

## Great Sand Dunes eolian system archaeological program research through multiple disciplines and multiple partners

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In a pocket on the eastern side of southern Colorado's San Luis Valley sit the Great Sand Dunes, the continent's tallest dunes. These dunes, developed by winds blowing across the valley, are textbook examples of reversing dunes and are the most conspicuous portions of a greater eolian system. The system is complex, containing many varied elements: the dunes themselves, inter-dunal wetlands, sand sheets that feed sand to the dunes, the sabkha (the crusted and mineralized surface of ancestral lakebeds), and the creeks that originate in the Sangre de Cristo Mountains to the east and flow past the dunefield, transporting sand upwind into the system (Figure 62.1).

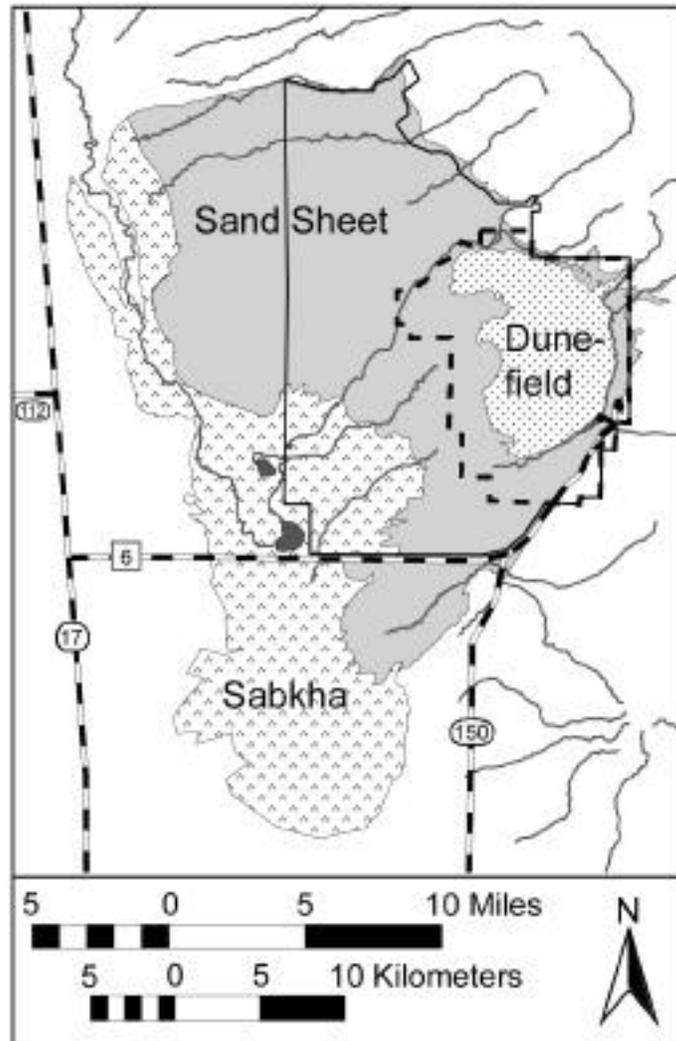
Until fall 2000, Great Sand Dunes National Monument contained primarily the dunes themselves and little else. The need to protect the complete eolian system was strong. On November 22, 2000, President Bill Clinton signed legislation that allows for the creation of Great Sand Dunes National Park and Preserve, whose new authorized boundary includes most of the relevant eolian system. This expansion includes the headwaters of Medano and Sand creeks within 41,646 acres of national preserve and an additional 107,000 acres of sandsheet and sabkha to the west and northwest. As of this writing, designation as a national park is pending acquisition of these 107,000 acres. The current designation is "Great Sand Dunes National Monument and Preserve."

Interwoven with the natural environment is a very long and rich human history, dating from the Clovis around 11,200 years ago and the Folsom around 10,500 years ago. Investigations into cultural resources were identified as a high priority in the park's resources management strategy, which became the impetus for the Great Sand Dunes eolian system archaeological program.

### Program background

In fiscal year 2000, the park received initial funding for a multi-year archaeological inventory program. Additional monies were also received to investigate unspecified areas on The Nature Conservancy lands just outside the park. At a well-attended public scoping session, three things became evident:

- Any high-quality archaeological program would have to be much larger than the park's boundaries;
- There was insufficient money, even to address pure inventory needs in the park and
- A great variety of specialists would be required.



**Figure 62.1. Principal eolian features of Great Sand Dunes National Monument and Preserve.**

During the scoping session, several integral components of the program were identified:

- Use of a geochronological framework as a basis for interpreting the archaeological sites and other features;
- Cultural anthropological investigations into historic and ongoing traditional use of the dunes;
- Specialized studies of all types, ranging from trace element analyses of lithic raw materials to investigations of population movements to characterization of diatomaceous stratigraphic units as a means to study past environments;
- A variety of archaeological specialties;

- An education component for both schoolchildren and the general public; and
- A volunteer component, particularly due to the high degree of archaeological interest in the San Luis Valley and the qualifications of the San Luis Valley Archaeological Network's members.

To accomplish the project, a consortium of organizations, institutions, and individuals was formed, with each entity providing what it can to facilitate the overall program. The participants include:

- Foothill Engineering, Inc.;
- Applied Cultural Dynamics;
- The Nature Conservancy;
- San Luis Valley Archaeological Network;
- U.S. Geological Survey;
- Smithsonian Institution;
- U.S. Forest Service Passport in Time Program;
- San Luis Lakes State Park;
- The Friends of the Dunes;
- National Park Service (NPS), Great Sand Dunes National Monument and Preserve and the NPS Intermountain Support Office—Denver; and
- Colorado State Historical Society, Office of the State Archeologist.

With matching funds from NPS, The Friends of the Dunes received two substantial grants from the Colorado State Historical Fund. Additional funding was received from the Department of the Interior's Burned Area Emergency Rehabilitation (BAER) fund to redocument and evaluate documented archaeological sites burned in an April 2000 wildfire.

### Background

An important starting point for the inventory was *Colorado Prehistory: A Context for the Rio Grande Basin*, a recently published study of the region's human history. This document makes it clear that archaeological understanding of the San Luis Valley is extremely limited. In fact, the prehistory of the region is practically unstudied and paleoenvironmental information is minimal. There are a number of compliance-driven inventories that document the use of chipped-stone tools used throughout the valley. There are many poorly provenienced collections. But very few sites have been tested and even fewer excavated. Scant contextual information exists, and there are only a handful of radiocarbon dates. As a result, chronological information is rudimentary at best. The Paleo-Indian period is the most known and best-dated, mainly because of the Smithsonian Institution's past research. We know there is a generic "Archaic" period, and we know, through ceramics, that there are Late Prehistoric sites.

Due to the lack of excavation data, there are few in-context associations. There are few assemblage data, so we don't know, for example, what late Archaic "looks" like. Hearth styles cannot be associated with any group or time period, other than by comparison to other parts of the country. Similarly, subsistence information is minimal. Very few hearths have been collected, and other than Paleo-Indian, no floors or other living surfaces have been rigorously investigated. There are some extremely large, bizarre stone tools that appear to be pestles of some type, but none have acceptable provenience or associations. We can only guess about the grasses, other plants, and animals that sustained the lives of the prehistoric occupants of the eolian system.

To address many of these information gaps, geomorphological, ethnographic, and archaeological research was begun in summer 2000. In only one field season, the researchers have compiled a tremendous amount of information.

### **Geomorphology**

The Quaternary history of the Great Sand Dunes area is not well known, mainly because wind erosion has erased much of the evidence commonly used to distinguish deposits of different ages. Nevertheless, several kinds of evidence remain that provide insights into how and when components of the existing landscape were formed. Materials suitable for C14 dating have been collected along Sand Creek and Big Spring Creek, two streams that have different fluvial histories. Big Spring Creek originates at a spring located in dune sand and its alluvial history is contemporary with a period during which the water table has been near its present level. In contrast, Sand Creek originates in the Sangre de Cristo Range and has gravel terrace deposits, now mostly buried by dune sand, that extend much farther back in time than the sandy terrace deposits of Big Spring Creek. Other sources of geochronological and environmental information include (1) abandoned springs, (2) relict floodplain deposits, (3) paleopond deposits, (4) buried paleosols, (5) zones enriched in secondary CaCO<sub>3</sub> of both pedogenic and groundwater origin, and (6) a bed of benthic diatoms that records the existence and level of a lake that once existed in an area now covered by dunes. Further research will focus on Medano Creek, which flows to the east and south of the dunes.

### **Ethnography**

Ethnographic overview research on the San Luis Valley demonstrates that both ethnic and functional complexity must be expected in dealing with the protohistoric archaeological remains. In addition to Ute and Jicarilla Apache people, who were present in the valley on a regular seasonal basis, the area was substantially used by northern Pueblo (Tiwa and Tewa), Navajo, and Comanche people as well, and occasionally by Cheyenne, Arapaho, Kiowa, and Kłowa Apache people. Summer villages, temporary food-processing sites, and military fortifications are only a few of the types of sites suggested by ethnohistoric research; consultation with contemporary Native Americans shows a variety of other uses of the area, including use of sand from the Great Sand Dunes for ceremonial purposes. Ongoing research will expand the present understanding of present and recent past uses of the eolian system.

### **Archaeology**

The two primary archaeological partners involved in this project are the Smithsonian Institution and Foothill Engineering Consultants, Inc. The Smithsonian work is focused on the western side of the park at Indian Springs and Big Springs. This area contains an incredibly rich concentration of archaeological remains dating from as recent as several hundred years ago to over 10,000 years ago. Prehistoric archaeological findings during the 2000 field season included the first documented house pit structure in the area, possibly dating from 4,000 to 6,000 years ago. The house pit contained subfloor features and several artifacts, including a bone awl and a stone pendant. The Smithsonian research is tied closely to the geomorphological investigations in an attempt to clarify how the geological landscape is related to cultural occupation through time.

A wildfire on April 18, 2000, burned approximately 3,000 acres on the eastern side of the park. The burned area contained 67 documented prehistoric and historic sites. Using BAER funds, Foothill Engineering Consultants archaeologists relocated and evaluated the effects of the fire on these resources. Site documentation was updated and each resource was evaluated for potential listing in the National Register of Historic Places. The impact of the fire on the cultural resources varied significantly. One positive aspect of the fire was that it burned off vegetation that had previously hidden both historic and prehistoric sites. Sites that were once thought to be small in size were oftentimes found to be much larger than originally recorded. The fire also had negative impacts, for it burned the artifacts and features on the surface of the sites. Artifact damage appeared to be minimal, although some of the stone artifacts

seemed to be friable after burning. Some historic and prehistoric features were also damaged or destroyed during the fire. For example, a known wickiup (conical poled lodge) was completely burned. It appears that none of the known culturally peeled ponderosa pine trees were damaged by the wildfire.

Preliminary treatment at endangered sites included collection of diagnostic artifacts and testing of prehistoric fire hearths. One of the tested hearths contained over 150 pounds of rocks, an obsidian flake, and a small corner-notched projectile point. C14 dates obtained from four of the hearths in the park (including this rock-filled one) indicate occupation from the Late Prehistoric period, ca. AD 1000. Obsidian artifacts from nine sites (including the flake from the rock-filled feature) were chemically sourced and found to have come from the Jemez Mountains in northern New Mexico, approximately 150 miles to the south. This is important information regarding prehistoric trade and travel routes.

#### **Involvement of partners and the public**

Involvement by project partners has been significant. The Friends of the Dunes, a non-profit support group for the park, applied for and received two grants from the Colorado Historical Society worth \$260,000. The purpose of these grants is to supplement and support multidisciplinary research team efforts. The first grant-funded work will begin in summer 2001 with several archaeological survey and testing projects and geomorphological investigations.

The Nature Conservancy is another valuable partner that supports the overall archaeological program. Examples of their involvement include hosting team and public meetings, and giving tours of archaeological sites to members and the interested public.

Public education and volunteer opportunities are considered a very important aspect of the overall project. In addition to The Nature Conservancy, several groups are involved in this part of the project.

Passport in Time is a volunteer archaeological program administered by the Forest Service. This year, a Passport in Time project will investigate several sites containing wickiups. These wickiups, located within the newly designated park expansion area, usually date from the late 1700s to the late 1800s. Forest Service and NPS archaeologists and volunteers will also work closely with Native American tribal representatives, such as those from the Ute and Apache, to further our understanding of the wickiups and help determine management strategies for these fragile resources.

Middle school students in the Dig This 2 archaeology class from the St. Vrain Valley School District in Longmont, Colorado, spent several days volunteering with Foothill archaeologists last summer. They assisted with excavation of a hearth and helped record several historic sites. Additional student volunteer sessions are planned for this field season.

Local San Luis Valley schools are also involved in the program. One local middle school student volunteered with the archaeological survey crew for several days last year, and additional interest has been generated for volunteer opportunities for the 2001 season.

The final public entity supporting the program is the San Luis Valley Archaeological Network, a local archaeological advocacy group that is very active in the area. This group will be supporting the program by providing numerous field volunteers this summer.

#### **Conclusion**

Work on the Great Sand Dunes eolian system archaeological program has only just started and has already yielded tremendous amounts of information on the human history of the area. With the efforts of specialists from many disciplines and the participation of many diverse partners, this project will provide invaluable insights into the area's rich human history.