



# Canyonlands

The official newspaper  
of Canyonlands National Park

Mesa Arch, Island in the Sky

## Discover the Dark

BY ANGIE RICHMAN

IT IS 11 P.M. ON A WARM SUMMER NIGHT AND I'm sprawled like a cat across the sandstone near Grand View Point at the Island in the Sky. This place always gives me the sensation of being on top of the world. The only sounds I hear are the occasional buzzing of insects and the soft hum of my telescope and camera. An endless sky filled with stars washes over me. I believe this moonless night is one of the darkest I have ever seen. Surely I am not the first human to observe the cosmos from here, yet tonight I am alone.

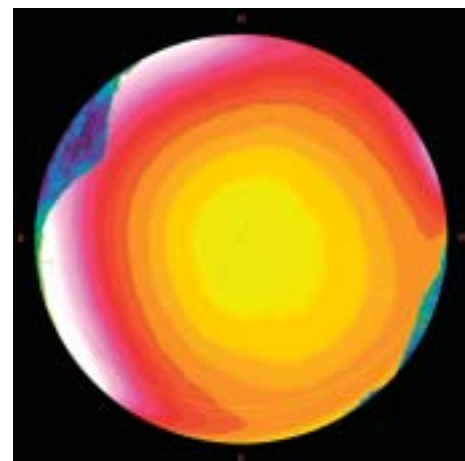


The night sky view from Grand View Point at the Island in the Sky. The bright cluster of stars near the middle of the photograph is part of the Milky Way.

Many wonders await visitors in Canyonlands, from the natural beauty of the red rock formations to the remains of prehistoric cultures. Archeologists think that the sun, moon and stars were significant to these cultures since these subjects are frequently represented in pottery designs, rock art images and even the alignment of buildings. Can you imagine the awe and mystery felt by prehistoric people as they gazed upon the night sky? That same sky is still available to us today, and is one of Canyonlands' most spectacular features.

The longer I lay here the more my eyes grow accustomed to the darkness. After a while, I can even see some of the faintest stars, nebulae and galaxies without the telescope. The Milky Way has so much character it looks like a fern leaf and actually casts faint shadows on the ground. But gradually I become aware of the glow from nearby towns and traffic on the horizon. In the last fifty years, the use of outdoor lighting has grown sharply, dramatically impacting the night sky. I am bothered by the amount of sky that is drowned out by this human-imposed light. My love and concern for the night sky has brought me to this place, and it is my job to collect the first sky brightness measurements in Canyonlands.

National parks preserve some of the darkest skies in the country. In some areas, it's possible to see up to 15,000 stars throughout the night. By contrast, fewer than 500 stars may be visible from more urban environments. To find the darkest parks and



City versus country: These images show the full night sky as if you were laying on your back looking up. The colors show precise levels of brightness, with the darkest areas displayed in deep purple and the brightest areas in yellows, reds and whites. The image on the left was taken in Santa Monica Mountains National Recreation Area outside Los Angeles, CA. The image on the right was taken in Canyonlands.

document the widespread affects of light pollution, the National Park Service created the "Night Sky Team" (see sidebar).

What many people don't realize is that light pollution affects more than just astronomers. Nocturnal animals need darkness for survival, and the circadian rhythms of humans and plants rely on an unaltered night sky. The Night Sky Team is laying the groundwork to protect and restore these dark places, ensuring our ability to connect with ancient sky watchers through the starry night and to contemplate our own place within the universe.

Though light pollution is created by a multitude of lights, this problem can be

resolved one light at a time. When an outdoor light burns out, consider it an opportunity to install a lower intensity bulb or replace the fixture with one that is more night-friendly. Shielding that directs light downward produces less glare and improves security. As long as people still care about the night sky, we can make a difference.

The silence coming from the telescope tells me it is time to pack up and go home. After loading the equipment into the truck, I take a final minute to marvel at the heavens. I wonder how many people have seen what I am seeing now. I wonder how many visitors to Canyonlands will enjoy the night sky, and I wonder how many will return to the cities and never know what they missed.



### The Night Sky Team

The National Park Service Night Sky Team works across the country to document the effects of light pollution. Monitoring is currently taking place in 30 parks, and may expand to 55 parks in the future. The program consists of collecting numerical data over time in order to track the "health" of the resource. The amount of light pollution is measured with a camera that is capable of precisely measuring light levels. Mounted on a robotic Meade LX 200GPS telescope, the camera takes 104 images to capture the entire sky. These images are stitched together, and by subtracting the light emitted by known individual stars, researchers generate a value for night sky darkness.

The parks of southern Utah were some of the first to be visited by the Night Sky Team. While most people realize that fewer stars are visible in a city, few probably realize that even remote parks like Canyonlands face the problem of light pollution. Preliminary data has shed light on many facts. Canyonlands has one of the darkest night skies in this ever-brightening country. However, several sources of light pollution can be detected. Casual observers can see lights of Moab, Blanding and Monticello, and the camera detects other light sources which reach high into the sky, eroding the view of the Milky Way and thousands of stars.

There is a lot to be done in order to restore the Canyonlands night sky to its full splendor. First and foremost is for the National Park Service to improve its own outdoor lighting and to share that experience with surrounding communities.

For more information on this project, visit our website ([www.nps.gov/cany/nature](http://www.nps.gov/cany/nature)) or contact the park (see next page).



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. Read more about the Canyon Country Outdoor Education program on the back page.



### IT'S ALIVE!

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



National Park Service  
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## Canyonlands Park News

### Published By

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](http://www.cnha.org).

### Editor

Neal Herbert

### Contributors

Angie Richman, Carrie Nuoffer, Ian Torrence, Mary Moran, Paul Henderson

### Park Mailing Address

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

### Phone

(435) 719-2313

### Email

[canyinfo@nps.gov](mailto:canyinfo@nps.gov)

### Website

[www.nps.gov/cany](http://www.nps.gov/cany)

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

# An Unwelcome Guest

BY IAN TORRENCE

NOT EVERYTHING YOU OBSERVE DURING YOUR visit to Canyonlands is meant to be here. In fact, you'll probably come across many unwelcome guests as you explore the park. But don't look to your fellow visitors: the culprits are non-native plants.

Non-native plants are one of the greatest threats facing Canyonlands and much of the American west. These plants can alter ecosystems, food chains and nutrient cycles by out-competing native organisms in their own habitat. They accomplish this by changing soil chemistry, natural fire frequency, as well as the availability of water, space, nutrients and light. As a result, populations of native plants like cottonwood, willow and many grasses have declined significantly in the last few decades.

In Canyonlands, cheatgrass (*Bromus tectorum*), an annual grass from Eurasia, can be found almost everywhere there is soil. Tamarisk (*Tamarix* spp.) and Russian knapweed (*Centaurea repens*), have invaded the rivers, springs and wetlands. Nearly 100 different non-native weeds have been documented in the park. Just as gardeners and landscapers deal with weeds around

their homes and yards, park managers confront weeds in Canyonlands, but on a much larger scale.

Canyonlands has taken an active approach to weed control for years. The first tamarisk control project began in 1984 in Horseshoe Canyon. Present efforts focus on the removal of tamarisk in Horse, Squaw, Lost and Salt Creek canyons in the Needles, and Shafer and Lathrop canyons at the Island in the Sky. Russian Knapweed control is being conducted along the Green River. The park also attempts to control invasive weeds like field bindweed (*Convolvulus arvensis*), diffuse knapweed (*Centaurea diffusa*), Russian olive (*Elaeagnus angustifolia*) and puncturevine (*Tribulus terrestris*).

Teams equipped with shovels, chainsaws and backpack sprayers perform most weed control in the park. Trees like tamarisk are cut and the slash is piled for burning. Stumps are sprayed with herbicide to prevent re-sprouting. Park staff, regional Exotic Plant Management Teams and volunteer groups like the Sierra Club and the Wilderness Volunteers have all assisted in this effort.

During the summer of 2003, National Park Service and Utah State University crews began mapping non-native weeds in the park. This inventory program will measure the extent of the weed problem and determine the focus of future weed management goals at Canyonlands.

Scientists are searching for better ways to manage non-native plants. The United States Geological Survey studies many aspects of non-native plants, including whether soil chemistry can be altered to suppress cheatgrass while favoring native plants. They are also developing methods to predict where cheatgrass might invade next. This would allow land managers to focus on undisturbed areas for early detection and even prevent new cheatgrass invasions.

During your visit to Canyonlands, you can help manage our weed problem. Prevent the spread of weeds by ensuring that you do not disperse seeds to new areas. Check your camping equipment, shoes and the undercarriage of your vehicle for plant stems, roots and seed before leaving an area. If you recognize non-native weed infestations the park should know about, fill out an observation card at any visitor center. Be sure to include the name of the weed, its location and size of the infestation.

When you return home, you can further your education by learning about the non-native weeds in your community. Knowledge of these weeds will enable you to reporting infestations to local weed managers. More information is available on the web at [www.nature.nps.gov/biology/exoticplants/index.htm](http://www.nature.nps.gov/biology/exoticplants/index.htm).



Salt Creek Canyon with (left) and without (right) tamarisk. Tamarisk often forms dense groves that block out other species. Notice the greater abundance of surface water and variety of plants in the right hand photo.



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.

# What Brings May Flowers?

BY MARY MORAN

AS A CHILD, YOU PROBABLY HEARD THE HOPEFUL singsong "April showers bring May flowers." You may have cursed it as you sat staring out the window, ball in hand, waiting for the rain to stop. And it may not be true: in Canyonlands, it looks like flowers are more dependent on what happens in October and the following winter months.

Every spring, National Park Service biologists monitor plants in 27 vegetation transects in Canyonlands. The transects are located all over the park in a variety of plant communities. Many have been visited on nearly the same day every year since 1987.

The data from this monitoring is being analyzed for long-term changes in the makeup and diversity of plant communities. Changes since the 1980s include an increase in non-native plants (the number of species as well as the percentage of ground covered), which is a concern for park managers.

Such long-term trends can only be seen after many years of data collection because yearly changes can obscure them. Natural factors

like seasonal weather and precipitation can have a dramatic effect on short-term plant survival. For example, the chart below shows the number of vascular plant species found on several transects from 2001 to 2003. Notice that on every transect, a lot fewer species were found in 2002. What isn't shown is that it wasn't perennial plants (plants that usually live for several years) that died between 2001 and 2002. The dramatic difference lies in the abundance—or lack thereof—of annual plants like wildflowers that sprout from seed each year.

Ideal conditions for a good wildflower year are difficult to define. Every plant has its preferred winter conditions and water needs. Many plant species do not sprout without good fall rain. Others may die off during cold winters, or may be intolerant of long dry spells between October and April. Still others may only need good, soaking rains in the early spring.

You may have heard 2001, 2002 and 2003 called drought years in the Canyonlands region. All experienced less than average rainfall. However, 2002 was significantly drier than both 2001 and 2003. More impor-

tantly, the months prior to spring of 2002 experienced almost no rainfall. Any plants that sprouted in the fall probably dried out long before they could flower, and those that usually sprout in late winter or early spring may never have received the moisture trigger to make them sprout.

As a result, 2002 was a poor wildflower year. Even though there were April showers, by then it was too late. When annuals were seen in the transects, it was often one small sprout where in years previous there had been tens to hundreds of individuals.

Most of the transects rebounded in 2003, and some even had more species than in 2001. Given that very few annuals produced seed in 2002, where did these new plants come from?

Luckily, the annual plants here produce different types of seeds. Many are long-lived and sprout only when conditions are most favorable (see sidebar). These seeds survived the drought of 2002. Rather than April showers, desert annuals need seed adaptations for long-term survival, and regular fall and winter rain for a showcase wildflower spring.

Transect Name	Number of Species		
	2001	2002	2003
Grand View Point	31	14	30
Monument Basin	21	8	18
Upheaval Bottom	29	4	36
Taylor Canyon	22	2	18
Amoeba Butte	28	8	23
White Crack	29	16	26
Murphy Hogback	25	11	22
Lizard Rock	41	24	37
North Flat	35	12	22
Spanish Bottom	20	4	20
Squaw Flat	22	10	16
Pothole Point	40	18	37
Chesler Park	29	11	18



April and May are the best months to view wildflowers in Canyonlands. Shown above left: dwarf lupine (*Lupinus pusillus*) and common globemallow (*Sphaeralcea coccinea*). Above right: sego lily (*Calochortus nuttallii*).

## Wildflower Seeds Wait for Rain

Most of Canyonlands' annual plants cannot survive the intense, dry heat of summer. Luckily, they don't need to. They sprout between late fall and early spring, flower later in the spring, then go to seed and die as daytime temperatures rise.

However, for this strategy to work, their seeds must survive, and they must be smart about sprouting. For example, if all the seeds from a plant sprout at the same time, then they all run the risk of being wiped out by a drought or even a severe storm. Consequently, that species would have no offspring that could sprout in a future year when conditions are better.

Many plants solve this dilemma by producing different seed types. These usually include ones that sprout quickly (no matter what the conditions may be), and others with a long shelf life that may wait years before sprouting.

There are many ways for a seed to "wait" for ideal conditions. Some won't sprout if the soil is too salty; they'll remain dormant until rainfall lowers the salt content. Others have chemical inhibitors that keep the seed coat from breaking down until it's washed off by water. Another inhibitor must be consumed by bacteria that are only active in wet soils.

Many grass seeds have a mechanism that delays germination for several days after it rains, and prevents germination if the soil dries out too quickly. A few plants found along dry washes actually have hard seed coats that can only be cracked mechanically, usually by the turmoil of flash floods that leave saturated sandbars perfect for germination.

## 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](http://www.nps.gov/cany).

# Thanks to You

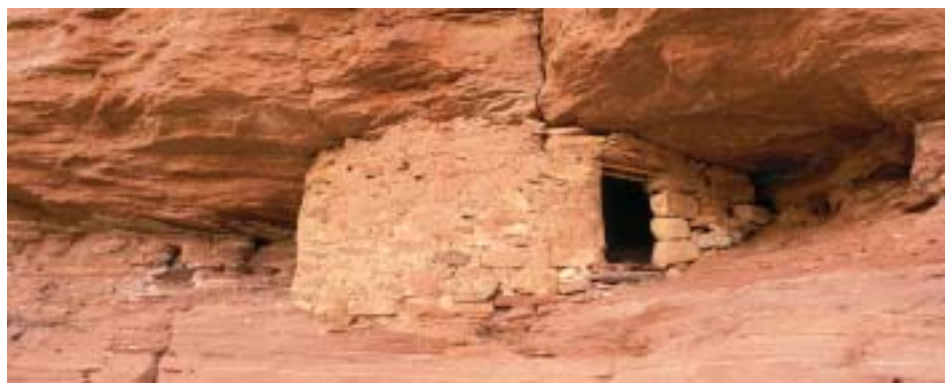
CANYONLANDS NATIONAL PARK WILL ENCHANT YOU WITH ITS MYSTERY AND BEAUTY. MILES OF ROADS and trails offer access to a colorful geologic wonderland in the heart of the high desert of southeast Utah – a masterpiece of nature's work. From sagebrush and claret cup to bighorn sheep and lizards, hundreds of 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 (Fee Demo) Program in order to reverse the deteriorating scope and quality of federal facilities and address natural and cultural resource issues. Prior to the Fee Demo program, money was returned to the general fund of the federal government and parks were only reimbursed for their collection costs. Now, Canyonlands keeps 80% of camping, entrance and backcountry permit fees. During the past seven years, over 5 million dollars in retained fee revenue has been put to work at Canyonlands.

Many projects have been completed with this money. Major trail reconstruction has been completed at Grand View Point, Mesa Arch and Roadside Ruin. A sprinkler system was added to the Island in the Sky Visitor Center. Additional restrooms have been installed at Upheaval Dome and Green River Overlook. 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, additional restrooms will be added to the Island in the Sky Visitor Center, the first-ever survey of paleontological resources will begin, and the field work for a complete archeological survey of the river corridors will begin.

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.



Money from park entrance fees is being used to fund an archeological survey of the river corridors. Shown above is an ancestral Puebloan granary along the Green River.



**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.

# Parks as Classrooms

WHAT WOULD IT BE LIKE TO GROW UP IN SOUTHEAST Utah with Canyonlands not only as your backyard, but as your classroom? Through the efforts of an educational outreach program managed by the National Park Service, children from local communities get to find out.

Canyon Country Outdoor Education (CCOE) seeks to provide a science experience for children (grades K-6) throughout southeast Utah. The program uses both class visits and field trips to introduce subjects like geology, minerals, moon phases, plant biology, primitive technology and many others. All lessons correspond with science topics addressed in the Utah State Science Core Curriculum and the National Science Standards. Field trips include visits to the Island in the Sky and Needles Districts of Canyonlands, Arches National Park, Hovenweep National Monument and Natural Bridges National Monument. CCOE also maintains partnerships with the Bureau of Land Management, the Nature Conservancy, and the United States Forest Service and visits sites managed by those agencies as well.

Before each field trip, CCOE instructors visit the classroom to introduce the concepts the field trip will emphasize and remind students what they'll need to bring. On the day

of the trip, students arrive at the field site by bus and are greeted by CCOE instructors. Field trips typically take a full school day and involve small groups of students rotating through four learning stations. At each station, the students participate in hands-on science activities like:

- First graders acting out the roles of various plant parts (roots, stems, leaves and flowers).
- Second graders digging in the sand to find "Dinosaur bones" and reconstructing what the animals might have looked like.
- Third graders using prehistoric tools like atlatls (a precursor to the bow and arrow) and digging sticks to understand the principles of force and motion.

- Fourth graders discovering the adaptations of desert dwelling plants and animals while hiking the Cave Spring Trail in the Needles District.
- Fifth graders hiking to Sipapu Bridge at Natural Bridges to learn about erosion.
- Fifth graders exploring scientific experiments at the Island in the Sky's air quality monitoring station.

After each field trip, CCOE instructors return to the classrooms to reinforce the concepts covered.

Public support for the program has been exceptional. Participating teachers comment positively on the effectiveness of the instructors, the multidisciplinary nature

of the field trips, and the opportunities for students to become engaged with science education in an outdoor setting. A comment from a 5th grade student reflects one of the fundamental goals of the CCOE program: to help students experience the natural and cultural resources of our national parks and surrounding areas. She writes: "I'd like to go (to the park) again and teach my family what you taught me on the field trip."

For more information on Canyon Country Outdoor Education, including program internships and to download the curriculum, visit the outdoor education website at [www.nps.gov/cany/education](http://www.nps.gov/cany/education), or contact the park (see page two).



Fifth graders learning about the Island in the Sky air quality monitoring station.



A third grader tries his hand at the atlatl, a precursor to the bow and arrow.



First graders acting out the roles of various plant parts.