

4 corners

Another stroll
through some of
America's less
famous National
Parks



(Part 2 of the "Best Idea" trilogy)



This trilogy consists of 3 geographically-based volumes, as shown above. You are in volume 2. The name of each volume is explained within its pages while the name of the trilogy is taken from a quote by Wallace Stegner, who said:

"National parks are the best idea we ever had. Absolutely American, absolutely democratic, they reflect us at our best rather than our worst."

Wallace Earle Stegner (1909 to 1993) was an American novelist, short story writer, environmentalist, and historian who won the Pulitzer Prize in 1972.

The National Park Service manages 418 individual units in all 50 states, the District of Columbia, and US territories. The table below shows most of the different naming designations, all of which are commonly referred to as "parks". Some parks such as Jean Lafitte consist of more than one location or unit.

16 National Battlefields, Battlefield Parks & Battlefield Sites
9 National Military Parks
52 National Historical Parks & 77 National Historic Sites
1 International Historic Site
4 National Lakeshores & 10 National Seashores
29 National Memorials & 88 National Monuments
60 National Parks
4 National Parkways
19 National Preserves & 2 National Reserves
18 National Recreation Areas
5 National Rivers
10 National Wild and Scenic Rivers and Riverways
3 National Scenic Trails

About 380 of the units keep records of visitor numbers, and we have used the official 2018 figures in deciding which sites count as "less famous".

23 Parks had more than 4 million visitors in 2018, and 45 had more than 2 million.

4 of the sites featured here had fewer than 100,000 visitors in the same period, and only 1 had more than half a million visitors.

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We are sure you will know of, and may well have visited, the more famous US National Parks such as Yellowstone..



Death Valley,.....



..and the Grand Canyon.



You will know that there are many more National Parks in the USA, especially in the west of the country. Arizona and Utah in particular have some spectacular geomorphology with great canyons and red rocks, but there are plenty of interesting sites further east in the country as well. For example the National Parks Service looks after The National Mall in Washington D.C. and the Jefferson National Expansion Monument (Gateway Arch) in St. Louis.



In this book we're going to have a look at some sites which are much less well-known but still very interesting.



So why is this book called “4 corners”? If you look at the centre of the circle on the map above, you will see that 4 States meet in one place, called Four Corners. This is the only place in the USA where this happens, and the States in question feature large numbers of National Parks. Let’s now have a look at some of the less famous of these.

One of Arizona's jewels is of course the Grand Canyon but not far from Grand Canyon Village lies **Wupatki National Monument**. Although less spectacular than the Grand Canyon, Wupatki is more accessible and to some people more interesting.

Wupatki is a pueblo, "a North American Indian settlement of the south-western US, especially one consisting of multi-storeyed adobe houses built by the Pueblo people". It was occupied for less than 2 centuries up until about the year 1250.



This is clearly a multi-storeyed building, and what makes it special is its size and the way it is built round rock outcroppings, using these as part of the structure. This latter feature will hopefully become clearer in the following photographs.





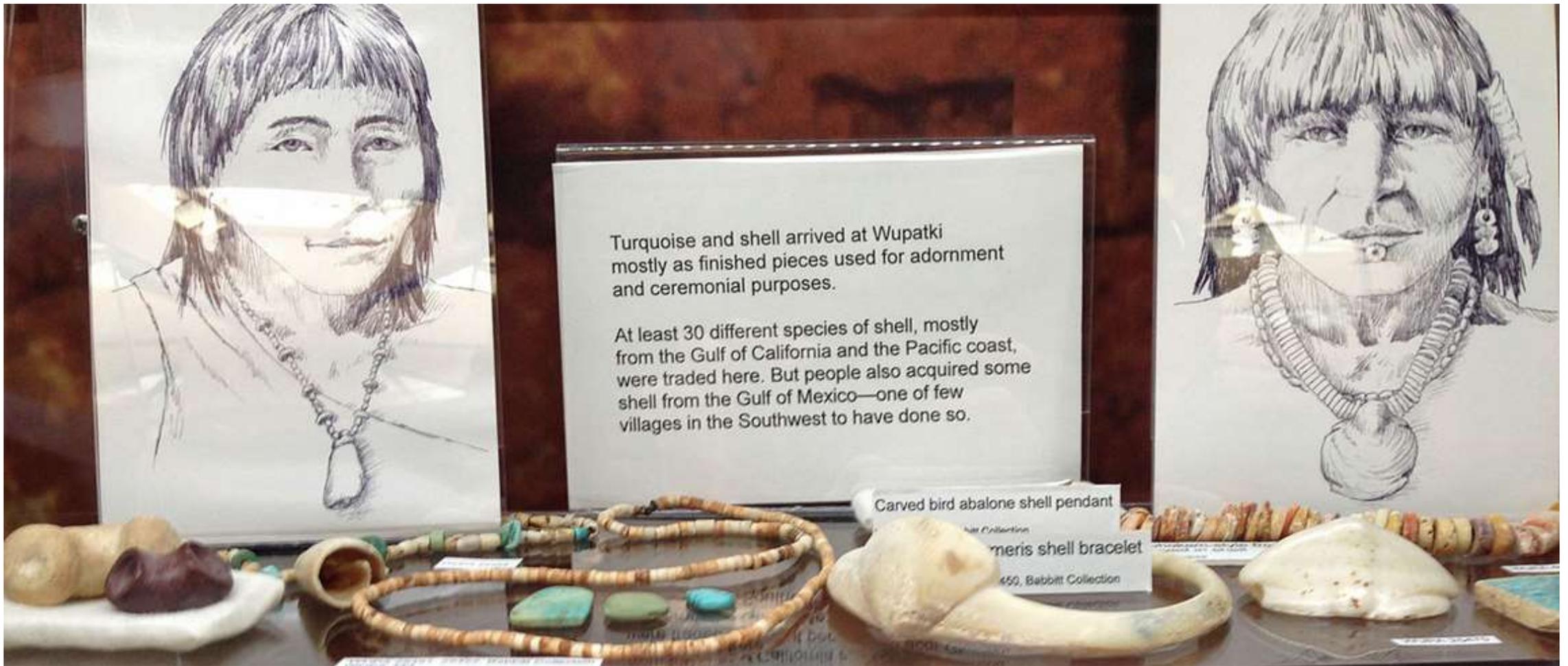


Human history here spans at least 10,000 years. But only for a time, in the 1100s, was the landscape densely populated. The eruption of nearby Sunset Crater Volcano a century earlier probably played a part. Families that lost their homes to ash and lava had to move. They discovered that the cinders blanketing lands here could hold moisture needed for crops.

As the new agricultural community spread, small scattered homes were replaced by a few large pueblos, each surrounded by many smaller pueblos and pithouses. Wupatki and other masonry pueblos like Wukoki and Lomaki put their roots into the bedrock.

At that time there was no other pueblo like Wupatki. Less than 800 years ago, it was the tallest, largest, and perhaps the richest and most influential pueblo around. It was home to 85-100 people, consisted of about 100 rooms and several public spaces including a community room and a ceremonial ball court. Several thousand more people lived within a day's walk. It was built in one of the lowest, warmest, and driest places on the Colorado Plateau.





Turquoise and shell arrived at Wupatki mostly as finished pieces used for adornment and ceremonial purposes.

At least 30 different species of shell, mostly from the Gulf of California and the Pacific coast, were traded here. But people also acquired some shell from the Gulf of Mexico—one of few villages in the Southwest to have done so.

Carved bird abalone shell pendant
Babbitt Collection
meris shell bracelet
450, Babbitt Collection

Trade networks expanded, bringing exotic items like turquoise, shell jewellery, copper bells, and even parrots. Wupatki flourished as a meeting place of different cultures until, around 1250, the people moved on, probably because the area became denuded of trees and the soil no longer carried the right nutrients for crops.

We now move north into Utah to **Natural Bridges National Monument**

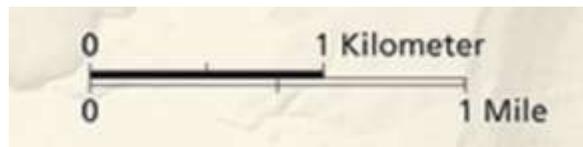
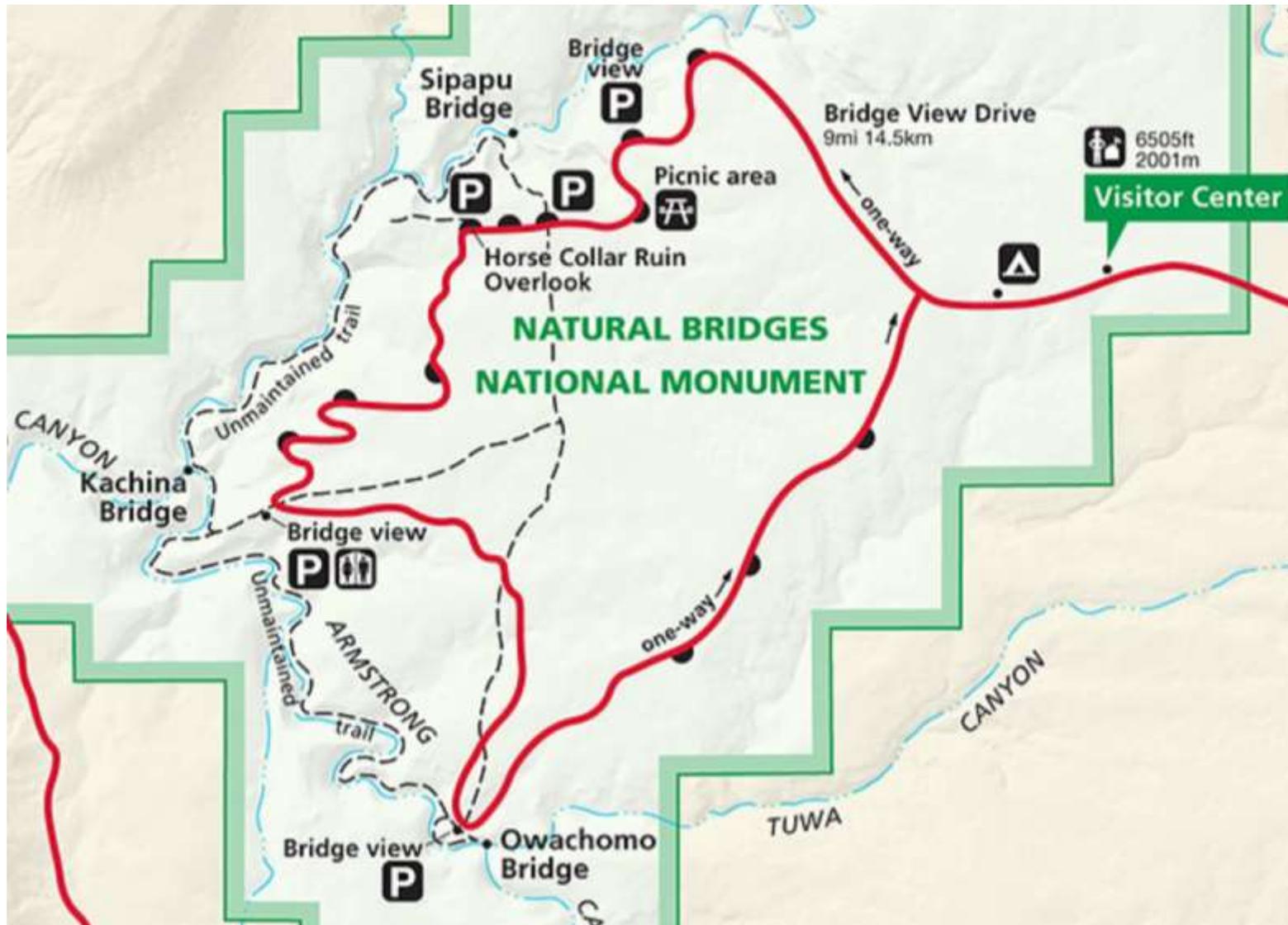
10 million years ago, plates colliding below the surface pushed layers of sand, silt and mud upwards to create a high desert called the Colorado Plateau. After uplift, the Colorado River and its streams cut into the plateau and created winding canyons.

Some of the tributary streams wound back and forth in folds like those shown here. Thin canyon walls separated the different turns. As water pounded against these walls, eventually the rock crumbled. This left thin *natural bridges* of rock above the newly-made streambed.

The Colorado Plateau extends far beyond its namesake State into Utah, New Mexico and Arizona. The Colorado River is named for the State in which it rises, but less than a quarter of its 1450 miles lies in Colorado. It continues into Utah, near Natural Bridges National Monument, then Arizona before forming the Nevada/Arizona and California/Arizona borders.

It reaches the sea at the Gulf of California in Mexico. As you may well know, it is a particularly destructive creature: it is responsible for the creation of the Grand Canyon.





There are natural bridges in other parts of the USA, and indeed in other countries, but to the best of my knowledge nowhere else can you find 3 large bridges in such close proximity. The map on the left and scale below show that it is less than 7 miles from the first to the last along the twisty trail on the canyon floor, and less than 4 miles as the crow flies.

As the National Parks website puts it:
“Three majestic natural bridges invite you to ponder the power of water in a landscape usually defined by its absence.”

The bridges form as water, carrying rocks and other debris, wears away the canyon walls and breaks through to the next loop of the river, leaving an arch of rock above the water level. At first, each bridge is thick and massive like Kachina Bridge shown here.

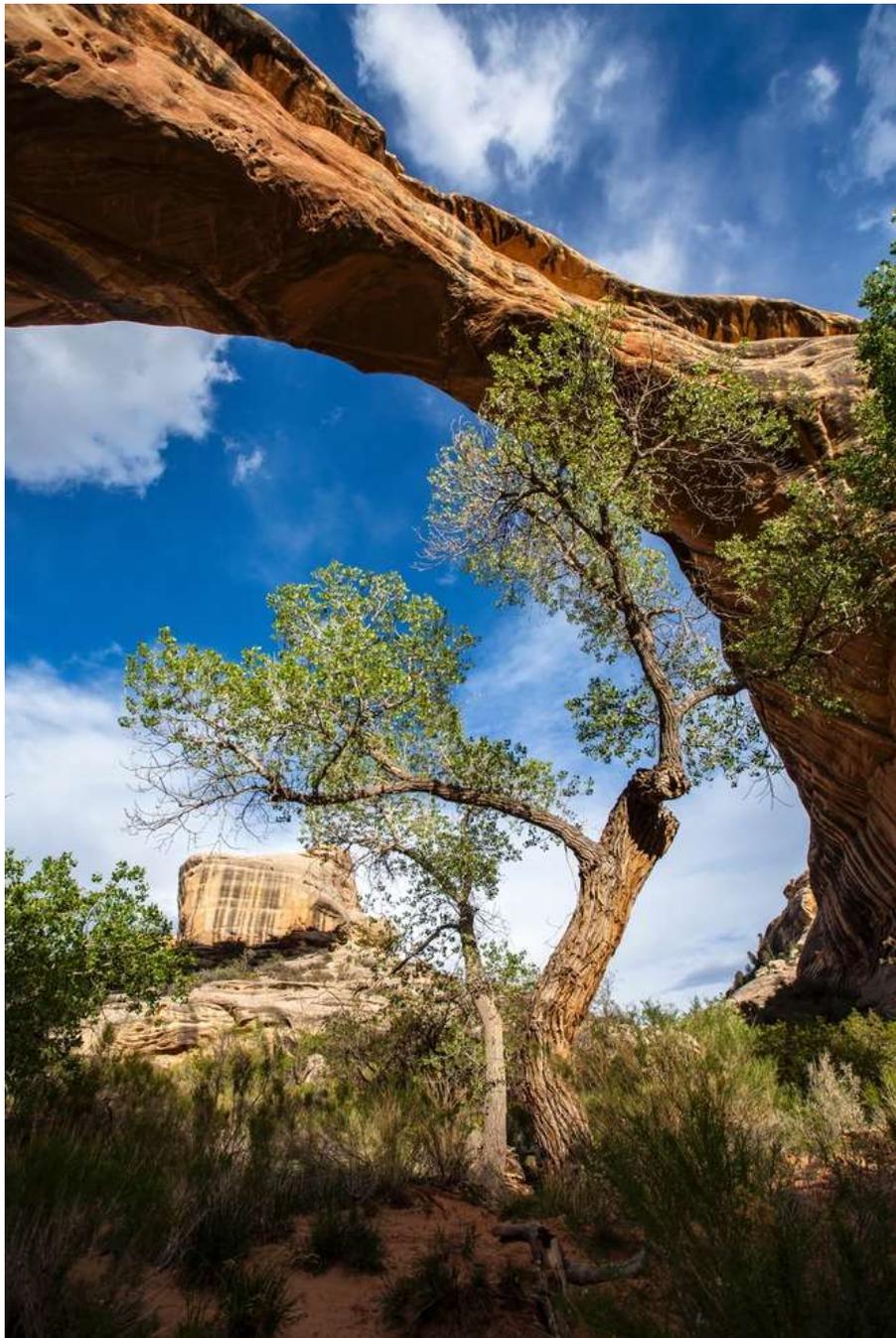
Erosion works away at the rock, making the bridge more delicate over time, like those on the following slides. Eventually, all these bridges will collapse.

The site has been a National Monument since 1908, the bridges being named *Kachina*, *Owachomo* and *Sipapu* in honour of the Native Americans (Hopi tribe) who once made this area their home.



The bridges are quite difficult to make out from above: the space under Kachina is slightly below and left of centre of this picture, but the top of the bridge blends in with the background.





Sipapu means "the place of emergence," an entryway by which the Hopi believe their ancestors came into this world. Kachina is named for rock art on the bridge that resembles symbols commonly used on kachina dolls. Owachomo means "rock mound," a feature on top of the bridge's east abutment.

People repeatedly occupied and abandoned Natural Bridges during prehistoric times. They first began using this area from 7000 BC to 500 AD although only the rock art and stone tools left by hunter-gatherer groups reveal that humans lived here then. Around 700 AD, ancestors of modern Puebloan people moved onto the mesa tops to dry farm and later left when the natural environment changed.

Three hundred years after their ancestors left, the farmers returned. They built homes of sandstone masonry or mud-packed sticks, both on the mesa tops and in alcoves in the cliffs. South facing caves provided passive solar heating and cooling. The farmers often chose sites near seep springs where water could be found. They left this area for the last time around 1270 AD.

Navajos and Paiutes lived in the area during later times, and Navajo oral tradition holds that their ancestors lived among the early Puebloans.

Sipapu bridge is considerably less substantial than Kachina, as you can see.

Owachomo bridge is also much more delicate than Kachina.



One of the most startling National Parks is in Colorado, about 50 miles north of the New Mexico border. As you drive along at an altitude of about 7500 feet, in the San Luis Valley nestling among the peaks of the Sangre de Cristo Range of mountains (which themselves rise to more than 13,500 feet), you suddenly encounter America's tallest sand dunes in the **Great Sand Dunes National Park**.

The sand dunes rise to a height of 750 feet from the floor of the valley, cover an area of about 30 square miles and are estimated to contain over 5 billion cubic metres of sand.



Where did the sand come from?

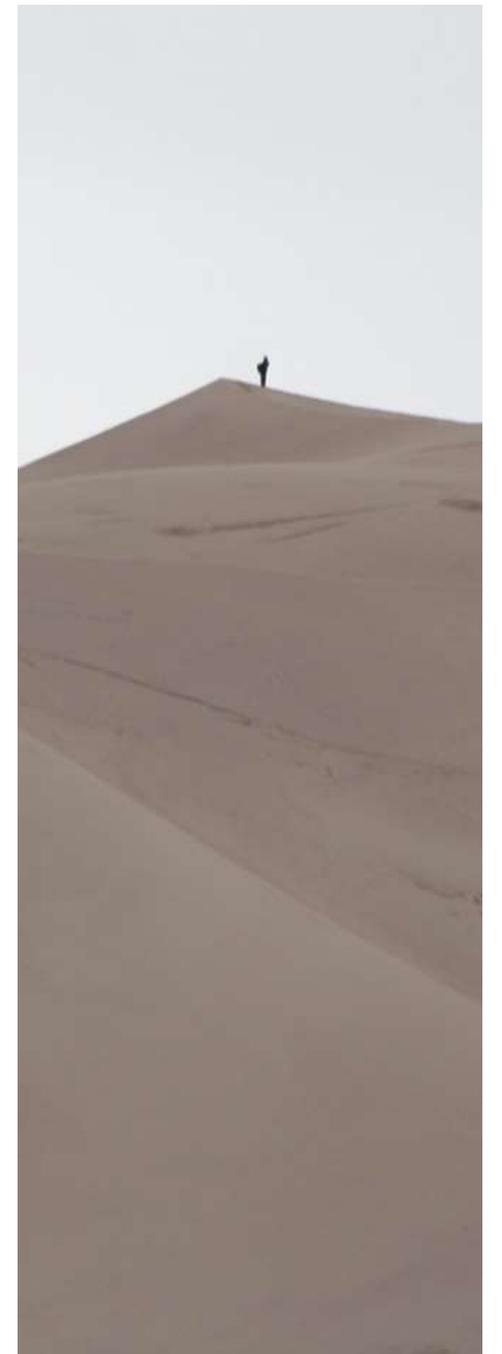
A huge lake once covered much of the San Luis Valley floor but it receded after the volcanic deposits in the southern end of the valley were washed away. This left behind two much smaller lakes in the north-eastern side of the valley. Large amounts of sediment from the volcanic San Juan Mountains continued to wash down into these lakes, along with some sand from the Sangre de Cristo Range. Dramatic natural climate change later significantly reduced these lakes, leaving behind a sand sheet.



Sand that was left behind blew with the predominant southwest winds toward a low curve in the Sangre de Cristo range. The wind funnels toward three mountain passes and the sand accumulates in this natural pocket. The prevailing winds blow from the valley floor toward the mountains, but during storms the winds blow back toward the valley causing the dunes to grow vertically.

Two mountain streams capture sand from the mountain side of the dune field and carry it around the dunes and back to the valley floor. The creeks then disappear into the sand sheet, and with a beautiful symmetry the sand blows back onto the dunes.

These shots of people on the dunes may give a better idea of scale.

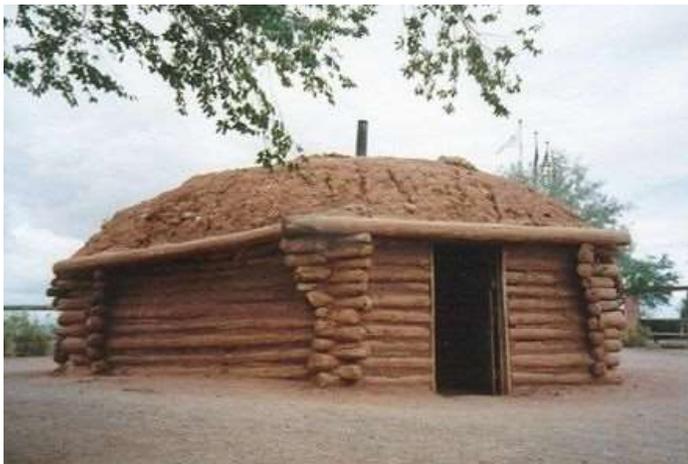




Back in Arizona we find **Canyon de Chelly National Monument** whose colourful sheer cliff walls were created by millions of years of land uplifts and stream cutting. Incidentally, the word “Chelly” is a poor approximation of the Navajo name “Tseyi” (pronounced Shay).

The Ancient Puebloans found the canyons an ideal place to plant crops and raise families. People thrived until the mid-1300’s when the Puebloans left the canyons to seek better farmlands. Descendants of the Puebloans, the Hopi, then migrated into the canyons to plant fields of corn and orchards of peaches.

After the Hopi left this area to settle permanently on the mesa tops to the west, the Navajo settled the Southwest between the four sacred mountains. The Navajo, or Dine' as they call themselves, continue to raise families and plant crops just as the “Ancient Ones” had. The farms, livestock and hogans of the Dine’ are visible from the canyon rims.



In many places the canyon walls are virtually vertical.







Evidence of continued occupation of the canyon by the Navajo people.

The Ancient Puebloans who lived here until the 14th century built pit houses that were then replaced with more sophisticated homes as more families migrated to the area.

More homes like the one in this picture were built in alcoves to take advantage of the natural protection.









Spider Rock seen from the southern rim road.

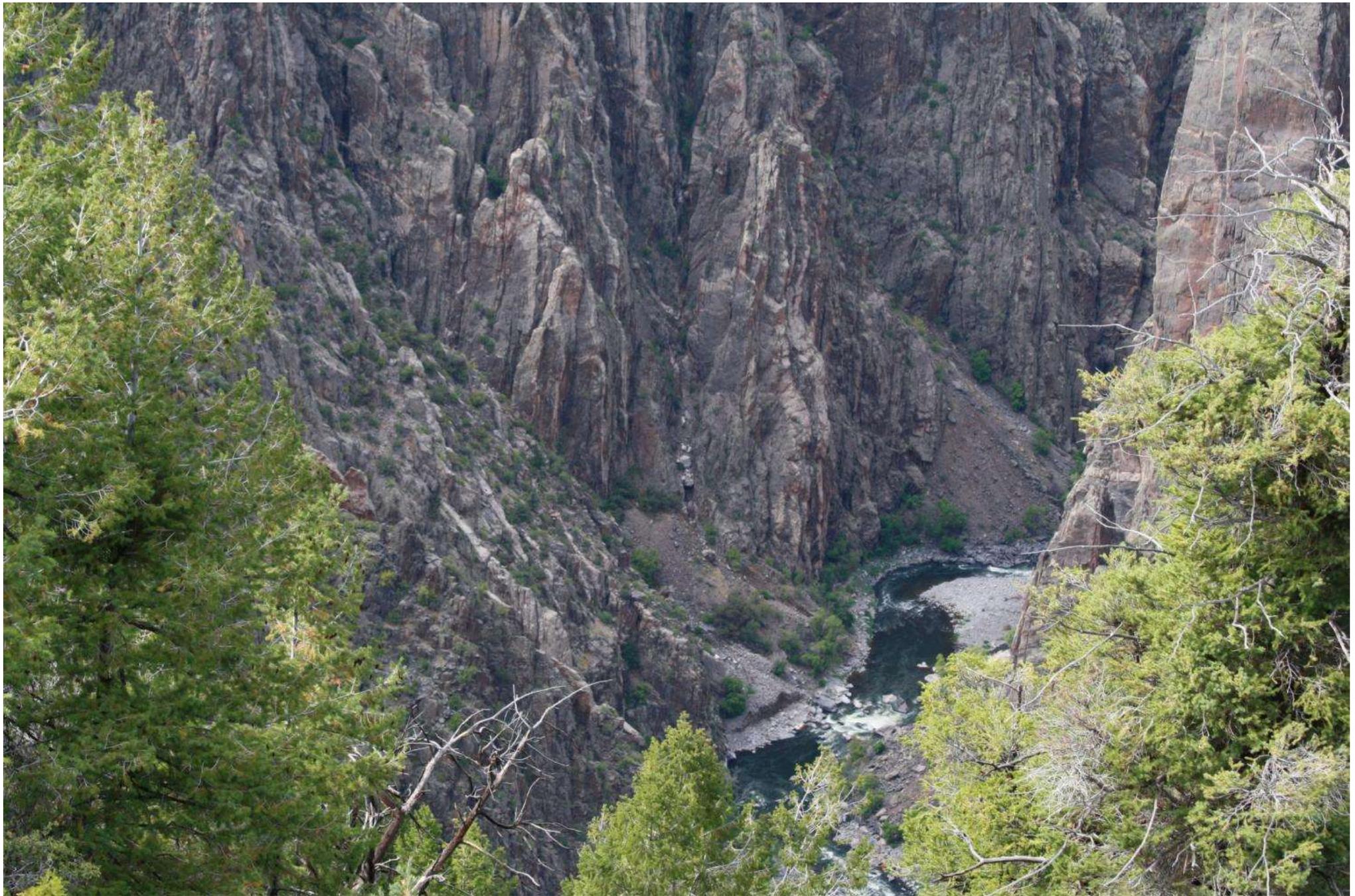
This is an example of a hoodoo, a tall, thin spire of rock that protrudes from the bottom of an arid drainage basin or badland.

Hoodoos are also called tent rocks, fairy chimneys or earth pyramids. They typically consist of relatively soft rock topped by harder, less easily eroded stone that protects each column from the elements. They generally form within sedimentary rock and volcanic rock formations.

Let's nip back into Colorado now to **Black Canyon of the Gunnison National Park**.

The view of the canyon from the first overlook on the South Rim approach road.







This picture shows how the different layers of sedimentary rock have been twisted by tectonic activity from their original horizontal strata.

Here the river is about 1100 feet below the rim.

How many stars can you see in the night sky? 500? 1000? The chances are that if you are anywhere near an urban area you won't see any more because of light pollution.

In Black Canyon of the Gunnison the National Park Service uses as little artificial lighting as is necessary for safety. Motion detectors limit the light needed within restrooms and other areas in the park, and all outdoor lighting devices use low-energy, low-impact bulbs with shields that direct light to the ground where it is needed.

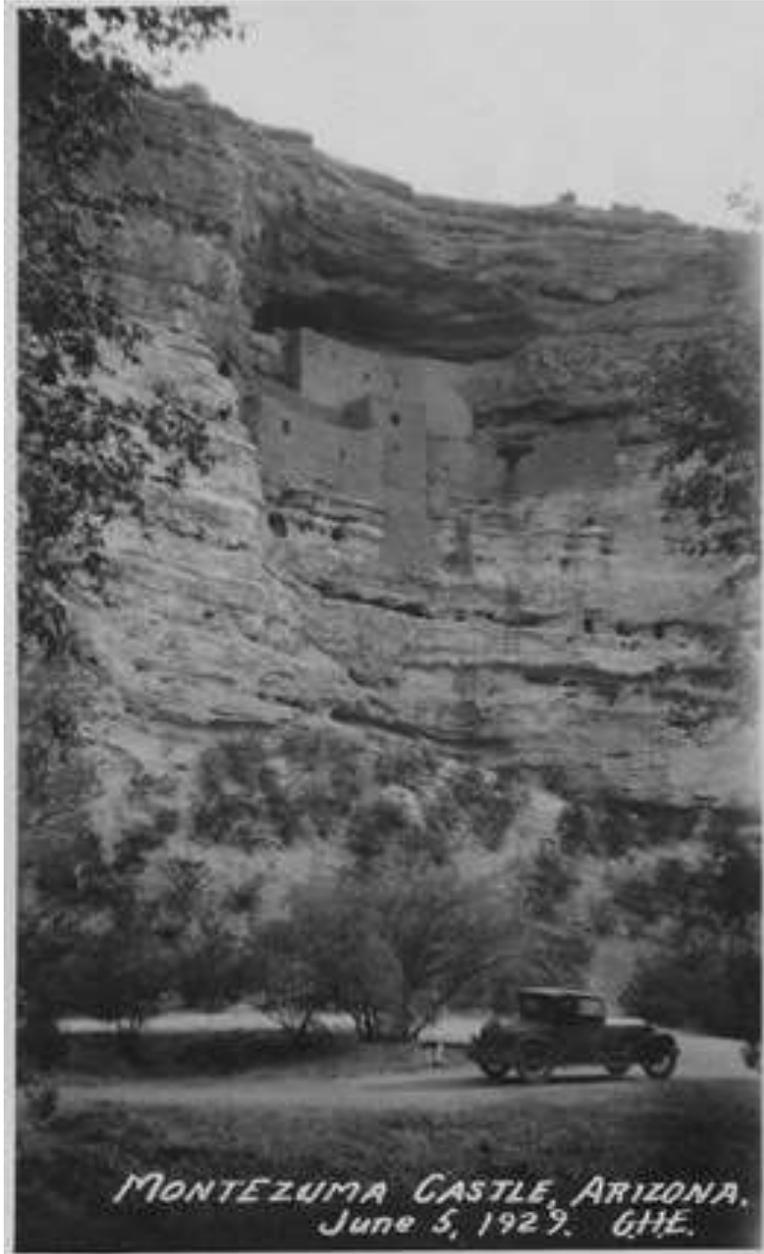
As a result, here you can find some of the darkest skies in America: in some areas it's possible to see up to **15,000** stars throughout the night. Because of these exceptional skies, as well as astronomy education programs and responsible lighting, Black Canyon of the Gunnison National Park was designated as an International Dark Sky Park in 2015. The International Dark-Sky Association works to preserve the skies and educate the public about light pollution and how they can make a difference in protecting dark skies in national parks and at home.

Black Canyon offers night sky viewing opportunities throughout the year. The park is always open to stargaze on your own, rangers and local astronomers give evening talks from May until September 3 times per week (weather permitting), and a large astronomy festival takes place each June with guest speakers and special activities.









Now to Arizona again for **Montezuma Castle National Monument**.

Neither part of the monument's name is correct: it isn't a castle, and it has absolutely no connection to Montezuma!

When European-Americans first saw the ruins in the 1860s, by then long-abandoned, they named them for the famous Aztec emperor Montezuma in the mistaken belief that he had been connected to their construction. In fact, the dwelling was abandoned more than 40 years before Montezuma was born, and was not a castle in the traditional sense, but instead functioned more like a high rise apartment building, as many families lived there.

Construction of the "Castle" itself is thought to have begun in the 12th Century, though the building efforts probably occurred gradually, level-by-level, over many generations. The region's population likely peaked around 1300 AD, with the Castle housing between 30 and 50 people in at least 20 separate rooms. A neighbouring segment of the same cliff wall suggests the existence of an even larger dwelling (referred to as "Castle A") around the same time, of which only the stone foundations have survived. The discovery of Castle A in 1933 revealed many Sinagua artefacts and greatly increased understanding of their way of life.

On December 8, 1906, President Theodore Roosevelt celebrated the passage of the Antiquities Act by declaring four sites of historic and cultural significance as America's first National Monuments. Among these was Montezuma Castle, which the President identified as a place "of the greatest ethnological value and scientific interest."

Early visitors to Montezuma Castle could access the ruins via a series of ladders propped against the cliffs. You can just make these out slightly to the right of the centre of the picture.



So who were the Sinagua people?

They were a pre-Columbian culture that occupied a large area in central Arizona between about 500 AD and 1425 AD.

The Sinagua economy was based on a combination of hunter-gatherer foraging and subsistence agriculture. They hunted a variety of game from antelope, bear and rabbit to turtles and ducks.

The word "Sinagua" is a contraction of the Spanish words "sin agua," or, "without water", an allusion to the arid country in which they lived.

In all probability those early historians who coined the name were unaware of how much climate change had impacted the area in the intervening years.





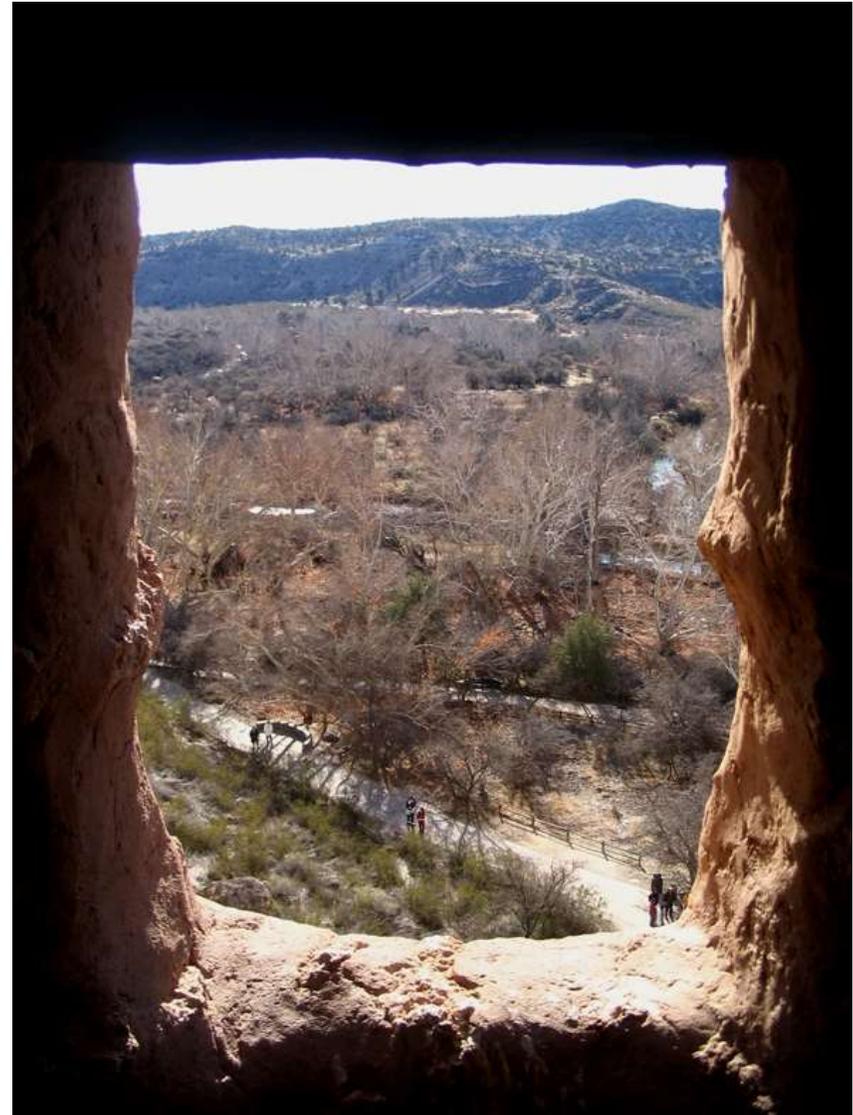


This page and the following one have photos taken by National Park Service archaeologists inside Montezuma Castle. Tours into the Castle were closed in 1951 due to deterioration. Today staff archaeologists only enter the Castle when needed for monitoring and preservation activities.

The interior of the castle remains almost completely intact, with many of the original ceiling support beams still in place. These logs were first installed over 800 years ago by the Sinagua Indians who built what we now call Montezuma Castle.

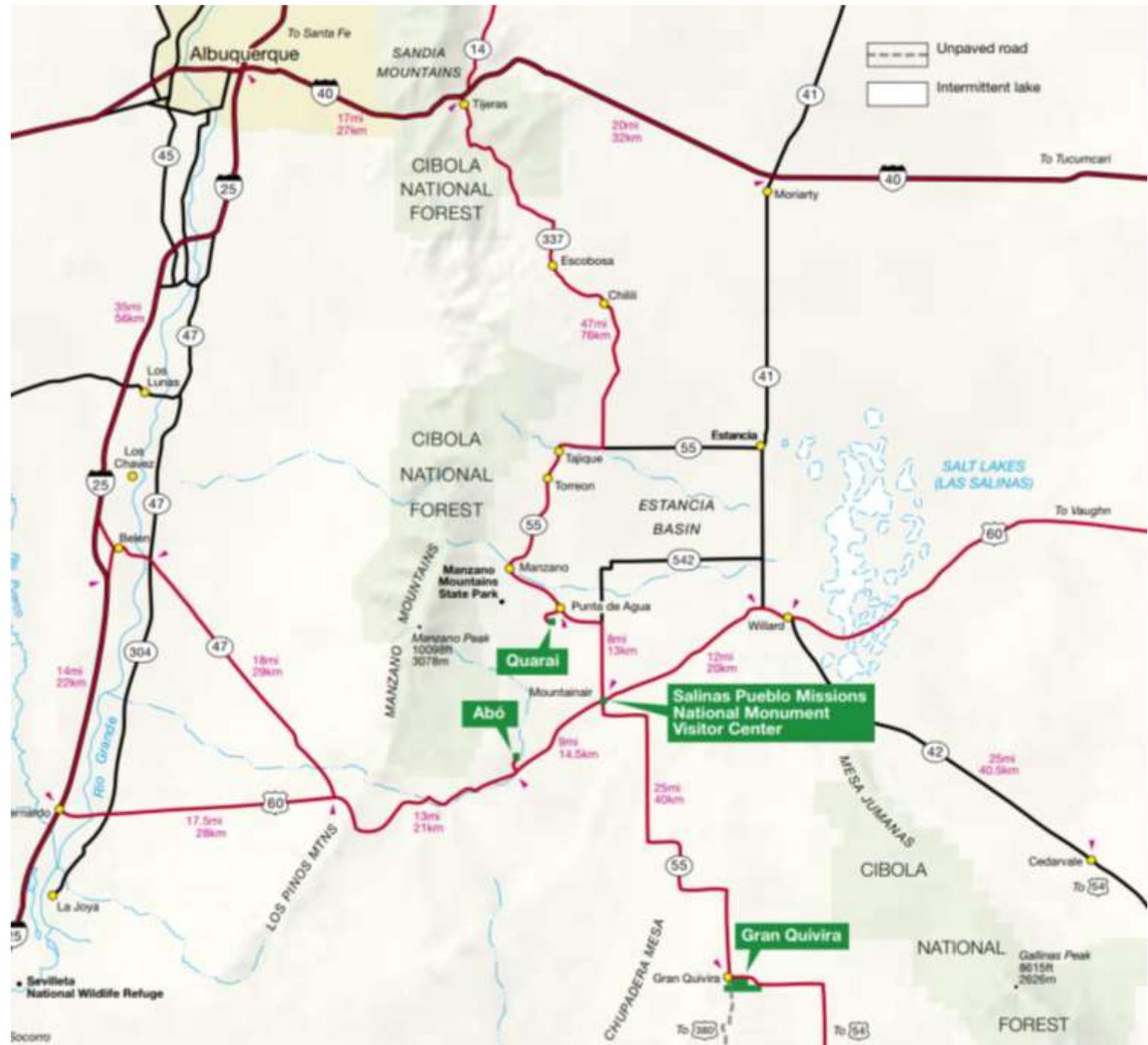


From the top floor of the ruin, it is possible to see inside several additional rooms that are not easily accessed today. When the Sinagua culture occupied the dwelling, these rooms would have been covered over and used for food preparation, storage, or sleeping areas.



On to New Mexico now, where about 50 miles southeast of Albuquerque lies the wonderfully-named town of Mountainair. 3 missions around the town constitute the **Salinas Pueblo Missions National Monument**.

Once, thriving Native American trade communities of Tiwa and Tompiro language-speaking Pueblos inhabited this remote frontier area of central New Mexico. Early in the 17th century Spanish Franciscans found the area ripe for their missionary efforts. However within about 60 years, by the late 1670s the entire Salinas District, as the Spanish had named it after nearby salt lakes, was depopulated of both Indian and Spaniard. What remains today are austere yet beautiful reminders of this earliest contact between Pueblo Indians and Spanish Colonials: the ruins of three mission churches, at Quarai, Abó, and Gran Quivira.



Abó Mission exterior



RESPECT THE
RATTLESNAKES PRIVACY
PLEASE STAY
ON THE TRAIL



Abó Mission
interior

Quarai Mission
exterior





Quarai Mission interior and entrance. (The cones are very modern!)





Gran Quivira

Next we go back to Arizona, to **Tonto National Monument**. You may be disappointed to learn that there does not seem to be any connection with the Lone Ranger!

The word “tonto” means “stupid” in Spanish: the Chiricahua people living to the south called the Western Apache of this area Ben-et-dine (“brainless people”), and this was translated into Spanish by the European settlers.

The Lower Cliff Dwellings

Tonto National Monument
National Park Service
U.S. Department of the Interior



A thousand years ago, the vast area of the American Southwest became a melting pot of cultures. From this, the Salado of Tonto Basin emerged, displaying identifiable characteristics such as pottery and architecture. Eventually, thousands lived in the Tonto Basin. Around A.D. 1250, some began building in the caves. You are able to visit one of these “cliff dwelling” homes today.



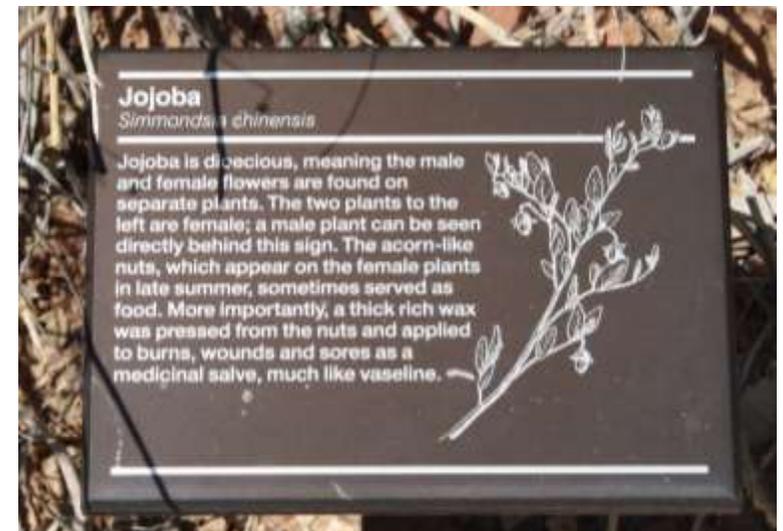
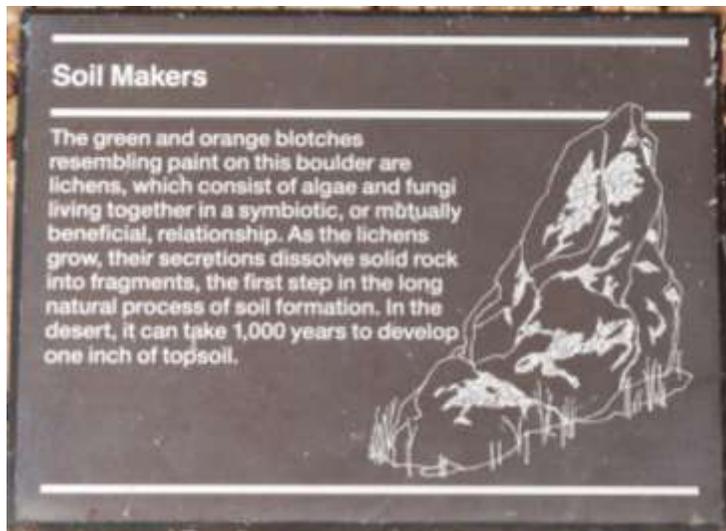
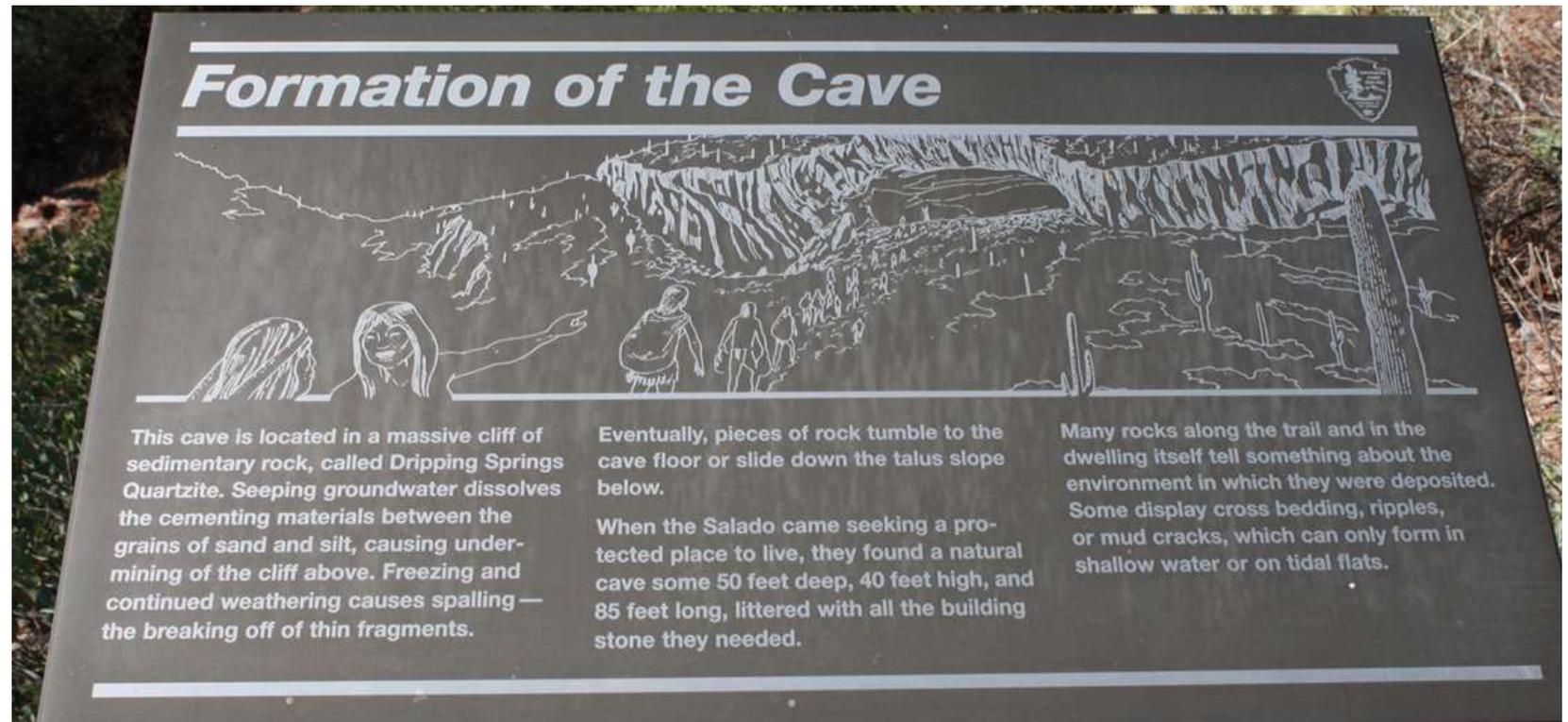
There are 2 sets of cliff dwellings but the upper set are only accessible with a ranger-led guided tour (and only in winter). The lower dwellings are at the top of a smooth path up the hill from the Visitor Centre and visitors are free to explore these independently.

The Visitor Centre itself contains a number of interesting displays documenting the history of the site and the lives of the people who lived here, as well as a video presentation.

Best of all, the Visitor Centre is wonderfully air-conditioned!

On the trail from the Visitor Centre to the cave dwellings there are many educational signs including those pictured here. The topics covered include the geology of the area as well as the plant life.

The role of lichens in soil formation (see the picture on the left below) is fascinating.





If you choose to climb up to the cave in close to 40°C in the middle of the day (as one of us was stupid enough to do), then it is worth remembering that the saguaro cactus scattered across the hillside provide virtually no shade!







Interior
of the
cliff
dwellings

Beneath a grassy mountain valley in central Colorado lies one of the richest and most diverse fossil deposits in the world. Petrified redwood stumps up to 14 feet wide and thousands of detailed fossils of insects and plants reveal the story of a very different, prehistoric Colorado in **Florissant Fossil Beds National Monument**.

Florissant Valley lies 35 miles west of Colorado Springs on the flanks of Pikes Peak. To the north and east, the Rocky Mountains dominate the skyline. To the west lies high meadow land with large expanses of undulating native grasses so beautiful that early fur trappers to the area referred to it as a park. In the summer the grassy meadows are filled with the coloured mists of thousands of wild flowers.

In the centre of this lush valley stands the Hornbek homestead complex, the home of a strong, determined woman who came to the area with her four children in the 1870s. Claiming land under the Homestead Act, Adeline Hornbek defied traditional gender roles to become the owner of a prosperous ranch.



Although her story is very interesting, most visitors to this National Monument come to see and learn about the fossils found here, including a number of petrified redwoods like those shown on the right.

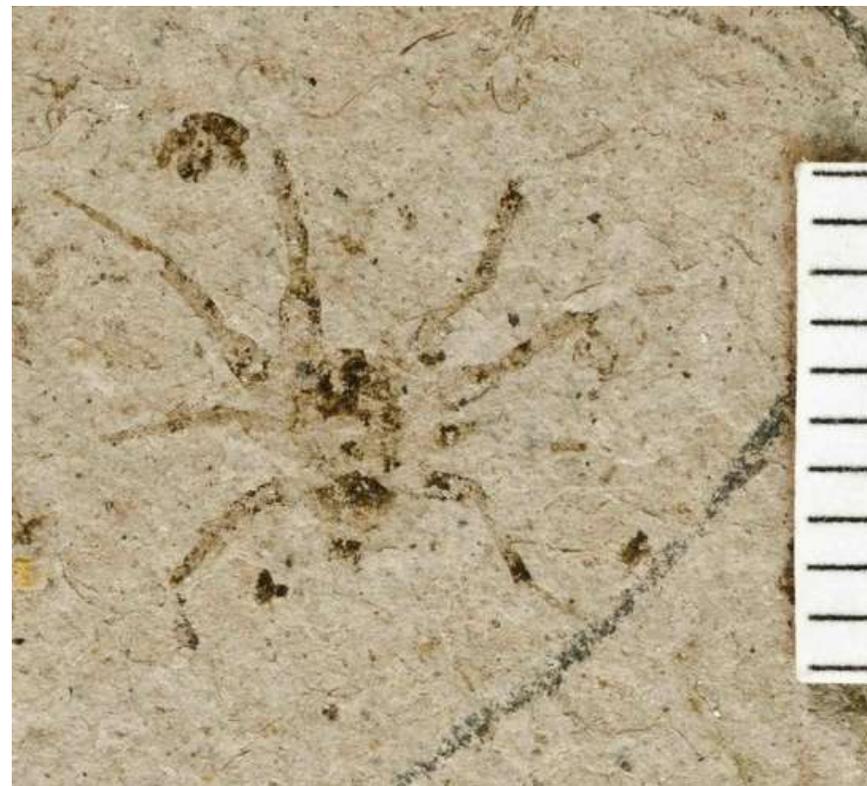
There are plenty of examples of fossilised plant life....



From left above: redwood foliage, the leaf of an extinct genus of the beech family, and a fern.



..as well as insects such as this Caddisfly wing on the left and the spider below.



The real attraction for most visitors, however, is the number of redwood stumps.



The fossils from the Florissant fossil beds are from the late Eocene Epoch, approximately 34 million years ago. (For comparison, dinosaurs became extinct approximately 65 million years ago at the end of the Cretaceous Period.)

Around 20 miles to the southwest, a series of stratovolcanoes, similar to modern day volcanoes like Mt. St Helens, developed and erupted periodically. Ash from these events was deposited throughout the area and mudflows (called lahars) would flow down the valleys.

The volcanic activity in the area that caused so much destruction ironically led to the preservation of the fossils within the Florissant Formation's shales and mudstones. As the ash was deposited on the landscape, it was carried by water through streams and lahars to the lake. The lahars then covered the base of the redwoods that were growing there at the time, and the trunks of the trees became harder and fossilized. Through permineralization, the precipitates that were in the ground water flowed through the tree trunks, replacing the original matter with siliceous minerals, replacing the organic matter with silica. This process of mineralization led to the preservation of the stumps of the trees.





One of the largest of the redwood stumps is accurately (if a little unimaginatively) called “The Big Stump”.

It is 38 feet in circumference, similar in size to many of the redwoods still growing in America, particularly in northern California.

Back to Arizona again, where in the pine forests near Flagstaff (one of the jump-off points for a visit to the Grand Canyon), a much smaller canyon cuts into the rolling plateau. This is **Walnut Canyon National Monument**.

Twenty miles long, 400 feet deep and ¼-mile wide, it was carved by Walnut Creek over a period of 60 million years.

The canyon's inner gorge is formed of sandstone, while the limestone ledges of the upper canyon contain delicate marine fossils. Millions of years later, people arrived: artefacts show that Archaic peoples, who travelled throughout the Southwest thousands of years ago, occupied the canyon at times. Later came the first permanent inhabitants, who flourished in the region from about A.D. 600 until 1400.

Scattered families farmed the canyon rims for centuries, growing small gardens of corn, squash, and beans. During the 1100s, many moved into limestone alcoves below the canyon rim, where they constructed the cliff dwellings we see today. The Walnut Canyon community thrived for another 150 years before the people moved on.

With the construction of the railway nearby in the 1880s, Walnut Canyon became a popular destination; scores of "pot-hunters" streamed into the canyon. Armed with shovels **and dynamite**, these souvenir-seekers upturned ancient floors, toppled enduring walls, and desecrated graves. The theft and destruction led to the establishment of Walnut Canyon National Monument in 1915.





View from the rim trail.



The geology of the canyon lends itself to caves and hollows in the canyon walls....

..like those seen in
the bottom right
of this picture.





Our next site is back in Colorado and is **Colorado National Monument**.

“Impressive views of canyons and the surrounding landscape are found throughout Colorado National Monument and provide visitors with outstanding examples of the park’s geology. Long, open vistas combined with the extraordinary natural scenery enhance and accentuate the visitor's enjoyment of the natural resources of Colorado National Monument and the surrounding region. Overlooks and visitor facilities have been provided for visitors specifically for this purpose.” So says the official National Parks website.







Can you
remember what
these rock pillars
are called?



(They are called hoodoos, in case you had forgotten.)



On our first visit the innate caution (or to be more honest, fear of heights) of one of the group prevented further exploration.

This person was shamed into venturing to the overlook on our next visit and found it just about tolerable by keeping away from the edge!



Back to Arizona now for our next site, the **Navajo National Monument**. Erosion of the walls of the canyons here created large overhangs which prehistoric man used as shelter from the elements. More recently stone dwellings were built in these alcoves to provide a greater degree of protection.

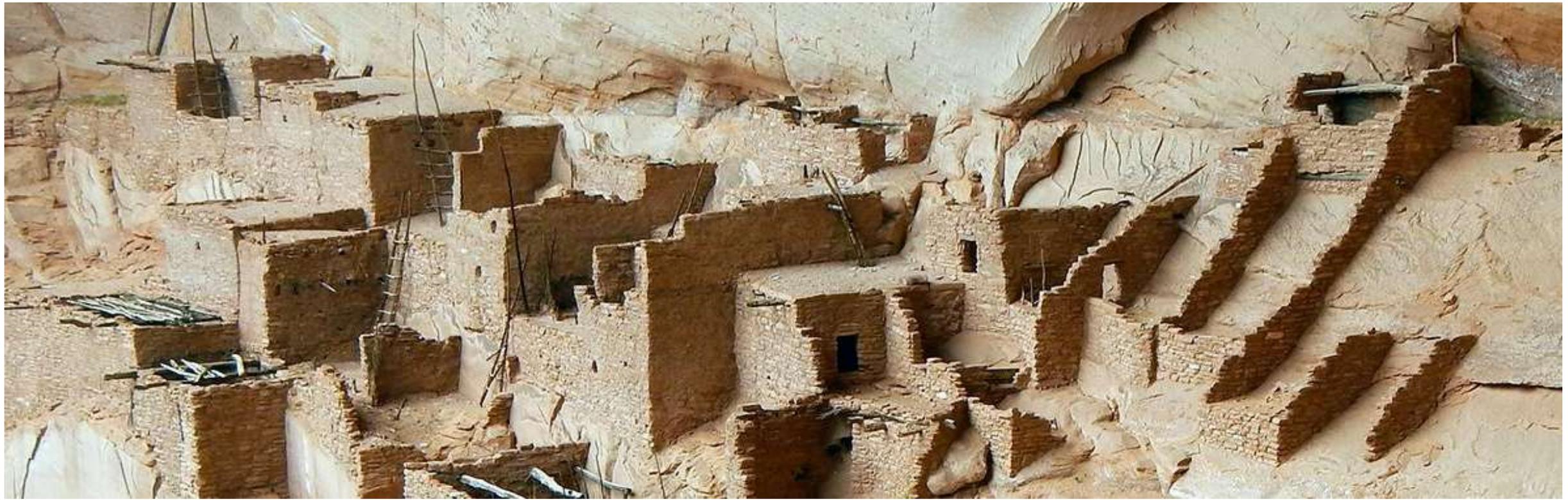
This plateau is at an elevation of more than 7000 feet above sea level.



Tucked away in the natural sandstone alcoves in these canyons are three cliff dwelling sites, called Betatakin, Keet Seel, and Inscription House.



These villages, which date from AD 1250 to 1300, still have their original architectural elements such as masonry walls, roof beams, and pictographs.



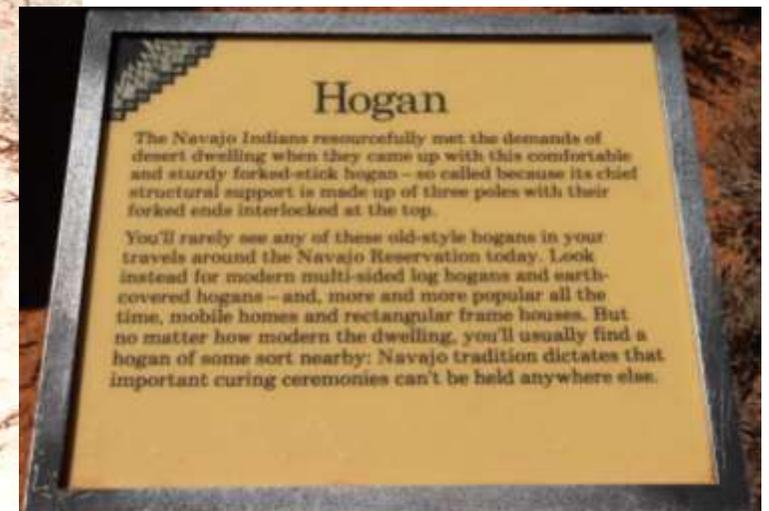
Ancestors of the Hopi (Hisatsinom) lived here for thousands of years. Trade brought seeds of corn and other crops into the region. Hisatsinom lifeways changed from nomadic hunting-and-gathering to farming. They began to build multi-storied stone masonry houses clustered in villages in the canyons.

The Navajo (Din'e) moved into this area around 1800, and changed from hunting and gathering when the Spanish introduced domesticated animals. Sheep herding became central to their lives. The Din'e have a long tradition of using the area around Navajo National Monument for both sacred and economic purposes.

2 other tribes, the Paiute and Zuni, also have close ties to the canyons in the Navajo National Monument.



There are examples here too of traditional Navajo building techniques such as hogans.



Hogan

The Navajo Indians resourcefully met the demands of desert dwelling when they came up with this comfortable and sturdy forked-stick hogan – so called because its chief structural support is made up of three poles with their forked ends interlocked at the top.

You'll rarely see any of these old-style hogans in your travels around the Navajo Reservation today. Look instead for modern multi-sided log hogans and earth-covered hogans – and, more and more popular all the time, mobile homes and rectangular frame houses. But no matter how modern the dwelling, you'll usually find a hogan of some sort nearby: Navajo tradition dictates that important curing ceremonies can't be held anywhere else.



Sweathouse

This miniature forked-stick hogan without a smoke hole is actually a highly effective bath – an ancient solution to the problem of keeping clean in a land where water is scarce.

Here's how it works: Stones are heated in a fire, then rolled in, or carried in on a wooden fork. The bathers undress outside, and then crawl inside. A blanket is hung over the door opening. Now all it takes is patience while the radiant heat does its work. This is the time for relaxing tired muscles – conversing – and perhaps singing sweathouse songs. Afterward, the bathers emerge from the sweathouse to rinse off with water, if any is available, or to rub dry with the soft, absorbent sand of Navajo country.

Evidence of even earlier inhabitants of the area.



DINOSAUR FOOTPRINT

Footprints of a small dinosaur that walked on his hind legs. About 180 million years ago, he left a lasting signature by walking through the mud. The print then filled with sediment, and both print and cast (upside-down here) eventually turned to stone. Tracks of these three-toed Jurassic reptiles are very common in the limestone formations of the Navajo Country.



We stay in Arizona but travel 150 miles south for the final Park in this book, the **Petrified Forest National Park**.

The petrified wood found in the park and the surrounding region is made up of almost solid quartz. Each piece is like a giant crystal, often sparkling in the sunlight as if covered by glitter. The rainbow of colours is produced by impurities in the quartz, such as iron, carbon, and manganese.

Over 200 million years ago, the logs (more like whole tree trunks, in fact) washed into an ancient river system and were buried quickly enough and deeply enough by massive amounts of sediment and debris also carried in the water, that oxygen was cut off and decay slowed to a process that would now take centuries.

Minerals including silica dissolved from volcanic ash, absorbed into the porous wood over hundreds and thousands of years, crystallized within the cellular structure, replacing the organic material as it broke down over time. Sometimes crushing or decay left cracks in the logs. Here large jewel-like crystals of clear quartz, purple amethyst, yellow citrine, and smoky quartz formed.



Who Cut the Wood?

Petrified trees today lie strewn across clay hills and within cliff faces; each log broken into large segments. The quartz within the petrified wood is hard and brittle, fracturing easily when subjected to stress. During the gradual uplifting of the Colorado Plateau, starting about 60 million years ago, the still buried petrified trees were under so much stress they broke like glass rods. The crystal nature of the quartz created clean fractures, evenly spaced along the tree trunk, giving the appearance today of logs cut with a chainsaw.









Within the Petrified Forest National Park lies the Painted Desert, so called because of the range of colours of the barren landscape.



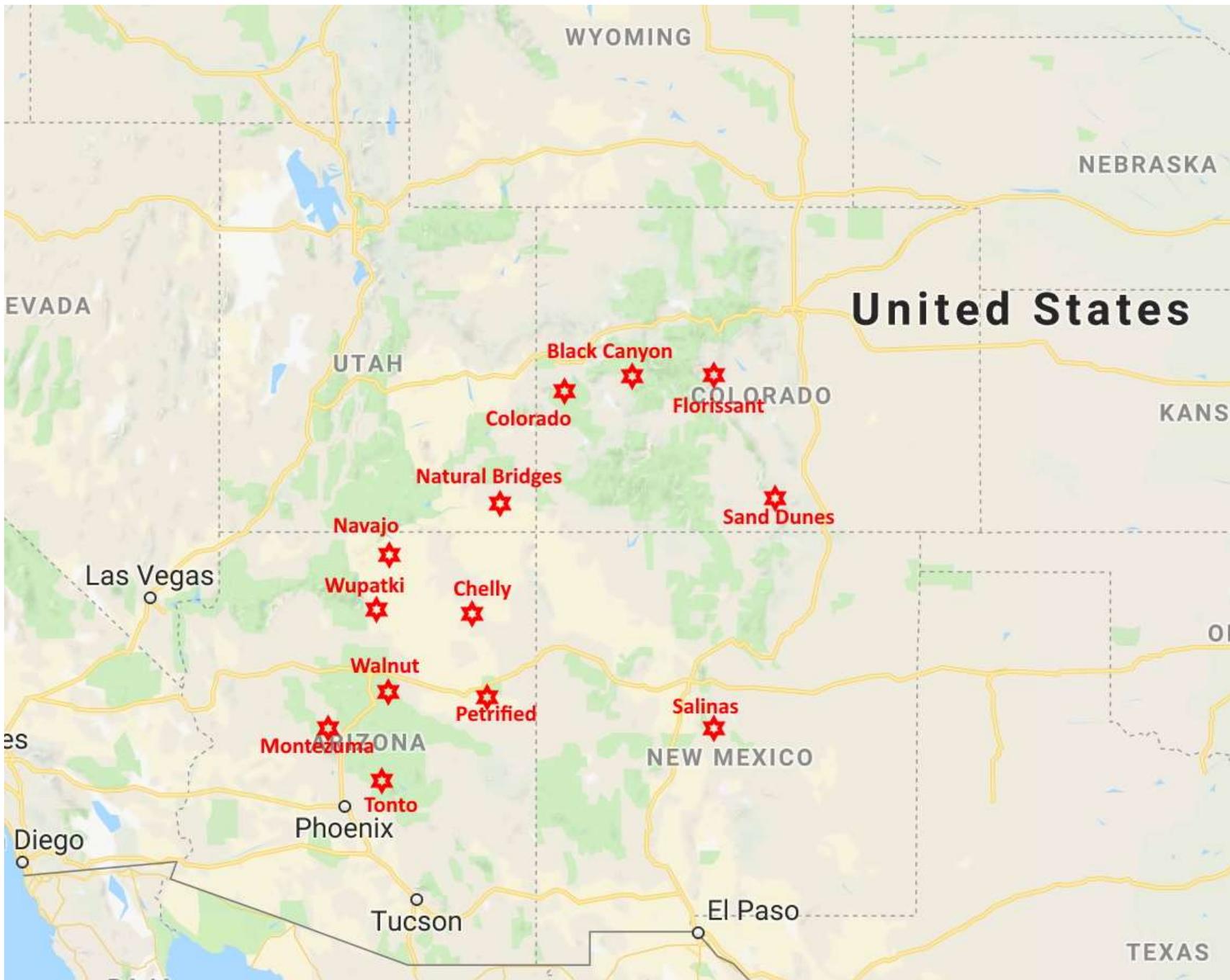




Painted Desert Inn

In its almost 100 years overlooking the Painted Desert, the inn has undergone many changes. The original building from the early 1920s was actually made of pieces of petrified wood. Today's adobe facade dates to the 1930s renovation.

This national historic landmark is only a museum now, with no overnight accommodation or food service. Displays inside highlight the building's history, Route 66 (which passes nearby), and the Civilian Conservation Corps. There are also restored murals by Hopi artist Fred Kabotie.



This map gives an idea of the locations of all the sites featured in this second book.

The table below shows their rank in the 2018 list of most-visited National Parks.

101	Petrified Forest NP	644922
128	Great Sand Dunes NP & PRES	442905
131	Canyon de Chelly NM	439306
136	Montezuma Castle NM	390151
140	Colorado NM	375467
149	Black Canyon of the Gunnison NP	308962
183	Wupatki NM	205122
197	Walnut Canyon NM	167736
235	Natural Bridges NM	103118
249	Florissant Fossil Beds NM	79568
267	Navajo NM	61195
303	Tonto NM	39822
311	Salinas Pueblo Missions NM	34629

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