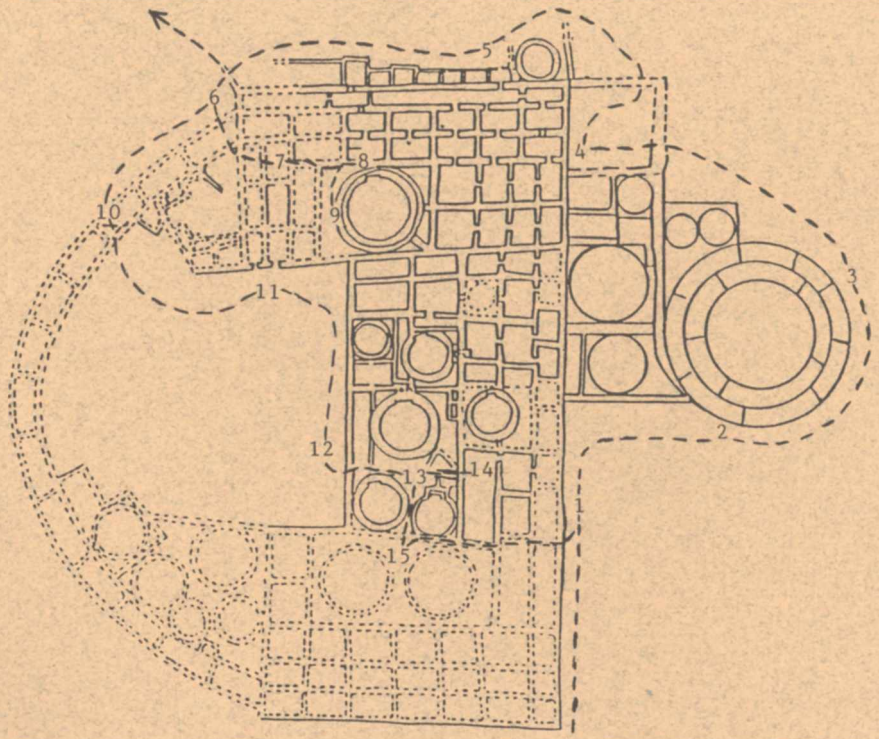
Pueblo del Arroyo

PUEBLO DEL ARROYO

SOUTH MESA LOOP TRAIL



PLEASE STAY ON TRAIL AND OFF RUIN WALLS

Welcome to Pueblo del Arroyo

To use this trail guide, follow the numbered stops along the trail which correspond to the numbers in the text. While exploring Pueblo del Arroyo, this guide will enable you to recognize how the architecture in Chaco conveys information about when and how the different structures were built.

The trail through Pueblo del Arroyo is 0.25 mile long. It is a gravel trail and assistance is recommended for those in wheelchairs. This trail leads to the trailhead for the South Mesa Trail, which back-country hiking requires a permit. Permits can be obtained at the visitor center or from a park ranger. The South Mesa Trail is not wheelchair accessible.

The archeological resources in Chaco Culture National Historical Park are fragile, irreplaceable, and a significant part of our nation's cultural heritage. The park received international recognition for the prehistoric cultural resources it contains when Chaco was designated a World Heritage Site in 1987. You can help protect and preserve this part of our global cultural heritage by following these basic rules. Stay on the designated trails. Do not walk, climb, stand, sit, or lean on the walls. Do not deface, add to, or alter the rock carvings and paintings. Do not collect pottery or other artifacts anywhere in the park. If we all take responsibility for these resources, they will be here for the education and enjoyment of future generations.

For your safety, do not climb canyon walls, or onto the mesas except via a designated trail. Children should remain with the guardian responsible for their safety.

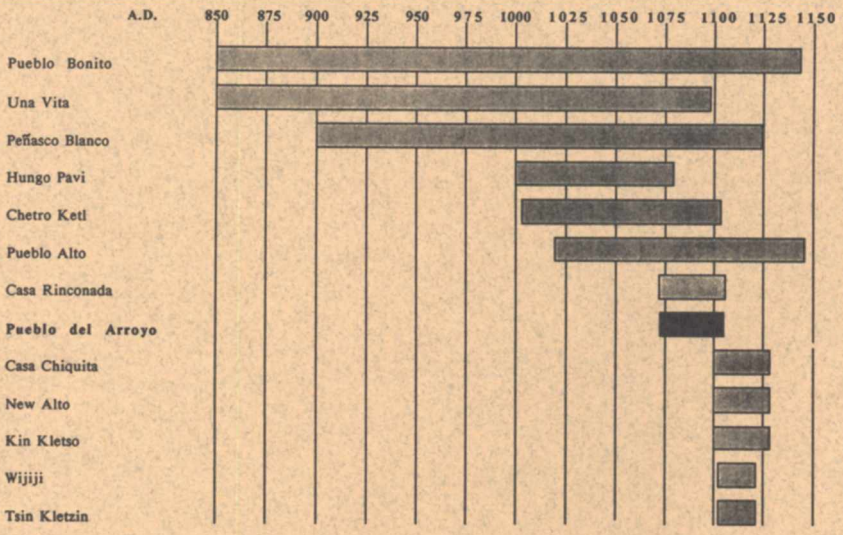
Pets are **not** allowed in the ruins.

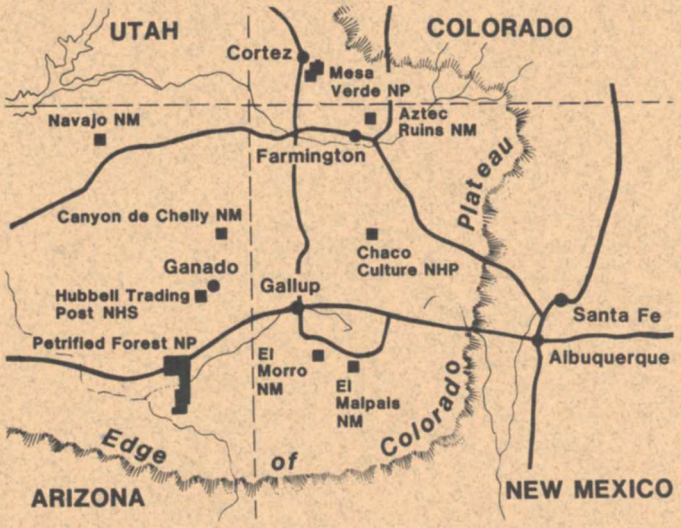
Pueblo del Arroyo is a Spanish name that means "Town of the Gully." The Navajo name for this structure translates as "Home Beside Water's Edge."

The large-scale, multi-storied masonry pueblos that are found in Chaco were not the first structures to be built in the canyon. The beginning of human occupation in the Chaco Canyon area began around 8,000 years ago. At that time, people lived in temporary campsites as they moved around to seasonal food source areas. These sites are identified by the characteristic artifacts found at them including stone tools, the bones of game animals, and heat-cracked rock from fires.

People secured better control over their food supply when domesticated crops were introduced around 1000 B.C. By A.D.. 400, corn, beans, and squash were staples of the prehistoric diet. The increase in agricultural production allowed the population to grow and led to a more settled way of life in small villages. At that time, dwellings consisted of circular subterranean pit houses with above-ground storage pits often clustered in small groups. People continued to live in this way for several centuries, but by A.D. 1000 another transition occurred.

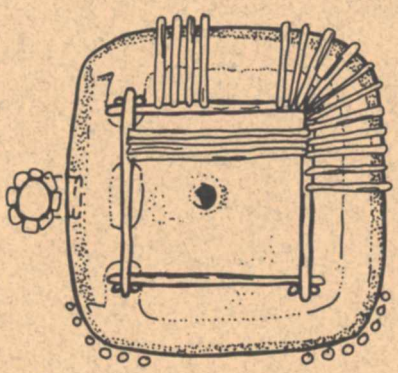
Pit house villages were replaced with small stone masonry



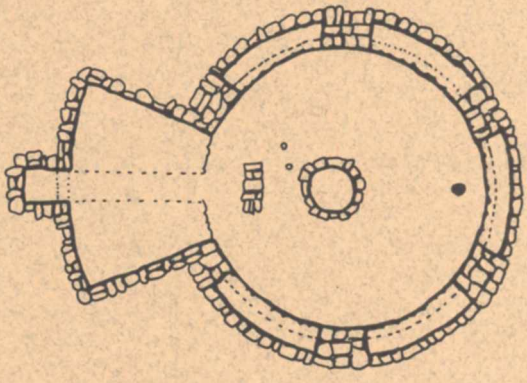


Colorado Plateau

pueblos built on the ground surface. Circular subterranean chambers, today called "kivas," evolved in place of pit houses. These basic developments occurred throughout the Colorado Plateau. Beginning around the middle of the 9th century and continuing through the 11th century, another development took place in Chaco Canyon that set it apart from other areas. In addition to the small masonry pueblos, the people of Chaco developed vast, multistoried structures such as Pueblo del Arroyo, Pueblo Bonito, and Chetro Ketl. Archeologists call these structures "great houses." They are easily differentiated from other prehistoric architecture because of their formalized masonry, large scale, planned design, and the engineering technology they exhibit.



Pit house floor plan



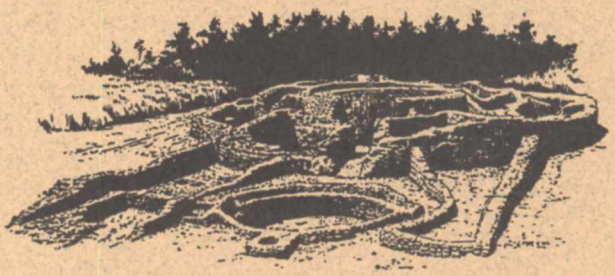
Kiva floor plan

1 An immense quantity of stone was required for the construction of a Chacoan great house. Stone was quarried from the sandstone cliffs that form the canyon, and two general types were used. The first, a hard, gray-brown, thinly bedded sandstone is found along the upper level of the canyon cliff. The second, a softer, tan colored sandstone forms the lower walls of the canyon. The prehistoric builders appear to have preferred the harder, tabular stone. It was used more frequently, particularly in the earlier styles of masonry construction (from about A.D. 900 to A.D. 1100). The blockier, tan colored sandstone was used in construction after 1100. This use of two types of sandstone during different eras provides archeologists with a tool for identifying and dating construction.

Thinly bedded tabular sandstone

Blocky sandstone

2 This triple-walled structure, called a "tri-wall," is rare in the Chaco region. Most multi-walled structures are found further north in the San Juan River drainage and the Mesa Verde region of southern Colorado and Utah. The form of this structure, built with the softer sandstone, and the distinctive carbon painted black-and-white pottery that was found here are characteristic of sites built after A.D. 1100. The presence of this structure in Chaco lends support to the theory that ideas were being exchanged between the people of Chaco and northern population centers.



Multi-walled structure

Archeologists are unsure how this tri-wall structure was used. However, the formal design, mass, size, and placement of this building indicate it had ritual significance. Among the multi-walled structures that have been excavated, most have enclosed kivas. When the central room of this tri-wall was excavated in 1926, researchers did not find any features typical of kivas such as wall niches or a fire hearth, but they did discover that the floor was partially paved with sandstone slabs.

3 In addition to stone, large quantities of mud mortar and plaster were needed for construction. Chaco Wash, along which you are standing, provided the sand, silt, clay, and water from which mortar and plaster were made. Today, the wash has been cut as deep as 30 feet and up to 100 feet wide. Early non-Indian explorers of Chaco, who came through the canyon in the late 1800s, described the wash as being as shallow as 18 inches and only eight feet wide. This dramatic change in the profile of the wash is primarily the result of over-grazing during the past 100 years.

According to tree-ring studies (dendrochronology), and studies of prehistoric pollen and plants, there has been very little change in climatic conditions in Chaco Canyon since prehistoric times. Yet there have been dramatic changes in the landscape around you. Beginning in the 1880s, sheep and cattle grazed throughout the canyon area.

Grazing depleted the native plant population and favored non-native species, like Russian thistle (tumbleweed). Overgrazing also diminished overall ground cover, increasing both the intensity and amount of erosion. This wash is a product of that process.

The large round cobbles that you see below are part of an erosion control effort. They have been placed here to prevent further cutting of the arroyo banks, protecting the pueblo from additional damage.

4 The large beams protruding from the walls are primary roofing beams called "vigas." The large square holes in the outer back wall were used for ventilation and allowed sunlight to enter. The row of small square holes in the

rear wall of the interior room were used to support the secondary roofing elements.

Most of the primary and secondary beams used in construction were ponderosa pine. Although there may have been small stands of pine in the wetter areas of the canyon, there were no extensive local forests. It has been estimated that it took about 300 years and over 200,000 trees to build the great houses in the canyon. This timber had to be brought in from forests as far away as 40 miles and was moved without draft animals or wheeled vehicles.

5 This is an addition of at least eight ground floor rooms built onto this wall long after completion of the main pueblo. Using archeomagnetic dating on a firepit in one of these rooms, occupation has been dated to approximately a.d. 1140. Based on their size and the features found in them, such as firepits and grinding slabs, these rooms are typical of domestic dwellings. In addition to the row of rectangular rooms, a kiva was added to each end completing this late addition. The architectural style and date of construction of these rooms indicates a change in occupation of the building or a change in its use. The contrast between the two masonry styles used in construction is also apparent, allowing us to see that these sections were built at different times with different materials. During the time Pueblo del Arroyo was occupied, much of the masonry was concealed by a mud plaster coating.

Before reaching the next stop, the ruins trail crosses the trailhead for the South Mesa Trail. This is a back-country hiking trail that requires a permit. Permits can be obtained at the visitor center or from a park ranger.

6 Along with the corresponding wing of rooms on the north side of the plaza, this section was built during the second construction phase at Pueblo del Arroyo. When completed, it was four stories high. The original exterior wall (which is to the right of the existing exterior wall) began to tilt outward after, or during, construction. To compensate for this, the builders constructed supporting buttress walls along this long exterior wall. This is just one type of structural buttressing that was designed by the great house architects.

The unusually long and narrow room below you originally extended for over 100 feet but was later divided into three rooms. The dividing walls of this room were built upon vigas which is an unusual building design. This design may have been used because it provided additional support to the outward tilting wall.

7 The section of broken wall to your right becomes thinner in cross-section at the upper story levels. This decrease in the width of the walls with each succeeding story served two functions: strength and stability. The walls of the first story were very wide and this created a strong and stable base from which to build. The decrease in wall width in each additional story lightened the load of the upper stories on the massive base.

Wall cross-sections also show the amount of mortar it took to build these structures. Mixing this mortar required a considerable quantity of water. Getting enough water for construction must have been a serious challenge for the builders. During occupation, rain water was diverted by a series of irrigation systems, and stored in pots. Other probable sources of water were seeps, pools in the slick rock, and wells dug in Chaco Wash.

8 As you look down to the floor level of this three-story section, you might wonder how these rooms were reached during prehistoric times. Ladders, carved from logs, connected upper and lower story rooms, and also provided access to lower rooftops. Since the time the Chacoans left the canyon, these ladders have disappeared. Unaware of the consequences, archeologists and explorers who came through Chaco at the turn of the century used ladders and other building timbers for firewood. The few that remain are preserved in museums.

Carved ladder

Most of the other perishable materials that were used in construction have also disappeared, although remnants remain. As you look down into these lower story rooms, you see a portion

of an original roof or upper story floor. Roof construction begins with a layer of peeled ponderosa pine or fir beams, known today by the Spanish term "vigas." The second layer consists of lighter, peeled poles called "latillas," and this is followed by a layer of brush or twigs archeologists call "closing material." A layer of clay mortar or packed adobe was laid next, and this top layer was smoothed to create the finished surface.

9 This kiva was built into a square enclosure of stone masonry walls, a characteristic feature of late kiva construction in Chaco. The enclosing square of masonry elevated the kiva to the second story, and created four empty triangular corners. These corner areas were sometimes filled with trash, rubble, or soil and then flattened. On other occasions (as here), these corner rooms were roofed and used for storage and other functions related to the kiva.

Today, we tend to think of architecture in terms of practical use. Each room of a building has a specific purpose, such as a dining room or living room. Many of the rooms in these structures may not have been built to accommodate the practical needs of occupants, but were constructed to support other architectural features, or were built to create a structure pleasing to the eye. Enclosing the kiva in a square room to elevate it is one example of a structural design that supports the overall architecture style.

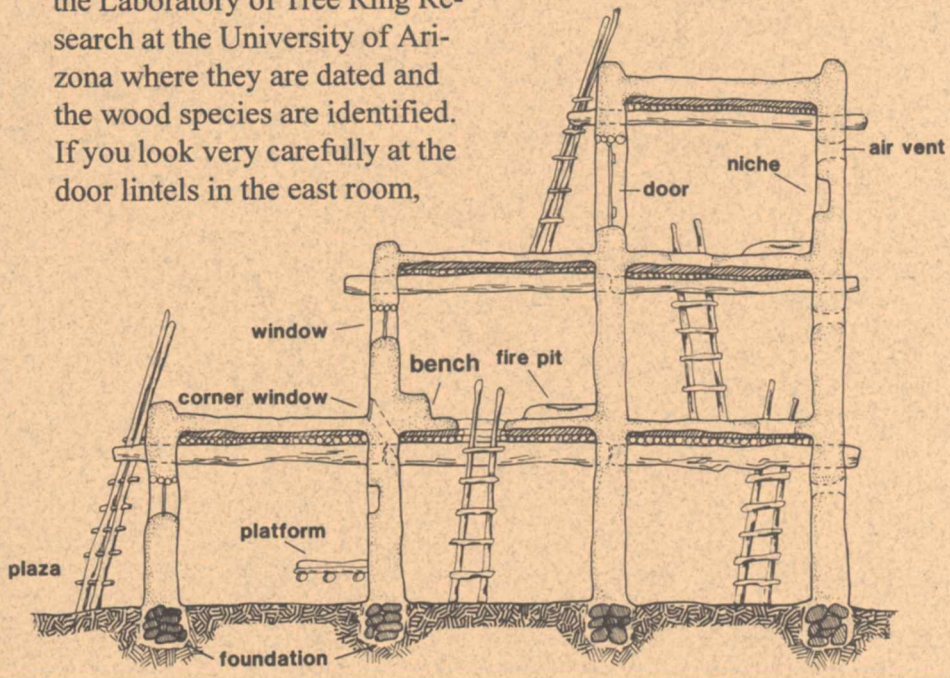
10 The orientation of Pueblo del Arroyo differs from most other great houses because it faces east rather than south, and it is one of the few in the canyon set out in the open floodplain away from the cliffs. This unusual orientation may relate to the overall placement of buildings within the central portion of the canyon, reflecting a carefully conceived master plan. Pueblo del Arroyo is similar to other great houses in that the plaza area is well defined by multi-storied blocks of rooms to the north, south, and west. The plaza-facing rooms were one-story and led up to three-story sections along the west rear wall, and along the back walls of the northern and southern roomblocks.

You are standing on the unexcavated rubble of an arc of

one-story rooms that enclosed the plaza. A little over half of Pueblo del Arroyo, including the tri-wall structure, was excavated under the direction of archeologist Neil Judd from 1923 through 1926 as part of a National Geographic Society expedition.

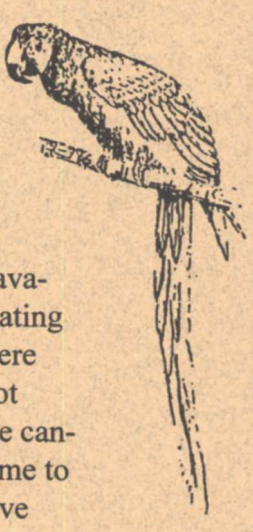
11 Inside these ground floor rooms are remnants of original plaster approximately one thousand years old. Examining the small beams across the top of the door (door lintels), you will see small plugs where core samples have been removed. The cores are sent to the Laboratory of Tree Ring Research at the University of Arizona where they are dated and the wood species are identified. If you look very carefully at the door lintels in the east room, you will see a core labeled "6195." Sophisticated testing and technology allows us to pinpoint the date this tree was cut to A.D. 1103. We know that this room was built after that date. The wood is Douglas-fir.

12 Three bird skeletons, identified as macaws, were excavated from this long room. These beautiful, colorful birds are native to Mexico and areas farther south. Macaws were highly prized for their feathers, which may have been used in ceremonial costuming or for other ritual pur-



Pueblo cross section

poses. This room, with a firepit in the floor, may have been used as a macaw pen. A fire would have been needed to keep these birds warm during the harsh Chacoan winters. No immature skeletons have been found during excavations, indicating that they were probably not raised in the canyon, but came to Chaco as live trade goods.

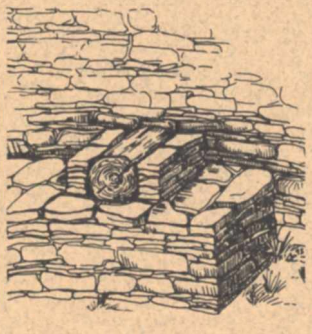


Macaw

Archeologists have looked for and found parallels between the architectural forms of the Anasazi and the ancestral cultures of Mexico and Meso-America. We also know that the Chacoans traded for objects from these cultures. Aside from macaws, they traded for items made of shell and copper, such as trumpets and bells. Cloisonne decorated sandstone and turquoise mosaics have also been found here; ideas and objects which originated in areas far to the south.

13 The circular chambers around you are referred to as kivas. Among modern pueblos, kivas are primarily used for religious or ceremonial purposes. Because of this, it is important to treat them with respect.

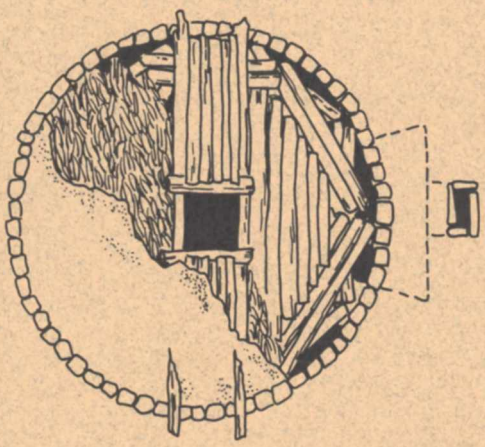
The kiva to your right, shaped like a keyhole, is more typical of regions north of Chaco such as Mesa Verde and was constructed sometime after A.D. 1100. The larger kiva, on the left, is more typical of the type of kivas found at Chaco. The bench supported six masonry



Pilaster

boxes called "pilasters," each constructed by encasing a horizontal log in plastered masonry. On top of these pilasters rested the butts of logs which extended from pilaster to pilaster to encircle the chamber. Additional tiers of logs made circles of

ever-decreasing size until the desired height was reached, creating a dome-shaped ceiling. The remaining space was covered with poles, leaving an opening for a hatchway. The result was a "cribbed roof." As you look down into the larger kiva, you will see the masonry pilasters enclosing original beams. Small, cup-shaped cavities were carved into the upper surfaces of these horizontal beams before the



Cribbed roof

timbers of the ribbed roof were laid in place. Offerings of beads, shell, and turquoise were placed into these cavities, and they were then sealed with carefully fitted lids of stone or wood. Although these cavities are now filled with sand, if you look very carefully you will see the small, circular depressions on the tops of these ancient beams.

14 The roomblock to the left (south) is the oldest section of the site, dating to about A.D. 1078. Three of these rooms were excavated and floor features were found in two. These features included firepits and a storage bin, indicating domestic use.

On the right (north) is a large, rectangular room in a section of the structure that was remodeled by the early builders. Original construction was completed around 1078. The remodeling dates to the early 1100s. On the floor of the first-story room are six "mealing bins" which held grinding slabs called "metates" in Spanish. Metates provided the surface for the grinding of corn by means of a another smaller stone called a "mano." The angle at which the metates were set into the bins allowed for greater efficiency in the work. These bins were constructed so the person grinding could brace the feet and back against a wall for support and comfort.

15 The north wing of Pueblo del Arroyo remains unexcavated except for the kiva. Unexcavated sections of a site are valuable archeological resources for future research. For example, before the technique of dating by means of tree-rings was developed in the 1920s, prehistoric wood was frequently tossed aside or used for fuel. Charred material was thrown out with the back dirt until the 1950s. After that time, carbon-14 dating was developed, and charcoal became a valuable resource for dating. In the 1960s, another breakthrough made it possible to determine the approximate date the clay liner of a firepit was burned. Before then, many such features had been exposed to weather or destroyed.

This unexcavated portion of Pueblo del Arroyo is a safety-deposit of material where new techniques may be applied in the future. For these reasons, do not disturb or remove artifacts.

READ MORE ABOUT IT!

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Chaco Culture National Historical Park
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Chaco Culture
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National Park Service

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