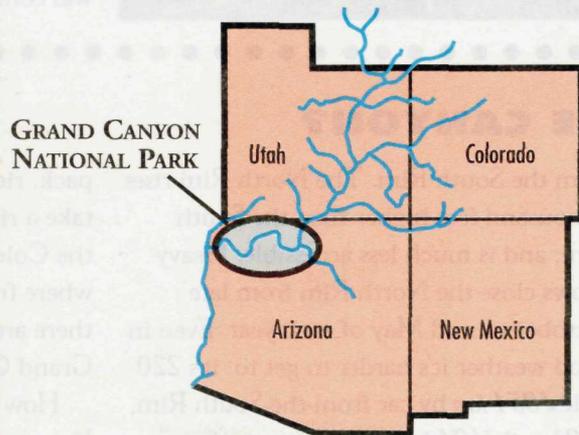


LOOK AT THE QUINCY

GRAND CANYON

AT

National Park



WHERE IS IT?

Grand Canyon is in the northwest corner of Arizona, close to the borders of Utah and Nevada. The Colorado River, which flows through the canyon, drains water from seven states, but the feature we know as Grand Canyon is entirely in Arizona (see centerfold map, pages 4 and 5).

Most of Grand Canyon lies within Grand Canyon National Park and is

managed by the National Park Service. Adjacent lands are administered by other units of the National Park Service (Lake Mead National Recreation Area and Glen Canyon National Recreation Area), other federal agencies (the Bureau of Land Management and the U.S. Forest Service) or neighboring Indian tribes (the Havasupai, Hualapai, and Navajo Indian Reservations, which border the park to the south and east).

HOW BIG IS IT?

That depends on how you look at it. The park includes over a million acres of land — 1,218,375.54 acres/493,077 hectares, to be exact, or 1,904 square miles/4,931 square kilometers. But most people measure the canyon in river miles, along the course of the Colorado River at the bottom of the canyon. By that standard, Grand Canyon is 277 miles/446 km long. It begins at Lees Ferry (mile 0) and ends at the Grand Wash Cliffs (mile 277/446 km; see centerfold map).

The Colorado River is longer, of course: 1,450 miles/2,333 km long from the Rocky Mountains of Colorado to the Gulf of California in Mexico. Grand Canyon is only one of many beautiful canyons which the river has carved. Others include Cataract Canyon and Glen Canyon — the latter now beneath the waters of Lake Powell. Most people agree, however, that Grand Canyon is the most spectacular: there's

simply no other place in the world that looks quite like it.

Width and depth of the canyon vary from place to place.

At the South Rim, near Grand Canyon Village, it's a vertical mile (about 5,000 feet/1,524 m) from rim to river (7 miles/11.3 km by trail, if you're walking). At its deepest, it is 6,000 vertical feet/1,829 m from rim to river. The width of the canyon at Grand Canyon Village is 10 miles/16 km (rim to rim), though in places it is as much as 18 miles/29 km wide.

Here's another way to look at size: a trip to the bottom of the canyon and back (on foot or by mule) is a two-day journey. Rim-to-rim hikers generally take three days one-way to get from the North Rim to the South Rim. A trip through Grand Canyon by raft can take two weeks or longer, and experienced backpackers have spent weeks in the more remote areas of the canyon.



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ARE THERE DAMS IN GRAND CANYON?

No, although several dams bordering the park have a profound effect on Grand Canyon. At the upper end of the canyon, 15 river miles/24 km above Lees Ferry, is Lake Powell, formed by the waters behind Glen Canyon Dam, pictured right. At the lower end of the canyon is Lake Mead, formed by the waters behind Hoover Dam.



The controlled release of water from Glen Canyon Dam at the upstream end affects the water that flows through Grand Canyon. Waters from Lake Mead flood the lower 40 miles/64 km of Grand Canyon when the lake is full. Hoover Dam was completed in 1936. Glen Canyon Dam was completed in 1963.

HOW DOES ONE SEE THE CANYON?

Nearly five million people see Grand Canyon each year. Most of them see it from their car or shuttle bus at overlooks along the South Rim (this includes Grand Canyon Village, Hermits Rest, and Desert View). The South Rim — 60 miles/97 km north of Williams and 80 miles/129 km

northwest of Flagstaff, Arizona — is the most accessible part of the park and is open all year.

A much smaller number of people see the canyon from the North Rim, which lies just 10 miles/16 km (as the raven flies) directly across the canyon

from the South Rim. The North Rim rises a thousand feet higher than the South Rim, and is much less accessible. Heavy snows close the North Rim from late October to mid May of each year. Even in good weather it's harder to get to: it's 220 miles/354 km by car from the South Rim, or 21 miles/34 km by foot across the canyon by way of the North and South Kaibab Trails.

The inner canyon includes everything below the rim and is seen mainly by hikers, mule riders, or river runners. There are many opportunities here for adventurous and hardy persons who want to back-

pack, ride a mule to Phantom Ranch, or take a river trip through the canyon on the Colorado River (which can take anywhere from a few days to three weeks — there are no one-day river trips through Grand Canyon).

How do people get across the canyon? If you're walking, the South Kaibab Trail crosses the Colorado River on a narrow footbridge 70 feet/21 m above the water. There is only one way to cross by automobile, and that is via Navajo Bridge, just a few miles downstream from Lees Ferry, where the canyon is still only 400 feet/122 m wide.

HOW OLD IS THE CANYON?

That's a tricky question. Although rocks exposed in the walls of the canyon are geologically quite old, the canyon itself is a fairly young feature. The oldest rocks at the canyon bottom are close to 2,000 million (2 billion) years old. The canyon itself — an erosional feature — has formed only in the past five or six million years. Geologically speaking, Grand Canyon is very young.

ARE THE OLDEST ROCKS IN THE WORLD EXPOSED AT GRAND CANYON?

No. Although the oldest rocks at Grand Canyon (2,000 million or 2 billion years old) are fairly old by any standard, the oldest rocks in the world are closer to 4,000 million (4 billion) years old. The oldest exposed rocks in North America (which are among the oldest rocks in the world) are in northern Canada.

WHEN AND WHY DID GRAND CANYON BECOME A NATIONAL PARK?

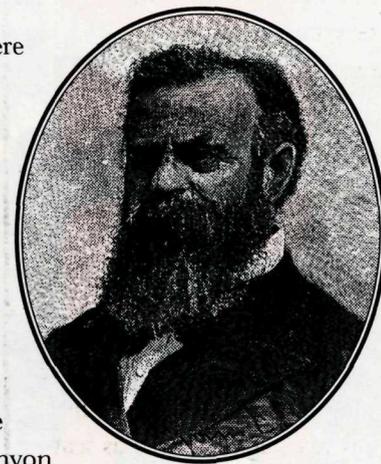
Grand Canyon is unmatched throughout the world in the incomparable vistas it offers to visitors on the rim. It is not the deepest canyon in the world (both the Barranca del Cobre in northern Mexico and Hell's Canyon in Idaho are deeper, just to name two), but the Grand Canyon is known throughout the world for its overwhelming size and its intricate and colorful landscape. Geologically it is significant because of the thick sequence of ancient rocks that are beautifully preserved and exposed in the walls of the canyon. These rock layers provide an early geologic history of the North American continent. Finally, it is one of the most spectacular examples of erosion in the world.

The history of the Grand Canyon region is just as interesting. Grand Canyon was largely unknown until after the Civil War. In 1869 Major John Wesley Powell, a one-armed Civil War veteran with a thirst for science and adventure, made a pioneering journey through the canyon on the Colorado River. He accomplished this with nine men in four small wooden boats (only six men completed the journey). His party was, as far as we know, the first ever to make such a trip.

In the late 19th century there was interest in the region because of its promise of mineral resources (mainly copper and asbestos, as it turned out). The first pioneer settlements along the rim came in the 1880s. Early residents soon discovered that tourism was destined to be more profitable than mining, and by the turn of the century Grand Canyon was a well-known tourist destination.

Many of the early tourist accommodations were not so different from the mining camps from which they developed, and most visitors made the grueling trip from nearby towns to the South Rim by stagecoach.

In 1901 the railroad was extended from Williams, Arizona to the South Rim, and the development of formal tourist facilities at the South Rim increased dramatically. By 1905 the El Tovar Hotel stood where it does today, a world class hotel on the



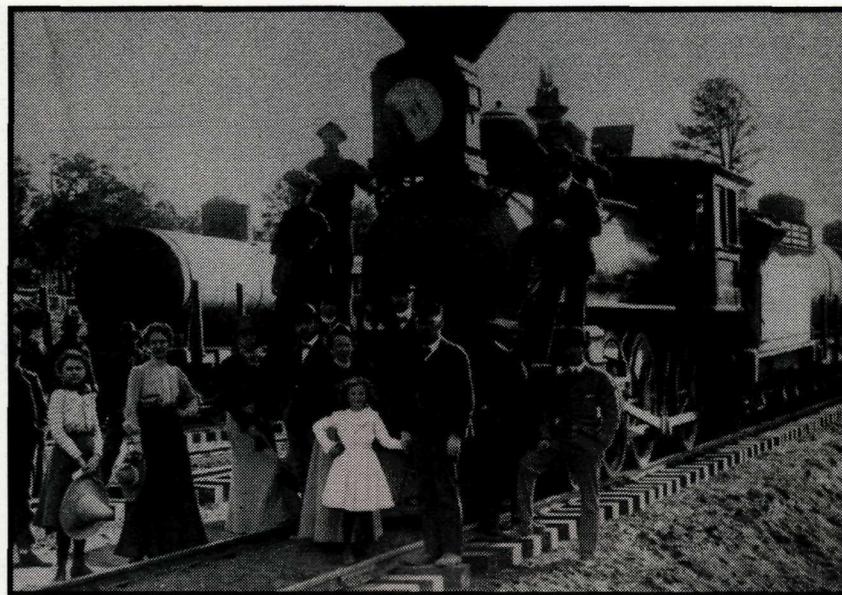
John Wesley Powell

(Continued on page 3)

(WHEN AND WHY DID GRAND CANYON BECOME A NATIONAL PARK, *continued from page 2*)

canyon's edge. The Fred Harvey Company, known throughout the West for hospitality and fine food, continued to develop facilities at Grand Canyon (including Phantom Ranch, built in the inner canyon in 1922). Although first afforded federal protection in 1893 as a forest reserve and later as a national monument, Grand Canyon did not achieve national park status until 1919, three years after the creation of the National Park Service. Today Grand Canyon National Park receives nearly five million visitors each year — a far cry from the annual visitation of 44,173 which the park received in 1919.

Grand Canyon was made a national park in order to give it the best protection we, as a nation, have to offer. The mission of the National Park Service, here and elsewhere, is to preserve the park and all of its features, including the processes that created them, and to provide for its enjoyment by park visitors in a way that will leave the canyon unspoiled for future generations. Now, more than ever, we recognize how complex and difficult a task that can be (see section on ENVIRONMENTAL ISSUES on page 8).

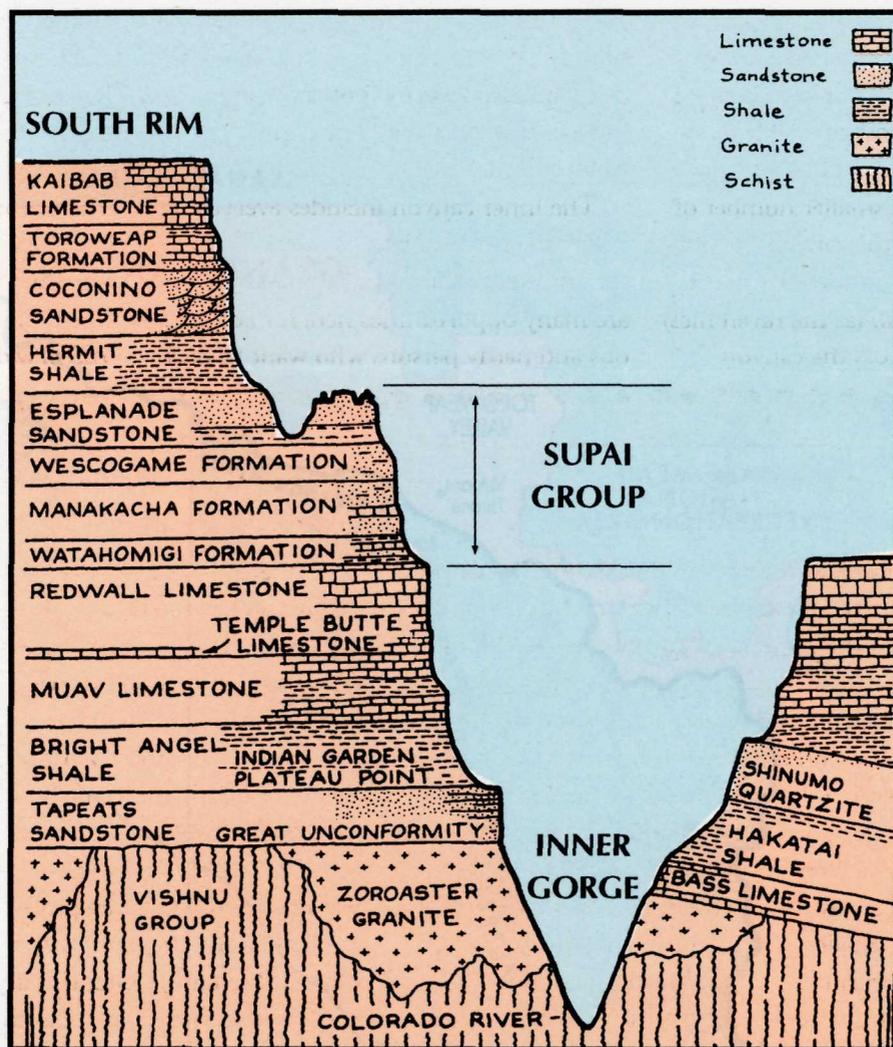


THE GEOLOGIC STORY AT GRAND CANYON

Grand Canyon attracts the attention of the world for many reasons, but perhaps its greatest significance lies in the geologic record that is so beautifully preserved and exposed here. The rocks at Grand Canyon are not unique; similar rocks are found throughout the world. What is unique about the geologic record at Grand Canyon is the great variety of rocks present, the clarity with which they're exposed, and the complex geologic story they tell.

There are really two separate geologic stories at Grand Canyon. The older story is the one revealed in the thick sequence of rocks exposed in the walls of the canyon. These rocks provide a remarkable (but incomplete) record of the Paleozoic Era (550-250 million years ago), as well as scattered remnants of Precambrian rocks as old as 2000 million (2 billion) years. The story these rocks tell is far older than the canyon itself. Mesozoic and Cenozoic rocks (250 million years old to the present) are largely missing at Grand Canyon (they've either been worn away or were never deposited). The rock record at Grand Canyon is summarized in the geologic cross section above.

The second geologic story at Grand Canyon concerns the origin of the canyon itself: when and how



Geologic section courtesy of David Thayer

did it come to be? On one level the answer is simple: Grand Canyon is an erosional feature that owes its existence to the Colorado River (which is responsible for the depth of the canyon). Of equal importance are the forces of erosion that have shaped it and continue to shape it today — mainly running water from rain, snowmelt, and tributary streams which enter the canyon throughout its length. The climate

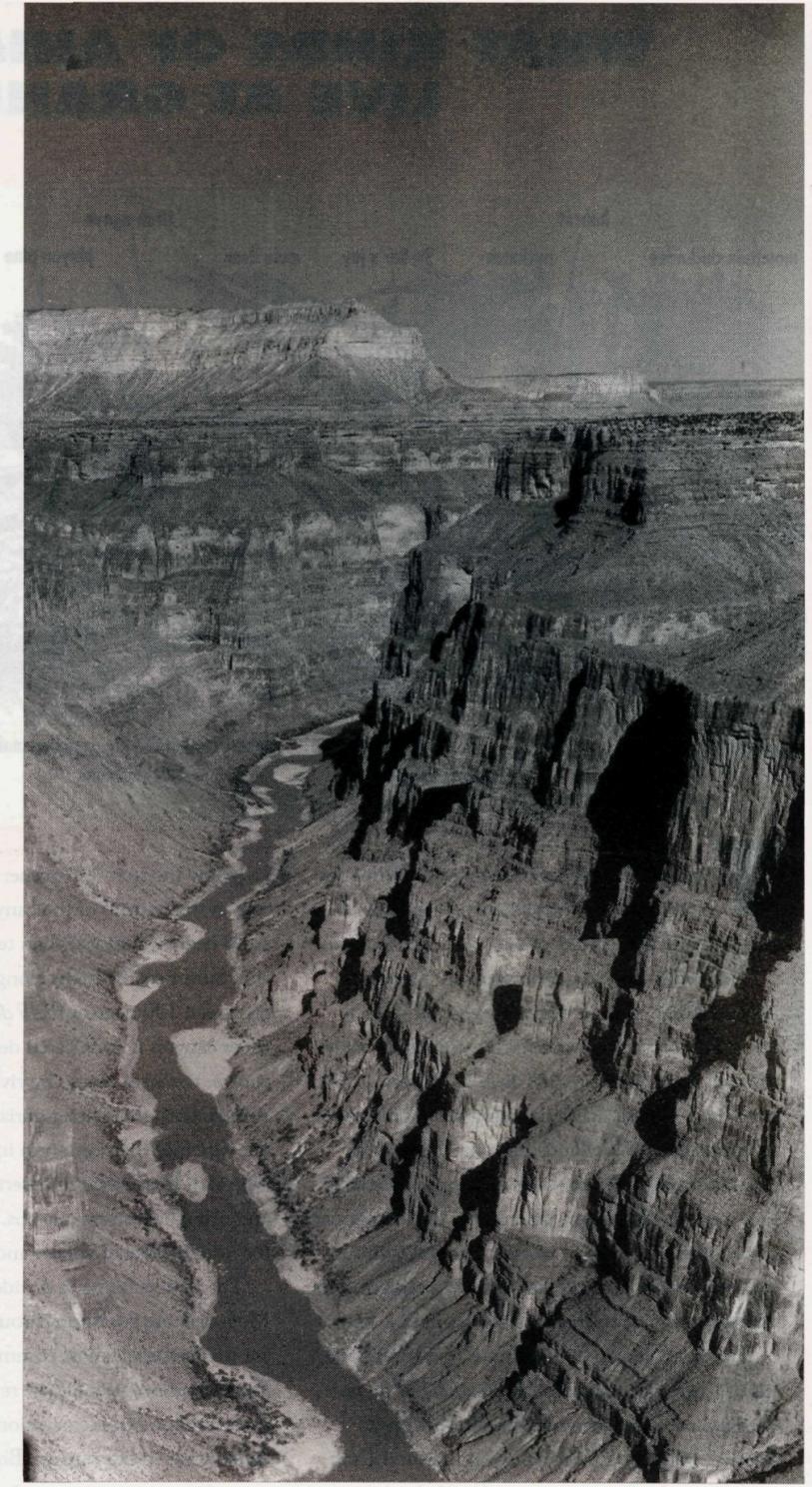
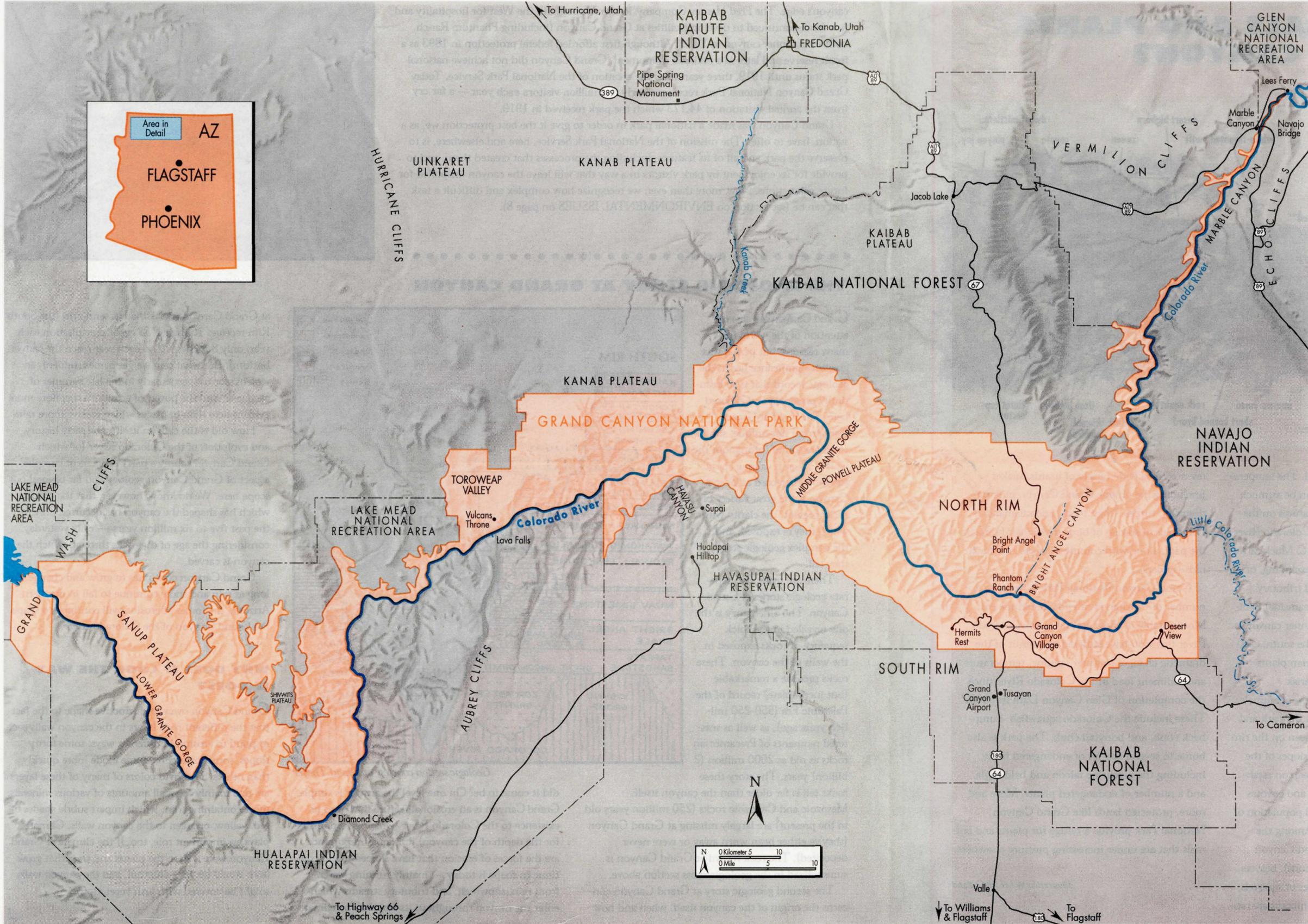
at Grand Canyon is classified as semi-arid (the South Rim receives 15 inches/38 cm of precipitation each year; only 8 inches/20 cm each year reach the canyon bottom). But what rain we get comes suddenly in violent storms, particularly in the late summer of each year, and the power of erosion is therefore more evident here than in places which receive more rain.

How old is the canyon itself? The early history and evolution of the Colorado River (of which Grand Canyon is only a part) is the most complex aspect of Grand Canyon geology and far beyond our scope here. We do know, however, that the erosion which has shaped the canyon has occurred only in the past five to six million years — only yesterday, considering the age of the rocks through which the canyon is carved.

Grand Canyon continues to grow and change. As long as rain and snow continue to fall in northern Arizona, the forces of erosion will continue to shape the Grand Canyon of the Colorado River.

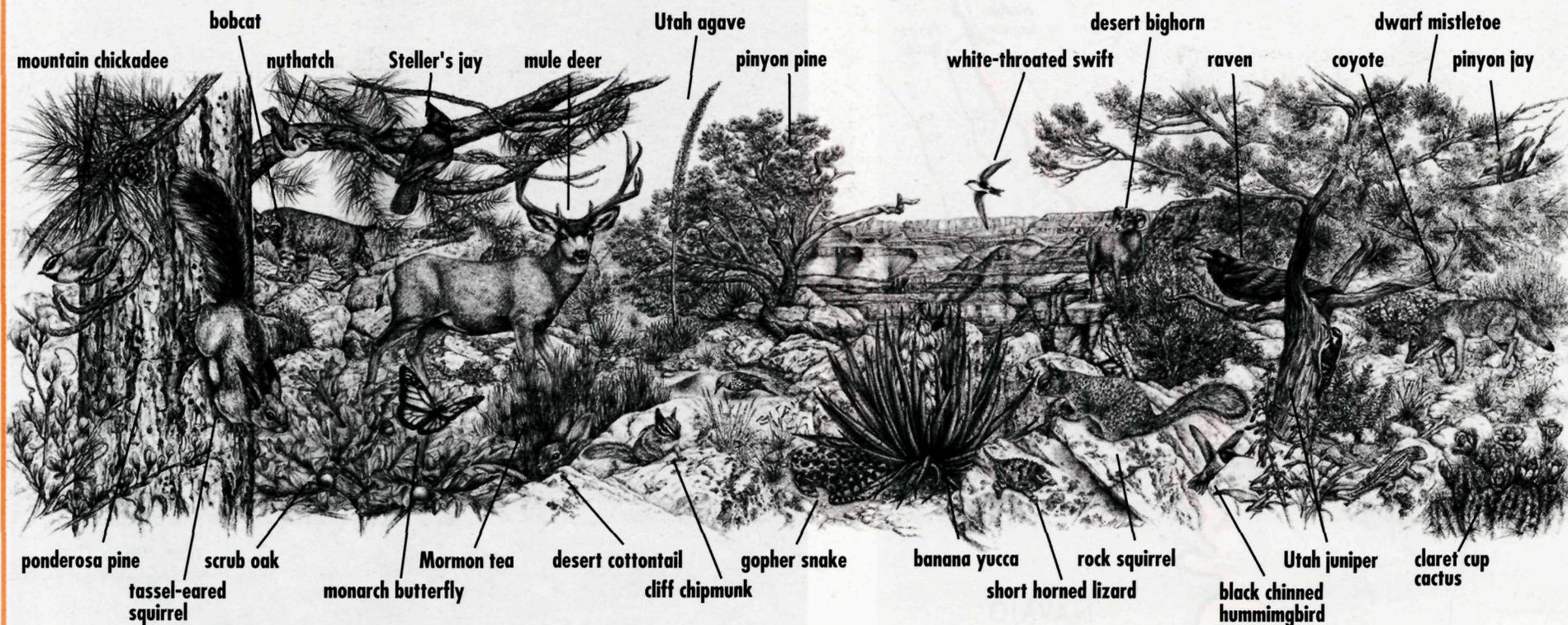
WHY DOES IT LOOK THE WAY IT DOES?

Grand Canyon owes its distinctive shape to the fact that the different rock layers in the canyon walls each respond to erosion in different ways: some form slopes, some form cliffs, some erode more quickly than others. The vivid colors of many of these layers are due mainly to small amounts of various minerals, most containing iron, which impart subtle shades of red, yellow, or green to the canyon walls. Climate plays an important role, too. If the climate at Grand Canyon were wetter, the plants and trees that grow here would be very different, and the canyon walls might be covered with lush vegetation.



Looking east from Toroweap Overlook, 1952. NPS photo

WHAT KINDS OF ANIMALS AND PLANTS LIVE AT GRAND CANYON?



There are 75 species of mammals, 50 species of reptiles and amphibians, 25 species of fish, and over 300 species of birds at Grand Canyon.

The South Rim of Grand Canyon lies on the edge of a high plateau whose gray-green forests stand out in sharp contrast to the arid lands below the rim. From here the cliffs drop 5,000 feet/1,524 m to the Colorado River, crossing several life zones in the process. It is a landscape characterized by abundant sunshine, extremes of temperature, and long periods of drought punctuated by downpours in summer and snow in winter. The soil is thin; bedrock lies just a few inches below the surface. The competition for moisture in this dry land is keen.

The forest on the South Rim is open and park-like. At elevations above 7,000 feet/2,134 m, ponderosa pine is the dominant tree in the forest. Below 7,000 feet/2,134 m pinyon pine and Utah juniper are the dominant trees. Gambel oak is another common member of the forest. The trees are interspersed with drought-resistant shrubs like cliffrose, fernbush, and serviceberry. Warm, sunny areas along the rim may be home to desert plants like banana yucca and claretcup cactus.

Below the rim, it's another world. The temperature at the bottom of the canyon can be as much as 30 degrees F higher than temperatures on the rim. Summertime highs along the Colorado River can reach 120 degrees F/49 degrees C. Much of the inner canyon is considered desert, excluding, of course, the areas along the river and tributary streams with their rich riparian (streamside) habitat. Much of the vegetation in the inner canyon is typical of that found in deserts to the south: cacti and drought-resistant shrubs. Riparian plants include thickets of willow and tamarisk.

The park is home to a wide variety of animals. Mule deer are common throughout the park and are the mammals most commonly seen on the rim. Desert bighorn inhabit the remote slopes of the inner canyon but are occasionally seen on established trails in the canyon. Bobcats and coyotes range from rim to river, and a small population of mountain lions exists in the park. Among the smaller mammals that inhabit Grand Canyon are ringtails (closely related to raccoons), beavers, gophers, chipmunks, several varieties of squirrels, rabbits, and bats. Reptiles and amphibians are rep-

resented by a wide variety of lizards, snakes (including the unique Grand Canyon pink rattlesnake), turtles, frogs, toads, and salamanders. Hundreds of species of birds make their home in the park, along with countless insects and arachnids (spiders).

Grand Canyon National Park is home to a number of threatened or endangered species. Most notable of these are the native Colorado River fish who have suffered as a result of the dramatic changes in water volume, temperature and sediment load of the Colorado River since the completion of Glen Canyon Dam in 1963. These include the Colorado squawfish, humpback chub, and bonytail chub. The park is also home to several species of endangered birds, including the peregrine falcon and bald eagle, and a number of endangered plants. More and more, protected lands like Grand Canyon National Park provide a refuge for plants and animals that are under increasing pressure elsewhere.

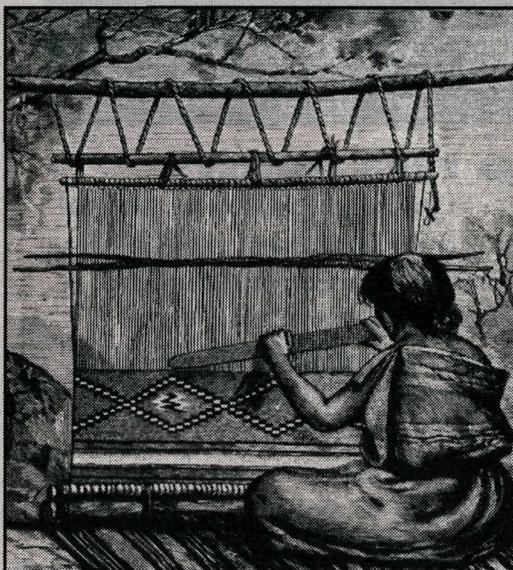
Illustration by Liz McClelland

NATIVE AMERICANS AT GRAND CANYON—PAST AND PRESENT

Humans have inhabited the Grand Canyon region for at least 4,000 years. The oldest evidence of their presence is tiny split-twig figurines, animal figures a few inches in height, made primarily from twigs of willow or cottonwood and found in caves below the rim. These early remains were fashioned by the people of the Desert Culture. (For more on split-twig figurines, see below.)

Prehistoric Pueblo peoples of the southwestern United States made their home in the four corners region (where Utah, Colorado, New Mexico, and Arizona share a common point). Their record in the Grand Canyon region is rich and spans the time period from 200 B.C. to A.D. 1300.

They migrated from sites in the area around A.D. 1300 and are believed to be the ancestors of the Hopi people, who inhabit the region to the east of Grand Canyon. The Hopi name for these ancestors is Hisatsinom (hee-SOT-sin-ahm). The Hopi people believe that they emerged from the canyon and that their spirits rest here. Today the Havasupai people continue to inhabit the inner canyon in a region to the west of Grand Canyon Village. Here in this remote and beautiful corner of the canyon sits the village of Supai and the



descendants of a people who have lived here for several hundred years. The village remains accessible only by foot, pack animal, or from the river but is heavily visited each year by tourists.

The Navajo people make up one of the largest tribes in North America. The Navajo live throughout the region and on the Navajo Reservation, which borders the park on the east. Relative newcomers to this region, they are the descendants of Athabascan peoples who migrated to the southwest from the north in the 15th century.

The Hualapai Reservation borders the canyon on the south, in the western Grand Canyon. The Hualapai are descendants of the Cerbat people and have been in the area since A.D. 1300.

The Southern Paiute Indians occupy land north of the Colorado River in what is known as the Arizona Strip. They used the canyon for hundreds of years.

The Zuni Indians view the canyon as their place of origin, though today they live in New Mexico.

Brighty OF THE GRAND CANYON



In 1953, Marguerite Henry published a small book called *Brighty of the Grand Canyon*. Ever since that time, children and adults have been fascinated by the tale of a small burro who played a role in Grand Canyon history. Who was Brighty? Did he exist? And if so, how much of the tale is true?

There was a real Brighty. As far as we can tell, he lived at Grand Canyon from around 1892 until 1922. He was given the name "Bright Angel" after the creek that flowed into the canyon from his summer home on the North Rim, but everyone called him Brighty. He spent his summers carrying water from a spring below the rim to tourist accommodations on the North Rim. He was tolerant of children, who would ride on his back for hours. Most of the events and people in Marguerite Henry's book were based on fact: Brighty was the first to cross the new



bridge at the bottom of the canyon, and he did meet Teddy Roosevelt.

Today a life size bronze statue of Brighty (the work of sculptor Peter Jepson) sits near Grand Canyon Lodge on the North Rim, where he is admired and remembered by children and adults alike. In spite of his friendliness toward people, and his willingness to act as a beast of burden for his friends, he was essentially a wild creature who roamed the canyon at will. It is this spirit of independence, more than anything, that has captured the hearts of readers for years.

Burros are not native to North America. They were introduced to the Grand Canyon area by prospectors in the late 1800s and resided in the park for most of this century. Increasingly they were a problem for native species, both plants and animals. The last of the burros were removed from Grand Canyon in the 1980s.

Make your Own Split-Twig Figurine

A figurine is made from one twig (1) which has been split into two parts, leaving several inches toward the thick end intact (2).

The unsplit end forms the back legs and backbone (3).

One split end, when wrapped around the legs (4), forms the body (5); the other end, which forms the front legs is then brought up to create the head and neck (6-8).

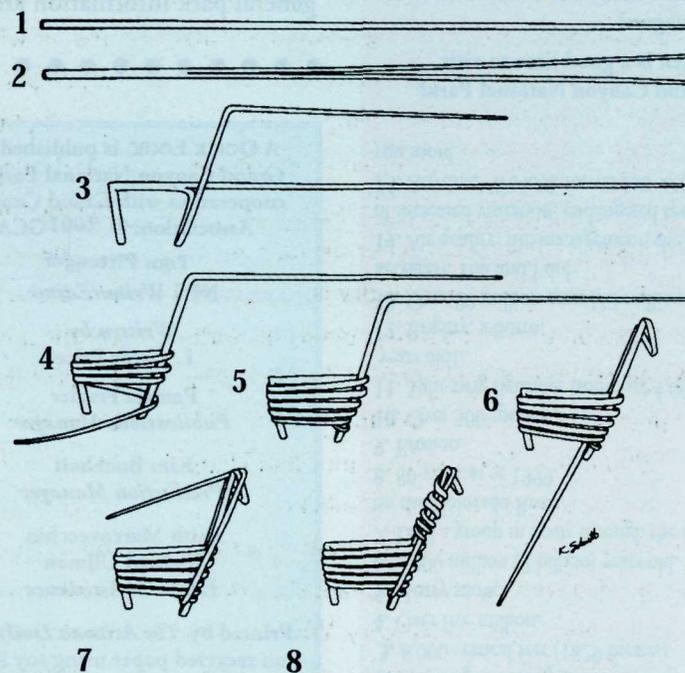


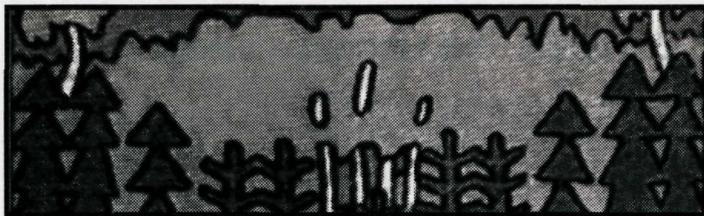
Illustration by Karen Schmitt

TEST your KNOWLEDGE of GRAND CANYON

Read through A QUICK LOOK to find answers to the following Grand Canyon-related questions:

1. How many square miles (or acres) does Grand Canyon National Park protect?
2. What are the names of the three bordering American Indian tribes?
3. What is Grand Canyon's deepest point from rim to river?
4. How many people visit Grand Canyon each year?
5. Why is the North Rim closed from late October to mid May each year?
6. How old are the oldest rocks found at Grand Canyon? Are these the oldest rocks in the world?
7. What was John Wesley Powell the first person to do at Grand Canyon?
8. How long has Grand Canyon been protected as a national park?
9. Geologically speaking, to what does the canyon owe its existence?
10. How many species of birds live in Grand Canyon's diverse habitats?
11. What is the oldest evidence of humans at Grand Canyon?
12. Who did Marguerite Henry write about in her book?
13. How many acres of land does the National Park Service administer? Who owns this land?
14. What are some of the important environmental issues that concern Grand Canyon National Park managers?
15. When is a good time to visit Grand Canyon National Park?

ANSWERS:
1. 1,904 square miles (1.2 million acres).
2. Havasupai, Hualapai, Navajo tribes.
3. 6,000 vertical feet (1829 meters).
4. Over five million.
5. Heavy snow.
6. 2,000 million (2 billion) years old. No!
7. Lead a group in boats through the canyon on the Colorado River.
8. 80 years as of 1999.
9. Erosion.
10. Over 300 species.
11. Split-wing figurines (some are 4,000 years old).
12. Brightly, a burro.
13. Over 80 million acres (32 million hectares). You and I do!
14. Air quality, fire management, the impact of increased visitation, endangered species.
15. Anytime! We look forward to seeing you soon!



THE NATIONAL PARK SERVICE

Grand Canyon National Park is managed by the National Park Service, an agency of the Department of the Interior. The National Park Service administers over 80 million acres/32 million hectares of public land in the United States. These lands include more than 380 diverse units of the National Park System, including national parks, national monuments, national historic sites, etc.

The national park idea is an old one, often called "the best idea America ever had." It is generally traced to the establishment of Yellowstone National Park in 1872. At that time the National Park Service did not exist; early parks were administered by other branches of the federal government (including the army). The National Park Service itself came into being by act of Congress in 1916. Since then, the National Park Service has been custodian of some of the most significant natural and historic sites throughout the country.

IF YOU PLAN TO VISIT GRAND CANYON

Be sure to plan ahead! Reservations for overnight lodging or camping (and mule trips) are often booked a year in advance. Write and request a Trip Planner from Grand Canyon National Park, P.O. Box 129, Grand Canyon, Arizona 86023. If you are interested in overnight hikes into the canyon, ask for the Backcountry Trip Planner. (Lodging reservations for the South Rim, including Phantom Ranch, may be made by calling (303) 297-2757; North Rim lodging reservations may be made by calling (303) 297-2757. Recorded messages with general park information are available at (520) 638-7888.

ENVIRONMENTAL ISSUES FACING PARK MANAGERS AT GRAND CANYON

Environmental issues of concern to park managers at Grand Canyon are as diverse as the park itself and include air quality, fire management, the impact of increased visitation, and endangered species, to name just a few. We tend to think of national parks as islands in time and space, but that's a dangerous illusion: more and more the forces which affect the integrity of the park ecosystem come from outside the park and are beyond the direct control of park managers.

The issue of air quality at the canyon is a prime example. Many summer visitors to Grand Canyon find the view from the rim obscured by regional haze carried in from urban and industrial areas to the south and west, from far outside the park. Even in winter, when prevailing winds tend to carry cleaner air from the north, emissions of sulphur dioxide from local sources can significantly impair visibility at Grand Canyon.

Water is another significant issue: most of the water which finds its way into the canyon comes from outside the park, and the flow of the Colorado River through Grand Canyon is directly controlled by the release of water from Glen Canyon Dam, just 15 miles/24 km upstream from the park. In the past few years a great deal of research has been directed toward the effect of Glen Canyon Dam on the Colorado River in Grand Canyon. For years we've been aware of the more obvious effects of the dam: colder water, carefully controlled flows, the absence of distinct seasonal fluctuations, and greatly decreased sediment load. Only now are we beginning to understand the long term effects these changes have had on the system as a whole.

Such issues are of interest to all of us, and there are no easy answers. But the task of preservation and protection within park boundaries is not nearly as simple as it must have looked years ago. The issues which interest park managers are in many cases the same issues which affect us all and which we as a nation must address.

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SUGGESTED READING

Living at the Edge: Explorers, Exploiters and Settlers of the Grand Canyon Region by Michael F. Anderson. Grand Canyon Association, 1998. Human history.

Exploring The Grand Canyon: Adventures of Yesterday and Today by Lynne Foster. Grand Canyon Natural History Association, 1990. Young adult.

An Introduction to Grand Canyon Ecology by Rose Houk. Grand Canyon Association, 1996. Ecology.

A Field Guide to the Grand Canyon by Stephen Whitney. 2nd ed. Mountaineers, 1996. Natural history.

An Introduction to Grand Canyon Geology by L. Greer Price. Grand Canyon Association, 1999. Geology.

Grand Canyon's Long-Eared Taxi by Karen Taylor. Grand Canyon Natural History Association, 1992. Mules at Grand Canyon.

These books, and many others, may be purchased from Grand Canyon Association: P.O. Box 399, Grand Canyon, AZ 86023 (520) 638-2481 or (800) 858-2808 for orders only. www.grandcanyon.org