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## **TEN PREHISTORIC HEARTH SITES AT WHITE SANDS NATIONAL MONUMENT, NEW MEXICO**

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### **INTRODUCTION**

White Sands National Monument is located in the Tularosa Basin of south-central New Mexico. The basin extends from central New Mexico into western Texas and northern Mexico. It is enclosed on the eastern and western sides by mountain ranges. The area is part of the Chihuahuan desert and has no permanent water sources. White Sands National Monument was established for the preservation and study of its white gypsum dunes. Within the dunes are archaeological sites with plaster hearths and artifacts. Little is known about the age, use or inhabitants of the hearth sites at White Sands. To answer these questions, this project radiocarbon dated 10 hearths from different sites within the park. Soil from the hearths was also collected and investigated for plant pollen and plant remains. This project was made possible through support by a grant from the Western National Parks Association.

### **HEARTH SITES**

The hearths were formed in the dunes as heat from prehistoric campfires and roasting pits altered the gypsum sand ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) to plaster of Paris/anhydrite ( $\text{CaSO}_4 \cdot \text{H}_2\text{O}$ ). When the hearths were exposed to moisture, the plaster of Paris hardened preserving charcoal, animal bones, pollen and plant remains. Research on these hearth sites is essential in order to collect information before it is lost. Only 32 hearth sites have been documented within the park and many more may exist. Unfortunately, the wind that creates the sand dunes is also incredibly destructive to the hearths. As the wind blows, flying sand abrades the hearth surfaces, and the sand supporting the hearths is whittled away until the hearths collapse and are destroyed.

### **CULTURAL PERIODS**

According to research conducted in the Tularosa Basin, the earliest occupation of White Sands National Monument probably began during the Paleoindian period of the Pleistocene, sometime after 10,000 B.C. The area then contained a large lake, Lake Otero, which attracted big game animals like mammoth. Paleoindians made a living by following and hunting these animals. The Paleoindian period ended around 5500 B.C.

The Archaic period 5500 B.C. to A.D. 200 followed the Paleoindian period. During this era the climate became drier throughout the Southwest. As big game animals decreased in numbers, small animal hunting and wild plant food collecting became important.

Collecting different plants as they ripened required people to move seasonally from the basin floor to the mountain slopes. The dunes at White Sands may have been used for hunting and collecting. Cultivated corn and beans first appeared during the Archaic period, but the change to agriculture took several more centuries.

Sometime around A.D. 200, regionally distinctive cultural groups developed in the Southwest. The Jornada Mogollon tradition emerged from the Archaic in southern New Mexico. Initially the Jornada lived in small pithouse villages and produced their first pottery around A.D. 400. In addition to depending on agriculture, they continued to hunt animals and collect wild plants. Later around A.D. 1200, the Jornada built and lived in pueblos located at the base of the mountains along the edge of the Tularosa Basin. These people depended primarily on trade and intensive farming for their needs, but may have continued to use the dunes for collecting and hunting. The Jornada Mogollon appear to have abandoned the area around A.D. 1400.

By the late 1500s the area had become the homeland of the Mescalero Apaches. This group dominated south central New Mexico for centuries. One possible Apache camp site has been found in the park. Most Apache use of the area ended by the late 1800s, followed by permanent Anglo and Hispanic occupation of the basin.

## THE INVESTIGATION

Ten sites with eroding hearths containing charcoal fragments were selected for radiocarbon dating. The date of a site is useful for determining when it was occupied and who might have been there. Once a site is dated its features and artifacts can be compared to other sites, helping to understand its relationship to other sites in the basin and the Southwest.

Radiocarbon is produced when cosmic rays react with nitrogen in the air. Plants absorb the air and the radiocarbon, animals then eat the plants absorbing the carbon. When a plant or animal dies, it stops absorbing carbon and the carbon that is already in the plant or animal begins to disintegrate. Scientists can measure how much radiocarbon has disintegrated since it decays at a slow but steady rate. The less radiocarbon a plant or animal has the older it is.

Pollen and plant remains are useful for determining what the climate was like in the past, since different plants grow under different conditions. The study of pollen and plant remains from the 10 hearth sites may answer questions about the climate at White Sands. For example, what was the environment like when the sites were occupied? Where the dunes visited during droughts?

The study of pollen and plant remains may also be useful for determining which plants were collected, used and eaten. It has been suggested that the dunes sites were created by people who were rabbit hunting, collecting seeds from Indian ricegrass and roasting succulent plants like agave.

## **DISCUSSION**

Radiocarbon results from the hearth sites found that five were from the Archaic period and five were Jornada Mogollon. The oldest hearth dated 1760-1600 B.C. while the youngest was A.D. 1190-1290. It appears that the dunes were visited by Archaic period people continuing through the Jornada Mogollon period.

The pollen analysis found that nine of the 10 sites sampled were occupied during times with more moisture or rainfall than the present. In addition, cattail pollen found in the soil from the two oldest sites, indicated that the climate was much wetter in the Archaic period. Standing water, ponds or playas may have existed in the area. However, it seems that the dunes were not a popular destination during periods with drought.

The analysis of plant remains was less successful. Although members of the mustard family, rose family, pink family, legume family, thistle, wild buckwheat, fern, yucca and prickly pear cactus grew in the area there is no evidence for their use at the 10 sites. Ephedra and sumac berries were found in the soil samples from two of the hearths. No other plants appear to have been processed in or next to the hearths. Several hearths had burned four-wing saltbush, willow and cottonwood fragments. These plants may have been used as fuel or as a buffering vegetation layer for plant or animal roasting. No animal bone was recovered from the 10 hearths. Unfortunately, the actual use of the hearths is still unclear.

## **CONCLUSION**

The hearth sites sampled within the park are both Archaic and Jornada Mogollon. Radiocarbon dating placed the earliest site at 1760-1600 B.C. The latest site dated A.D. 1190-1290. There appears to be a similarity in the sites from the Archaic and Jornada Mogollon periods in that both periods had hearths similar in content. This similarity may support the idea that the Jornada Mogollon continued to hunt animals and collect wild plant food even after adopting agriculture and building pueblos.

Pollen analysis did provide information on the overall climate. The results indicate that the majority of sites were occupied during periods of increased moisture, and that there may have been standing water during the Archaic period. The study of the plant remains did not indicate which plants were collected by the site occupants. Only one instance of ephedra and sumac berries was found with a hearth. However, there was evidence of roasting activities at the hearths since they contained charred four-wing saltbush, cottonwood or willow.

Despite some limitation of this study, this project has provided information useful for understanding hearth sites at White Sands National Monument. The project has preserved information that would have been lost to erosion and lays the foundation for future research.