Joshua Tree Guide

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

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

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

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

campfires
Campfires are permitted in campgrounds and in picnic areas where firegrates 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.

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

food, lodging, services
There are no concessions within the park. However, surrounding communities can fulfill most visitor needs. Contact local chambers of commerce for information. Their telephone numbers and web addresses are listed on page six of this publication.

getting to the park
The park is located about 140 miles east of Los Angeles via I-10. Entrances to the park are located off CA HWY 62 (Twentynine Palms Highway), at the towns of Joshua Tree and Twentynine Palms. A third entrance is located about 25 miles east of Indio off I-10.

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

international visitors
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 dangerous creatures as they lose their fear of humans.

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

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

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

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

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

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

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

stay out and stay alive
Mining was an important activity in this area and numerous mining sites can be found within the park. If you choose to visit them, use extreme caution and do not enter old mine workings.

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

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

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

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

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

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

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

world wide web
If you are “connected,” check out the National Park Service publications on the web at www.nps.gov. We are adding more information all the time. For information about other desert attractions in California, surf over to www.californiadesert.gov.

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

Joshua Tree

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

Years ago the Joshua tree was recognized by American Indians for its useful properties: tough leaves were worked into baskets and sandals, and flower buds and raw or roasted seeds made a healthy addition to the diet. The local Cahuilla have long referred to the tree as "hunuvat chiy 'v" or "humwicha," both names are used by a few elders fluent in the language. By the mid-19th century, Mormon immigrants had made their way across the Colorado River. Legend has it that these pioneers named the tree after the biblical figure, Joshua, seeing the limbs of the tree as outstretched in supplication, guiding the travelers westward. Concurrent with Mormon settlers, ranchers and miners arrived in the high desert with high hopes of raising cattle and digging for gold. These homesteaders used the Joshua tree’s limbs and trunks for fencing and corrals. Miners found a source of fuel for the steam engines used in processing ore.

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

Spring rains may bring clusters of 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 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 Vegetation Specialist Jane Rodgers

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.

By Vegetation Specialist Jane Rodgers
What to See and Do

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

IF YOU HAVE FOUR HOURS OR LESS, begin your tour at a park visitor center. Park staff will be happy to provide you with current information about conditions in the park as well as answers to your questions. With limited time you may want to confine your sightseeing to the main park roads. Many pullouts with wayside exhibits dot 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. A ranger-led program will add enjoyment and understanding to your visit. Check at visitor centers and on campground bulletin boards for listings. If solitude is what you are after, plan an all-day hike. A list of hikes is included in this publication and trail information can be obtained from visitor centers. Or, call ahead and reserve a spot on the popular Desert Queen Ranch guided walking tour.

Some visitors like to experience the desert from the seat of a mountain bike. 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 but may be too dangerous to approach.

**Old Dale Road**
This 23-mile (37.3 km) road starts at the same point as Black Eagle Mine Road. The first 11 miles (17.8 km), cross Pinto Basin, a flat, sandy dry lake bed. Leaving the basin, the road climbs a steep hill, then crosses the park boundary. A number of side roads veer off toward old mines and residences. The main road leads to 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**
The road turns south from the paved road two miles (3.2 km) west of Jumbo Rocks Campground. The distance from the junction to Squaw Tank is 5.4 miles (8.8 km) This section is mostly downhill but bumpy and sandy. Starting at Squaw Tank, a 6-mile (9.7 km) circular route explores Pleasant Valley. A printed guide is available at the beginning of the road.

**Covington Flats**
The dirt roads in Covington Flats offer access to some of the park's largest Joshua trees, junipers, and pinyon pines in the high desert. From Covington Flats picnic area to Eureka Peak is 3.8 miles (6.2 km) one way. The dirt road is steep near the end, but the top offers views of Palm Springs, the surrounding mountains, and the Morongo Basin. Your trip will be 6.5 miles (10.5 km) longer if you ride or drive over to the backcountry board, a starting point for excellent hiking.
Joshua Tree National Park is a backpacker's dream with its mild winter climate and interesting rock formations, plants, and wildlife. It embraces 794,000 acres of which 574,000 acres have been designated wilderness. By observing the guidelines below, your venture into the backcountry should be safe and enjoyable. If you have questions, ask a ranger.

It is your responsibility to know and abide by park regulations.

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

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

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

Domestic issues
Water sources in the park are not potable and are reserved for wildlife, so you will have to carry in an adequate supply for drinking, cooking, and hygiene. You will want to give some thought to the trade-off between the water required to hydrate dried foods and the heavier 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.

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

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

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

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

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

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

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

Horseback riding
Horseback riding is a popular way to experience the backcountry and there are 253 miles of equestrian trails and trail corridors that traverse open lands, canyon bottoms, and dry washes. Because of the special requirements for horses, care should be taken in planning your trip. You may call 760-367-5500 and request that a horse bulletin be mailed to you.

You will need to have a current backcountry horse permit, and obtain a backcountry board. Follow the directions on the backcountry board.
RANGER PROGRAMS

Desert Queen Ranch Tours
Call 760-367-5555 for reservations
Saturday evening campfire programs
Sunday morning orientation coffees
Morning and afternoon discovery walks
Activities especially for kids...
And much more

Pick up a current schedule at a visitor center
site: www.nps.gov/jotr.

THE JOSHUA TREE GUIDE IS PRODUCED BY THE EMPLOYEES AND VOLUNTEERS OF JOSHUA TREE NATIONAL PARK AND IS PUBLISHED BY JOSHUA TREE NATIONAL PARK ASSOCIATION. IT IS Printed ON RECYCLED PAPER.

NATURE TRAILS

Trail  | Mileage  | Starting Point
--- | --- | ---
Arch Rock  | 0.5-mile loop  | White Tank Campground, opposite side 0
Begbique All-Access  | 0.5-mile loop  | Start of Cottonwood, one-half mile from the southern entrance to the park
Barker Dam  | 0.5-mile loop  | Barker Dam parking area
Cap Rock  | 0.5-mile loop  | Cap Rock parking area, at the junction of Park Blvd. and Keys View Road
Cholla Cactus Garden  | 0.5-mile loop  | Desert Spring Visitor Center
Cottonwood Spring  | 1-mile loop  | Cabin and Wood Visitor Center
Hidden Valley  | 1-mile loop  | Hidden Valley picnic area
Hi-View  | 1-mile loop  | Desert Spring Visitor Center
Indian Cove  | 0.5-mile loop  | Indian Cove Campground
Keys View  | 0.5-mile loop  | Keys View
Oasis of Mara  | 0.5-mile loop  | Oasis Visitor Center, Twentynine Palms
Palm Rock  | 0.5-mile loop  | Jumbo Rocks Campground, just beyond loop E

How Far Is It?

Campground  | Entrance  | West  | Keys View  | Interstate 10  | Jumbo Rocks Campground  | Oasis of Mara  | Ryan Campground  | Sheep Pass Campground  | White Tank Campground
--- | --- | --- | --- | --- | --- | --- | --- | --- | ---
20 miles north of Cottonwood Visitor Center  | 10  | 30  | 45  | 38  | 24  | 0  | 16  | 16  | 24  | 11

HIKING TRAILS

Trail  | Round-trip Mileage  | Time  | Starting Point  | Description
--- | --- | --- | --- | ---
Boy Scout Trail  | 3 miles (4.8 km)  | 2-3 hours  | Desert Spring visitor center  | Excellent view of the California Skyline and Hiking trail passes through the park. Access to the trail is at its junction with Cornerstone Fiats, Keys View, and Top of the World (Route 66) Roads to Keys View and Cottonwood Campground then north entrance to the park. The trail allows for shorter hikes of 4, 6, 7, or 11 miles (6.4, 10.7, or 17.7 km). Two to three days are required to hike the entire length of the trail.

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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.

The Cahuillas (pronounced: Ka-pee-yahs) periodically set fire to oases in order to 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-pee-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 1820, 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 Site.

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 undisgested 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.
The Weather

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

Rockpiles

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

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

The monzogranite developed a system of rectangular joints. One set, oriented roughly horizontally, resulted from the removal, by erosion, of the miles of overlying rock, called gneiss (pronounced “nice”). Another set of joints is oriented vertically, roughly paralleling the contact of the monzogranite with its surrounding rocks. The third set is also vertical, but cuts the second set at high angles. (figure 1)

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)

The Desert Institute

The Desert Institute is the educational branch of the nonprofit Joshua Tree National Park Association. We are proud to offer outdoor classes in science, history, and the arts related to Joshua Tree National Park and the Mojave Desert. Classes are taught by experts in their field, are offered on weekends, and vary in length from one to three days. Optional college credit is offered through UC Riverside for course titles followed by an asterisk (*). Course fees vary from $55 to $175.

Fall Classes

- Basic Desert Survival
- Native American Basket Weaving Skills I & II
- Archaeology of Joshua Tree National Park* (Sep. 27, 28, 29)
- Edible Plants of the Desert (Sep. 28, 29)
- Mammals of Joshua Tree National Park* (Oct. 4, 5, 6)
- Landers Earthquake Fault Tour (Oct. 5 or Nov. 16)
- Map and Compass Basic Skills (Oct. 11, 12 or Nov. 2, 3)
- Map and Compass Advanced Skills (Oct. 12, 13)
- Entomology of Joshua Tree National Park (Oct. 18, 19)
- Native American Plant Cordage (Oct. 19)
- Venomous Animals of the Mojave* (Oct. 25, 26, 27)
- Plein Air Poetry (Oct. 26)
- Desert Night Sky (Oct. 26)
- Art of the Nature Sketchbook (Nov. 1, 2)
- Geology: Creation of the Joshua Tree Landscape* (Nov. 8, 9, 10)
- Desert Tracking (Nov. 16, 17)
- Photographing the Joshua Tree Landscape (Nov. 22, 23)

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

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

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

*Canis latrans* is an amazingly adaptive animal found in forty-nine states and numerous national parks. Many park visitors see coyotes as living symbols of the wild. So it’s little wonder that people sometimes seek the thrill of approaching, photographing, or even feeding these wild creatures.

Doing so allows us to connect with the natural world, reaching for a moment beyond our tame and separate existence. Yet doing so threatens the very creatures with whom we seek to connect.

**The Advantage of Adaptability**

Coyotes are an integral part of the ecosystem here. And they live successfully in the natural world because of their adaptability, particularly when it comes to food. Coyotes are omnivores and scavengers, which means they eat anything they can find—dead or alive. Rodents comprise sixty percent of their natural diet. But they also eat berries, bean pods, fruits, lizards, fish, rabbits, and birds. With such a varied diet, coyotes rarely go hungry. Coyotes are wary, if not shy. You may have seen one at Joshua Tree, furtively crossing a road or standing silently along a ridge. Frequently confused with wolves or even domestic dogs, coyotes may be golden, gray, or brown. Their tails are quite bushy and their snouts are tapered and pointed. Coyotes stand about two feet at the shoulder and weigh about 35 pounds.

When left alone, coyotes remain within their natural ecosystem, playing an important role that contributes to its overall balance and stability.

**The Threat**

The very adaptability that helps coyotes live successfully in the natural world can get them in trouble when their world meets ours. You may have seen a coyote strolling through a campground or picnic area, looking very much at home. If so, you saw an individual who has adapted to being around humans and to eating human foods. Coyotes are intelligent, clever, and, at least in one way, similar to us. They quickly learn to follow the path of least resistance. So when we feed a coyote directly or leave food scraps near a campsite or car, the coyote learns to associate humans with food. This begins a pattern that is difficult to break and may lead to the coyote's premature and unnatural death.

This can happen in several ways. First, if coyotes adapt to accepting human food, they may stop hunting for their natural diet. Then, when the tourist season ends in the summer, they may starve. Second, extra food provided by humans creates an artificial abundance for the coyote triggering the birth of more pups than summer food supplies can support. Third, some coyotes learn that cars mean food, so they sit or lie on roads, unaware that they can be struck and killed by these same vehicles. Finally, though coyotes adapt to being fed by humans, they remain wild animals; they will bite if they feel threatened, and they can carry rabies or other serious diseases. There have also been several recent incidents in southern California where coyotes have attacked small children at community parks.

For these reasons, we at Joshua Tree National Park must consider visitor safety and either relocate or shoot a coyote that has adapted to human food. Because coyotes are often too smart to get caught in relocation traps, they usually have to be killed if they become a nuisance.

**Don't Feed Coyotes**

It's a simple solution—and an effective one. If we don't encourage coyotes to adapt to human food, they'll be much less likely to get hit by cars, starve during the summer, or be shot for visitor safety.

Coyotes can find plenty of natural food in the desert. Please don't endanger their lives or yours by feeding them. With your cooperation, coyotes can use their adaptability to remain a wild and natural part of Joshua Tree for years to come.

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**Fee Demonstration Program Gives Park Facilities a Facelift**

In 1996 Congress established the Federal Recreation Fee Demonstration Program (Fee Demo), which allows many national parks, forests, and recreation areas to increase entrance and other user fees. The participating sites retain 80 percent of the funds collected for use in repairing and upgrading visitor facilities such as campgrounds, visitor centers, exhibits, utility systems, and trails. The remaining 20 percent of the new fees is apportioned among the parks not able to participate in the program. In 1998 separate legislation established the National Park Passport, a $50 annual pass to all National Park Service sites, that returns up to 70 percent of receipts to the parks for projects that improve visitor facilities and services and enhance park resources.

As one of the Fee Demo parks, Joshua Tree has welcomed the infusion of new revenues, as they have enabled the park to make significant improvements to its aging, 1960s-era physical plant. Examples of projects the park has completed or has in progress include:

- Camping at Indian Cove and picnicking at Hidden Valley have been enhanced by landscaping, new picnic tables, fire pits, and parking bumpers.
- Vault toilets, which greatly improve the restroom experience, have been installed in many locations around the park—and more are on the way.
- A new facility at the north entrance to the park creates a safer and more attractive place for the public to be greeted as they arrive.
- Solar-powered amphitheaters at Jumbo Rocks and Indian Cove campgrounds, with upgraded sound and rear-projection systems, have replaced the noisy generators.
- Tiled walkways and patios and energy efficient stucco walls are part of a major facelift of park headquarters and the Oasis Visitor Center.
- New interpretive exhibits introduce visitors to the natural and cultural resources of the park at the Oasis Visitor Center.
- A more reliable radio system to upgrade the efficiency of park rescue, law enforcement, and emergency medical services is now in place.
- A natural gas-fueled cargo-van outfitted with exhibits and a solar panel serves as a traveling classroom bringing the park to local schools.
- Tours of the historic Desert Queen Ranch have been expanded. (You may call 760-367-5555 for more information or to make reservations.)
- Over 100 wayside exhibits, trailhead signs, and backcountry registration boards are currently being designed.
- Current information about the park is now available to arriving visitors when they tune to AM1610.
- Visitor safety is being improved and wildlife protected by a program to close hazardous mine shafts while providing access for bats.
- Plants started in a Fee Demo funded greenhouse are being used to restore old roads, abandoned mine sites, and other disturbed parklands.
- In addition, the implementation of the park's Wilderness & Backcountry Management Plan is being accomplished with Fee Demo revenues. New ranger programs, a wilderness newspaper supplement, a new boating permit process, rock climbing studies, archeological site inventories, and wilderness education kits are among the many projects that have been accomplished so far.

Thanks to visitor participation, 34 projects have been funded to date by Fee Demo allowing the park to continue to provide for visitor enjoyment and protect the American treasure that is Joshua Tree National Park.
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 from Joshua Tree National Park Association.

Getting to Know Joshua Tree National Park

Road Guide to Joshua Tree National Park, Decker. Guides visitors on a driving tour through the land where the Mojave and Colorado Deserts meet. 48 pages PB $6.95

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

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

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

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

Joshua Tree Video. Excellent introduction to Joshua Tree National Park. 30 minutes VHS $12.95; PAL $15.95

Recreation Map of Joshua Tree, Harrison. Colorful map of Joshua Tree National Park highlighting points of interest, campgrounds, picnic areas, topographic features, and backcountry roads and trails. $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 $8.95; $9.95 for French or German.

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

Education to enhance your visit to Joshua Tree National Park

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

MEMBERS OF THE JOSHUA TREE NATIONAL PARK ASSOCIATION are automatically enrolled in Partners in Nature Education (PINE), which qualifies them to receive a 20 percent discount on all Desert Institute classes, as well as 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 electronic copy has been published on our website: www.joshuatree.org.

How to Get the Best of Your Visit

Use this guide to help you plan your visit. If you have any questions, please call 760-367-5535 or write to our office. Your visit is sure to be rewarding. You will find information on what to do, where to do it, and when to do it. The information is arranged to help make your visit as enjoyable as possible.

Life in the Desert

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

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

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

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

Wildlife of North American Deserts, Cornett. A concise introduction to the most commonly encountered animals in the five North American deserts. 211 pages PB $9.95

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

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

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

Shrubs and Trees of the Southwest Desert, Bowers. An easy-to-use guide full of descriptions and line drawings of over 100 desert shrubs and trees. 140 pages PB $11.95

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 $8.95

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

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

On the Road in California

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

California's Wilderness Areas, Wuerthner. Seventy-four wilderness areas were created by the 1994 Desert Protection Act. Provides the information visitors need to explore these places. 320 pages PB $27.95

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

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

The Living Desert, a musical journey exploring national parks and monuments through natural sounds. Excellent mood-setter for your driving tour of the Southwest's desert areas. Tape $10.95, CD $15.95

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

Desert Solitaire, Edward Abbey. The author's recollection of summers spent as a ranger in the canyon and rim country of southern Utah, including observations of the natural world. 269 pages PB $13.00

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.

Postage & Handling Rates

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

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Desert Bighorn Sheep

The Desert Bighorn, *Ovis canadensis nelsoni*, ranges through the dry, desert mountains of eastern California, much of Nevada, northwestern Arizona, and southern Utah. The total population of this sheep is about 13,000. Two hundred fifty or so live in Joshua Tree National Park.

Male sheep, called rams, often weigh over 200 pounds. They can be recognized by their massive brown horns. The horns curl back over the ears, down and up past the cheeks. By the time a ram is seven or eight years of age, he can have a set of horns with a full curl, a spread of 30 inches, and a weight of almost 30 pounds. Horn size is a symbol of rank in the herd. However, many rams rub off the ends of their horns (called “brooming”) because they interfere with their vision. Ewes, the females, are smaller than rams and have shorter, smaller horns that never exceed half a curl.

Desert Bighorn prefer a habitat of steep, rocky terrain for escape from predators, bedding, and lambing. Bighorn zigzag up and down cliff faces with amazing ease. They use ledges only two inches wide for foot holds, and bounce from ledge to ledge over spans as wide as 20 feet. They can move over level ground at 30 miles per hour and scramble up mountain slopes at 15 mph. They are aided by cloven hooves which are sharp-edged, elastic, and concave.

Graze and browse of a wide variety of plant species serve as food. Green grasses are preferred, but when this food is not available, as is the case for most of the year in Joshua Tree, they feed on a variety of other plants, including cacti. Bighorns have a complex nine-stage digestive process that allows them to maximize removal of nutrients from their food.

The bighorn uses open areas of low growing vegetation near rugged terrain for feeding. This habitat preference divides Joshua Tree’s bighorns into three more or less separate herds. The 120 animals that live in the Eagle Mountains at the far eastern boundary of the park is the largest herd. The second consists of about 100 animals and ranges through the main part of the Little San Bernardino Mountains. The smallest herd, which numbers only 30 animals, is found in the Wonderland of Rocks. Members of this last band are the ones most often seen by park visitors. Ewes seldom venture from their natal herd, but rams wander rather frequently.

It is in the narrow canyons, where most springs occur, that the adult sheep’s only significant predator, the mountain lion, *Felis concolor*, lies in wait.

The Desert Bighorn is most active during daylight, moving to traditional bedding areas at night. During the summer bighorn rest during the hot midday, often on cliffs above their water source. Rest periods are also used for chewing cud.

Water is critical to bighorn survival. In early spring of years with good winter rains they get enough water from the grass they eat to go without drinking. At other times they must trek to a spring or water-holding depression at least every third day. Lactating ewes need to drink almost every day. Making the trek to water is the most dangerous part of a bighorn’s life. It is in the narrow canyons, where most springs occur, that the adult sheep’s only significant predator, the mountain lion, *Felis concolor*, lies in wait.

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Bighorn have extremely acute eyesight, which aids in jumping and gaining footholds in the steep terrain. They often watch other animals moving at a distance of almost a mile. During the rut, the bighorn rams snort loudly. The lambs bleat, and the ewes respond with a guttural “ba-aa”. They also utter throaty rumbles when frightened.

Like all sheep, bighorn are gregarious, sometimes forming herds of over 100 individuals, but small groups of eight to 10 are more common. For most of the year, mature rams stay apart from females and the young in separate bachelor bands.

Rams do not defend territories, but do engage in battles over mating access to a particular female. Overall vigor as well as horn size determines male dominance status. Rutting may occur at any time of year, but seems to peak in August and September. Gestation lasts 150 to 180 days. Desert Bighorn may give birth at any season, but most births occur from January to April. Twins are rare. Within a few weeks of birth, lambs form bands of their own, seeking out their mothers to suckle only occasionally. By six months of age, they are completely weaned.

Only about one-third of the lambs survive the rigor of their first summer. Ewes are usually ready to breed in their second or third year. Males reach sexual maturity at the same age, but are not usually strong enough to compete for mating until they are seven years old. After reaching adulthood, most bighorn live over 10 years, with maximum life span being 20 years.

The Desert Bighorn population today is only about 10 percent of what existed before the settlement of the West. This species is extremely sensitive to disease. Like the native humans with whom it shared the southwest for thousands of years, it has little resistance to the diseases of European sheep and cattle. Disease contracted from domestic livestock may be the major factor in decline and loss of populations. Wild horses and burros also compete with Desert Bighorns for water and forage in much of their range. Happily, the bighorn of Joshua Tree National Park are isolated from areas of livestock grazing and face no competition from feral horses or burros.

So far in a 30 plus year research program, our bighorn herds have been judged to be in good condition. The third phase of the assessment will begin this fall in the Wonderland of Rocks. The park wants to find out if increased recreational use in the area has an affect on bighorn sheep behavior. Ten ewes will be captured individually using a handheld net-gun fired from a helicopter and collared. The collars will transmit their location via satellite so researchers can monitor their behavior.

by Dr. Harold De Lisle, herpetologist