05-04

Pathways to Understanding: Archaeological Survey of the Zuni-Acoma Trail, El Malpais National Monument.

Final Report of the Zuni-Acoma Trail Archaeological Survey Project

Prepared by:

Jason G. Theuer, Ph.D. candidate
Southern Methodist University
Dallas, Texas

Michael A. Adler, Associate Professor of Anthropology
Southern Methodist University
Dallas, Texas

James W. Kendrick, Chief of Heritage Preservation
El Malpais and El Morro National Monuments
Grants, New Mexico

Project Number WNPA 05-04

Project Number ELMA 2005 C

FOREWORD

Archaeologists have known for many years that ancient trails traverse the rugged lava flows of El Malpais National Monument in west-central New Mexico. Built by ancestors of contemporary Puebloan communities and mainly distinguished by small cairns, these trails are rather common archaeological features throughout the monument. In recent years, volunteers and staff have informally documented miles of historic and prehistoric trails. Our current understanding of them, however, has not kept pace with our knowledge of their frequency across the monument.

The most visible of these trails to the public is the Zuni-Acoma Trail (ZAT). It stretches 7.5 miles across the northern portion of the monument and allows the public to experience the beauty and ruggedness of El Malpais. One of the first trips that I took into the field upon joining the staff at El Malpais National Monument was to hike the ZAT and try to get a sense of its archaeological significance. I was immediately struck by the number and diversity of archaeological features and sites along the trail. On this first reconnaissance I encountered various types of rubble mounds, both basalt and sandstone, and structures that appeared to be religious shrines. I noticed a wide variety of lithic materials at these sites, including obsidian from the Grants area to the north and spotted chert from the Zuni Mountains to the west. Ceramic artifacts also caught my attention, there being a combination of Cibola White Wares, Brown Wares and White Mountain Red Wares, indicating extensive past economic and social networks.

One site in particular fascinated me. It contained a small pueblo made of basalt, and had an extensive array of low basalt walls. I returned to this site several times in the following years and never found its boundaries. It was one of the most extensive sites I had yet encountered in the monument. Prior to this project, it had not been recorded or mapped. It was recorded during this project as ELMA 507, and mapped in the summer of 2007. Archaeological survey could not, however, determine the function of the walled features throughout the site. A more complete understanding of these features will require test excavations, providing tremendous potential for future research and interpretation.

I could tell from the shrines, though, that this area was and is very important, even sacred, to neighboring Indian tribes. It was troubling to know, then, that we had very little information on any of the cultural resources along the ZAT. How could we effectively preserve these remarkable archaeological sites if we knew so little about them?

As time went by we learned more and more about the prehistoric trails in the monument. Specific trail types became apparent as more information was collected; most of the trails we discovered appear to have been built to facilitate economic or religious purposes across and within the lava flows. That is, trails were constructed in such a way as to get one across the lava flows as quickly and easily as possible. These can be considered economic routes. On the other hand, some trails will take one to a specific, often spiritually significant, location. These can be considered religious trails, and can often be interpreted as pilgrimage routes.

As El Malpais National Monument was gathering more and more information on ancient trails, Professor Michael Adler and graduate student Jason Theuer from the Anthropology Department at Southern Methodist University (SMU) in Dallas, Texas, inquired about potential archaeological projects that were needed. I mentioned that an archaeological inventory of the ZAT was one of the monument's primary cultural resource management needs. This project, *Pathways to Understanding,* was started soon thereafter with SMU. The concept of a pathway is both a real description of the ZAT and a metaphor for a better understanding of ancient trails and their archaeological significance.

In archaeological terms, now that the survey is complete, we have a much better understanding of the spatial distribution of cultural resources along the ZAT. We know that sites tend to cluster spatially on either end of the trail and off of the rugged lava flows. This is a pattern we see elsewhere in the monument, particularly during the Pueblo II to early Pueblo III periods (c. AD 900 to the early 1200s). Archaeological features along the ZAT include bridges and other basalt structures, some of which we have learned through tribal consultation are shrines. Features also include cairns of other trails that lead in other directions. In terms of earliest use of the ZAT, identification of Kiatuthlana Black-on-white at Site 507 indicates use of the trail may date as early as the middle AD 800s.

This project has increased our understanding of more than just ancient trails, though. Neighboring tribes understand that we are determined to preserve cultural resources along the ZAT. Knowing the number, types, location, and condition of cultural resources along the ZAT will enable better preservation, protection, and interpretation of these resources. There is a greater appreciation for the management challenges ahead and of the potential for future research. Finally, we have a better understanding of the significance and cultural importance of the trail, its associated features and sites, and the lava flows themselves to the Pueblos of Acoma and Zuni.

James W. Kendrick
Archaeologist
El Malpais National Monument
National Park Service

Project Summary

Visitor impacts on archaeological sites within public lands pose a constant challenge for land managers and managing agencies. This is particularly true for the National Park Service (NPS) and its mission to preserve and protect natural and cultural resources for the enjoyment of present and future generations. El Malpais National Monument preserves and protects of one of the nation's most beautiful natural landscapes, the lava flows south of Grants, New Mexico. The monument receives many visitors a year coming to see the lava flows, caves, and tubes. Visitors also visit the monument to hike the few trails that venture into this rugged landscape and the even fewer trails that dare cross it. The Zuni-Acoma Trail, or Acoma-Zuni Trail depending on which way you are traveling, is one of the few public-access trails that crosses the lava flows. In addition to its natural beauty, the lava flow areas contain a rich cultural history. The Zuni-Acoma Trail has been used for almost one thousand years, or more, by the Ancestral Pueblo peoples and their descendent communities. The lava flows are considered sacred to all of the nearby Native American communities and contain a rich cultural record of their long history of interaction with the landscape.

In an effort to assist the National Park Service, archaeologists from Southern Methodist University and El Malpais National Monument and cultural resource advisors from the Pueblos of Acoma and Zuni collaborated to design and implement an archaeological survey of the public-use section of the Zuni-Acoma Trail. The Zuni-Acoma Trail stretches over 75 miles, linking the Pueblos of Acoma and Zuni. One portion of the trail is contained within El Malpais National Monument, a 7.5-mile segment that crosses both lava flows and open parkland. The Zuni-Acoma Trail Archaeological Survey Project research design focused on a comprehensive inventory of all prehistoric cultural resources located along the public-use trail in order to improve the monument's ability to preserve and protect sensitive cultural resources. The archaeological survey covered a contiguous transect on both sides of the trail, with total coverage of 550 acres. Within this area project personnel recorded 14 prehistoric archaeological sites. While numerous small scatters of historic artifacts were documented, no intact historic sites were recorded.

Acknowledgements

We would like to extend our deepest thanks to the Western National Parks Association (WNPA) and Brenda Acker for providing funding for this project and for being so flexible and understanding when circumstances beyond anyone's control forced this project into a slightly different direction. National Park Service Archaeologists Matt Basham and Steve Baumann provided invaluable time and expertise assisting with physical and GIS mapping, offering new techniques and encyclopedic knowledge. The Cultural Resource Advisory Team from the Pueblo of Zuni, including Davis Nieto, Octavius Seowtewa, Leeland Kaamasee, Harry Chimoni, Eldrick Seoutewa, and Perry Tsadiasi contributed extensive knowledge of traditional resources, tolerated dozens of questions and requests, and provided the bulk of the survey crew for surveying the main lava flow. Theresa Pasqual from the Acoma Historic Preservation Office greatly assisted the project, even with the notable disadvantage of taking over the office more than halfway through the project after the resignation of the previous director. Our deepest gratitude goes out to all of the cultural resource advisors who participated in this project. Special thanks go to Jessica Hargrave, the sole undergraduate from Southern Methodist University, who was brave enough to join a survey project in the aptly named El Malpais, "the bad country."

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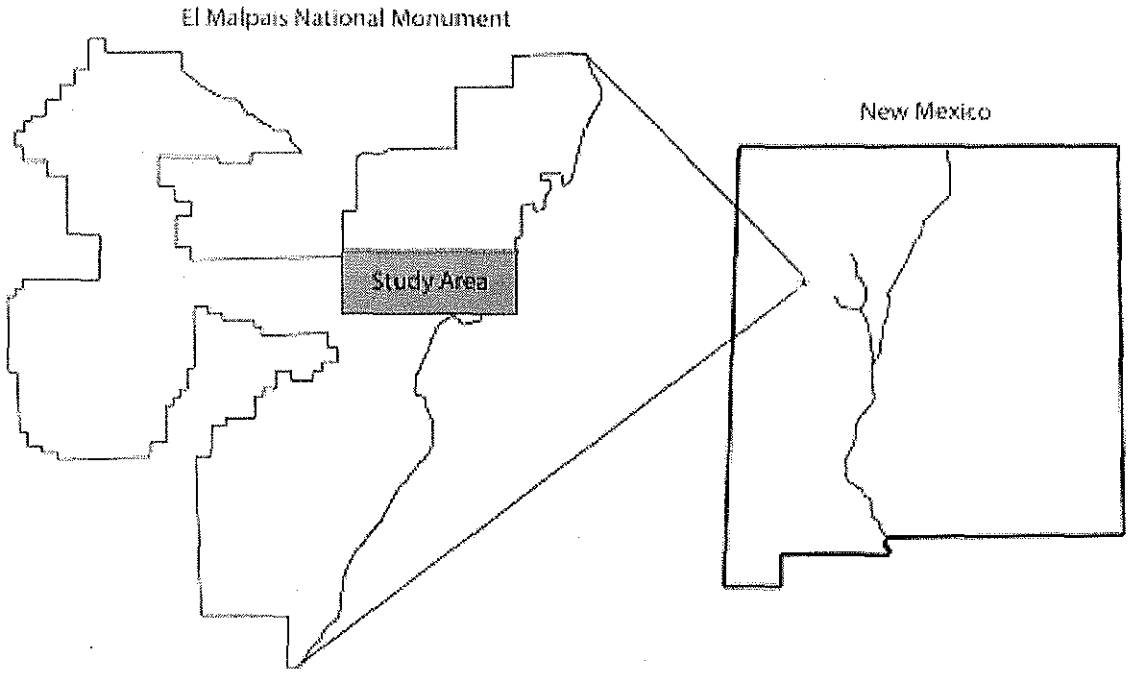

Figure 1.1 Map showing the location of El Malpais National Monument in the state of New Mexico and the location of the study area within El Malpais National Monument.

Introduction

The Zuni-Acoma Trail has served as a primary route connecting the Pueblos of Acoma and Zuni, located in west-central New Mexico, for at least a millennium. A short section of the trail runs through El Malpais National Monument south of Grants, New Mexico. During 2006 and 2007, the Zuni-Acoma Trail Archaeological Survey Project conducted a full coverage archaeological survey of the 7.5-mile public-use section of the Zuni-Acoma Trail located within El Malpais National Monument. The project had three primary goals. The first goal was to document prehispanic and historical cultural resources along the public-use trail. Second, the project assessed the degree to which public visitation posed a threat to these cultural resources. Finally, we sought to develop recommendations for protecting and preserving these resources. This report describes the findings and recommendations resulting from this project.

The Zuni-Acoma trail connects the Pueblos of Acoma and Zuni across a distance of 75 miles. Stretching from the mesas surrounding the Pueblo of Acoma, the trail winds through the El Malpais lava flows, across the Zuni Mountains and Zuni Valley to the Pueblo of Zuni. A 7.5 mile portion of the trail crosses the lava flows of El Malpais National Monument. Although numerous prehispanic (prior to A.D. 1540) trails meander through the lava flows, the Zuni-Acoma Trail crosses the lava flows at one of the narrowest points of the flows and remains one of the most direct routes across the rugged landscape. Based on past ethnographic information and recent work with cultural resource advisory teams from both Zuni and Acoma, the Zuni-Acoma Trail continues to hold strong cultural significance to the people of both Pueblos of Zuni and Acoma. In addition to serving as an important economic corridor for the movement of goods, the trail is central to Acoma and Zuni religious beliefs and practices. The lava flows are regarded as a very powerful spiritual area and while the Zuni-Acoma trail provided a route across the lava flows for participation in shared ritual calendars, the trail also provides access to religiously important areas within the lava flows.

II

Environmental Setting: A Natural History

El Malpais National Monument is located in West-Central New Mexico on the southern Colorado Plateau (Wozniak and Marshall, 1991). The lava flows lie at the south extent of the San Juan basin, east of the Zuni Uplift, and west of the Acoma Embayment (Kelley, 1955). These two up lifted areas flanking the lava flows area form a natural, lava filled basin. The elevation within the monument ranges from 6,600 to 8,400 feet a.s.l.

Geology

The volcanic activity that formed the El Malpais lava flows began a little over 700,000 years ago. Approximately 15 separate flow episodes occurred between 700,000 and 3,000 years ago, with the greatest periods of activity occurring within the last 200,000 years (Laughlin and WoldeGabriel, 1997). At least 2 flow events have occurred since human populated the Americas. The Bandera flow is dated to approximately 10,000 years ago and the McCartys flow occurred approximately 3,000 years ago.

The majority of the survey area falls within this most recent McCarty's lava flow. Though this most recent flow may have covered human occupations that predate 3,000 B.P., we have no way of assessing the presence or absences of occupations under these flows. On the peripheries of the main McCarty's flow, lava ridges are separated by sandy-silty areas. These areas have occasionally been mislabeled as "kipuka" a Hawaiian term for an island of raised land which lava flowed around, preserving it. This is not the case with the McCartys flow, however. The silty sands represent aeolian and alluvial sedimentary deposits slowly filling the low-lying areas in-between raised lava ridges. If these deposits contain evidence of human activity they have to post-date the McCarty's lava flows.

Flora and Fauna

Despite the name El Malpais, meaning "the badlands" or "the bad country" the lava flows support abundant plant and animal life. Four hundred and forty-one plant species have been identified within the monument, including plants at the far extremes of their distributions (Bleakly, 1997). For example, the lava flows support ponderosa pine at a lower elevation than anywhere else within this species' distribution. The lava flows provide many unique micro-climates and micro-habitats including lava tube caves, lava holes filled with water, and "ice caves" that all support a variety of flora and fauna.

The majority of the survey area consists of mixed-woodland supporting piñon, juniper, and ponderosa pine. Numerous grasses and shrubs are supported in the silty-sand areas distributed across the lava flow, taking hold in cracks and crevasses of the volcanic landscape. The most common plants encountered in the survey area include: ponderosa pine, piñon, juniper, gamble oak, skunkbrush, four-wing saltbush, sage, yucca, cholla, prickly pear cactus, hedgehog cactus, blackspined hedgehog cactus, and numerous grasses.

The range of fauna found within the lava flows is diverse and abundant. Lightfoot (1997) documents 71 species of mammals, 9 species of amphibians, 27 species of reptiles, and 109 species of birds recorded within El Malpais National Monument. In addition to the more common rodents, lagomorphs (rabbits), birds, and reptiles, survey personnel observed black bears, golden eagles, horned lizards, skunk, salamander, elk, and a solitary mountain lion during fieldwork.

III

Cultural History

Paleo-Indian (12,000 – 10,000 B.P.) and Archaic (10,000– 3,000 B.P.) Period

During the time that humans have lived in and around the El Malpais area, active flows have erupted at least twice. Ancestral Native Americans living in the area witnessed the most recent flow roughly 3,000 years ago. References to this most recent lava flow (eruption) are preserved in the oral histories of both Pueblos (personal communication Seowtewa, 2006; Pasqual, 2007). An earlier eruption may have been witnessed by Paleo-Indian hunter and gatherers over 10,000 years ago. While there is limited artifactual evidence for these earliest Paleo-Indian occupations in the region (Schachner and Kilby 2005:45; Reed 2007), there is no oral tradition that specifically relates to this early lava flow event.

Human interaction with the lava flows within El Malpais National Monument may date as early as the peopling of North America and the Southwest. Although lava flow events 10,000 and 3,000 years erased most evidence of Paleo-Indian and Archaic occupations, evidence from nearby areas clearly indicates that Archaic and Paleo-Indian populations utilized the area. Only general cultural patterns can be ascribed to the nature of Paleo-Indian and Archaic occupations within El Malpais National Monument since most direct evidence of their presence has been covered by at least one, if not two, lava flows.

Paleo-Indian and Archaic projectile points have been recovered from numerous sites near the lava flows within El Malpais National Monument. Around 30 Paleo-Indian projectile points ranging from Clovis and Folsom types to Cody Complex have been recovered by previous archaeological investigations in and around El Malpais National Monument (Broster, 1980; Broster and Harrill, 1982; Powers and Orcutt, 2005). Almost half of the recovered specimens show signs of reworking suggesting that these points are not in their original deposited context and were collected and used by later inhabitants. The recovered contexts of the points that were not reworked suggest that Paleo-Indian inhabitants monitored the movement of large game in and around the low-lying playas and may have utilized the natural landscape, such as sandstone cliffs and steep walled box canyons, in hunting game (Powers and Orcutt, 2005).

Numerous Archaic points have been recovered within El Malpais National Monument and many of these in association with probable Archaic habitation sites. Some Archaic points were probably collected by later inhabitants and transported to their recovered contexts. This was clearly the case with a reworked Bajada style point recovered from an Ancestral Pueblo site (ELMA 500) situated within the 3,000 year old lava flow. The fact that a Middle Archaic point was recovered from on top of a 3,000 year old lava flow strongly suggests that this point was collected and subsequently redeposited by Ancestral Pueblo inhabitants.

Current ethnographic evidence suggests that this Archaic point, and probably other early artifacts as well, may have been collected for use in ritual. Modern Pueblo men frequently wear projectile points recovered from archaeological contexts on chains as necklaces. The Zuni believe that if a tribal member finds a projectile point within their lands (reservation) that their ancestors intended for them to find it, and that the projectile point will protect them whenever they leave their lands and ensure a safe return (Seowtewa, personal communication, 2005). While this pattern cannot be projected into the past with certainty, it offers an interesting possible explanation for the common occurrence of older projectile points on Ancestral Pueblo sites.

Basketmaker III (A.D. 400 – 700) Period

The paucity of Archaic and Paleo-Indian period projectile points recovered from within El Malpais National Monument is matched by a dearth of Basketmaker sites within El Malpais National Monument. The Zuni-Acoma Trail Archaeological Survey did not identify any Basketmaker sites or materials, though sites dating to this period are found elsewhere on the Monument. Nearly all Basketmaker sites identified within the larger Monument area appear to date late in the sequence, primarily to late Basketmaker III period. The Basketmaker period witnessed the development and proliferation of agriculture and increased sedentism. As such, it is not surprising that most Basketmaker sites within the monument are located near potential agricultural areas. This compares to earlier Paleo-Indian and Archaic settlement patterns that appear to focus on harvesting natural resources, such as piñon nuts, and hunting game.

As described below, the majority of cultural resources presently documented in the Zuni-Acoma Trail area post-date A.D. 1000. The lava flows that erupted around 3,000 years ago may have left the landscape inhospitable for many generations and forced Basketmaker populations to settle in areas at the peripheries of the affected areas. This may explain why Basketmaker sites are nearly absent in the area and do not appear until very late in the Basketmaker sequence.

Ancestral Pueblo Settlement Patterns (A.D. 700 – 1500)

The vast majority of cultural resources within and around the lava flows date to the Ancestral and Historic Pueblo periods. There is no uniform cultural history for Ancestral Pueblo settlement across the Southwest, each and every region has a unique chronology of culture change. The chronology for the El Malpais area originally developed by Ruppé (1953) and Dittert (1959), and more recently has been modified by Wozniak and Marshall (1991) and Powers and Orcutt (2005), mainly in refinements to the temporal spans assigned to each period and phase.

Pueblo I: approximately A.D. 700 – 950
Red Mesa Phase: A.D. 870 – 950
Pueblo II: approximately A.D. 950 – 1125
Early Cebolleta Phase: A.D. 950 – 1050
Late Cebolleta Phase: A.D. 1050 – 1125
Pueblo III: approximately A.D. 1125 – 1320/1325
Pilares Phase: A.D. 1125 – 1200
Early Kowina Phase: A.D. 1200 – 1275
Late Kowina Phase: A.D. 1275 – 1325
Pueblo IV: approximately A.D. 1320/1325 – 1540

During the Pueblo I period the typical architecture in the El Malpais area consisted of pit-houses and jacal or masonry structures. Sites are typically small. Public architecture is not common, although great kivas are occasionally present in some Pueblo I communities (Wozniak and Marshall, 1991). Dittert (1959) identified two general Pueblo I settlement districts, the Los Pilares district in the north, and the Los Veteados district in the south. Dittert (1959) and Power and Orcutt (2005) identified slight differences between the two districts, with a slightly higher presence of Gray ware ceramics in the sites in the northern district, and a higher frequency of Brown wares in the southern district. The presence of Brown ware and evidence of other Mogollon influences is discussed below.

The Pueblo II period is characterized by increasing population levels and the presence of Chaco-style great houses in the region. Habitation sites during this period are typically larger than during the Pueblo I period and consist of multi-room pueblos, constructed as contiguous room blocks. Wozniak and Marshall (1991) suggest that during this period kivas were used exclusively as ceremonial structures. The influence of the Chaco phenomenon is strongly witnessed in the El Malpais area. Several community centers with great kivas and associated habitation sites have been identified within the monument. The presence of Chaco-style architecture suggests that this area was integrated into the Chaco system likely through economic exchange and religious pilgrimages.

During the Pueblo III period, occupation sites are typically larger than during the Pueblo II period, but less numerous. By the end of the Pueblo II period the Chaco regional interaction system had collapsed and the ripple

effect was felt throughout the pueblo world. Great kivas continue through the Pueblo III period, but in a slightly different form from earlier. During the Pueblo III period great kivas are larger and most are unroofed (Wozniak and Marshall, 1991). This same pattern is witnessed further west in the Zuni Valley where archaeological survey recorded a number of large sites with extremely large great kivas showing no evidence of roofing (Keith Kintigh, pers. comm. 2005). Population densities increased in many areas during the Pueblo III period and the majority of sites recorded during the current survey date to the late Pueblo II - early Pueblo III period.

The Pueblo IV period is typified a continuation of settlement system changes initiated during the Pueblo III period, namely the continued aggregation of regional populations into fewer, larger settlements. Only a few sites are known within or near El Malpais National Monument that date to the Pueblo IV period. These sites typically contain over 200 rooms, multiple kivas, and are found in defensive locations (Powers and Orcutt, 2005; Wozniak and Marshall, 1991). It appears that by the beginning of the 15th century all of the large Pueblo IV settlements within and near the monument were no longer actively occupied.

Mogollon Influence

While very few areas in the Southwest can be considered "pure Ancestral Pueblo" or "pure Mogollon" there appears to be a strong Mogollon influence in the El Malpais area. This influence manifests in both ceramic and architectural technologies employed by the regions inhabitants. Mogollon Brown ware is found in many places throughout the monument with the highest frequencies existing in the southern areas of the monument (Kendrick, pers. comm. 2007). El Malpais National Monument archaeologist Jim Kendrick (pers. comm. 2006) has suggested that the architecture found throughout the monument strongly resembles architectural patterns found in the Mogollon region to the south and west. This Mogollon influence in architectural patterns is witnessed not only in the southern areas, but throughout the monument. It must be kept in mind that archaeologically defined culture areas or patterns, such as "Mogollon" may not necessarily coincide with ethnic, linguistic or other cultural identities of the peoples who left these patterns behind. These are classificatory labels that are defined on the basis of material culture. Given the dynamic nature of population relocations and community interactions, archaeological sites identified as "Mogollon" were likely inhabited by people considered to be ancestral to the modern pueblos. Despite these semantics, there does appear to be a mixing of regional traits at most sites within El Malpais National Monument, which supports strong connections with communities farther to the south, and ancestries that include local and immigrant communities.

Historic Period Use of the Lava Flows (Post A.D. 1540)

The lava flows have played an integral role in local economies from the prehistoric through modern times. During the historic era, Spanish explorers, missionaries, and Anglo-Americans have all interacted with the lava flows in various ways.

The earliest historically documented descriptions of the El Malpais lava flows come from the diaries of Spanish explorers and Franciscan missionaries. One of the earliest accounts comes from Father Estéban Perea in the summer of 1629 while traveling from Acoma to Zuni (Kendrick 2005 in Powers and Orcutt, 2005). The lava flows certainly would have been encountered earlier by Francisco Vasquez de Coronado in 1540 while searching for the fabled Cities of Gold and again by Don Juan de Oñate in 1598 and 1605. While the earliest accounts are limited, the best known documents come from the diaries of a Franciscan Missionary, Silvestre Velez de Escalante, who along with Francisco Atanasio Dominguez led an expedition in 1776 to find a land route to Monterey, California. The expedition, know as the Dominguez-Escalante Expedition, failed to find a route from Santa Fe to Monterey and on their return to Santa Fe the disheartened expedition was forced to find a route across the rugged lava flows.

Prior to the National Park Service's administration of the lava flows, stewardship of the lava flows was the responsibility of the Bureau of Land Management. It was during BLM administration that the Zuni-Acoma Trail was developed into a public-use trail. Part of the rationale for this public development of the trail was its putative role in European exploration of the region. Initially the BLM determined that the Zuni-Acoma Trail was the route utilized by Dominguez and Escalante to cross the lava flows on their return to Santa Fe after failing to find an overland route to Monterey, California. Later research by National Park Service archaeologists and historians disputes this perspective, arguing instead that Dominguez and Escalante probably followed the route now taken by HWY 53

around Zuni to the spring at San Rafael, then turned towards El Nacimiento, or the area we know today as McCartys.

With the completion of the railroad in 1880's Anglo settlers established homesteads along the lava flows, where they grazed cattle and harvested lumber. The railroad opened the west to east markets where lumber and antiquities were both highly sought after. Lumber cutting appears to have been one of the most profitable activities, other than the theft and looting of cultural resources, for people in the area. In addition to economic activities, it appears that hunting was quite common in the lava flows, allowing local people to supplement their diets with wild game. The historic trash that litters certain areas of the lava flows provides ample evidence for the impact of historic hunting, herding and lumber harvesting. Small and large trash piles, lumber cutting debris, and hunting blinds are the material remains of these activities found throughout the Zuni-Acoma Trail area as well as across the larger El Malpais Monument landscape. This should not be surprising, for thousands of years the lava flows have provided resources and economic opportunities to local populations during times of hardship.

The Navajo arrived in the El Malpais area sometime during the 15th or 16th century (Powers and Orcutt, 2005). There is little direct evidence of the earliest Navajo uses of the area. Historical documents and personal communications with local Navajos indicate that the Navajo have a deep connection and relationship with the lava flows. The Navajo used the lava flows for protection from Spanish occupation of the region and later provided refuge from the U.S. army. The Navajo also utilized the grasslands surrounding and within the flows for grazing sheep.

Substantial amounts of cattle grazing activities have taken place within and at the edges of the lava flows over the past few centuries. While most of this grazing may be attributed to Euro-American settlers, the Acoma have a long history of grazing cattle in this area. Currently, Acoma owns a significant amount of land adjacent to the monument and lava flows and graze cattle on most of this land. Acoma has been allowed to continue grazing cattle on their lands and drive cattle through the monument to other sections of Acoma land. This activity has been allowed since grazing was determined to be a "traditional activity" by previous authorizing agencies and necessary to maintain traditional life-ways.

IV

Zuni-Acoma Trail Archaeological Survey Project

Research Design

The Zuni-Acoma Trail Archaeological Survey Project research design was implemented in 7 phases: reconnaissance survey, collaboration, archaeological survey, preliminary reporting, mapping, final consultation, and final reporting. One of the most important features of the research design was the active collaboration with the Pueblos of Acoma and Zuni. Collaborative meetings were held separately with cultural resource advisory teams from both pueblos prior to the archaeological survey. These meetings provided both communities the opportunity to review and request changes to the archaeological survey design. These meetings provided numerous important insights that would not have been otherwise been included in the research design and survey implementation. Site visits and collaborative meetings were held in the field during the site recording and mapping phase. These site visits proved invaluable, with participants identifying several previously unidentified features and clarifying the identifications of several others.

During the early stages of reconnaissance survey and literature searches the investigators examined aerial photographs on file at El Malpais National Monument. Examinations of these photographs, particularly of areas known to contain large sites, revealed that aerial photographs were of little to no use and therefore were not purchased with project funds.

This research was designed to produce a comprehensive inventory of cultural resources along the public-use section of the Zuni-Acoma Trail for the Zuni Pueblo, Acoma Pueblo, and El Malpais National Monument. The goals of the research were three-fold: 1) to assist and improve El Malpais National Monument's preservation and protection of cultural resources, and 2) to facilitate Zuni and Acoma access to Traditional Cultural Properties by integrating their involvement throughout the research process and encouraging their investment in the protection and preservation of these shared resources, and 3) to present recommendations for future preservation of the trail's cultural resources. An important result of the work was an increase in our archaeological knowledge of trails and sacred landscapes through the collaboration with cultural resource specialists from both Pueblos, allowing a more informed integration of traditional knowledge into both research designs and report summations.

Survey Methods

Archaeologists from Southern Methodist University conducted an archaeological survey of the Zuni-Acoma Trail from July 1, 2006 through August 4, 2006. The trail was broken down into three main sections 1) East Trail Head, 2) West Trail Head, and 3) Central Flow. Both the East and West trail heads consist primarily of aeolian, and some alluvial, deposits atop older lava flows. These areas have significantly higher densities of sites and IO's (isolated occurrence), most likely due to the availability of arable lands and water. The central portion of the trail consists of 5 miles of recent lava flow with virtually no sediment accumulation and varying densities of vegetation.

The archaeological survey conducted at the East and West trail heads ran transects perpendicular to the trail at a spacing of ten meters. Transects extended out to a minimum of 100 meters on either side of the trail. Some transects were extended slightly farther in order to reach the edge of recent lava flows. Other transects extended farther than 100 meters in order to cover vulnerable areas likely to contain archaeological sites. Unfortunately, due to funding cuts, a small crew of two archaeologists conducted the majority of the survey in the East and West trail head sections.

The survey of the central portion of the trail ran a single transect the entire length of the trail with 7 people spaced at 15 meters. This resulted in a slightly smaller area covered, roughly 50 meters on either side of the trail, within the main lava flow. The amended survey strategy within the main flow was designed to improve the level of safety for the surveyors and enhance the accuracy of the coverage. Initial perpendicular transects run on the lava flows proved to be inefficient since straight lines could not be followed and the marked trail was easily lost. For safety reasons, a single transect was run the length of the trail with a single surveyor following the trail and directing the persons on either side. Preliminary surveys illuminated the dangers in leaving the trail as only small cairns mark the trail and, once lost, GPS equipment was necessary to relocate it. This survey strategy allowed surveyors to examine every lava tube and collapsed bubble within reach of most visitors.

Recording Methods

Nearly all isolated occurrence (IO) recording, site recording, and mapping activities were carried out by a single person to ensure consistency in the recording methods and artifact identifications. Archaeologists Matt Basham and Steve Baumann from El Malpais National Monument assisted with the site mapping and detailed feature mapping at one site (ELMA 507). The surveyors and recorder used the definitions for sites and IOs provided by El Malpais National Monument with slight modifications.

The process used by El Malpais National Monument for defining sites was slightly modified for this survey. The El Malpais National Monument definition for a site, as provided by Park Service Archaeologist Jim Kendrick, is as follows:

> "**A Site** is defined as an assemblage of 10 or more artifacts with or without a feature, or a feature with or without artifacts. The boundary of a site is marked when the distance from one artifact to the next is greater than 20 meters."

This definition was amended to include assemblages of less than 10 artifacts when more than 1 type of artifact was present. In one instance, artifacts separated by more than 20 meters were grouped into a single site (ELMA 503) as the terrain and artifact types clearly demonstrated spatial and temporal continuity.

The most difficult aspect of identifying sites was distinguishing natural basalt formations from architectural masonry alignments. Limited exposure of natural basalt flows in sedimentary areas made indisputable identification impossible. It is certainly possible that cultural features were not recorded as they could not be distinguished from natural outcrops. Any suspicious linear alignments were examined in great detail for the presence of even a single artifact. If surveyors located an artifact within 20 meters of the alignment it was treated as an archaeological site. However, the vast majority of human-created linear alignments contained no artifacts.

Following the standards employed by El Malpais National Monument, an isolated occurrence (IO) was defined as any single artifact separated by more than 20 meters from any other artifact, or a group of less than 10 artifacts of similar or identical type. This definition became extremely useful when recording historic trash. In numerous instances small clusters of nearly identical soda cans, tin cans, or beer bottles were located and recorded as an IO. IOs recorded during this survey included individual pottery sherds, individual lithics, and historic artifacts.

The survey located, identified, and made note of numerous historic archaeological sites. However, due to numerous constraints and unforeseen circumstances, the research design was changed to focus solely on Ancestral Pueblo cultural resources and none of the historic sites were formally recorded. A list of historic sites, primarily trash dumps, with locations has been provided to El Malpais National Monument so that future researchers may record these sites

In addition to the site recording form, feature forms, architecture forms, and artifact identification forms (pottery, lithic debitage, and lithic tool forms) were all completed for each site where appropriate. Comprehensive artifact tallies and identifications were completed at all but 2 sites, where artifact densities were too great to confidently record all visible artifacts. Pottery identifications were made utilizing two primary references; Hays-Gilpin and Van Hartsveldt (1998), and Mills, et al (1991). These references provided for the most accurate typological identifications to be made in the field. No typological identifications were made based purely on decoration or surface treatment. The recorder documented paste characteristics, including paste color, oxidation,

texture, and fracture, temper types, and surface treatment in order to narrow down the possible pottery types and then examined painted decorations to make the final determinations.

Lithic identifications, including lithic material type and artifact type, were recorded using the references compiled by El Malpais National Monument archaeologists. These field references included the most prominent types of lithic raw material found in New Mexico including source locality and a comprehensive list of all other types of lithic materials frequently and infrequently encountered. Lithic identifications included both artifact types and debitage analysis. The debitage analysis did not identify primary, secondary, or tertiary flakes, but instead recorded flake size, amount of cortex present and material type.

The forms used to record IOs, archaeological sites, and artifacts were developed by El Malpais National Monument Park Archaeologist and Chief of Cultural Heritage Preservation, Jim Kendrick. Examples of these forms and manuals are provided in Appendix A.

Site maps were produced using one of two methods. Twelve of the fourteen archaeological sites were mapped using the Brunton and Tape method. The two remaining sites (ELMA 507 and ELMA 508) were far too large to accurately map with a Brunton and tape measure. Both sites were assessed for the suitability of using a total station, but because of the sinuous nature of the lava flows and abundant tree cover it was determined that the use of a digital total station was not feasible as more than one datum would be necessary to map the entire area. An alternate method, utilizing a GPS device and a Cartesian coordinate system, was proposed by seasonal National Park Service Archaeologist Matt Basham. Archaeologists Matt Basham and Karl Gordon utilized this technique on several previous projects conducting survey and site recording work for the Western Archaeological Conservancy Center (WACC) based out of Tucson, Arizona. This new technique has also been used to map sites within El Malpais, particularly when large sites need to be mapped quickly (during fire management activities, for example).

A Helpful New Mapping Technique

This new method for mapping large site is based off of the use of highly sensitive, hand-held GPS devices. The usefulness of this method lies in its use of relatively inexpensive GPS devices can be used to produce highly accurate maps. In lieu of a sub-centimeter accurate GPS device that can cost several thousand dollars, relatively inexpensive hand held Garmin GPS devices can be used that only cost a few hundred dollars. The method takes advantage of the fact that UTM coordinates function like a Cartesian coordinate system with X-axis and Y-axis units corresponding to Easting and Northing measurements. Since UTM Easting values increase as one moves east and Northing values increase as one moves north these numbers can directly correlate to X and Y axes.

In order to map a site, recorders need only start by identifying a point farther south and farther west than any points within the site boundary. This point serves as the origin point for the X and Y axes. While UTM coordinate are usually 6 or 7 digits, this method only utilizes the last 3 or 4 digital of the UTM reading. The origin point is placed in the bottom left hand corner on graph paper and the X-axis value is labeled with the last 3 or 4 digits of the UTM Easting value and the same is done on the Y-axis with the Northing value. Maps can be scaled to any size necessary by identifying the furthest Northeastern point within the site and scaling the map as needed.

Once the scale has been determined and the map setup mapping activities proceed rapidly. Contour lines, site boundaries, and geologic formations are easily mapped by walking with the GPS along either contours or boundaries, placing dots on the graph paper by reading the last 3 or 4 digits of the UTM readings, and connecting the dots. Architecture and features and mapped in the same manner as the natural features utilizing the last 3 or 4 digits of the UTM reading to place them within the established Cartesian coordinate system. Large architectural features can be mapped relatively quickly by plotting the location of corners and free hand drawing the connecting walls based on visual observations.

For extremely large sites and/or complex natural features, such as mapping exposed lava flow and sediment filled areas, the "tracking" feature can be used on the GPS to record UTM readings as the recorder simply walks along the edge of the lava flow. Multiple tracks can be saved to the device so that separate natural and cultural features can be easily recorded and mapped (from the comfort of a shady spot under a tree and out of the desert sun). In extreme cases, the vast majority of a map can be recorded with the tracking feature and transcribed to a paper map at a later time (such as back at camp or in the office).

Survey Results and Interpretations

The survey covered approximately 550 acres and identified numerous archaeological resources. The temporal and cultural affiliation of the archaeological resources along the trail span from Pueblo I (800 A.D.) sites to mid-20th century Euro-American logging and cattle grazing areas. Numerous IOs were identified dating to even more recent times (<5 years old), however archaeological resources are not defined as such until the material is at least 100 years old and historical resources at 50 years. As such a great deal of the material post dating 1970 was removed as trash. These materials were primarily beer bottles, soda cans, plastic food bags (i.e. potato chips), and balloons.

This survey documented 14 sites (Figure 4.1 and Table 4.1) and 93 IOs (Table 4.2). In addition, the survey of the central lava flow identified numerous trail cairns no longer in use. Many of these cairns mark previous segments of the Zuni-Acoma Trail. These cairns include both ancestral Pueblo and historic BLM cairns. The two are distinguished by the presence of a tall log or stick around which rocks were stacked. This type of cairn was made by the BLM and is clearly visible from a great distance. The ancestral Pueblo cairns are much smaller, seldom more than 3-4 rocks tall, and may include a piece of sandstone carried in from the sandstone outcrops on the east side of the trail.

The entirety of the Zuni-Acoma Trail segment located on monument lands was assigned field number ELMA 513. Numerous features were identified in the lava flows that are directly associated with the trail (Figure 4.2). These features include primarily rock shelters and other temporary shelters that were probably used in direct association with the trail (i.e. if the trail were not there, these features would not have been there either). Although few sites probably exist independent of the trail, the features included in ELMA 513 are those which are most clearly dependent on the trail.

The archaeological sites documented represent primarily Pueblo II-III (1050-1325 A.D.) habitation and agricultural sites. Many of the sites had been picked clean of artifacts and visitors had marked at least 2 other sites with wooden cairns, probably for the purpose of collecting artifacts. Only 2 sites contained no clear evidence of structures. Of the 12 sites containing visible architecture, all of them possessed more than one room. Of signficance is that, based on ceramic evidence, all of the sites appear to date to within roughly 100 years of each other. This suggests that the occupation of this area was most intense during the late Pueblo II and early Pueblo III periods, or roughly 1100-1200 A.D. This is a period of increasing migration and relocation of populations across the northern portion of the Southwest, and the increasing use of the El Malpais region may well be the result of population relocations across the larger Southwest.

Though the largest and most visible sites located on this survey are identified as habitation and agricultural sites, the low densities of artifacts (ceramic, lithic and other materials) indicates that these sites were associated with seasonal and relatively short-lived occupations. While it is certainly likely that visitation to the sites by hikers has resulted in the loss of many artifacts due to illegal surface collecting, the dearth of even the most insignificant lithic debitage (usually not the target of artifact collectors) indicates short-term uses of these sites. As discussed below, a significant number of the sites may not have been constructed as durable occupation locations, but as structures associated with ritual site visitation and pilgrimage activities by ancestral and more recent indigenous populations.

Information provided by the Cultural Resource Advisory Teams from Acoma and Zuni suggested several possible functions and interpretations of various sites. The primary interpretation for most sites is dependent upon the spiritual and religious significance of the lava flows. The strong religious nature of the lava flows was an ever-present factor in the location of sites and their interpretations. Both Acoma and Zuni recognized and identified Traditional Cultural Properties (TCPs) at various locations throughout the survey area.

The Zuni-Acoma Trail served as more than a foot path connecting two distant communities. Although the trail did function as an economic corridor, its most significant purpose was spiritual. The lava flow served, and continues to serve, as a place for pilgrimages, prayers, and offerings and the Zuni-Acoma Trail offered access. The trails not only lead from the pueblos to the flow, but also across the flow and to specific places within it. The Acoma and Zuni consider the lava flows to be an extremely important place because of the spiritually powerful areas within it.

The religious significance of the trail and the lava flows extends beyond pilgrimages, prayers, and offerings. The lava flows are considered to be one of the places where the ancestor spirits and deity spirits of the Zuni and Acoma reside, referred to as Shalakos and Kats'inas, respectively.

This survey did not record the identified historic sites. The historic sites and features identified included historic trash piles, hunting blinds (or wind screens for camp fires), and logging roads. The historic sites and IOs are attributed to two primary activities; cattle grazing and logging. The historic materials associated with logging include roads, piles of cut logs (all cut to roughly 8 feet in length), and possibly the hunting blinds/campfire screens (since these features were only identified in the areas with evidence of logging). The historic features associated with cattle grazing are represented by trash and a single make-shift corral. The use of the East trail head for cattle grazing is evidenced by the clearly visible cattle trails and dung. Large trash piles were identified in several small lava tubes at the East trailhead; however, neither their affiliated activity nor age could be clearly discerned without further investigation.

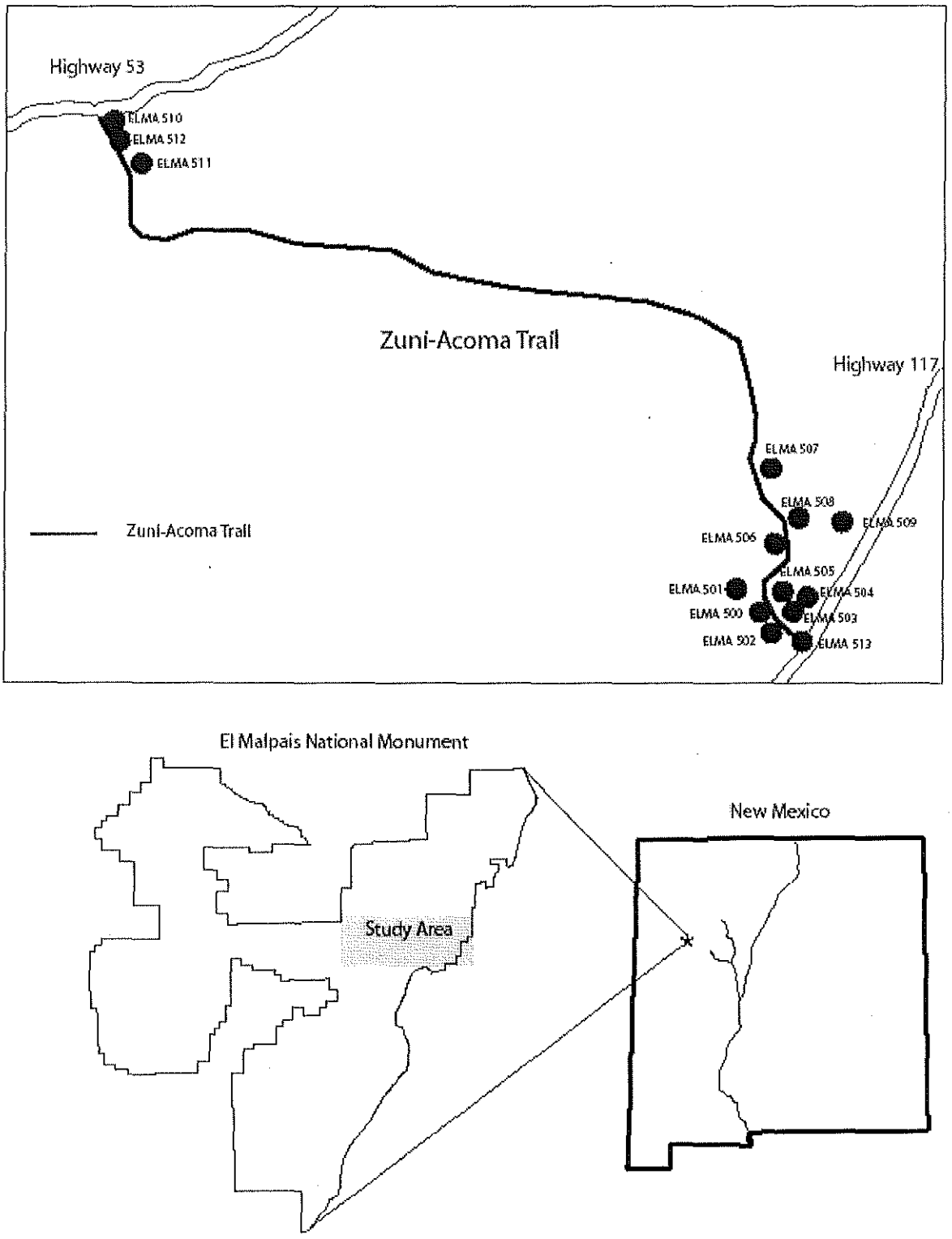

Figure 4.1 Map of archaeological sites recorded along the Zuni-Acoma Trail.

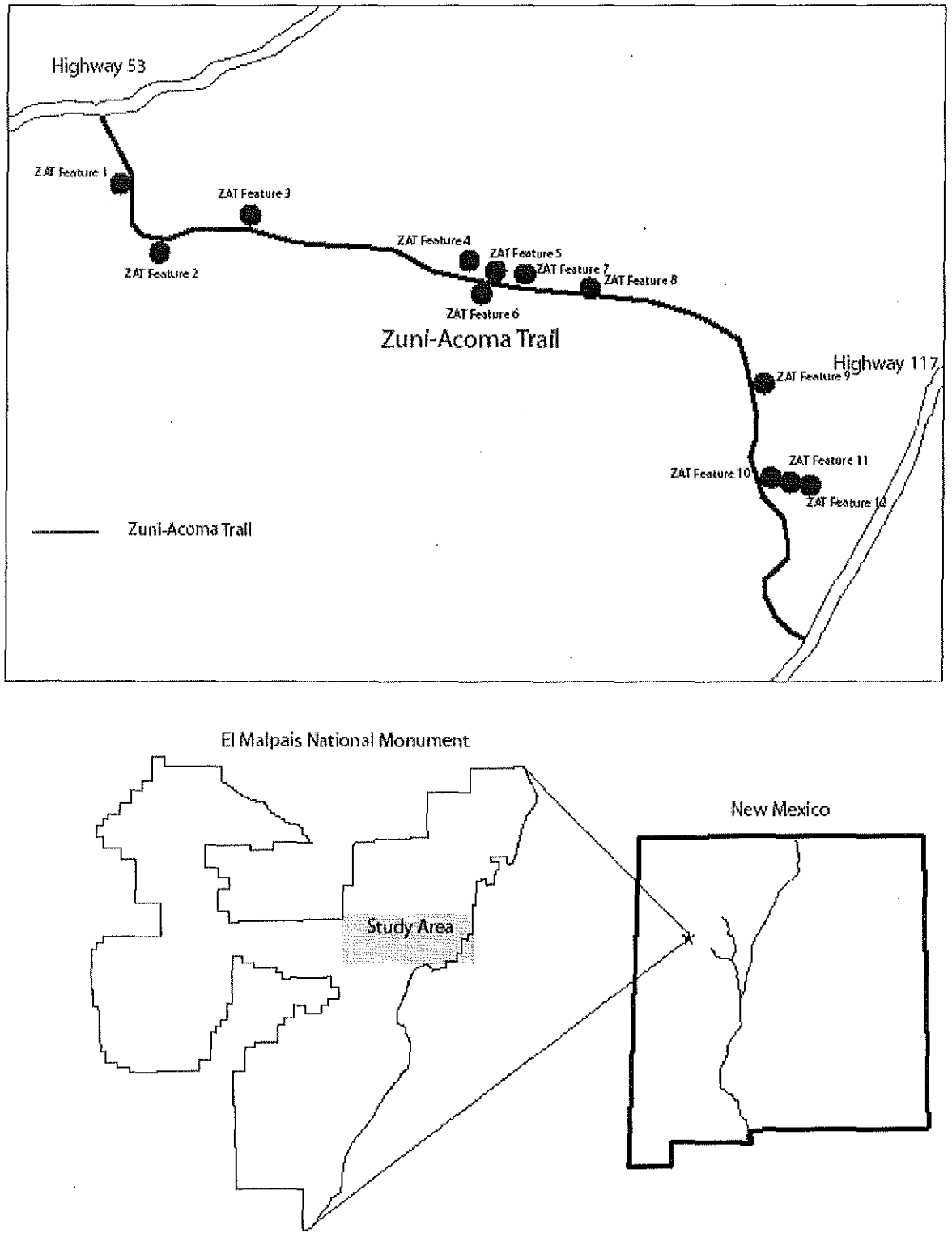

Figure 4.2 Map showing the location of features associated with the Zuni-Acoma Trail.

Table 4.1 List of Ancestral Pueblo archaeological sites recorded along the Zuni-Acoma Trail, El Malpais National Monument, New Mexico. Trail probably predates Pueblo II, however, extensive artifact collecting has greatly impacted all archaeological sites.

Field Number	Site Description	Time Period	Size / # of Rooms (min)	NRHP eligible?	Protection Needs
ELMA 500	Basalt masonry pueblo, scattered rooms, and artifact scatters	PII/III	5,000 m^2 / 10 room pueblo, 3 scattered rooms	Yes, part of district, criteria D	Monthly monitoring
ELMA 501	Basalt masonry pueblo	PII/III	400 m^2 / 1 room	Yes, part of district, criteria D	
ELMA 502	Basalt masonry structure and possible second	PII/III	1,500 m^2 / 1 or 2 separate structures	Yes, part of district, criteria D	
ELMA 503	Artifact scatter with scattered sandstone	PII/III	6,000 m^2 / NA	No, insufficient materials and integrity	
ELMA 504	Basalt masonry pueblo	PII/III	1,200 m^2 / 6 rooms	Yes, part of district, criteria D	
ELMA 505	Artifact scatter with possible masonry	No diagnostic artifacts	200 m^2 / NA	Yes, part of district, criteria D	
ELMA 506	Basalt masonry pueblo	PII/III	1,400 m^2 / $\leq$5 rooms	Yes, part of district, criteria D	
ELMA 507	Basalt masonry pueblo and agricultural features	PII/III	>100,000 m^2 / >10 rooms	Yes, part of district, criteria D	Trail relocation
ELMA 508	Basalt masonry pueblo and agricultural features	PII/III	105,000 m^2 / >10 rooms	Yes, part of district, criteria D	Trail relocation
ELMA 509	Basalt masonry structure	PII/III	500 m^2 / ind.	Yes, part of district, criteria D	
ELMA 510	Basalt masonry pueblo	PII/III	1,050 m^2 / 6 rooms	Yes, part of district, criteria D	Monthly monitoring
ELMA 511	Basalt masonry pueblo	PII/III	1,000 m^2 / 3 rooms	Yes, part of district, criteria D	
ELMA 512	Basalt masonry pueblo	PII/III	300 m^2 / 8 rooms	Yes, part of district, criteria D	Monthly monitoring
ELMA 513	Zuni-Acoma Trail	PII – Present	12.9 km / NA	Yes, part of district, criteria D	A portion of the trail on the east side needs to be moved to protect ELMA 507 & 508

Table 4.2 List of Isolated Occurrences recorded along the Zuni-Acoma Trail.

IO Number	IO Description	Time Period
IO-001	Indeterminate basalt cluster	Unknown/Pueblo
IO-002	Indt. basalt cluster with 1 lithic Illustrated on ELMA 502 site map	Unknown/Pueblo
IO-003	Possible fire pit	Historic?
IO-004	Indeterminate basalt cluster	Unknown/Pueblo
IO-005	Possible structure, no artifacts	Pueblo?
IO-006	Possible fire pit	Historic?
IO-007	Linear Basalt feature (check dam?)	Pueblo?
IO-008	Possible structure, no artifacts	Pueblo?
IO-009	2 possible structures, no artifacts	Pueblo
IO-010	Golf ball	Historic (<50 yrs)
IO-011	Hearth and metal can	Historic
IO-012	Cairn / Marker, sandstone	Pueblo?
IO-013	Basalt alignment	Unknown
IO-014	Basalt alignment	Unknown
IO-015	Indt. Basalt cluster/pile	Unknown/Pueblo
IO-016	Metal bucket with wire handle	Historic
IO-017	Pottery sherd (plain Cibola White Ware)	Pueblo
IO-018	Metal paint can lid	Historic
IO-019	Flattened metal can	Historic
IO-020	Indt. Basalt cluster/pile	Unknown/Pueblo
IO-021	2 broken glass bottles (1 purple)	Historic
IO-022	Indt. Basalt cluster/pile	Unknown/Pueblo
IO-023	Metal can	Historic
IO-024	Metal paint can lid	Historic
IO-025	2 metal cans	Historic
IO-026	Metal cigar tin	Historic
IO-027	Basalt hunting blind / fire screen	Historic
IO-028	Indt. Basalt cluster/pile	Unknown/Pueblo
IO-029	Basalt hunting blind / fire screen with associated charcoal	Historic
IO-030	Basalt hunting blind / fire screen with associated charcoal	Historic
IO-031	Rubber: tire tread	Historic
IO-032	Basalt hunting blind / fire screen	Historic
IO-033	Logging debris (14 logs @ 8')	Historic
IO-034	Logging debris (7 logs @ 8')	Historic
IO-035	Basalt hunting blind / fire screen with associated charcoal and a Prince Albert tobacco can	Historic
IO-036	Logging debris (8 logs @ 8')	Historic
IO-037	Logging debris (7 logs @ 8')	Historic
IO-038	Basalt hunting blind / fire screen with associated charcoal	Historic
IO-039	Basalt hunting blind / fire screen	Historic
IO-040	Fire pit / heart with associated charcoal	Historic
IO-041	2 metal cans, 1 metal can lid, and a possible fire pit	Historic
IO-042	2 metal cans, 1 metal can lid, and a possible fire pit	Historic
IO-043	Basalt fire pit and 1 Prince Albert tobacco tin	Historic
IO-044	Top of broken glass bottle with metal screw top	Historic
IO-045	Barbed wire corral	Historic
IO-046	Pottery sherd, plain Cibola White Ware jar body	Pueblo
IO-047	Cairn / marker, single sandstone block	Unknown/Pueblo
IO-048	Lithic: bifacial thinning flake, white chert	unknown

Table 4.2 (continued)

IO-049	2 dressed sandstone blocks, 1 piece clear glass, 1 piece quartzite angular debris	Unknown
IO-050	Flattened metal can	Historic
IO-051	Logging debris, 2 rows (10 logs and 8 logs @ 8')	Historic
IO-052	Logging debris, 2 rows (6 logs and 7 logs @ 8'), 1 metal can	Historic
IO-053	Beer can, "Coors" with Church-Key top	Historic
IO-054	Metal object with hinges, possible truck engine hood (side access)	Historic
IO-055	Possible masonry feature	Pueblo/Historic
IO-056	Linear masonry feature	unknown
IO-057	Metal can (milk?)	Historic
IO-058	Single sandstone block / manuport	Unknown/Pueblo
IO-059	Single sandstone block / manuport	Unknown/Pueblo
IO-060	Metal can lid (sardine)	Historic
IO-061	Pull tab aluminum can	Historic
IO-062	Pull tab "TEXSUN" orange juice can	Historic
IO-063	Pull tab "TEXSUN" orange juice can	Historic
IO-064	Pull tab "TEXSUN" orange juice can	Historic
IO-065	Lithic, angular debris, opaque white chert with brown and purple	unknown
IO-066	Pull tab "TEXSUN" orange juice can	Historic
IO-067	Pull tab can, similar to 066 and 062-064	Historic
IO-068	2 beer bottles, brown glass	Historic
IO-069	Logging debris, deteriorating lumber	Historic
IO-070	4 beer bottles, brown glass (2 different marking on base)	Historic
IO-071	Tin can, Church-Key top	Historic
IO-072	Lithic, single bifacial thinning flake, off-white chert	Unknown
IO-073	Single sandstone block / manuport	Unknown/Pueblo
IO-074	Lithic, single bifacial thinning flake, Jemez obsidian	Unknown
IO-075	Brown glass beer bottle (identical to IO-068)	Historic
IO-076	Brown glass beer bottle (identical to IO-068)	Historic
IO-077	Lithic, single angular debris, coarse white chert	Unknown
IO-078	Glass bottle, clear glass, broken	Historic
IO-079	Glass bottle, brown glass, broken	Historic
IO-080	Single sandstone block / manuport	Unknown/Pueblo
IO-081	Metal can (tin)	Historic
IO-082	Indt. Sandstone cluster/pile (cairn/marker?)	Unknown/Pueblo
IO-083	Metal can (tin) with aluminum top and pull tab	Historic
IO-084	Pottery, 1 plain white bowl rim (Cibola), 1 plain gray jar body (Tusayan). Possible basalt masonry	Pueblo
IO-085	3 metal cans (2 types) and 1 piece of metal strapping	Historic
IO-086	Metal can	Historic
IO-087	Metal can lid	Historic
IO-088	Metal can	Historic
IO-089	4-way tire iron and section of metal tubing (brake line)	Historic
IO-090	Metal can (motor oil)	Historic
IO-091	Metal can (tin) with aluminum top and pull tab	Historic
IO-092	Stacked basalt with a pop-top Pepsi can and a pull tab aluminum can	Historic
IO-093	Lithic, proximal section of primary thinning flake; light tan – gray Chert	Unknown

V

Preservation and Protection

The most pressing concern for the Zuni-Acoma Trail is the protection and preservation of the archaeological resources along it. The two most ominous threats to the archaeological resources are humans and cattle. Both humans and cattle pose a grave threat to the preservation and integrity of archaeological sites, artifact assemblages, and the stability of remaining intact deposits. It is no secret that people from the area frequently go into the lava flows looking for pueblo pottery and antiquities. Many stories circulate through the area about gold hidden in the lava flows by bandits and train robbers. These stories coupled with the numerous intact pots that have been removed from the lava flows have a strong hold over many people looking to make a quick dollar. These threats must not be ignored. Humans do pose the most severe and immediate threat to the archaeological resources within the flows and these threats must be addressed.

Cattle grazing activities have caused extensive damage directly and indirectly. Trampling has physically destroyed masonry and countless artifacts, both pottery and lithic alike. However, the greatest threat posed by cattle stems from the degradation of the desert grass communities. Cattle's grazing greatly weakens the stability of intact sediments by removing grasses and destroying their root systems. Once the root systems are destroyed there is no longer any structural support for the loose sediments and erosion quickly removes sediments destroying intact archaeological deposits.

The threat posed by cattle grazing must be addressed. Fences are needed to separate National Park Service land from the adjacent BLM and tribal lands. Many of the existing fences are in extreme disrepair and require immediate attention. This is one of the few instances where threats to archaeological resources can be easily mitigated and do not require excavation, erosion control, or other costly endeavors. However, a cadastral survey is necessary to identify and delineate the boundary between the National Monument and Acoma land. In many areas this boundary is not easily identified and numerous cultural resources lie along the lava flow edge. It is strongly recommended that the Pueblo of Acoma be deeply involved in this process, as the Park Service may be of great assistance in protecting and preserving cultural resources that straddle the boundary.

The threats posed by humans to the archaeological resources are numerous and require a series of initiatives to address them. The most obvious disturbance, caused by humans, is artifact collecting and looting. Several sites clearly show the detrimental affect of humans in the near absence of any surface artifacts, and the few artifacts present are no larger than a dime. Several of these site, although not directly on the trail, have numerous footprints scattered across them, attesting to the presence of visitors. At least two sites were clearly marked by visitors so they could be revisited in the future. A wooden tripod was constructed on one site while the other was marked with a series of stones creating an arrow pointing from the trail directly to the site.

While most sites are not visible from the trail to the untrained eye, the people visiting these sites and collecting artifacts are frequently well versed, although not formally trained, in identifying sites. Once again it must be noted that most visitors intend no harm and do not venture off the trail, but those that do have looting and artifact collecting at the forefront of their intentions and protection and preservation policies must be enacted with these looters and vandals in mind.

A more active monitoring program by park archaeologists and law enforcement is necessary to keep people from collecting artifacts. This is especially important since so few artifacts remain at many sites and the removal of a few will dramatically impact the site. There are mixed opinions about the Park Service collecting artifacts from sites. Two main issues must be addressed before the decision to collect an artifact is made. First, collaborators from the Pueblos of Acoma and Zuni during this project agreed that diagnostic or culturally significant objects should be collected if they are in immediate danger of being removed by visitors. Second, certain culturally significant objects, even diagnostics, should not be removed from sites if there is no immediate danger. This refers specifically to projectile points found on archaeological sites where the projectile point clearly dates to an earlier period. These

projectile points were collected by the Ancestral Pueblo and used as religious objects (pers. comm., Seowtewa 2006). As such, the Pueblos would prefer that these objects remain on site as they may originate from medicine bundles or graves. According to the Zuni consultants, these early points found on later sites are not utilitarian objects but religious items.

The public-use Zuni-Acoma Trail passes directly through several sensitive archaeological sites. The foot traffic on this trail is causing moderate damage (partial loss-irreparable) to intact architecture and artifacts. Although there is a much greater threat of artifact collecting and looting at these sites, the foot traffic alone is damaging intact architecture and artifacts. These areas also offer evidence of recent camping despite the fact that camping is not permitted anywhere along the trail. The impact of visitors on these sensitive areas and the clear evidence for camping necessitates the Park Service take action to protect these sensitive areas.

We recommend moving a small section of the public-use trail so that visitors no longer, even inadvertently, disturb these sites. Moving the public-use trail will provide exceptional protection for these sensitive areas and enhance the public's experience on the trail by relocating more of the trail to the recent lava flows and out of the sandy sediment filled areas. Moving the trail should be one of the top priorities for the park and will provide the most efficient protection for these areas.

Aside from collecting and foot traffic through archaeological sites humans pose another threat to the area. The lava flows contain many sensitive areas of importance to the Pueblos of Acoma and Zuni. Although collecting artifacts from these sites and altering the object present pose a grave threat, there is also the threat of visitors bringing objects and leaving them at these sites. Monitoring sites may be insufficient to protect them. Motion sensors placed at sensitive areas would allow law enforcement and park archaeologists to respond immediately to disturbances and apprehend culprits ahead of the monitoring schedule.

Additional measures may be extremely effective for protecting sites and artifacts. Presently, signs posted by the National Park Service at the trail heads inform visitors of the activities not permitted within the monument, such as camping, use of motorized vehicles, and collecting artifacts. Although most visitors do not intend to damage cultural resources, they simply do not understand that the removal of a single pottery sherd or lithic flake causes irreparable damage. As such we recommend that both Pueblos and the NPS draft signs to be posted at the trail heads. Signs collaboratively drafted by the Pueblos and the NPS indicating their cultural importance of archaeological sites and materials will hopefully have a more profound and inhibiting effect on visitors.

A final recommendation is the need for a partnership between the National Park Service and both Pueblos to ensure that the trail is monitored and resources guarded. A partnership between the National Park Service and the Pueblos of Acoma and Zuni will provide better protection for archaeological resources contained within the lava flows.

VI

Future Research Opportunities

There are numerous avenues for future research along the Zuni-Acoma Trail. The current research project developed a comprehensive inventory of the ancestral Pueblo archaeological resources along the trail, but did not attempt to investigate individual sites or tie these sites to regional economic or settlement patterns. In addition to investigating the Ancestral Pueblo, the historic archaeological resources require future work. The historic resources need to be fully documented and studied. Examinations of the historic trash scatters may reveal clues to the exploitations of the lava flows by local inhabitants and the relationships to local and national economic trends. Both the historic and the ancestral Pueblo sites offer the opportunity to address questions of how people lived in and interacted with the lava flows.

Numerous side trails branch off from the Zuni-Acoma Trail. In order to more fully protect and preserve the cultural resources within the lava flows it is necessary to document these trails and the features associated with them. Developing an understanding of the ancestral Pueblo relationship with the lava flows necessitates documenting side trails to determine whether these trails cross the flow or lead to other areas within the flow. There are dozens of trails within the flows yet we have little idea how many of these trails actually cross the flows and how many lead to specific places. Answers to these questions will illuminate both the economic and spiritual functions of these trails and the lava flows themselves.

The lava flows offer an ideal testing ground for remote sensing techniques and non-invasive subsurface testing. The interpretation of many of the sites along the trail would greatly benefit from sub-surface testing and further investigation. Excavations may reveal the function of the indeterminate features identified at several sites, and determine whether these features are architectural or agricultural in origin. Although excavations can provide the most reliable answers, remote sensing would be extremely useful in the large sandy areas to identify the extent of buried architecture. Sandy soils with underlying basalt substrates provide exceptional contrast for many remote sensing techniques.

Additional collaborative research with advisors from the Pueblos of Acoma and Zuni could greatly increase our knowledge of the natural environment. Recently El Malpais National Monument conducted a vegetation survey and inventory within the monument. Substantial amounts of knowledge could be collected and preserved through a collaborative project with the tribal advisory teams documenting those plants with traditional uses within the monument. This research could also help protect areas containing plants of medicinal value to the Pueblo medicine societies and assist in the monument's management of vegetation resources.

VII

Summary

The Zuni-Acoma Trail Archaeological Survey was conducted between 2005 and 2007. It began with collaboration from the National Park Service and the Anthropology Department at Southern Methodist University in Dallas, Texas, continued with consultation with the Pueblos of Acoma and Zuni, and was completed through cooperation and field work among all of these parties. The project surveyed 550 acres within El Malpais National monument and recorded a total of 14 prehistoric archaeological sites. These results have greatly enhanced the monument's ability not only to better preserve these sites, but also to better understand and interpret them.

Archaeological survey of the Zuni-Acoma Trail revealed a long history of human interaction with the lava flows extending back from over 1000 years ago and extending into the 21st century. The Ancestral Pueblo settlements associated with the Zuni-Acoma Trail primarily date to the late Pueblo II and early Pueblo III periods, a pattern witnessed throughout El Malpais National Monument. These settlements are integrally tied to the lava flows and their spiritual and religious significance. The lava flows maintain extremely important religious value to the Pueblos of Acoma and Zuni. The closing of most settlements during the Pueblo III period was not accompanied by abandonment or disuse of the lava flow area. The lava flows of El Malpais have remained an important aspect of traditional practices, life-ways, and religion.

Confidential appendices

Confidential appendices containing all site information, maps, results of collaborative meetings, and interpretations provided by the advisory teams are not included in this document. All information is on-file with El Malpais National Monument, Zuni Cultural Resource Enterprise, and the Acoma Historic Preservation Office. These appendices contain culturally sensitive information exempt from the Freedom of Information Act and not for circulation beyond these three (3) organizations. Permission to access these files must be obtained from **all three** organizations; the Pueblo of Acoma, the Pueblo of Zuni, **and** the Superintendent and the Chief of the Heritage Preservation Division at El Malpais National Monument.

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