours for that distance when hiking in summer's heat.

It is best to hike with others, but if you choose to go alone, be sure to discuss your plans with someone beforehand. Let them know where you will be hiking and what time you will return. And be sure to check in with them when you come out.

It is assumed that you will be outfitted appropriately with clothes and gear, as well as the "ten essentials." (If you are not familiar with the "ten essentials," then you need to consult a basic hiking guide.)

The trail, its features and major landmarks, should be familiar to each member of your party. Designate a meeting place and time in case you get separated. If you do get separated from your party, return to the meeting place and stay there, rather than searching for the rest of your group.

**Last but not least**

After returning from your hike, continue to monitor your food and water intake and your urine output. Staying hydrated will reduce some of the muscle soreness and cramping the following day.

Meeting the challenges of a summer desert hike will be a rewarding experience, if you are willing to exercise your intelligence as well as your body.

by Joshua Tree Protection Rangers

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**Road Closure**

As part of Joshua Tree National Park's ongoing effort to upgrade and rehabilitate its road system, Keys View Road, from the intersection with Park Boulevard (near Cap Rock) and Keys View overlook will be under construction this summer.

About five and one-half miles of roadway will be closed Monday through Friday from June 1 until the end of September, 2007. The road will be open for visitor traffic on weekends and federal holidays. Visitors are urged to obey posted speed limits in the construction zone and to follow all instructions from traffic control personnel.

The purpose of the construction activities is to rehabilitate aging park roads and eliminate unsafe road conditions. Highway repairs will also protect native park vegetation by preventing illegal off-road driving and reducing soil compaction from social trails.

The repairs will improve drainage along park roadways to control erosion and flash-flooding. Visitors will also enjoy wider, paved roadways with one-foot paved shoulders. Parking areas are being improved and new roadside curbing will better preserve native Joshua trees and desert wildlife habitat.
Joshua Tree has gained international attention as a superb rock-climbing area. During the gold mining era, a colorful part of the park's cultural history. 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 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 hike 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. A 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 humpy 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.

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<th>Campgrounds</th>
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<th>Sites</th>
<th>Fee</th>
<th>Group Sites</th>
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<th>Water</th>
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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 hike 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 humpy 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.

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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 hydration. 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. If you want to see the “singing” of coyotes living on the outskirts of the campground.

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.

Backcountry boards are a cause for concern about the safety of the vehicle's occupants. It is also subject to citation and towing.

Locating your camp
Your wilderness camp must be located one mile from the road and 500 feet from any trail. Make yourself aware of any day-use areas in the vicinity (they are indicated on the maps at the backcountry boards) and make certain to camp outside their boundaries.

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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 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 these 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.

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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.
**Area Information**

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

- **Joshua Tree**, CA 92252
  - www.indiochamber.org
  - indiochmbr@aol.com
  - Emergency: dial 909-383-5651

- **Joshua Tree**, CA 92252
  - www.indiochamber.org
  - indiochmbr@aol.com
  - Emergency: dial 909-383-5651

- **Palm Springs**, CA 92262
  - www.pschamber.org
  - PSChamber@worldnet.att.net
  - 760-366-3723

- **Twentynine Palms**, CA 92277
  - www.29chamber.com
  - chamber@yuccavalley.org
  - 760-325-1577

- **Yucca Valley**, CA 92284
  - www.yuccavalley.org
  - 760-365-6323

**Nature Trails**

- **Arch Rock Trail**
  - Mileage: 3-mile-loop (5 km)
  - Starting Point: White Tank Campground, opposite side of road.

- **Baja All-Access Trail**
  - Mileage: 25-mile-loop (40 km)
  - Access: 25-mile-loop (40 km) South of Cottonwood, one-half mile from the southern entrance to the park.

- **Barker Dam Trail**
  - Mileage: 1.5-mile-loop (2.4 km)
  - Starting Point: Barker Dam parking area.

- **Cap Rock Trail**
  - Mileage: 4-mile-loop (6.4 km)
  - Starting Point: Cap Rock parking area, at the junction of Park Blvd. and Keys View Road.

- **Cholla Cactus Garden Trail**
  - Mileage: 25-mile-loop (40 km)
  - Starting Point: Cottonwood Visitor Center.

- **Cottonwood Spring Trail**
  - Mileage: 1-mile-loop (1.6 km)
  - Starting Point: Cottonwood Spring parking area.

- **Hidden Valley Trail**
  - Mileage: 1-mile-loop (1.6 km)
  - Starting Point: Hidden Valley picnic area.

- **Hi-View Trail**
  - Mileage: 1.5-mile-loop (2.4 km)
  - Starting Point: Northwest of Black Rock Campground.

- **Indian Cove Trail**
  - Mileage: 6-mile-loop (9.6 km)
  - Starting Point: West end of Indian Cove Campground.

- **Keys View Trail**
  - Mileage: 2.5-mile-loop (4 km)
  - Starting Point: Keys View.

- **Lost Horse Trail**
  - Mileage: 4 miles (6.4 km)
  - Starting Point: North of Cottonwood Visitor Center, east of Quail Springs.

- **Lost Palms Oasis Trail**
  - Mileage: 7.2 miles (11.5 km)
  - Starting Point: Site of ten-stamp mill and foundations. Summit elevation: 578 feet (176 m). Moderately strenuous.

- **Mastodon Peak Trail**
  - Mileage: 3 miles (4.8 km)
  - Starting Point: Cottonwood Spring or Cottonwood Campground.
  - Description: Excellent views of the Eagle Mountains and Salton Sea. Summit elevation: 3271 feet (997 m). Moderate.

- **Ryan Mountain Trail**
  - Mileage: 3 miles (4.8 km)
  - Starting Point: Ryan Mountain parking area or Sheep Pass Campground.
  - Description: Excellent views of Lost Horse, Queen, and Pinyon Valley. Summit elevation: 5481 feet (1674 m). Moderately strenuous.

**Hiking Trails**

- **Boy Scout Trail**
  - Round-trip Mileage: 16 miles (25.8 km)
  - Time: 2-3 days
  - Starting Point: Indian Cove backcountry board or Key West backcountry board 0.5 mile (0.8 km) east of Quartz Springs Point area.

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Thirty-five miles of the California Riding and Hiking Trail pass through the park. Access to the trail is at its junction with Cavin Station Flats, Keys View, and South 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 (0.4, 1.0, or 1.6 km). Two to three days are required to hike the entire length of the trail.

**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 Winsona 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.
As ground water percolated down through the monzogranite’s joint 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 roughly horizontally, 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)

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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 system, 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.
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.

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 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, 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.

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. 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 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.

Matt Riley’s Fatal Mistake

It was 114 degrees (46°C) in the shade and the distance to the nearest spring was 25 miles (40 km) when Matt Riley and Henry Kitto set off on foot from the OK Mine at 9 a.m. They had one canteen of water between them.

Their plan was to refill the canteen at Cottonwood Spring, then continue on to Mecca to celebrate the 4th of July. Neither man knew much about the route.

Kitto became ill 12 miles (19 km) out. He gave the canteen to Riley and turned back. Kitto survived the walk back to the mine.

Riley pressed on, trying to get to Cottonwood before he ran out of water. He never made it. His body was found under a bush next to the road to Mecca.

The tracks Riley left behind indicated he had passed within 200 yards (180 m) of Cottonwood Spring before turning back and circling aimlessly—a sign of disorientation, which is a common side effect of extreme dehydration.

Matt Riley’s fatal mistake was to walk across the desert without enough water. To hike all day in the midsummer desert sun, a person needs to drink at least two gallons (7.6 liters) of water.

Riley and Kitto had set off with only one small canteen. There was no way they could have survived a 25-mile (40-km) trek in plus 100 degree heat with that small amount of water. Kitto’s decision to turn back saved his life. When Riley decided to continue on, he doomed himself.

Matt Riley died 87 years ago, but his mistake is repeated by desert visitors every year. For a safe visit, be sure to carry adequate water with you when you venture into the park. Drink your water supply rather than trying to conserve it. When it is half gone, it is time to turn back.

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.

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. 173 pages PB $14.95


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

Cragam's Guide to Joshua Tree National Park, Breaks park activities into three easy to use areas: hiking, rock climbing, and camping. DVD $21.95

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

California Road & Recreation Atlas. Detailed maps include landscape, recreation guides, GPS grids, and freeway exit numbers. 143 pages PB $24.95

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

Life in the Desert

Desert Survival Tips, Tricks, & Skills, Nester. Explains how to deal with emergencies that might arise in a desert environment. Filled with examples, narratives, and illustrations to aid understanding. 70 pages PB $10.95

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

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

National Audubon Society Field Guide to California, Alden, Heath. 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

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

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. $1.50

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 $14.95

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

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

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

Poisonous Dwellers of the Desert, Dodge. This guide not only enables the reader to identify potentially dangerous species but encourages appreciation of the animals' natural history. 40 pages PB $5.95

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: 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.

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.

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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. 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 mean 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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