Park News

National Park Service
U.S. Department of the Interior

Canyonlands

The official newspaper
of Canyonlands National Park

Spanish Bottom, Colorado River

Jurassic Journey

BY LEN EISENBERG

185 MILLION YEARS AGO, DURING THE AGE OF dinosaurs known as the early Jurassic, Utah was a very different place. Instead of rocky deserts, isolated mountains and deep canyons, sand dunes covered the state from end to end. During rainy periods, lakes formed in low areas between the dunes, and life flourished in them.

Today that great pile of sand is known as the Navajo Sandstone. It forms the cliff walls of Zion National Park, the petrified dunes of Arches National Park, and mesa tops at the Island in Sky and Horseshoe Canyon districts of Canyonlands. In fact, one of the lakes is preserved at Horseshoe Canyon, revealing evidence of a fascinating ecosystem. If we could travel back in time to this lake, what might we see?

Returning to the early Jurassic, we find a sea of sand dunes stabilized by a living carpet of dwarf fern and cryptobiotic soil. From above, the distant glint of silver and gold from a reflected Jurassic sun announces the presence of a chain of lakes. The nearest lake is a few hundred yards wide and nearly a mile long. The lakeshore is lined with stands of conifers and cycads amid meadows of ferns and horsetails. Some of the trees are a foot in diameter and 30 feet high.

Walking on the dunes, the thin crust of vegetation easily breaks apart under our feet. It probably wouldn't take much of a climate shift to dry up the vegetation, the lakes, and set the dunes in motion. It is a sweaty 100 degrees out and a swim sounds good. As we wade into the lake, a group of shrimp-like forms hurry deeper into the water. Some of them have translucent hinged shells on their backs. Vegetated dunes rise above the trees and meadows back from the lakeshore. On one of the dunes a squat, dog-sized reptile is clawing swipes of sand out of a hole. Its short, strong arms have no trouble digging deep into the dune and uncovering a nest of wasp larvae. The creature licks up the larvae, and its thick, bristly hide protects it from the angry parents.

It takes a trained eye: to most visitors, this rock outcrop might blend right in with the rest of Canyonlands' fantastic landscape. However, its origins are somewhat unusual: it was created by mircoscopic organisms during the age of dinosaurs.

Evidence of a lake environment: pieces of petrified wood (above left) and a dinosaur track (right) provide more evidence that at one time Horseshoe Canyon was lakefront property.

On the northern side of the lake, microscopic organisms deposit mats of limy sediment on the lake bottom, which is marked by winding trails of bottom-mining worms and snails. In places, these mats have built up into large microbial mounds. It appears that if the lake level were to rise, the living surface of the mound would keep pace by growing larger. We notice that all of the mounds and most of the mats are on the south-facing side of the lake, where these photosynthesizing organisms receive the most sun.

Beyond the mounds we see three-toed dinosaurs walking around, each about the size of a skinny turkey. They could be a group of Segisaurus. One scratches the sand with a toe, then quickly thrusts down its narrow jaws and comes up with a mouthful of sand and a wriggling crustacean. We wade closer to get a better look, but they suddenly raise their heads in unison and bolt. We stand in the shallows amid the horsetails, impressed at how fast they can move.

Now a hand-sized green and gold dragonfly hovers a few feet away. It chases a flying bug, but then a young pterosaur, a flying reptile, flashes down and snatches the dragonfly from the air. As it flies away, gulping down its meal, we see that the pterosaur has the wingspan of a raven and a long stiff tail that ends in a wedge-shaped web of skin.

Eventually, we arrive offshore of the main area of meadows and trees. In and out of the shadows we see head-high dinosaurs moving–possibly a group of Ammosaurus. Some are on all fours pulling at ferns; others rise up on thick hind legs to reach the tops of plants. There are two or three larger individuals and a similar number of smaller ones, probably adults and offspring. While several make their way to the shoreline for a drink, one or more of the adults watch for danger. In the Jurassic world, it is not long in coming.

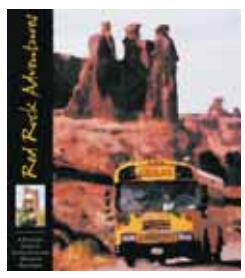
A large, meat-eating theropod makes a charge from the trees. The herbivores spin and rush along the shore, galloping on all fours. The predator has the angle and plows into the group, snatching at the smallest. It is butted off by the largest adult who turns in confrontation and blows a braying honk at its foe. The meat-eater is too small to take on this heavy, enraged animal and dodges around it to pursue the rest of the herd. The adult rushes after, braying and honking. The animals soon disappear from view without any sign of slowing. Whew! Not wanting to push our luck, we swim back to our starting place and return to the present.

The Jurassic lake at Horseshoe Canyon is located just east and north of the west side trailhead parking lot (see the bulletin boards for more information). Fossilized wood, microbial mounds, other plant remains, as well as dinosaur and invertebrate tracks have been found there or in nearby areas. Skeletal remains are very rare in the Navajo Sandstone and none have been found at Horseshoe Canyon.

***Len Eisenberg** is an independent geologist living in Oregon. His main research interest is the Navajo Sandstone, especially the indicators of unusual habitats and events in it. An expanded version of this story and the fossil evidence will be published by the Museum of Moab this year.*

User Fee

Thanks to you, improvements are being made throughout the park. See back page for details.



TEACHERS!

Red Rock Adventures: A Teacher's Guide to Canyon Country Outdoor Education contains over 100 science activities for grades one through six. Topics are taken directly from the Utah State Science Core Curriculum guidelines and are correlated to the National Science Standards. Download lesson plans and learn more about the program at www.nps.gov/cany/education.

IT'S ALIVE!

Watch your step as you're exploring the park. See the back page for more information on living soil crusts.

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Canyonlands Park News

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Canyonlands Natural History Association (CNHA), a nonprofit organization that assists the National Park Service in its educational, interpretive and scientific programs. CNHA's goals include enhancing every visitor's understanding and appreciation of public lands by providing a selection of quality, educational materials for sale at the park visitor centers. For more information, contact CNHA at (435)259-6003, or visit them online at www.cnha.org.

Editor
Neal Herbert

Contributors
Chris Goetze, Gary Howatt, Len Eisenberg, Melissa Memory, Mike Hill, Paul Henderson, Tim Green

Park Mailing Address
Canyonlands National Park
2282 SW Resource Blvd.
Moab, UT 84532

Phone
(435) 719-2313

Email
canyinfo@nps.gov

Website
www.nps.gov/cany

Cover Photo
Mike Hill

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

The Challenge of Drought

BY TIM GREEN

AS THE HEAT RETURNS TO CANYONLANDS THIS spring and the pools and streams filled with winter snowmelt diminish, a race begins. Trees, flowers, animals – all living things – will compete for water. But this race is nothing new: drought is common in the desert. Defined as an extended period of lower than average precipitation, drought has gripped the Canyonlands area since 1999.

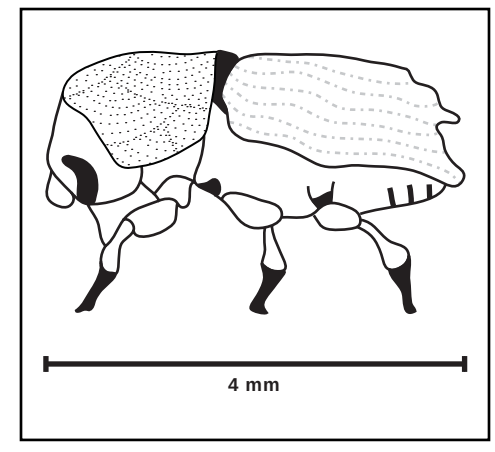
Lack of water tests the fitness of plants and animals. Organisms that survive drought, whether by finding new water sources or tolerating some degree of dehydration, pass on their abilities and genes to the next generation. If droughts were abnormal, they would be accompanied by a massive die-off of plants and animals. Though there has been no catastrophic species loss during the current drought, scientists working in Canyonlands have noticed many changes.

Although only a few animals are monitored closely in the park, there are indications that many populations are shrinking. Researchers doing small mammal inventories from 2000 to 2003 were unable to trap sufficient numbers. Mexican spotted owls, which are monitored closely in Canyonlands, have had lower than average reproductive rates. Mountain lions and bears may be roaming farther in order to locate sufficient food. In the past two years, there have been more and more bear sightings along the rivers as well as in the Maze and Needles Districts.

Generally, animals are dependent on plant production and seed output, which has also been low. The current drought has had a negative effect on the growth of most perennials, especially trees and shrubs. Of these, the pinyon pine has been hit particularly hard.

Pinyon pines (*pinus edulis*) occupy a significant niche in canyon country, making up nearly 60% of the forest cover in Utah. In the southeast corner of the state, they normally grow from 5,000 to 7,000 feet above sea level. Pinyon pines contribute much to the desert ecosystem, including habitat for birds and insects, shade for overheated hikers, erosion control and, of course, delicious nuts. However, a combination of circumstances now threatens the population of this important tree.

The pinyon pine has one effective defense against infestations: sap. When an insect like an engraver beetle tries to burrow into the bark of a tree, the flow of sap can prevent the beetle from advancing. In a normal forest, a small percentage of trees will be infested with engraver beetles. These are usually unhealthy trees whose demise may very well improve the overall health of the forest.



Engraver Beetle


Pinyon Pine

However, during a drought even the healthiest trees can suffer infestations. Lack of water decreases a tree's ability to produce sap and causes a buildup of sugars in its cells. This makes the tree both better tasting (to a beetle, anyway) and defenseless. Over the last five years, this unfortunate combination has caused the death of millions of pinyon pines in the Four Corners region. Unless an army of woodpeckers swoops in to eradicate the beetles, this trend shows no sign of abating.

Interestingly, this large scale die-off comes on the heels of twenty years of above average precipitation and forest growth. From 1976 to 1995, the southwest United States experienced some of its wettest weather in the past 1,000 years. This allowed the forests to grow denser and perhaps set them up for an inevitable pruning. After all, nature loves a cycle, and the recent beetle infestation may simply be a display of the ebb and flow that is part of the natural world.


Interpretive program at Grand View Point


Mountain biking on the White Rim Road


Hiking the Grand View Point Trail

Exploring Island in the Sky

Basics
- Visitor center is open 8 a.m. to 6 p.m. from April to late October, 8 a.m. to 4:30 p.m. the rest of the year. Features exhibits, book and map sales, audio-visual programs, backcountry permits, general information, and park rangers on duty.
- There are no free water sources at the Island. Water is sold in the visitor center at the front desk and at a vending machine outside.
- Orientation movie: *Wilderness of Rock* is shown on request at the visitor center (15 minutes).
- Vault toilets are located at the visitor center, Grand View Point, Green River Overlook, Upheaval Dome, White Rim Overlook and Willow Flat Campground. The visitor center toilets are wheelchair accessible.
- Campground at Willow Flat has 12 sites available on a first-come, first-served basis. No water or hookups provided. Nightly fee is $5/site.

Scenic drive
A 34-mile (round-trip) scenic drive allows visitors to tour the entire mesa top. The *Road Guide to Canyonlands - Island in the Sky District* offers an insightful narrative for the trip and is sold at the visitor center. Wheelchair accessible overlooks include Grand View Point, Green River Overlook and Buck Canyon Overlook. There are picnic areas at White Rim Overlook and Upheaval Dome.

Interpretive activities
- Interpretive trails (with printed guides) include Mesa Arch and Neck Spring.
- Ranger programs: Geology talks (20 minutes) are presented daily at 10:30 and 11:30 a.m. at Grand View Point (April to late October). Afternoon talks and walks as well as evening campfire programs are presented several times a week (April to September). Check at the visitor center or campground for times and topics.

For kids
Free Junior Ranger booklets are available at the visitor center. Kids age 6 to 12 can earn a Junior Ranger badge by completing five or more activities in the book. For hiking, kids enjoy peeking through Mesa Arch and climbing the back of the whale at Whale Rock. Use caution as there are unfenced overlooks on both of these trails.

What to do with your day
First, stop at the visitor center for current information on trails, roads, interpretive programs, weather, or to watch the park orientation movie.

If you have 2 hours:
Drive to Grand View Point or Green River Overlook. Hike to Mesa Arch.

If you have 4 hours:
Drive to Grand View Point, Green River Overlook and Upheaval Dome. Hike the Grand View Point, Mesa Arch, and Upheaval Dome Overlook trails.

If you have 8 hours:
Visit every overlook. Hike several mesa top trails or one of the more strenuous trails descending to the White Rim. Enjoy lunch on the trail or at White Rim Overlook or Upheaval Dome picnic areas.

If you are interested in geology:
View the exhibits at the visitor center and pick up a geology handout. Visit Grand View Point to see the rock layers. Visit Upheaval Dome and hike to the first overlook. There you can learn two theories about how the crater might have been formed.

If you are interested in natural history:
View the visitor center exhibits and pick up a free natural history handout. As you pass through Gray's Pasture, keep an eye out for mule deer or bighorn sheep. Walk the Mesa Arch or Neck Spring trails and learn about native plants.

If you are interested in human history:
View the visitor center exhibits and pick up a free handout. Hike the Aztec Butte Trail to see ancestral Puebloan ruins. Hike the Neck Spring Trail to view remnants of the ranching era. Old fences and corrals are visible along the scenic drive and Murphy Point Trail. Also, old mining roads are visible from most overlooks.

If you are interested in watching sunrise/sunset:
Find out sunrise and sunset times at the visitor center. Visit Mesa Arch at dawn. Visit Green River Overlook or Grand View Point at dusk for incomparable views of sunset over the canyons. Hike to the top of Aztec Butte for a spectacular view of the Island in the Sky and surrounding countryside.

Living Ruins

BY MELISSA MEMORY

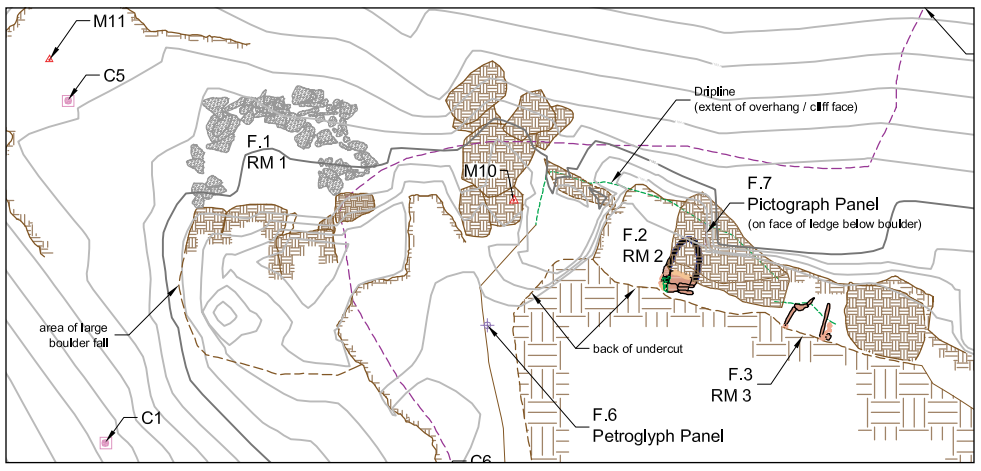
IF YOU ARE PADDLING ALONG THE GREEN OR Colorado Rivers this spring or fall, don't be surprised to find prehistoric ruins full of life again! This is the second year of the Canyonlands River Corridor Architectural and Rock Art Survey. Funded entirely through entrance fee receipts, this project is the first to sytematically document prehistoric granaries, habitation structures, rock art panels as well as cowboy camps along the rivers. This project is also the first for Canyonlands' emerging Vanishing Treasures Ruins Preservation Program, which seeks to combine archeological and architectural documentation with baseline preservation assessments.

In the field, archeologists create digital maps of sites, including any rock art panels and structures. They photograph site features, identify artifacts and write detailed descriptions of the area. With this level of documentation, archeologists can address questions like "When did people occupy this site?", "What were they doing here?" and "How does this site relate to others in the surrounding area?" This work will also help select which sites have the potential for more detailed study, such as wood for tree ring dating, intact midden (or garbage) deposits with food remains and other household debris, or stone quarried for making prehistoric tools.

Preservation assessments include describing building materials and techniques, determining the stability of structures, assessing future threats to the sites, and recommending appropriate treatments to stabilize them. These assessments also indicate whether a specialist such as a structural engineer, rock art conservator or architect would be needed to assist with site preservation.

The data from last year's field work revealed many more structures and rock art panels than were previously known. These include granaries used to store corn and other materials, structures thought to be seasonal homes, and circular structures of stacked rock. Through mapping the sites over the length of the rivers, an understanding of how the river corridors were used by people over time is beginning to emerge. Although the data has yet to be formally analyzed, most prehistoric sites appear to date from the Formative Period (900 to 1250 A.D.), and combine elements of both ancestral Puebloan and Fremont prehistoric traditions. Historic sites reflect ranching, mining and river exploration in the late 1800s through the designation of the park in 1964.

Fortunately, most sites are in relatively good condition. However, many show signs of visitor impacts. Entering structures, moving stones, collecting or moving artifacts all reduce the ability of archeologists to reconstruct the past. Imagine trying to solve a mystery if important evidence was removed from a crime scene! Eventually, everyone loses when the site collapses, or a rock art panel completely disappears. Canyonlands was established partly to protect the area's spectacular archeological resources. You can help preserve these sites by not entering structures, moving or collecting artifacts, or touching rock art panels. By visiting these sites responsibly, you will ensure that future generations can enjoy them too.



Detailed site maps show the location of artifacts, middens, rock art, structures and topography.

Mapping a site on the Colorado River. The yellow tags serve as reference points for architectural drawings.

Clovis Point Found

Roughly 12,000 years ago, people archeologists call Paleoindians wandered the landscape of what is now Canyonlands National Park. They led a nomadic lifestyle which included hunting large Pleistocene mega fauna like wooly mammoths and cave bears that are now extinct.

These people didn't leave much in the way of artifacts with one exception: the Clovis Point, a stone projectile point with a distinctive "flute" or channel running up both faces of the tool. These points were tied with sinew to large sticks and thrown as spears during the hunt. They were probably quite effective since one theory suggests that over hunting by Paleoindians was partly responsible for the extinction of the Pleistocene mega fauna.

Clovis Points are rare and when one is found it is greeted with great excitement. Such was the case in January of 2005 when a complete Clovis Point was found in the Maze District of Canyonlands. This discovery was even more remarkable because ten years ago, another Clovis Point had been collected in nearly the same spot. These appear to be isolated finds as no there is no archeological site associated with this area.

How these points might have arrived here and whether they are associated with each other remains a mystery.

Exploring The Needles

Basics

- Visitor center is open 8:00 a.m. to 5:00 p.m. from April to late October, and 8:00 a.m. to 4:30 p.m. the rest of the year. Features exhibits, book and map sales, audio-visual programs, backcountry permits, general information, picnic area, and park rangers on duty.
- Water is available year-round at the visitor center and at the Squaw Flat Campground.
- Orientation movie: *Wilderness of Rock* is shown on request at the visitor center (15 minutes).
- Restrooms are available at the visitor center and Squaw Flat Campground (wheelchair accessible). There are also vault toilets at Elephant Hill.
- Squaw Flat Campground has 26 sites available first-come, first-served. No hookups. Nightly fee is $10/site.

Scenic drive

The scenic drive continues 7 miles past the visitor center, ending at Big Spring Canyon Overlook. Along the way are several pullouts for short hiking trails, viewpoints and a picnic area. Graded gravel roads lead to Cave Spring, where there is an interpretive trail, and to the Elephant Hill trailhead, where there is a second picnic area. The Elephant Hill access road provides excellent views of the Needles from a car (about one mile from the pavement).

Interpretive activities

- Interpretive trails (with printed guides) include Cave Spring, Pothole Point, Roadside Ruin and Slickrock.
- Campfire programs are presented five nights a week at Squaw Flat Campground (April to October). Check at the visitor center or campground for topics and times.

For kids

Free Junior Ranger booklets are available at the visitor center. Kids age 6 to 12 can earn a Junior Ranger badge by completing five or more activities. The Cave Spring Trail, featuring a cowboy camp and prehistoric pictographs, is always a hit with kids. Pothole Point is another popular hike, especially if the potholes are full of water. Before you set out, rent a kids' discovery pack from the visitor center. Packs include a naturalist guide, binoculars, hand lens and more (small fee and deposit required).

What to do with your day

First, stop at the visitor center for current information on trails, roads, interpretive programs, weather, or to watch the park orientation movie.

If you have 2 hours:
Drive to Big Spring Canyon Overlook and hike the Pothole Point trail along the way. Drive to a view of the Needles on the Elephant Hill access road.

If you have 4 hours:
Explore the scenic drive and graded dirt roads. Hike the Cave Spring, Pothole Point and Roadside Ruin trails or the longer Slickrock trail.

If you have 8 hours:
After exploring the scenic drive, hike to Chesler Park or around the Big Spring-Squaw Canyon loop. Enjoy lunch on the trail.

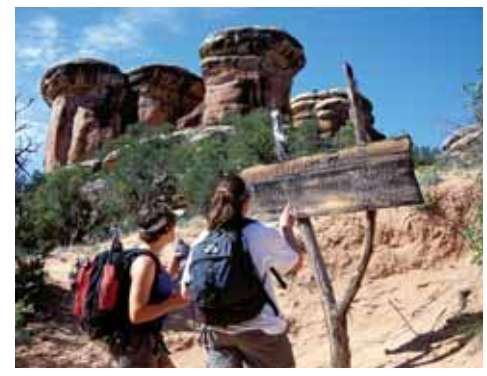
If you are interested in geology:
View the exhibits at the visitor center and pick up a free geology handout. Every Needles trail provides unique views of rock formations, and marine fossils are visible in the canyon below Big Spring Canyon Overlook (follow the Confluence Trail).

If you are interested in natural history:
View the visitor center exhibits and pick up a free natural history handout. Bighorn sheep are seen most frequently from overlooks along the Slickrock Trail. Squaw, Lost and Salt Creek canyons are great for early-morning birding.

If you are interested in human history:
View the visitor center exhibits and pick up the free human history handout. Hike the Roadside Ruin and Cave Spring trails. If time permits, visit the Peekaboo rock art panel in Salt Creek Canyon.

If you are interested in watching sunrise/sunset:
Find out sunrise and sunset times at the visitor center. Sunrise is spectacular from the campground area, especially along the short trail over the butte between Loops A and B. Visit Pothole Point or Wooden Shoe Arch Overlook as the glow of sunset washes over the Needles.

Pothole Point



On the trail to Chesler Park

Rock spires in Chesler Park

A raft plunges through a rapid on its way through Cataract Canyon.

Backcountry Areas

Much of the land in Canyonlands remains undeveloped, a fact evident at any of the overlooks along the Island in the Sky scenic drive. The park's primitive character has made it a popular destination for backcountry travel. In every district, rugged roads, trails and rivers provide paths into remote corners of the park.

The White Rim Road, a 100-mile loop below the Island in the Sky mesa, is a favorite of mountain bikers and four-wheel drivers. The Needles provides ideal itineraries for backpackers in search of solitude. The Maze offers opportunities for lengthy exploration by foot and vehicle. Due to its remoteness and the difficulty of roads and trails, travel to the Maze requires more time, as well as a greater degree of self-sufficiency.

Yet another way to see the park is on the rivers. Boaters can float down the flatwater sections of the Colorado and Green rivers to the Confluence, or continue downstream to face 14 miles of rapids as the river tumbles through Cataract Canyon.

Rock art enthusiasts should be sure to visit Horseshoe Canyon, a detached unit of Canyonlands northwest of the Maze. A moderately strenuous hike leads to a series of pictograph panels created by hunter-gatherers over 2,000 years ago.

If you're interested in planning a trip to any of these areas, request a copy of the *Canyonlands Trip Planner*, or visit our website at www.nps.gov/cany.

Thanks to You

CANYONLANDS NATIONAL PARK WILL ENCHANT YOU WITH ITS MYSTERY AND BEAUTY. MILES OF roads and trails offer access to a colorful geologic wonderland in the heart of the high desert of southeastern Utah – a masterpiece of nature's work. From sagebrush and claret cup to bighorn sheep and lizards, hundreds of species of plants and animals weave color and texture into Canyonlands' diverse landscape.

With all this majesty, hundreds of thousands of hikers, campers, boaters and other outdoor enthusiasts are drawn to Canyonlands each year. The park's popularity creates a challenge – to assist and protect its visitors, while preserving the natural and cultural treasures that brought them here in the first place. With your park fees and continued support, we can meet this challenge together.

In 1996, Congress authorized the Recreational Fee Demonstration Program in order to reverse the deteriorating scope and quality of federal facilities and address natural and cultural resource issues. In 2004, Congress passed the Federal Lands Recreation Enhancement Act that continues the fee programs for an additional 10 years. Prior to these programs, user fees were returned to the general fund of the federal government and parks were reimbursed only for their collection costs. Now, Canyonlands keeps 80% of camping and entrance fees. During the past eight years, over 5 million dollars in retained fee revenue has been put to work at Canyonlands.

For the first time in nearly 20 years, the park has a trail crew to perform routine maintenance on over 120 miles of trails. Major trail reconstruction projects have been undertaken at Grandview Point, Mesa Arch and Roadside Ruin. All of the paved roads at Canyonlands have received preventative maintenance that extends their life and makes travel safer. Visitor centers have received fresh paint and new carpets. A sprinkler system was added to the Island in the Sky Visitor Center. A Backcountry Information Office was constructed at Needles. Additional restrooms have been installed at Upheaval Dome and Green River Overlook, and the Island in the Sky Visitor Center. Campsites have been rehabilitated both in the frontcountry and along the White Rim Road.

Many other projects are in progress. This year, power-generating systems are being upgraded, the first-ever survey of paleontological resources will enter its second year and the fieldwork for the first systematic archeological survey of the river corridors will be completed.

National Park Service employees and volunteers work hard to protect the resources of Canyonlands. Now you're a partner in this important work. Thanks to you, park facilities and programs are improving, and visitors can continue to experience this national treasure for generations to come.

Rebuilding steps on the Upheaval Dome Trail

WATCH YOUR STEP! Cryptobiotic soil crust is a living groundcover that forms the foundation of high desert plant life in Canyonlands and the surrounding area. This knobby, black crust is dominated by cyanobacteria, but also includes lichens, mosses, green algae, microfungi and bacteria.

Protect Your Park

- Avoid trampling cryptobiotic soil crusts. Always walk on trails, slickrock or in sandy wash bottoms.
- Pets are not allowed on hiking trails or four-wheel-drive roads, even in a vehicle. Pets may be walked along paved roads and in the campground, but must be leashed at all times.
- Protect water sources. Do not swim or bathe in potholes or intermittent streams.
- Preserve your heritage. Do not enter, alter or deface archeological sites. Leave artifacts undisturbed.
- It is illegal to remove natural or cultural features including plants, rocks, artifacts, driftwood or antlers.
- Vehicles and bicycles must travel on designated roads.
- ATVs are not permitted.

Protect Yourself

- Drink at least one gallon of water per day if you're active in the desert.
- Always carry a map, adequate clothing and flashlight in the backcountry.
- Remain in one place if you become lost or separated from a group.
- Always let someone know where you are going and when you expect to return.
- Never cross a canyon that is flooding.
- During lightning storms, avoid lone trees and high ridges. Sit in a vehicle if possible.
- Be careful near cliff edges, especially when rock surfaces are wet or icy.

The Indomitable Juniper

BY GARY HOWATT

AMONG THE MAJESTIC SPIRES, CANYONS, buttes and mesas of Canyonlands can be found a truly amazing tree: the Utah juniper (*Juniperous osteosperma*). Junipers grow in some of the most inhospitable landscapes imaginable, thriving in an environment of baking heat, bone-chilling cold, intense sunlight, little water and fierce winds. Often they appear to grow straight out of solid rock. On the Colorado Plateau, the juniper, along with the pinyon pine, forms the most prevalent plant community – the pinyon-juniper woodland – between 4,500 and 7,000 feet above sea level.

The juniper can withstand drought conditions that often kill other plants and trees. Its hidden secret: a massive underground root system which can account for 2/3 of a tree's total mass. A juniper's tap root can penetrate 25 feet straight down in search of water. It can also send out lateral roots 100 feet or more from the tree. The roots are especially hardy: even when knocked over by wind, junipers often continue to grow.

Junipers grow very slowly. A juniper standing only five feet tall may be 50 years old. Junipers typically live from 350 to 700 years, with some even passing the millennium mark. Despite their longevity, junipers rarely exceed 30 feet in height or three feet in diameter.

No two junipers ever seem to look alike: some are bushy, some have multiple trunks, and many have poorly-formed crowns that are a mixture of live and dead branches. To conserve water junipers can self-prune, stopping the nutrient supply to one branch in order to ensure the survival of the tree.

Junipers can be identified by their bark, leaves and fruit. The bark is gray or light brown and often hangs in loose, fibrous strips. The leaves are dark green, flat and scaly and do not drop in the fall. The fruit is a pea-sized light blue berry which is actually a tiny pinecone covered with a drought-resistant waxy coating.

Animals find the juniper very inviting. The berries are edible, though they are not as popular as pinyon pine nuts. However, juniper berries are a staple for jackrabbits, coyotes and a variety of birds. This is important for the tree as well since it helps to disperse its seeds.

Humans have found many uses for juniper. The ancestral Puebloans took advantage of its medicinal qualities, which include the treatment of stomach aches, coughs and headaches. The dried seeds were (and still are) used for beading necklaces and bracelets and as the "rattle" in rattles. Juniper logs were used to build ceremonial hogans and other structures. Pioneers and cowboys found the rot-resistant wood great for fence posts and shingles, and it has long been favored for firewood. The soft bark has been used as bedding, toilet paper and, when tightly twisted, as a slow-burning match.

Junipers have other important functions as well. Their thick green foliage provides shade in an otherwise shadeless landscape. Their oddly twisted trunks, with branches pointing in all directions, have a mystical quality. Each tree is like a fine work of art that one might find in a museum. While these trees are protected at Canyonlands, in many other locations they are cut down for agriculture, grazing and urban development.

What would a park like Canyonlands be without juniper trees? It would still be beautiful, but perhaps less enchanting. The juniper adds charm, color and splendor, to the landscape. It provides a stark contrast to the lifeless rock, seemingly happy living in a place where few plants can. It is a master of survival in a harsh environment where ultimately rock perpetuates over time.

Juniper "berries" (they're actually tiny pinecones) are a source of food for many animals.

Drawing water from a stone: this juniper grew out of just a few fractures in the surface rock.