

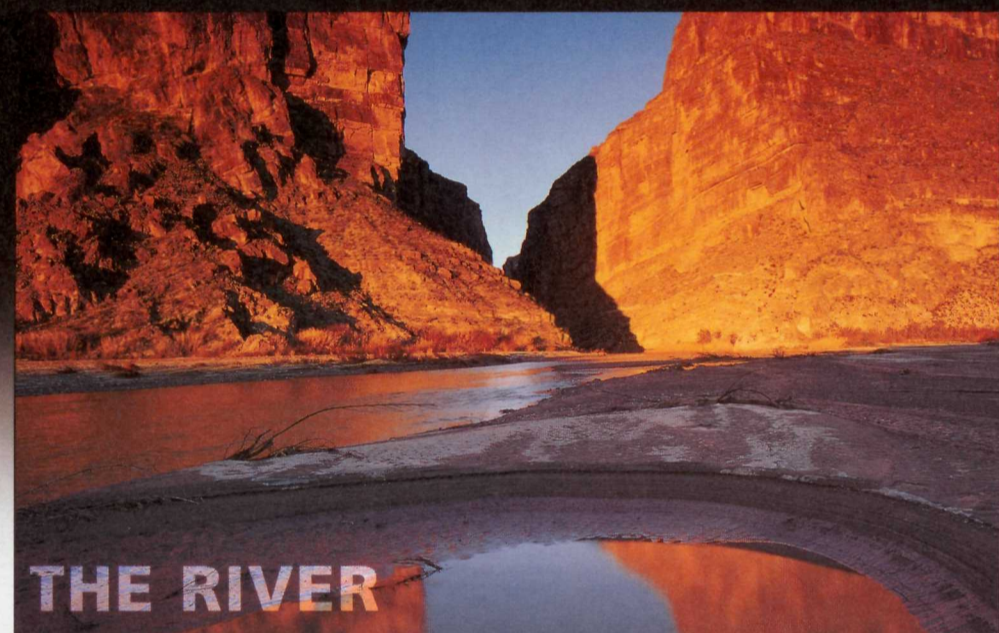
In Big Bend National Park roads end at the Rio Grande, the boundary between the United States and Mexico. But far more than two nations meet here. Three states about at Big Bend: Texas in the United States and Coahuila and Chihuahua in Mexico. Many of the park's famous, expansive vistas mix scenes belonging to both nations. One of the park's best-known features, Santa

Elena Canyon, is only half a canyon on the United States side. Its south canyon wall towers above Mexico. Big Bend National Park also marks the northernmost range of many plants and animals, like the Mexican long-nosed bat. The ranges of typically eastern and typically western species of plants and animals come together or overlap here. Many species here are at the extreme limits of their ranges. Latin

American species, many from the tropics, range this far north, while northern-nesting species often travel this far south in winter. Its location on a bird migration route between South, Central, and North America makes the park excellent for birdwatching. The Rio Grande corridor is also a migration highway for many species passing through the desert. Elevation contrasts create additional, varied micro-

climates that further enhance the diversity of plant and animal life and the park's wealth of natural boundaries. Birders and other wildlife watchers know that the greatest numbers of species often are found at the ecotone (the transition area) between adjacent ecological habitats. The park's many, varied ecotones—formed by river, desert, and mountains—result in an outstanding diversity of wildlife.

Top photo: The Rosillos Mountains, from Grapevine Hills ©JEFF GRASS



THE RIVER

Big Bend refers to the great southwest Texas U-turn the Rio Grande makes here—defining the park boundary for 118 miles. The river is an arcing linear oasis, a ribbon of green that cuts across the dry desert and carves deep canyons. Like all rivers surviving desert passages, it has its headwaters outside this desert, in Colorado. Irrigation, dams, agri-

where. Summer tanagers, painted buntings, vermilion flycatchers, and cardinals accent green foliage. River sand and gravel bars and cliff banks host creatures not expected in the Chihuahuan Desert. Sandpiper and killdeer sprint on sandbars. Cliff swallows fly to adobe nests of river mud.

The floodplain has been home to people for many centuries, but non-Indians have known the Rio Grande only since the 1500s. In the 1700s and 1800s Spaniards crossed it seeking gold, silver, and fertile land. The Presidio del Paso de San Vicente was set up in 1774 at a major river crossing. Apparently people didn't float the river. Comanche Indians crossed it in the 1800s, going to and from Mexico with raiding parties. In 1852 U.S. Army Maj. William H. Emory did a boundary survey. His party looked at all three river

Jackrabbit

Big ears are the jackrabbit's distant early warning system against its predators. The ears also work as radiators to transfer excess body heat to the environment as needed.



culture, manufacturing, exotic plants, and evaporation sap most of the Rio Grande's water before it gets to the park. In the park the river's water mostly comes from Mexico's Rio Conchos. Garfish and some turtles, living fossils, hint at the lush savannah and swamp here 50 million years ago. Their ancestors swam with crocodiles and hippopotamus-like creatures. If you wonder at the river's power—did it truly cut colossal canyons?—just listen to an aluminum canoe's hull hiss from the river's abrasive particles. The river has run for eons like a colossal belt sander.

The river creates an oasis for species not adapted to arid desert life, adding to the park's biological diversity. Its thin floodplain looks like a green belt in the desert. Beaver tooth marks on riverside cottonwood or willow trees may startle you, but beavers live in bank burrows here. Some birders say birds in the floodplain are more colorful than else-

Kangaroo Rat

The kangaroo rat is superbly adapted to dry desert life. It does not need to drink to survive. It can metabolize water from carbohydrates in seeds, and it wastes no excess moisture.



canyons but floated only Mariscal. An 1881 Texas Ranger-led survey party floated Santa Elena Canyon. An 1889 U.S. Geological Survey party was the first group known to run Boquillas Canyon. Mexican settlers began farming the river's banks about 1900; Anglo-Americans after 1920, when boundary unrest ended. Cotton and food crops were grown around Castolon and today's Rio Grande Village even after the park was created.



THE DESERT

North America has four deserts: Great Basin, Mojave, Sonoran, and the Chihuahuan, which extends deep into Mexico. Big Bend National Park lies in its northern third. Mountains that block rain border Chihuahuan Desert on three sides. Its other side abuts vast semiarid plains. This young desert is just 8,000 years old. Green and fairly lush, its rainfall comes mostly in the July to October monsoon. Its rains and clouds can mean far cooler summer days than you might expect in a desert.

Roadrunner

Running at speeds up to 20 mph, the roadrunner pursues lizards and small rattlesnakes. It pecks them to death with stunning blows of its beak. The roadrunner gets much of its required moisture from the body fluids of its prey.



Heat and seasonal winds increase aridity. Summer ground temperatures may be 180°F at mid-day—or freezing in winter as northern storms sweep by. If you want warmer winter walking or hiking or just to enjoy the outdoors, the good news is that the lower desert can be near 80°F in winter.

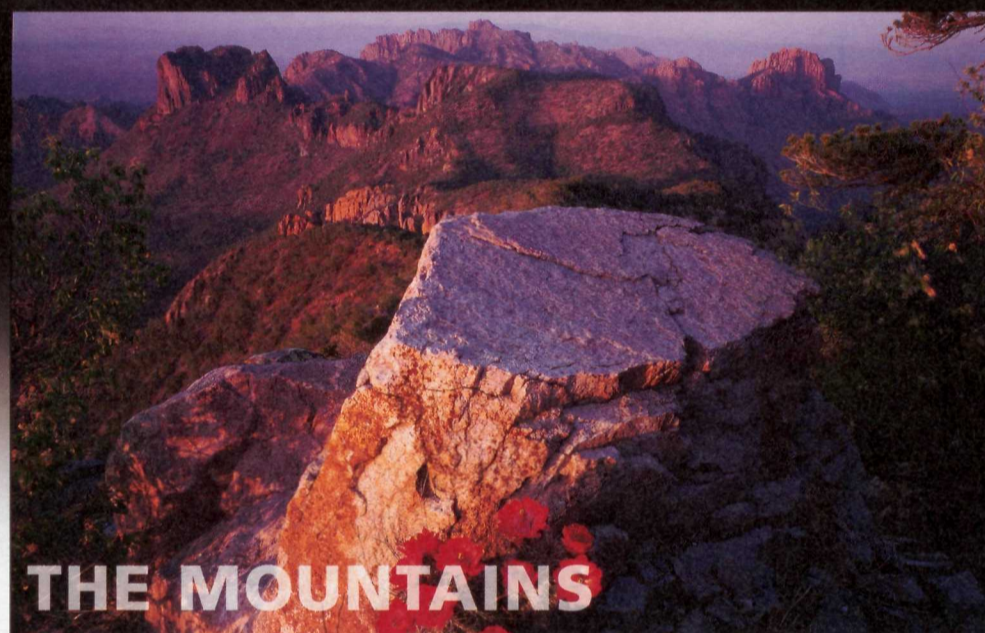
Desert life is adapted to save its energy and to get and keep water—like kangaroo rats or fairy shrimp, fast-growing toads, and jackrabbit ears. Many animals beat the heat by being out only at night. Most snakes do—hot summer days on the desert floor would kill them in minutes. Another way to beat this heat is to climb above it. Summer travelers cross the desert quickly, headed for the higher, cooler Chisos Mountains. Some

insects fly straight up a short distance to cool off. One walking beetle seems to rise up on stilts to escape killing heat.

Ancient peoples lived here 10,000 years ago but left little evidence until the Archaic or Desert Culture 8,000 years ago. They used hundreds of desert plants as food and for medicine and ate hearts of the sotol and lechuguilla plants, fruit and blossoms of yucca, fruit and young pads of prickly pear, and mesquite and acacia beans. They wove baskets and sandals of lechuguilla fiber and yucca leaves and hunted deer, rabbits, and other animals with atlatl throwing sticks and stone-tipped darts. Desert springs gave them drinking water. Home sites often still have remnants of rock shelters and hearths or fire rings.

In late Archaic times, their trade with people to the south and west introduced settled agriculture, and they cultivated corn, beans, and squash. By 1200 the La Junta people, farmers related to the upper Rio Grande Puebloan people, farmed floodplain areas west of today's park. In the 1500s Spaniards enslaved the Indians and greatly transformed their culture. Pushed south by Comanches, Apaches moved to this area in the 1700s.

Apaches were able to resist the Spaniards, who began losing their tenuous hold on the area in the 1700s. In the 1800s encroachment by Anglo-American homesteaders forced the Comanches southward. And by the early 1800s Mexican settlers lived in the Big Bend. Isolation made them targets of Comanche raids. Mid-1800s gold strikes in California and destruction of bison herds hastened the Comanches' decline. Military forts were built to secure the route to California gold fields.



THE MOUNTAINS

If the Rio Grande is the Big Bend country's linear oasis, then the Chisos Mountains are its green island in a sea of desert. The mountains attract creatures, several quite rare, you would not expect in a desert. The isolation set up thousands of years ago as the great ice age ended accounts for their rarity. As colder, moister climates retreated northward, many plants and animals were stranded in the Chisos Mountains by the surrounding lowlands' increasing aridity.

Golden Eagle

A golden eagle's wingspan may be six to eight feet. Its golden nape is seen only at close range. It nests in large trees or on high rocky ledges, eating mostly rabbits and big rodents.



Carmen Mountains white-tailed deer exemplify this. In the United States they live only in the Chisos Mountains; in Mexico only in the nearby mountains. They are unknown elsewhere. White-tailed deer are not well adapted to deserts and probably ranged widely here in the ice age. As the climate warmed, only mountains offered coolness. Today arid-adapted desert mule deer gradually encroach on mountain foothills, seeming to usurp some Carmen white-tailed range.

Average rainfall at the Basin—a Chisos Mountains spot popular with both people and wildlife—is over twice that at Rio Grande Village, by the river. Going to the mountains by the Basin Road, you pass grasslands punctuated by century plants and sotol but soon see green,

leafy shrubs. Then bushes get taller, with evergreen sumac, mountain mahogany, Texas madrone, and common beebrush. You see evergreen and deciduous trees. At elevation 4,500 feet, tall trees appear. Higher up in the drainages are masses of trees—junipers, small oaks, and pinyon pines. Some species grow at the extreme southern limit of their U.S. ranges in the Chisos Mountains. Arizona pine, Douglas fir, Arizona cypress, quaking aspen, and bigtooth maple are last remnants of ice age-influenced forests once widespread here.

Several plant species that grow in the United States *only* in the Chisos Mountains are also found in Mexico and elsewhere. Some Big Bend plant species are found nowhere else in the world. The Chisos oak grows only in the Chisos Mountains highcountry. So does the drooping juniper—looking like it needs a good watering.

Coyote

The coyote can put on a burst of speed sufficient to run down jackrabbits. Its craftiness, immortalized in many Indian stories, sometimes is witnessed by wildlife watchers.



To see all of the bird species that occur in the United States, you must come to the Chisos Mountains to see the Colima warbler. It nests here after wintering in Mexico. Also living here is the mountain lion, locally known as "panther," which has given its name to the lion's share of park places, like Panther Pass and Panther Junction.



Desert marigold



Claret cup cactus



Prickly pear cactus



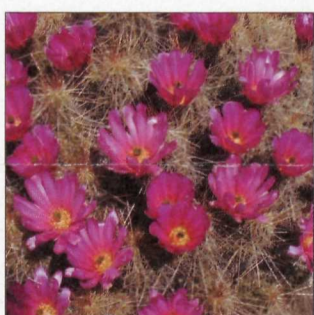
Desert willow



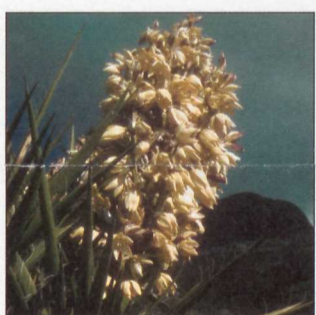
Ocotillo



Rock nettle



Pitaya cactus



Torrey yucca



Lechuguilla stalk

Amazing Adaptations

Not vast emptiness but a life zone—deserts are full of the plants and animals suited to their situations. Witness the carpets of wildflowers in bloom after a rainy period. Cacti blossom and bulge to full water-hoarding bulk. Plants that looked dead leaf out anew. A desert may be full of dormant seeds patiently waiting for rain. Cacti are the popular image of desert-dwelling plants. Good at getting water, they hang onto it like water-conservation misers. They have spines, not water-losing leaves, that also protect against being trampled or eaten. Thick, fleshy stems minimize surface area, and waxy coatings inhibit evapotranspiration. Its shallow, widely spread roots intercept rainwater as

soon as it enters the ground. Cacti store water, being their own reservoir to survive even long droughts. The ocotillo—not a cactus—is in a family by itself. With rainfall the ocotillo develops leaves but drops them when dry conditions return. This may happen several times a year. There are other adaptive strategies. One is waiting, dormancy. Unlike annuals in temperate climes, desert annual plants can wait for rain in their seed stage. If the rains don't come, the seed can stay dormant for years. (So are they really annuals?) Some seeds are coated with chemicals that inhibit germination. Unless enough rain falls to wash off the inhibitor, the seed ignores it. This adaptation makes sure a developing plant gets

enough water to complete its life cycle and set new seeds before the next dry spell. Desert annuals can develop, flower, and fruit far more rapidly than temperate annuals do. Creosote bushes ply yet another strategy. They are so regularly spaced that they look planted. Actually their leaves produce a toxin that, when they are shed, discourages other plants from intruding in their growing space. Their small, resin-coated leaves lose very little moisture to the air. Such strategies make creosote bush the park's most prevalent shrub and enable it to prosper in deserts. Creosote bushes that grow along a road drink runoff from the pavement and may grow twice as tall as the creosote bushes that grow just one

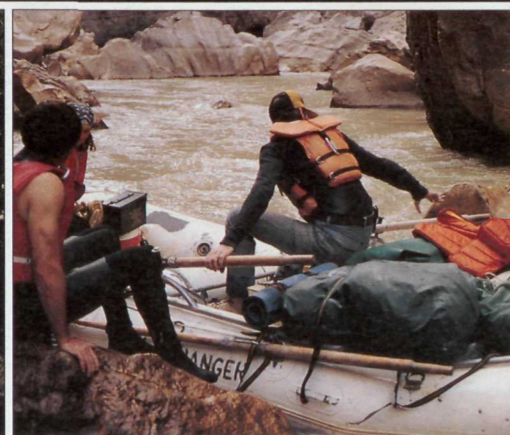
row back from the road. Some plants here have practical or commercial uses. Wax extracted from the candelilla, or wax plant, has been used to make candles, waxes, gum, and phonograph records. In the rainy season the candelilla stem fills up with a thick sap that coats the stem as a wax. This seals in moisture to protect the candelilla from the coming drought.

Desert plants flower most profusely in spring, especially in March, but this can be difficult to predict. One glimpse of this burst of floral wealth may change your image of the desert forever.

Exploring Big Bend



Backpacking the Chisos
NPS



River floaters
NPS



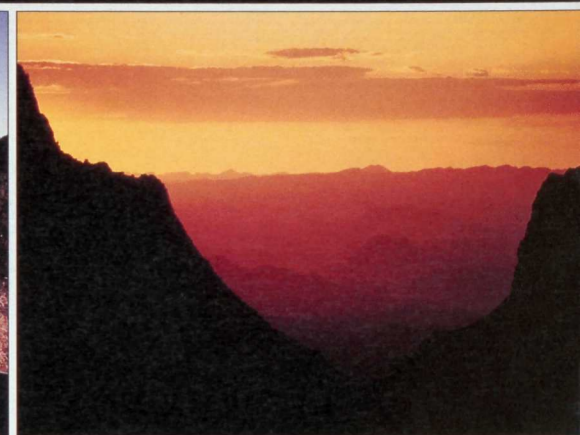
On the South Rim
©TIM BOEN



Historic ruin
NPS



Wilson Ranch
NPS



The Window
NPS

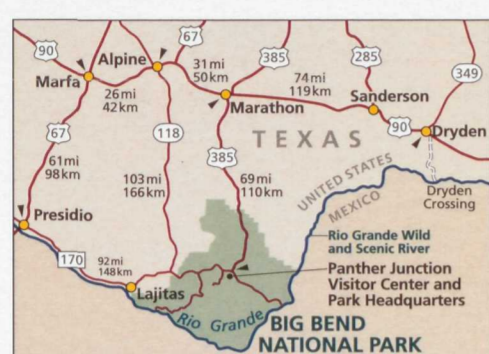
Visiting the Park

No public transportation serves the park, and distances are vast. The map at right shows approaches. Water and gasoline sources are few and far between. Check supplies before leaving Alpine or Marathon.

Carry drinking water in your vehicle and when hiking. Hikers require one gallon per person per day. Start your return trip before your water is half-gone. Treat spring water before drinking; do not drink river water.

Road, river, and hiking guides and maps and the official Big Bend National Park Handbook are sold at all park visitor centers. Check at visitor centers for scheduled programs and activities.

Find overnight lodging at Chisos Mountains Lodge in the Basin and in campgrounds at the Basin, Rio Grande Village, and Castolon. Rio Grande Village has a trailer park with utility hookups. Find backcountry roadside campsites along some park dirt roads (permit required). Many require high-clearance or 4-wheel-drive vehicles. All lodging and camping facilities may be full in spring and for holidays; call 432-477-2251 before driving to the park. For lodging reservations and information contact Big Bend National Park Concessions, Inc., Big Bend National Park, TX 79834-9991; 432-477-2291. For optional campground reservation information, November 15–April 15, visit www.recreation.gov or call 877-444-6777.



All park concession facilities are open all year, including the Chisos Basin complex, Rio Grande Village, and Castolon stores. Groceries and cold drinks, camping supplies, and film are sold at the Basin, Rio Grande Village, Castolon, and Panther Junction. Chisos Mountains Lodge has a gift shop. Gas is sold only at Panther Junction and Rio Grande Village. Get minor auto repairs at Panther Junction. Get most vehicle repairs and towing at Study Butte/Terlingua.

There are no medical services in the park. The nearest hospital is in Alpine, 100 miles north of park headquarters. A rural health clinic is 42 miles from park headquarters, in Lajitas, Tex., to the west. For the park's ambulance service or to report emergencies call 911.

More Information
Big Bend National Park
P.O. Box 129
Big Bend National Park, TX 79834-0129
TTY 432-477-2370; 432-477-2251
www.nps.gov/bibe

Big Bend National Park is one of over 390 parks in the National Park System. To learn more about national parks and National Park Service programs in America's communities, visit www.nps.gov.

Activities and Facilities

Big Bend offers superb walking, hiking, river running, and birding. Please read *Regulations and Safety* before you begin. If you have questions, ask a ranger.

Hiking Walks and hikes range from short, self-guiding nature trails to challenging cross-park treks. Off-trail hiking requires proper gear and adequate supplies. Use a topographic map and know your route.

River Use The park administers 245 miles of the Rio Grande for recreational use. Get a river float permit (required for all boat use) and up-to-date river information at park headquarters or ranger stations. Be well equipped and informed before running the river. A river guide is sold at all visitor centers and park headquar-

ters. There are no equipment rentals in the park. Contact the park for a list of river outfitters. River levels vary—from dangerously high to too shallow to float. Check river levels before starting a float trip. The Rio Grande is a Wild and Scenic River for 196 miles along part of the park boundary and downstream.

Birdwatching The park is a birder's paradise—over 450 bird species have been seen here. The larger migration occurs in spring. Ask a ranger about the best birding spots for your visit.

Regulations and Safety

Border Crossings Closed! There are no legal border crossings in the park—since 2002. Crossing to Mexico at Boquillas, Santa Elena, or elsewhere on the Rio Grande is illegal and will be prosecuted, with up to \$5,000 fines, and/or one year in prison. Closest legal ports of entry are Del Rio and Presidio, Tex.

Heat Can Kill Carry at least a gallon of water per person per day. Wear a hat, long pants, long-sleeved shirt, and sunscreen. Springs are unreliable and often dry, despite what maps show. Avoid mid-day hiking in summer. Mimic wildlife: hike in early morning or late evening.

Driving Obey speed limits: the park maximum is 45 mph. If storms flood water crossings, wait out the high water. Don't let your vehicle get swept away. Stay on established roads. Storm

damage may close backcountry roads. Check conditions before driving unpaved routes. Seatbelts are required in moving vehicles. Watch for wildlife at night. Animals blinded by headlights may stay on the road.

Trail Use Stay on trails to prevent erosion and other damage. When fire danger is extreme, smoking may be banned on some trails. Carry out all trash, including cigarette butts and toilet paper.

Camping and Fires Camping is allowed in campgrounds and at designated backcountry sites with a permit (fee). Wood or ground fires are prohibited in the park.

Backcountry Hiking and Camping Backcountry permits are required for any overnight use. In addition to the highcountry trails, there are rewarding hikes in lower, desert areas; ask a ranger. Do not camp in arroyos or washes. They can become raging rivers while you sleep. Beware of low spots, too. Watch for rapid changes in weather: extreme summer heat and thunderstorms and winter or early spring cold fronts.

Venomous and Other Wildlife Encounters Four rattlesnake species and one copperhead species live here, but these snakes are rarely seen by day. They are protected by law; do not harm them. Stay on trails and use a flashlight at night. Snakes, scorpions, tarantulas, and other wildlife generally will not harm you unless you annoy them. Get prompt attention if injured.

Never feed wildlife! Feeding wildlife is illegal. Store all food and toiletries in animal-resistant containers, vehicle, or food storage lockers. Conflicts with mountain lions or other wildlife are rare. Ask a park ranger about precautions and how to react.

Spines and Thorns Spines and thorns of cacti and other plants are hazardous. Wear sturdy shoes and clothing for off-trail hiking and carry tweezers.

Swimming and Wading Strong currents, submerged snags, and sudden drop-offs make the Rio Grande dangerous. It claims the lives of more swimmers and waders each year than of river runners.

Fishing No fishing license is required in the park, but a needed free permit is available at any park ranger station. Park rangers provide fishing information.

Firearms Texas state law governs possession of firearms in parks. For regulations check www.nps.gov/bibe or ask at a visitor center.

Pets Pets are allowed on roads and in developed campgrounds and primitive roadside campsites. They must be leashed at all times and are prohibited on trails and in public buildings and the backcountry.

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