

**CRATERS OF THE MOON
NATIONAL MONUMENT AND PRESERVE
ARCHAEOLOGICAL OVERVIEW**

FINAL REPORT



prepared for the

**USDI NATIONAL PARK SERVICE
and
USDI BUREAU OF LAND MANAGEMENT**

by

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MANAGEMENT SUMMARY

Due to the combined efforts of the BLM, NPS and the University of Oregon, roughly 45,000 acres (18%) of the Monument have been intensively inventoried for archaeological resources. Due to these efforts, a total of 291 prehistoric sites and 306 prehistoric isolated finds have been documented. In addition, seven archaeological sites on the Monument have been subjected to subsurface investigations within the past 25 years (see Figure 5.1). These include Baker Caves (10BN153 and 154), Scaredy Cat Cave (10MA30/143), Bowl Crater (10BN1066), Alpha Cave (10PR641), the Roasting Rock Site (10BN389), Catchment Cove (10BN861) and the Drifting Gene Site (10MA421).

While previous archaeological survey coverage of the Monument has been excellent, there are at least 50,000 acres of lava edge and 150,000 acres of open steppe that have yet to be explored. Based on the results of previous surveys, there are likely to be an additional 500 cultural resources (both prehistoric sites and isolates) encountered at the lava edge and 600 additional cultural resources found on the sagebrush steppe. It is more than likely that some of these resources will consist of seasonal base camps and, perhaps, residential bases. In addition, it is suspected that numerous aboriginal trails cross the basalt flows within the Monument.

Due to the density of prehistoric archaeological sites that are likely to be encountered within 300 meters of the lava edge, these areas should be considered “high archaeological sensitivity” zones. Unless subsurface investigations can be performed, these zones should generally be avoided by any ground disturbing activities. In addition, the lava edge requires regular monitoring by BLM and NPS personnel to reduce the potential for illegal surface collection and excavations. Based on the 2005 University of Oregon field investigations, it is apparent that accreting sediments along the lava flows can obscure significant subsurface cultural deposits and features.

Due to the significant number of properties that are clearly eligible to the NRHP within its boundaries, the Monument should be nominated as a National Register District and afforded the protection that such a designation can provide.

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INTRODUCTION

The purpose of this document is to present current archaeological data for the Craters of the Moon National Monument and Preserve and provide park managers and researchers with the appropriate measures to manage and interpret cultural resources contained within the Monument boundaries. This document also identifies specific areas with elevated archaeological sensitivity requiring special management and presents a predictive model that provides sufficient information to make knowledgeable decisions regarding future cultural resource policies.

The Craters of the Moon National Monument and Preserve encompasses 750,000 acres, of which almost 500,000 are covered by late Pleistocene and Holocene basalt flows (Figure 1). The remaining acres are primarily contained within “kipukas”, a Hawaiian term that refers to an island of land surrounded on all sides by lava. The Monument can boast of containing the largest kipuka in the world, referred to as Laidlaw Park.

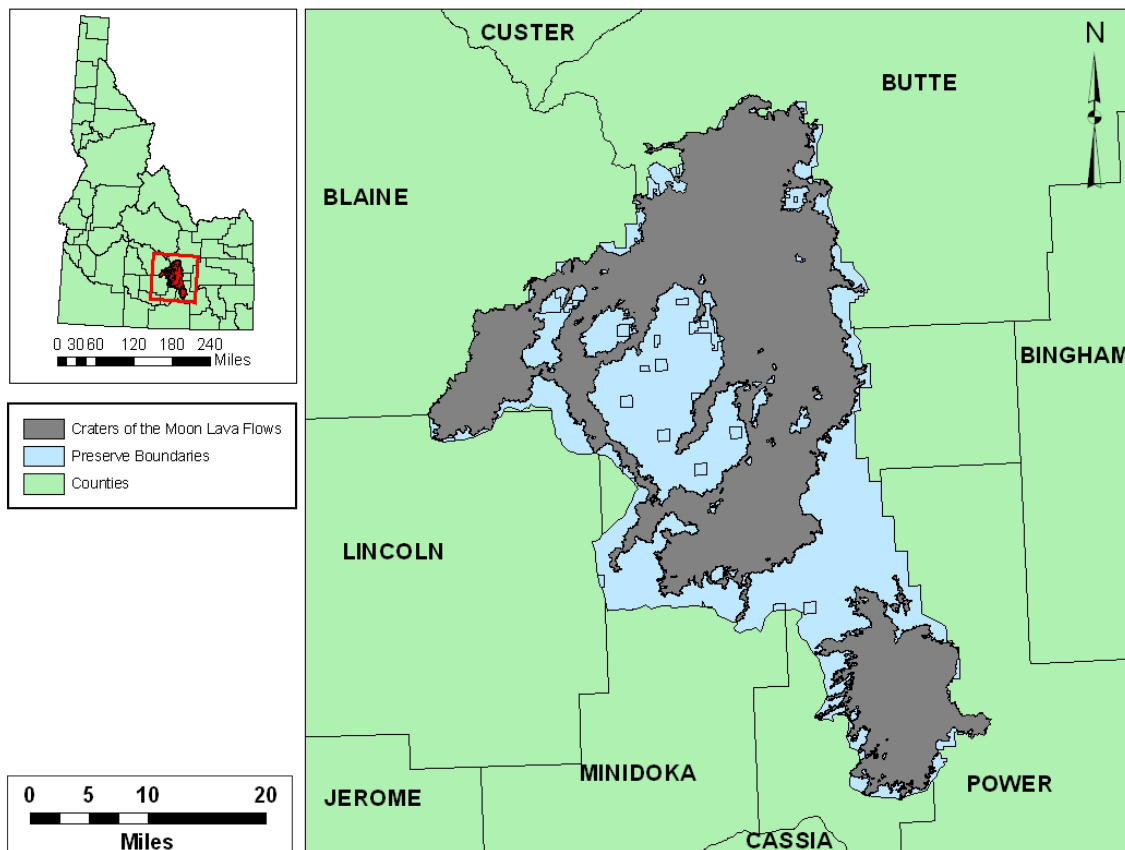


Figure 1. Location of the Craters of the Moon National Monument and Preserve in southern Idaho.

The Monument is located on the eastern Snake River Plain, a relatively flat volcanic feature bounded by the Basin and Range physiographic province to the south and the Idaho batholith to the north. The plain drops gradually from an elevation of roughly 2000 meters at the border of the Yellowstone Plateau on the eastern side, to roughly 700 meters on the western edge. The surface of the eastern Snake River Plain is comprised of Pleistocene and Holocene basalt flows covered by aeolian deposits (Kuntz et al. 1992). More recent flows (including many of those on the Preserve) are devoid of sediments.

Previous Archaeological Research

The Monument contains over 600 documented archaeological sites and isolated finds. While the majority of these resources were initially recorded during intensive aerial surveys associated with Bureau of Land Management (BLM) range fire rehabilitation efforts, the National Park Service (NPS) has also conducted archaeological investigations within the original monument boundaries.

One of the earliest formal archaeological investigations conducted on the Monument involved a reconnaissance survey by Idaho State University in the summer of 1966 (Sneed 1967). The survey included four segments of the Monument that Earl Swanson and Paul Sneed considered to be distinct. These included the mountainous northwestern section, the cinder cones and kipukas in the central section, the broken a 'a and pahoe-hoe flows in the southeast and the Carey Kipuka in the southwestern most section. A total of 28 prehistoric sites were documented, ranging from middle to late Holocene in age (Figure 2). Most of the sites consisted of open lithic scatters and rock features associated with perennial or intermittent water sources. However, two hunting blind sites, two obsidian quarries and five lava tube caves were also recorded. Sneed carried out an intensive collection strategy, resulting in a substantial number of projectile points (98), flaked stone tools (98), flakes and blades (77), ground stone (12), and ceramics (71) being removed from the surface of the sites (Sneed 1967).

Although Sneed's research generated a significant number of archaeological resources, the disposition of specific sites and location of the survey areas were not sufficiently documented. Sites were not described in any detail and sketch maps and/or small scale maps of the area were inadequate. In 1992, the NPS engaged the Idaho Museum of Natural History to conduct the first systematic archaeological survey within the Monument (Sammons and McLaughlin 1992). The research involved the intensive survey of roughly 300 sample units totaling 2000 acres. The selection of survey units was based on environmental variables and an effort to relocate the sites previously recorded by Sneed in 1966. However, the map showing the locations of the 300 sample units does not clearly identify where the 1992 intensive inventory occurred. Some effort will be required in order to include this survey in the GIS database.

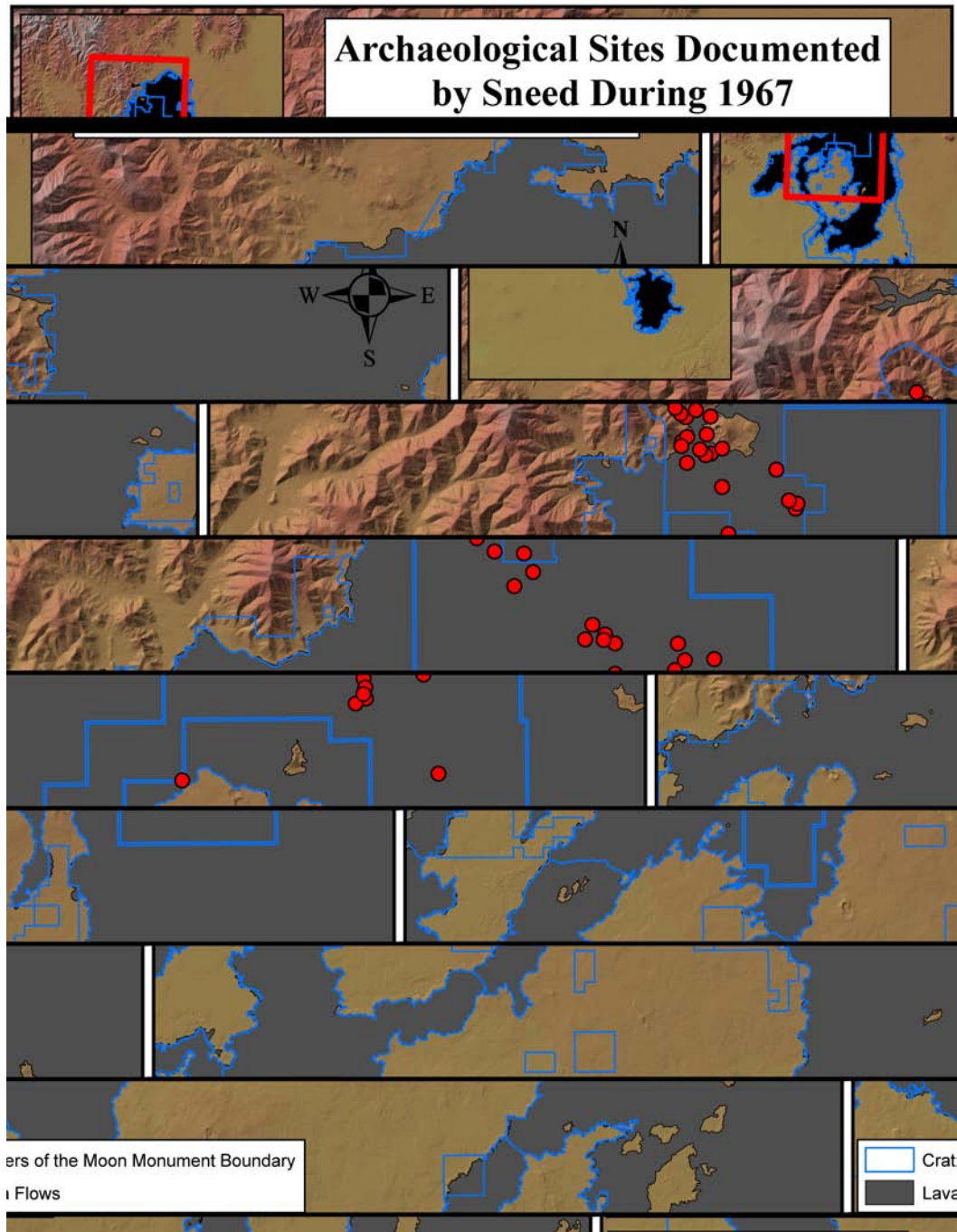


Figure 2. Map showing the locations of archaeological sites identified by Sneed in 1967.

A total of five new cultural resources were documented during the 1992 survey and most of Sneed's site locations were reportedly found. However, the ISU crew noted that the character of some sites differed from the original recording. Although most of the rock features were still intact, lithic scatters had either been altered by accreting sediments or heavy surface collecting. In fact, the lack of surface debris was directly attributed to the

previous intensive collecting by Sneed (Sammons and McLaughlin 1992). The “quarry” sites also exhibited only minimal evidence of use.

The Idaho Museum of Natural History returned in 1993 to conduct an intensive survey of 2000 acres in Little Prairie, located in the east-central portion of the Monument (Sammons 1993). Although ground exposure was exceptional due to a previous burn, only eight archaeological sites were documented. The report includes very brief descriptions of three prehistoric lithic scatters, four prehistoric isolated finds and one historic isolated find and, due to the absence of a 7.5 minute USGS map, the boundaries of the survey area are somewhat unclear.

In 1996, Idaho State University conducted an archaeological field school in the northern end of the Monument in the vicinity of Goodale’s Cutoff (Jenks 1998). The primary goals of the field school were to attempt to locate any surviving material remains indicative of the Oregon Trail and characterize the nature of prehistoric sites associated with the transition zone between the Snake River Plain and Pioneer Mountains to the north. Although not specified in the report, approximately 235 acres were intensively surveyed during the field school. A total of eleven new prehistoric cultural resources were documented. However, no historic sites associated with the Oregon Trail were encountered. Immediately following the pedestrian survey, two extensive lithic scatters (10BT2054 and 10BT2064) were subjected to test excavations. However, the very limited nature of these subsurface investigations precludes an evaluation of NRHP eligibility.

In 2004 and 2005, the University of Oregon Archaeological Field School conducted intensive pedestrian surveys in portions of the Monument. A total of 1600 acres were examined during the 2004 field season and 28 new archaeological sites were recorded. In 2005, the UO Archaeological Field School returned to the Preserve for additional intensive pedestrian surveys. These surveys were primarily conducted along the perimeter of basalt flows of various ages within Laidlaw Park. These efforts were designed to gain information on the nature of archaeological sites associated with specific late Pleistocene and Holocene lava fields on the Preserve. A total of 3200 acres were inventoried during the 2005 field season and 84 new sites were recorded. In addition to the pedestrian surveys, five archaeological sites were subjected to test excavations.

In addition to the archaeological research discussed above, numerous intensive fire rehabilitation surveys have been conducted on the Monument within the past 20 years. These have been performed by the BLM, usually within a month to two months following range fires, prior to reseeding activities. Because of the potential ground disturbance that can be caused by reseeding with a range-land drill, intensive archaeological inventories were carried out to ensure that properties potentially eligible to the National Register of Historic Places are not adversely affected by these federal undertakings.

Table 1 below provides a list of previous archaeological surveys conducted within the Monument and information, if available, regarding the name of the survey, acreage

surveyed and number of documented cultural resources (including sites and isolated finds). It should be noted that this list is far from complete. It does not identify the multitude of small compliance surveys conducted by the BLM or NPS over the past few decades. However, the Idaho State Office of the BLM is currently in the process of creating a comprehensive survey database, which should be completed within the next five years.

In addition, the authors were not able to obtain specific information regarding large fire rehabilitation surveys conducted by the Burley and Idaho Falls field offices of the BLM. These surveys were primarily performed in the eastern and southern portions of the Monument. Although included in Section IV with other survey data, the names of these projects and their associated reports are unknown at this time.

Table 1. Previous Archaeological Surveys within the Monument

Year	Acres	Cultural Resources	Survey Name	Reference
1966	Unknown	28	Archaeological Reconnaissance of the CMNM	Sneed 1966
1992	2000	5	Systematic Survey of Cultural Resources within the CMNM	Sammons and McLaughlin 1992
1992	9216	91	Black Ridge and Potter Butte Fire Rehabs	Henrikson and Henrikson 1993
1992	4134	26	Great Rift Fire Rehab	Balcom and Brewer 1993
1993	2000	8	Little Prairie Burn	Sammons 1993
1995	2765	26	Survey of North End of the CMNM	Force and Salley 1995
1996	235	11	Survey of Goodale's Cutoff Corridor	Jenks 1996
1996	1207	4	Richfield Fire Complex	Henrikson and McLaughlin 1997
2000	1477	14	Laidlaw Park Survey	Henrikson 2001
2001	750	8	Laidlaw Park Survey	Henrikson 2002
2003	1600	18	Crystal Ice Cave/King's Bowl Fire Rehab	Hoffert 2004
2004	1618	32	East Laidlaw Park Survey	Henrikson et al. 2005
2005	3228	95	Laidlaw Park Thumb Survey	Henrikson et al. 2005

Section I presents an environmental overview of the Monument and surrounding region, including a discussion of existing paleoclimatic studies. These studies can provide useful insights regarding the age and distribution of archaeological resources on the Monument and the cultural chronology of the region. Section II provides an overview of this chronology and highlights previously excavated archaeological sites that were used in the development of this chronology.

Geospatial analysis of the roughly 600 prehistoric sites and isolates on the Monument is presented in Section III. The analysis required manipulating the database provided by

the Idaho State Historic Preservation Office (SHPO). (However, roughly 40 sites and isolates recorded in the original Monument boundaries were not in the database, including those documented by Sneed in 1966, and could not be incorporated into this study).

The cultural resources in the SHPO database and those recorded during the past two field seasons were sorted into “types” based on the range of artifacts noted in surface assemblages. Because it was suspected that the “site description” attribute field in the database omitted useful information or contained erroneous data, efforts were made to resolve these issues. Dates of occupation were assigned to previously recorded archaeological sites within the study area if they contained diagnostic projectile points. This allowed for an examination of the distribution of sites through time.

Section IV presents a geochemical source analysis of diagnostic volcanic glass projectile points collected from the Monument over the last 25 years. The primary goal of this analysis was to examine how far volcanic glass projectile points from the Monument have been transported from their original source and assess whether patterns in the data suggest direct procurement or exchange networks. The results of this analysis are also considered with other facets of the archaeological record from the Monument to determine if changes in mobility and land use has occurred through time.

Section V provides of an overview of previously excavated sites on the Monument. A total of seven sites within the Monument have been subjected to formal test excavations. These have been conducted for research purposes, to evaluate NRHP eligibility or to assess damage associated with ARPA violations. Sites excavated prior to the University of Oregon investigations include Baker Caves (10BN153/154), Scaredy Cat Cave (10MA143) and Bowl Crater (10BN1066). The remaining sites, Roasting Rock (10BN389), Catchment Cove (10BN861), Alpha Cave (10PR641) and the Drifting Gene Site (Temporary No. 05-KM-20) were excavated in 2005 to collect data for inclusion in this document. Because surface lithic scatters on the eastern Snake River Plain are notorious for “disappearing” and “re-emerging” due to the continuous accretion and deflation of aeolian sediments, the primary purpose of the 2005 test excavations was to assist in identifying the geomorphic processes involved in this phenomenon. Section V also provides management recommendations for all previously excavated sites within the Preserve.

An overview of the 19th Century seasonal round of the Shoshone-Bannock is presented in Section VI and the delineation of archaeologically sensitive areas on the Preserve (as well as gaps in the data) is addressed in Section VII.

ENVIRONMENTAL SETTING

The Craters of the Moon National Monument and Preserve is located on the sagebrush steppe of the eastern Snake River Plain (Figure 3). The area is a cold desert with elevations ranging from 1500 to 2000 meters a.s.l. and winter snow and early spring rains

produce less than 10 inches of annual precipitation (Butler 1978). The region, bordered by the Basin and Range Province to the south and Northern Rocky Mountain Province to the north, is a lava plain given limited contrast by landforms of low topographic relief. These include rolling basalt pressure ridges, shallow basins, swales, knolls, buttes, vegetated areas surrounded by and isolated by lava flows (kipukas) and dozens of lava tube caves. These features were created primarily by pahoehoe basalt flows from low shield volcanoes and fissure eruptions ranging from Pliocene to Pleistocene in age (Greeley and King 1977; Kuntz et al. 1992). Sediments consist primarily of aeolian deposited silty or sandy loams, with most accumulations occurring on the lee sides of prominent land features. The Snake River, the region's only major waterway, transects the Plain, arcing east to west. Because of the incline of plain and catastrophic events such as the Bonneville Flood around 14,000 years ago (Currey and James 1982), much of the river corridor is characterized by deep, narrow gorges.



Figure 3. Craters of the Moon National Monument and Preserve, near Snowdrift Crater in northern Laidlaw Park.

The dominant native vegetation includes the shrubs *Artemisia tridentata* (big sagebrush), *Artemisia tripartita* (three-tip sagebrush), *Purshia tridentata* (bitterbrush), *Tetradymia canescens* (horsebrush), *Chrysothamnus puberulus* (rabbitbrush), and *Gutierrezia sarothrae* (snakeweed). Common native grasses include *Agropyron spicatum* (bluebunch wheatgrass), *Koeleria cristata* (junegrass), *Oryzopsis hymenoides* (ricegrass), *Poa nevadensis* (poa), *Poa secunda* (common poa), and *Stipa comata* (needle and thread grass) (Franzen 1980). Common mammals exploited by the region's historical inhabitants include *Antilocapra americana* (pronghorn antelope), *Odocoileus hemionus* (mule deer),

Bison bison (buffalo), *Cervus elaphus* (elk), *Lepus californicus* (blacktailed jackrabbit), *Sylvilagus nuttalli* (cottontail), *S. idahoensis* (pygmy rabbit), and *Marmota flaviventris* (yellow-bellied marmot). Common birds include *Dendragapus obscurus* (blue grouse), and *Centrocercus urophasianus* (sage grouse).

Although much of the eastern Snake River Plain is devoid of permanent water sources (except the Snake, Big Wood and Little Wood rivers), many swales and basins serve as natural catchment areas for winter snowmelt and spring rains (Henrikson et al. 1998). During the spring and early summer months, these ponds are a magnet for numerous species of waterfowl, including *Anas crecca* (green-winged teal), *A. acuta* (northern pintail), *A. cyanoptera* (cinnamon teal), *A. clypeata* (northern shoveler) and *Branta Canadensis* (Canada goose), which feed on the indigenous fresh water crustaceans.

GEOLOGICAL SETTING

An important consideration that is often overlooked in the investigation of Snake River Plain prehistory is the late Pleistocene and Holocene volcanism that has occurred in the region during the last 15,000 years (Kuntz et al. 1986, 1992). The geologic characteristics of the eastern Snake River Plain are distinct from those of the western Snake River Plain.

Geologists divide the two halves at roughly Highway 75 from Twin Falls to Ketchum because their “structural, geophysical, and geological characteristics” indicate “different origins” (Kuntz et al. 1992:229). The current character of the eastern Snake River Plain was established roughly 10 million years ago by continuous pahoehoe flows from fissure eruptions or vents that range between 1 and 2 kilometers across. Big Southern Butte, Middle and East Butte are rhyolite domes that were extruded between 1 million and 300,000 years ago (Kuntz, et al. 1992).

To grasp the potential impact of basaltic eruptions on prehistoric populations, it is important to review the various stages of volcanic activity that have occurred on the eastern Snake River Plain. The first stage of activity was characterized by harmonic tremors with the opening of fissures and steam vents. Lava fountains erupted, producing flames that may have extended to 500 meters in height, and tephra was ejected to distances as great as 10 kilometers downwind. The second stage began when lava fountains became localized, tephra cones formed and larger quantities of lava exuded from open fissures, resulting in surface flows. The third stage was marked by extended eruptions that may have lasted for months or a few years. Although lava tubes did form during the second stage (if the lava volume was adequate), tubes primarily formed during the third stage and dispersed lava to the outer edges of the flow. Most lava on the eastern Snake River Plain was dispersed in this fashion.

There are eight lava fields on the eastern Snake River Plain that formed during the late Pleistocene and Holocene. Although some are covered with a thin layer of aeolian deposits, most are fully exposed. These include Craters of the Moon, Wapi, Shoshone, Kings Bowl, North Robbers, South Robbers, Cerro Grande and Hells Half Acre (Figure

4). Cerro Grande is radiocarbon dated to roughly 13,000 ry B.P. and North and South Robbers dates to 12,000 ry B.P. The dates for each flow were generated from charcoal recovered from immediately beneath the flows (Kuntz et al. 1986).

Hells Half Acre, located southwest of Idaho Falls, has been radiocarbon dated at roughly 5200 ry B.P. The flow originated from a shield volcano that exuded pahoehoe lava for several months (Kuntz et al. 1992). Kings Bowl lava field, located between Craters of the Moon and Wapi flows, has been identified as a single eruption that may have lasted less than a day, occurring around 2200 ry B.P. Based on the character of the flow, this event must have been pretty spectacular, with explosion pits, lava lakes and spewed tephra. The Wapi lava field probably started at the same time as Kings Bowl but remained active for several months, as indicated by the lava tube systems typical of the

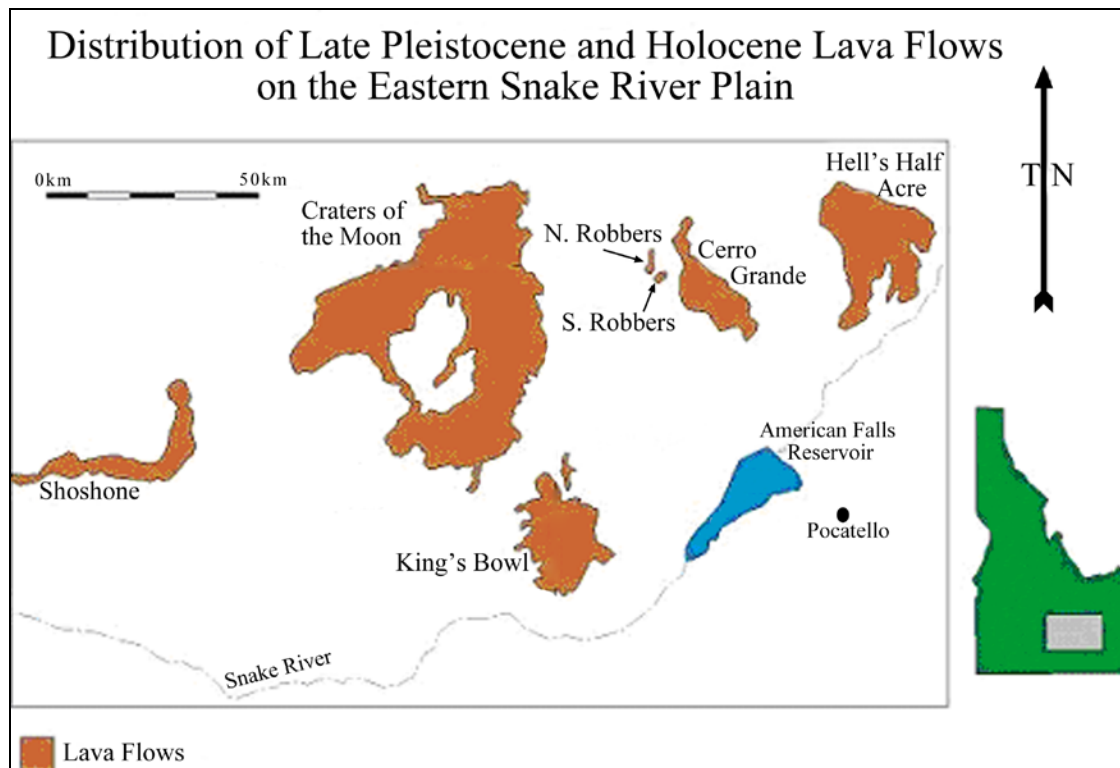


Figure 4. Distribution of late Pleistocene and Holocene lava flows on the eastern Snake River Plain (adapted from Kuntz et al. 1992).

third stage of a fissure eruption. A radiocarbon date of 2200 ry B.P. was obtained for the Wapi flow. The Shoshone lava field, west of Craters of the Moon, has been dated to 10,000 ry B.P. Although this flow occurred at the very beginning of the Holocene, it had to have impacted human populations. The lava field is 2 to 5 kilometers in diameter and altered the flows of the Big Wood and Little Wood Rivers at the time of its occurrence. Both rivers were forced to flow around the field. The two rivers now converge about 40

kilometers to the west at the terminus of the flow. The Craters of the Moon lava field is the largest in the continental United States and includes over 60 individual flows from cones or fissure eruptions (Figure 5). These eruptions range in age from 15,000 ry B.P. to 2100 ry B.P. (Kuntz et al. 1986) and have been classified into eight separate eruptive periods. These dates were generated from charcoal excavated from selected locations within the lava field to determine the ages of various eruptions. Specific eruption phases may have had significant impacts on the seasonal round and on the use of individual cold storage caves by humans then in the area.

Eruptive Period E, which includes the Grassy Cone, Laidlaw Lake and Lava Point flows, has been dated to between $7,840 \pm 140$ and $6,670 \pm 100$ ry B.P. Eruptive Period B and its associated flows range in age from 4510 ± 100 to 2660 ± 60 ry B.P. The largest of the Period B flows is the Minidoka. This massive flow is roughly 40 kilometers long and 5 to 10 kilometers wide, extending from the Craters of the Moon National Monument to the Wapi lava field to the south. It is thought to have occurred around 3600 ry B.P (Kuntz et al. 1986). The Minidoka flow may have also closed the area to game animals and people alike for an extended period, until creatures began entering the resultant “kipuka” at a later date when the eruptions ceased.

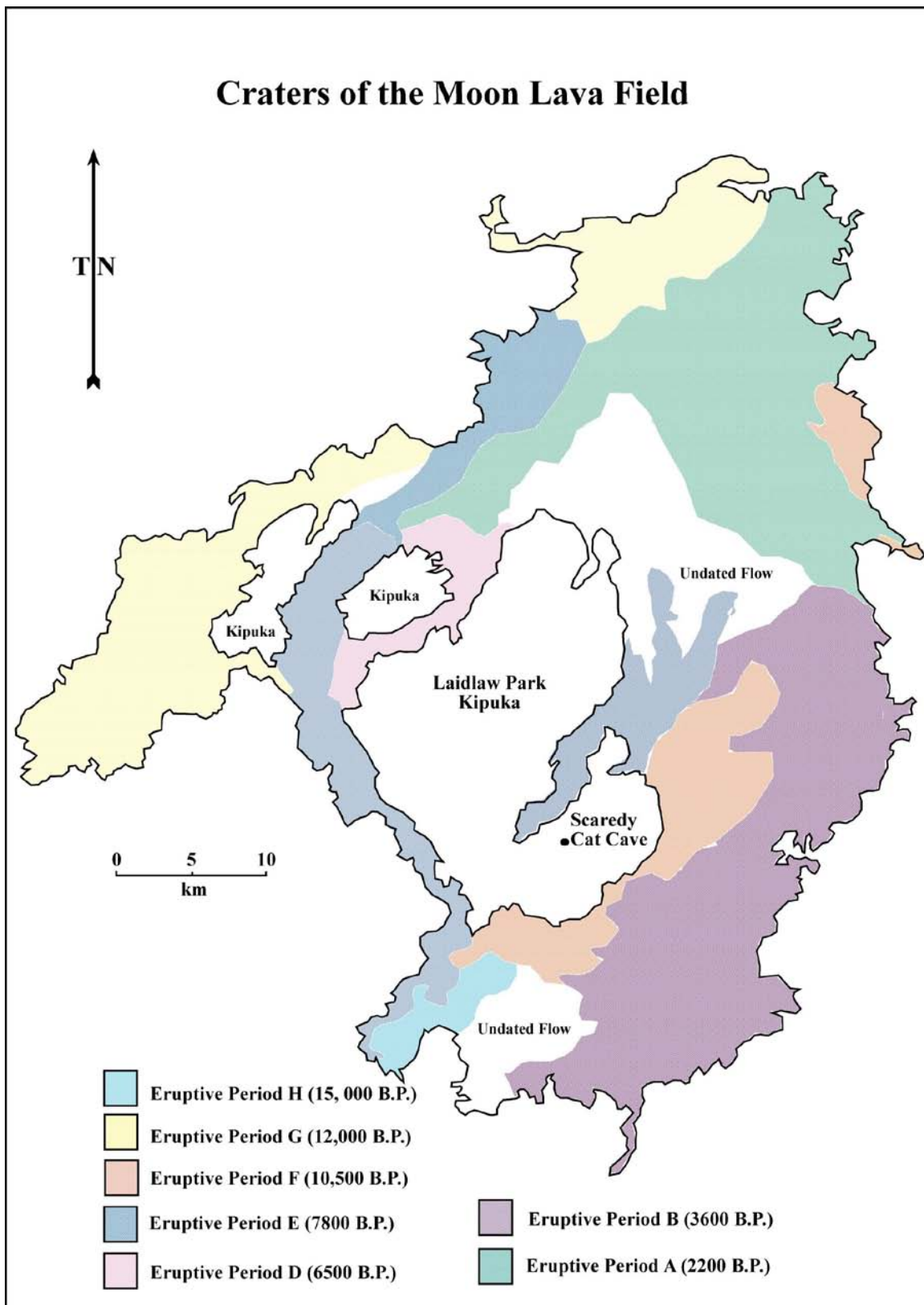


Figure 5. Eruptive periods documented on the Craters of the Moon Lava Field (adapted from Kuntz et al. 1992).

SECTION I

PALEOENVIRONMENTAL DATA FOR THE EASTERN SNAKE RIVER PLAIN

Although optimum sites for pollen data, such as permanent lakes and ponds, are scarce in the steppe environment of the Snake River Plain, some critical paleoclimatic research has been conducted in southern Idaho over the last twenty five years. Beginning in the late 1970s, Bright and Davis (1982) collected sediments from a variety of sources: dry ephemeral ponds, sand dunes, caves, packrat middens, and beneath lava flows on the eastern Snake River Plain. Although sediment samples from open-air sources such as ponds and dunes provided relatively limited information, two lava tube caves (Middle Butte and Rattlesnake caves) produced continuous climatic records (Figure 1.1).

More recent pollen and macrofossil analyses conducted in association with the test excavations at Scaredy Cat and Tomcat caves (Henrikson 2003) and the data recovery efforts (Henrikson and Long 2005) have also generated useful climatic sequences for the region (see Figure 1.1).

Middle Butte and Rattlesnake Caves

Pollen records from both Middle Butte Cave (5187 ft. a.s.l.) and Rattlesnake Cave (5177 ft. a.s.l.) indicate that maximum aridity occurred in their immediate surroundings around 7000 years ago (Bright and Davis 1982, Davis and Bright 1983). The vegetative community that surrounds Rattlesnake Cave is currently an ecotone between shadscale and sagebrush communities. However, pollen samples from 7000 ry B.P. contain higher percentages of Cheno-ams (plants of the amaranth and pigweed families, including shadscale) suggesting that higher temperatures, lower precipitation, or possibly both had resulted in a greater prevalence of shadscale vegetation than exists in the area at present (Bright and Davis 1982:31). The plant community currently surrounding Middle Butte Cave is an ecotone between juniper woodland and sagebrush communities. However, around 7000 years ago, the area around the cave was dominated by a more arid sagebrush community. Moisture conditions gradually improved by about 5200 years ago in the immediate vicinity of Middle Butte Cave and shadscale communities became established at lower elevations. For the last few thousand years, environmental conditions have remained relatively stable (Bright and Davis 1982, Davis and Bright 1983).

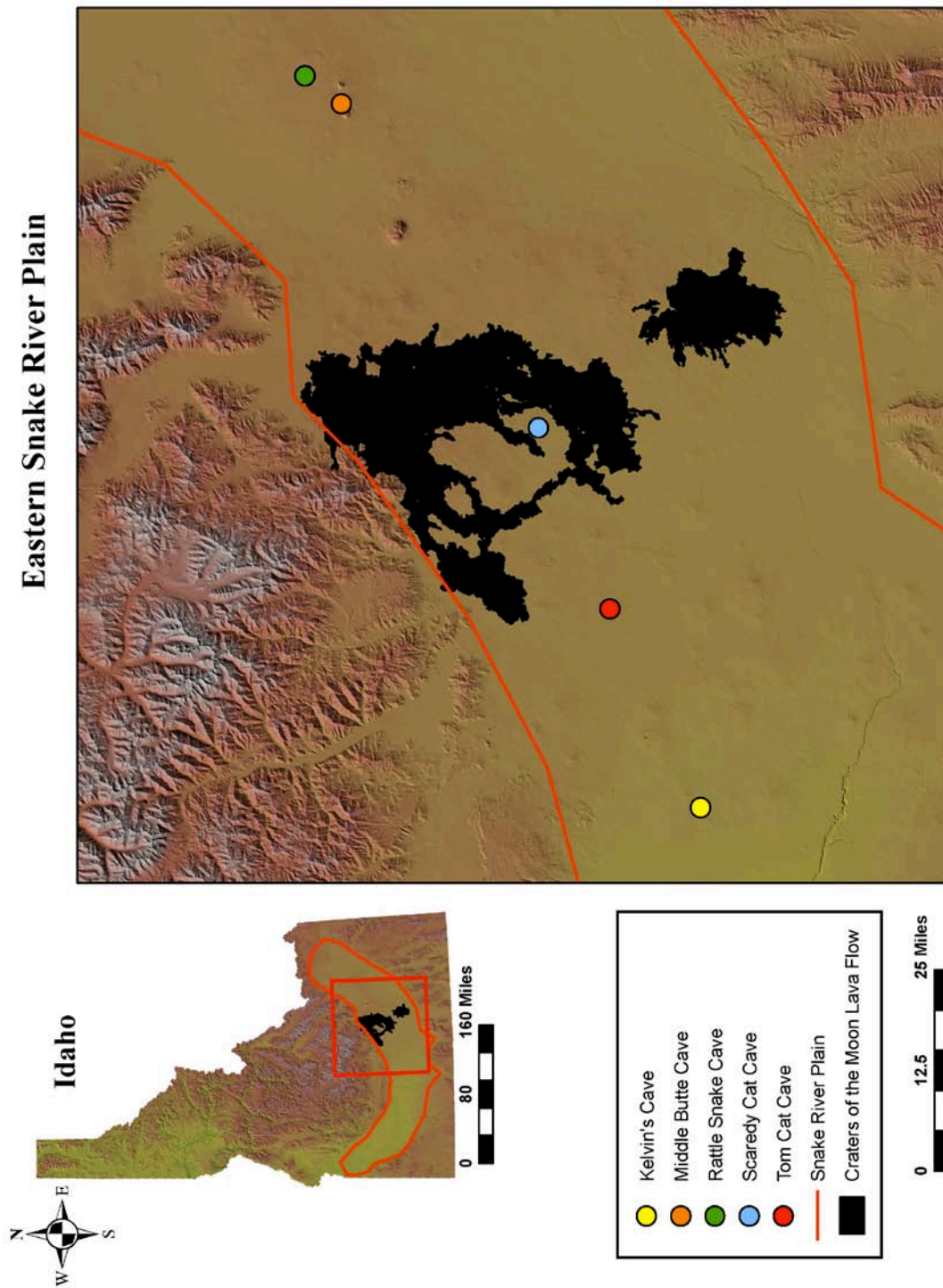


Figure 1.1. Location of lava tubes that have generated paleoclimatic data in the vicinity of the Craters of the Moon Monument and Preserve.

Tomcat Cave

Tomcat Cave, located roughly 15 miles southwest of the Monument, contained multiple cold storage features associated with radiocarbon dates ranging from 2400 ± 60 to 1170 ± 60 ry BP (Henrikson 2003). Column samples (Figure 1.2) from these features revealed relatively consistent ratios of arboreal pollen from alder and pine, sagebrush (*Artemisia*), rabbitbrush (*Purshia*) and a variety of grasses (*Poaceae*), suggesting that the sagebrush steppe community surrounding the site had been relatively stable between roughly 2500 and 1100 years ago (Cummings 2002). Because a large percentage of the sagebrush within the features was burned, significant amounts of charcoal were also present in the column samples. An exterior control sample taken from a depression immediate outside the cave exhibits similar ratios of sagebrush but fewer grasses. Charcoal present in the exterior control sample is likely associated with periodic wild fires (Cummings 2002).

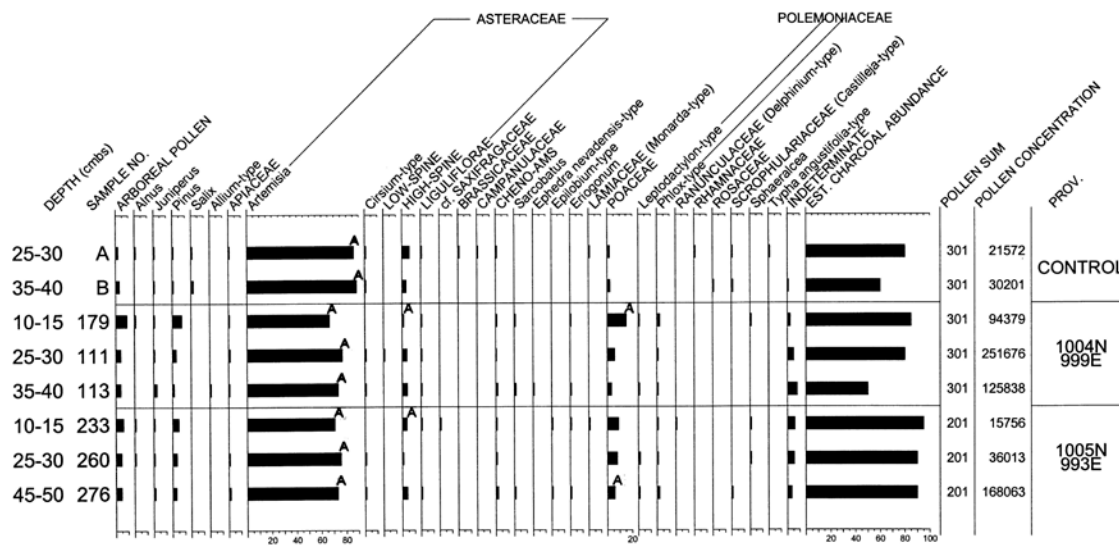


Figure 1.2. Pollen diagram for Tomcat Cave (from Cummings 2002).

Scaredy Cat Cave

Pollen data from Scaredy Cat Cave provide some interesting correlations with the paleoclimatic picture from Rattlesnake and Middle Butte caves. The site, located south of Bear Den Butte within the Craters of the Moon National Monument and Preserve, was subjected to test excavations in 1996 and 2000. Column samples from several test units, including a cold storage feature, closely resemble those of the sagebrush community currently surrounding the site, although pollen ratios from Test Unit 1 (dating between roughly 4700 and 4200 years ago) contained higher percentages of Poaceae or grass pollen. According to Wigand (1997) these results may indicate more grasses in the local area, suggesting slightly greater spring precipitation. The analysis also noted unusually high pine ratios and lower sagebrush ratios between 7200 and 6500 years ago, which suggests a brief interval of greater moisture. During the same

period, pollen of Cyperaceae (sedges) also suggests a water source nearby, at least seasonally. Several large ephemeral ponds just south of the cave now contain dense quantities of sedges in early to mid summer when water levels decrease through evaporation. These observations are congruent with the contentions of Mehringer (1986) and others that short, sharp fluctuations are a common feature of paleoclimatic curves in the interior west, often reversing for brief intervals the dominant trends of long-term climatic changes.

Kelvin's Cave

Pollen and macrofloral analyses were recently conducted on an interior soil column from Kelvin's Cave, located roughly six miles south of Shoshone, Idaho (Cummings and Puseman 2005). From these analyses, some information has been generated regarding the climatic conditions on the eastern Snake River Plain for the period following the Last Glacial Maximum (Figure 1.3). Between roughly 20,000 and 12,000 years ago, it appears that higher elevation taxa, such as members of the rose family, mountain mahogany and chokecherry were coexisting with sagebrush and other taxa that characterize the region today (Cummings and Puseman 2005). These data concur with recent studies of late Pleistocene climatic conditions in the adjoining Great Basin (Minckley et al. 2004).

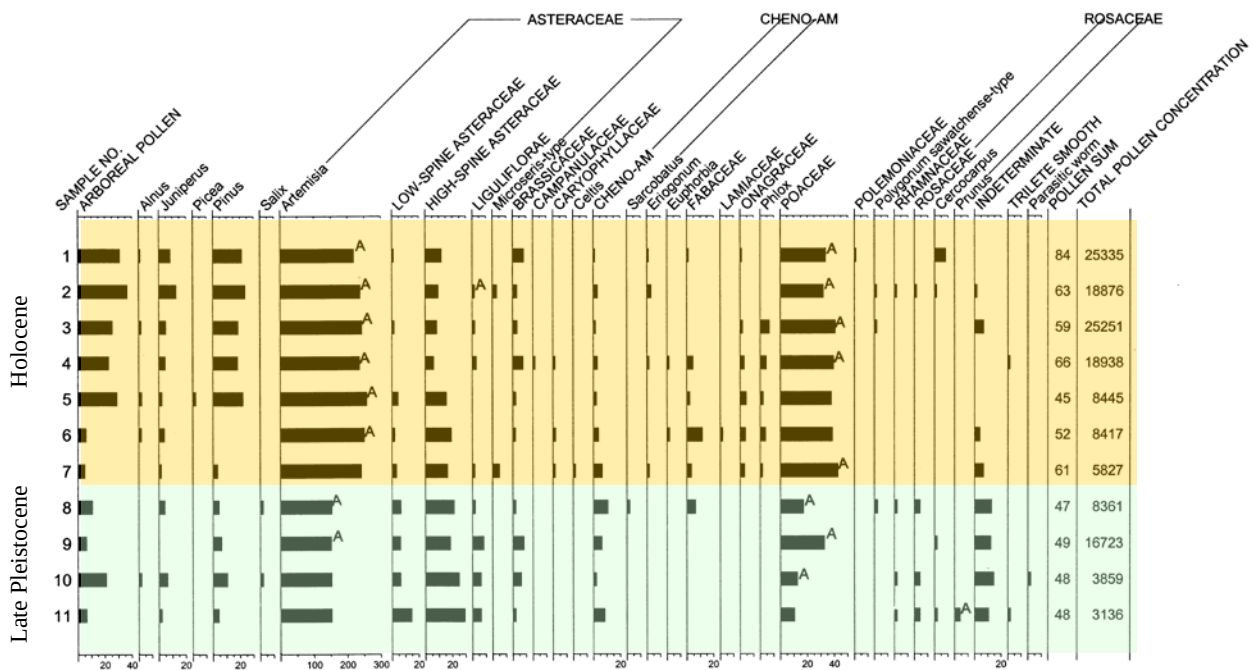


Figure 1.3. Modified Pollen Diagram for Kelvin's Cave (from Cummings and Puseman 2005).

The column sample from Kelvin's cave also indicates relatively constant ratios of *Artemisia*, grasses and arboreal pollen throughout the Holocene (see Figure 1.3). Based on the results of previous this may be an accurate representation of environmental conditions in the immediate vicinity of the cave, it should be noted that krotovina and cryoturbation features visible in the deposits may have obscured any short-term climatic fluctuations indicated in the cave's pollen record.

Conclusions

Currently available paleoclimatic data from the eastern Snake River Plain show that the trends documented for the early to mid Holocene did not result in the development of plant communities greatly different from those seen in the region today. While some changes occurred, with sagebrush expanding or retreating in relation to juniper and shadscale at different times, in general the Snake River Plain sustained a vegetation cover very similar to that of the present. Sagebrush steppe remained the dominant vegetation cover, and sedges such as those present at Scaredy Cat Cave today were also present there even during the early part of the thermal maximum that developed after about 7000 ry B.P.

The climatic stability suggested by the pollen and macrofossil analyses presented above is also indicated by a recent analysis of archaeological data. In examining the distribution of sites containing diagnostic artifacts on the eastern Snake River Plain, it appears that no significant differences exist between the location of sites during the middle and late Holocene periods, including sites tethered to ephemeral water sources (Henrikson 2002). While the relatively continuous occupation of many of these landscape features suggests that past climatic events may not have been of sufficient magnitude to alter overall human resource use in the region, this inference needs to be examined against further pollen data from non-archaeological contexts.

SECTION II

PROJECTILE POINT CHRONOLOGY FOR THE EASTERN SNAKE RIVER PLAIN

A projectile point chronology for the eastern Snake River Plain has been presented, with slight variations, by Butler (1986), Franzen (1981), Reed et al. (1986), Ringe (1993) and Holmer (1995). This chronology has been employed to structure the analysis of archaeological data from the Monument (Figure 2.1).

The early Holocene on the eastern Snake River Plain is generally characterized by large fluted and stemmed points dating from about 11,000 years to roughly 7500 years ago (see Figure 2.1). While Clovis and Folsom points have been found associated with Pleistocene megafauna in dated excavations in the Plains and Southwest, few of these projectile points have been found in datable contexts on the eastern Snake River Plain. One exception is represented by the earliest cultural components from Owl Cave, which produced four obsidian fluted points in association with mastodon bones dated to $12,850 \pm 150$ ry B.P., $12,250 \pm 200$ ry B.P. and $10,920 \pm$ ry B.P. (Butler 1978, Miller and Dort 1978).

Unfortunately, the Simon Clovis cache, unearthed on the Camas Prairie in the early 1960s, was accompanied by no datable organic remains (Butler 1963), and the same is true of a variety of fluted points encountered on the Snake River Plain as surface finds (Titmus and Woods 1988). It is well-established from radiocarbon dated sites in the Southwest and Great Plains, however, that the Clovis horizon is roughly dated to the interval 11,200 – 10,900 years ago (Grayson 1993). Large stemmed points, appearing between ca. 9000-7500 years ago are of types thought to be associated with the harvesting of game in lakeside environments of the Great Basin (Reed et al. 1986, Willig and Aikens 1988).

A new projectile point technology emerged roughly 7500 years ago with the warming and drying that followed the end of the Pleistocene. The beginning of the middle Holocene is delineated by the appearance of smaller stemmed and notched dart points, which were used in the harvesting of bison, deer, antelope, bighorn sheep and smaller animals as part of a broad-spectrum subsistence base.

Bitterroot or Northern Side-notched dart points (and, to a lesser extent, smaller stemmed points) characterize the beginning of the middle Holocene (ca. 7500-5000 years ago). These points have been found in excavated sites within the Intermountain West in association with bison and mountain sheep kills (Reed et al. 1986).

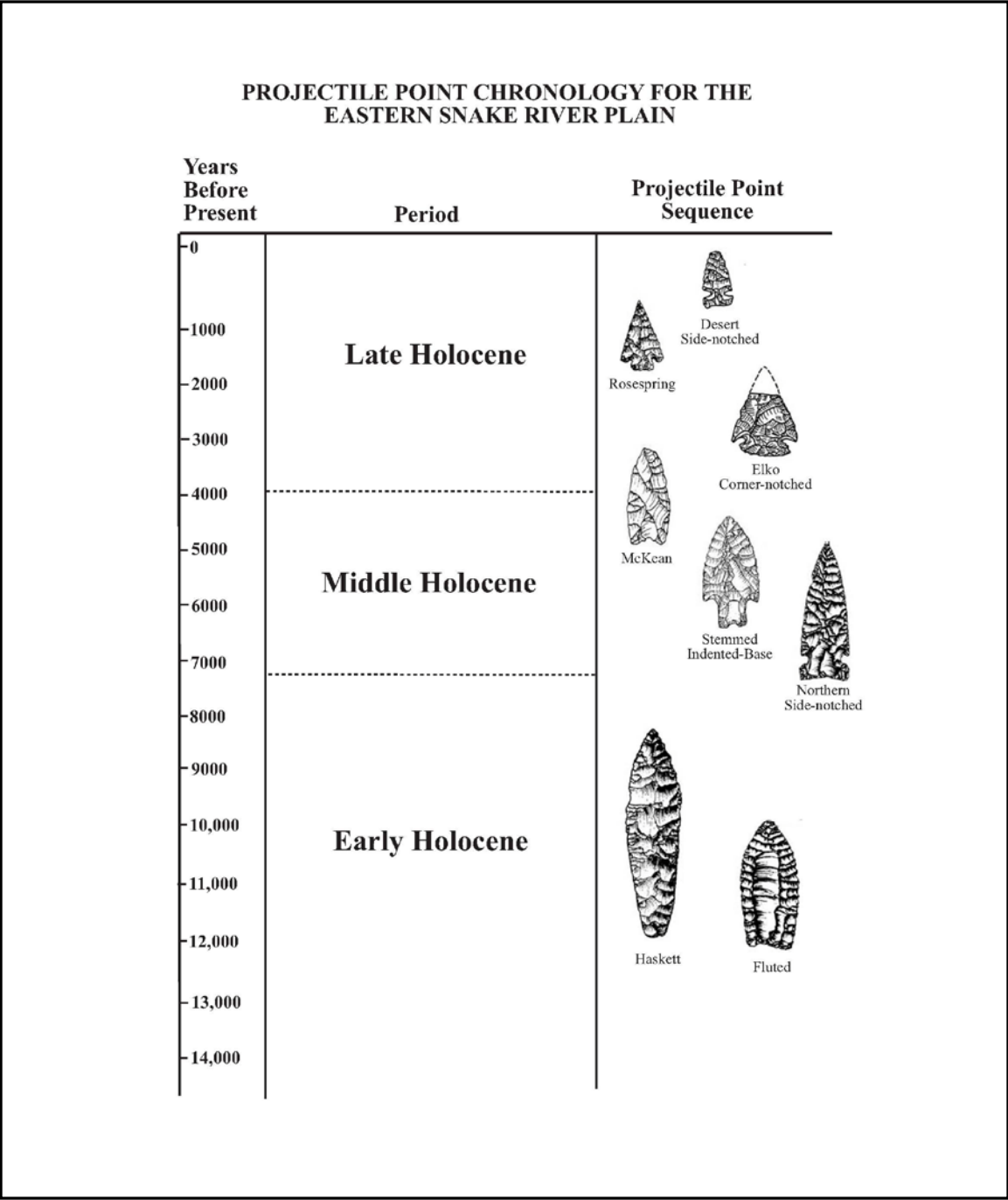


Figure 2.1. Projectile point chronology for the eastern Snake River Plain.

Stemmed indented-base points and lanceolate points of the McKean and Humboldt traditions emerged between 5000-3500 years ago, followed by the Elko Corner-notched dart point (ca. 3500-1500 years ago); but some controversy surrounds the dates associated with this point type (Flenniken and Wilke 1989).

The early phase of the late Holocene (ca. 1500-700 years ago) is defined by the development and domination of bow and arrow technology and the use of small corner-notched points. It is uncertain when pottery first appears during the late Holocene, but it is clearly associated with Desert Side-notched points, which dominate point assemblages between 700 years ago and the historic period.

Excavated Archaeological Sites on the Eastern Snake River Plain

An overview of significant archaeological sites on the eastern Snake River Plain excavated during the last fifty years (Figure 2.2) will give a fuller view of early lifeways in the region. Particular attention will be paid to sites containing bison remains but it is important to stress that small game and plant foods also played a key role in the aboriginal subsistence regimes throughout Holocene times.

The Early Holocene

Wilson Butte Cave, located south of Dietrich, Idaho, was reported to contain some of the earliest evidence of human occupation in North America. The site was excavated by Ruth Gruhn in the late 1950s. She identified a total of five stratigraphic layers. The lowest three layers (E, D, and C respectively) produced three dates, ranging from 14,500 to 15,000 ry B.P (Gruhn 1961). Layer E, resting on basalt matrix, contained two small fragments of worked bone. Layer D was essentially sterile and exhibited ice wedges indicative of extreme cold. The lower half of Layer C produced a basalt biface, two blades, and several bone tools. Potentially a pre-Clovis Site, the presence at Wilson Butte Cave of blades associated with such early dates may indicate a connection with Northeast Asian assemblages from the same period (Aikens 1990).

Wilson Butte also contained a series of younger deposits from successive occupations well into the Protohistoric Period (Gruhn 1961). The bones of many small animals and birds were recovered from the deposits but Gruhn believed most of these were left by raptors roosting in the cave. Bison remains make up the majority of the identifiable large mammal bones from the site, although some deer and antelope remains are also present. Gruhn suspects that bison were procured near the cave as early as 8000 years ago, but the earliest radiocarbon date associated with bison is 6850 ± 300 ry BP, from the middle part of Stratum C. The uppermost deposits of Stratum A, where bison was abundant, have an associated radiocarbon date of $AD 1535 \pm 150$. Gruhn argued that the earliest occupations represented only short visits by bison hunters and thinks that between roughly 6000 and 4000 years ago, the cave was completely abandoned. Occupations of the cave after 4000 years ago were much more intense and, according to Gruhn

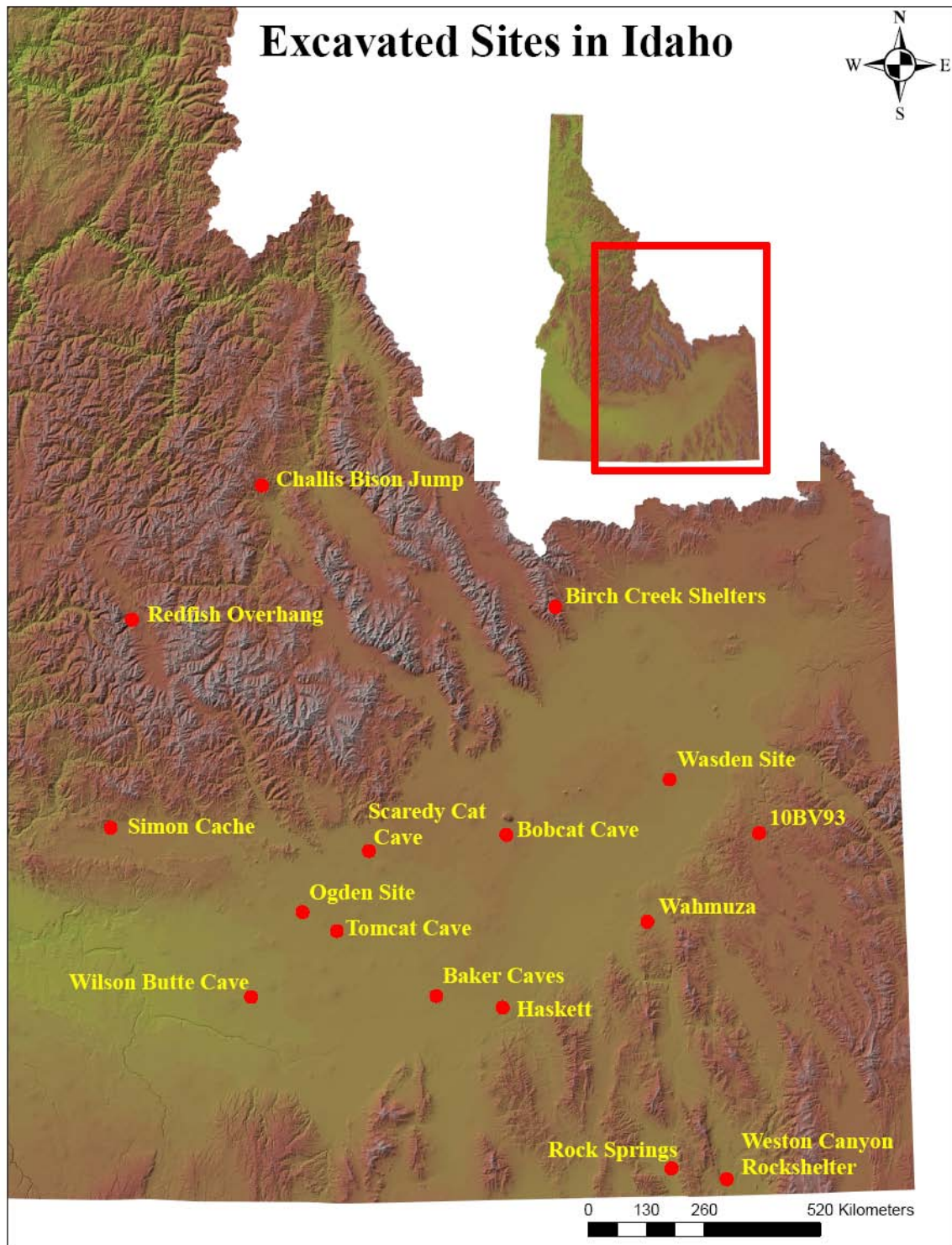


Figure 2.2. Excavated sites in southeastern Idaho.

(1961:122), “bison hunting was the most important economic activity carried out by the people camped at the site” while the presence of grinding slabs indicate that some plant processing also occurred at the site.

The Simon Site, located on the Camas Prairie north of the Snake River Plain, produced a large cache of Clovis blanks, preforms and projectile points made of exotic stone (Butler 1963). These artifacts were exposed as the landowner plowed a field in 1962. Although test excavations were performed in the immediate vicinity of the cache, no other archaeological material was revealed. While no radiocarbon dates could be generated from the site, the presence of Clovis projectile points makes the Simon Cache one of the oldest known sites in Southern Idaho. The Buhl Burial, located along the Snake River near Buhl, Idaho is of similar antiquity. Human remains recovered from a gravel pit date to 10,600 radiocarbon years B.P. (Green et al. 1998). The skeleton, identified as that of a young female, was found in association with a stemmed projectile point and other burial objects.

The Wasden Site, located just west of Idaho Falls, is a large, open-mouthed lava tube that contains archaeological material ranging from Early Holocene to Protohistoric in age (Butler 1968). Excavations began in 1965 and continued until 1971. The deepest deposits produced elephant long bone fragments exhibiting green fractures that indicated that they were broken while still fresh. Several fluted point fragments of volcanic glass were found in association. The bone produced dates between 12,800 and 10,900 ry B.P. (Miller and Dort 1978), which are earlier than those generally accepted for the fluted point tradition. This raises some doubts about the precision of the dates and there is an extensive literature on the problems of radiocarbon dating bone (Hassan and Ortner 1977).

The earliest documentation of bison procurement in southern Idaho is also present at the Wasden Site. The site revealed an extensive “bison bone bed” associated with stemmed points buried below Mazama tephra. Radiocarbon dates of 7100 ± 350 ry BP, 7750 ± 210 ry BP, and 8160 ± 260 ry BP were extracted from bone and charcoal found beneath the volcanic ash (Butler 1968). Over 50 individual bison were represented. According to Butler, who suspected that the deposit represented not one but a series of kills, only a “well-organized” group could have carried out such a task. The bison remains have never been analyzed or documented beyond Butler’s preliminary report and the site also contained evidence of later occupations that have yet to be analyzed and reported.

At the Haskett Site, located in a sand dune near American Falls (Butler 1965), fluted points as well as large, stemmed Haskett points were recovered directly from the ground surface. Excavations produced bison tooth enamel but little else. Although Butler suspected Haskett points were early, he could not assign a time frame until excavations at Redfish Overhang in 1972 provided radiocarbon dates in association with similar points. Redfish Overhang, located in the Sawtooth Valley north of the eastern Snake River Plain, produced a cache of Haskett points in association with a hearth. Charcoal recovered from the immediate vicinity of the cache produced a date of 9800 ± 300 ry B.P. (Sargeant 1973).

The Middle Holocene

Weston Canyon Rockshelter, located in a steep mountain canyon south of Pocatello, Idaho, was excavated in the early 1970s (Delisio 1971, Miller 1972). The shelter contains a series of occupations with the earliest dated at roughly 8000 years ago and the latest ending at 2000 years ago. The faunal remains recovered indicate intensive mountain sheep procurement, with a minimum of 300 animals represented. A few elk, bison and deer were also represented in the deposits. A large number of projectile points, scrapers and expedient tools indicate that butchering was the primary activity at the shelter.

The Birch Creek shelters, located at the mouth of the Lemhi Valley on the northeastern edge of the Snake River Plain, were excavated by Earl Swanson in the 1960s. Based on the natural stratigraphy of Bison and Veratic Rockshelters, Swanson argued that the local environment had experienced fluctuating climatic conditions ranging from moist and cool to arid and dry over the last 10,000 years (Swanson 1972). One early date of $10,340 \pm 830$ ry B.P. was obtained on bone from Bison Rockshelter but the remaining 14 radiocarbon dates range more or less evenly from 6925 ± 200 to 370 ± 80 ry B.P.

Swanson's research at Bison and Veratic Rockshelters yielded significant numbers of bison bones. Although bison were represented in all levels of the sites, there was a sharp increase in the number of bison bones after 3300 ry B.P. and this trend continued well into the Late Prehistoric period. The combined minimum number of individual bison (MNI calculated separately for each stratigraphic level) for both shelters was 170, compared with an MNI of 80 for mountain sheep and 45 for deer. Swanson argued that the increase in bison was directly correlated with an increase in their availability. An examination of the bison assemblage also indicated that only high utility items, such as the fore and hind quarters, were represented at the shelters. Lower utility parts of the carcass were obviously left elsewhere, presumably at the kill site. Based on the timing of the increase in bison numbers at Birch Creek, Swanson agreed with Gruhn's conclusions from Wilson Butte Cave -- that bison populations in southern Idaho must have been very small during the Middle Holocene. However, according to Swanson (1972), the increased moisture at the onset of the Late Holocene resulted in grassland expansion and subsequent growth in bison populations, which appear to have been more numerous by 3000 years ago.

One of the most recent bison finds investigated on the Snake River Plain is a small bison kill site discovered in 1987 during archaeological surveys for a power line installation in the rolling foothills on the far eastern edge of the Snake River Plain. Subsequent excavations at Site 10BV93 indicated that a small number of bison (represented by an MNI of five) were killed and butchered during a single event. A radiocarbon date of 4260 ± 60 ry BP was obtained on a fragment of bison bone (Gough 1990).

Excavations in Bobcat, Scaredy Cat and Tomcat Caves have revealed a distinct artifact assemblage of elk antler tines, broken handstones, and bison bone in association with

frozen sagebrush features (Henrikson 2003). Archaeological evidence indicates that linear “beds” of sagebrush stalks were prepared in the lowest (and coldest) portions of the caves. Faunal remains recovered from these features include diagnostic elements identified as *Bison bison* and numerous fragments of green fractured long bone that easily fall within the size range of bison. This suggests that various body parts of bison were placed between layers of stalks and later removed from the frozen sagebrush matrix with the use of handstones and antler tine ice picks. Evidence of this removal is apparent from the numerous broken tips of antlers recovered during the excavation of the sagebrush features. The sagebrush features from Bobcat Cave have associated radiocarbon dates of 4360 ± 70 ry BP and 4110 ± 70 ry BP. Ten radiocarbon dates from Scaredy Cat Cave indicate that the site was repeatedly used between 8190 ± 100 ry BP and 3810 ± 70 ry BP. Although Bobcat and Scaredy Cat caves indicate use primarily during the middle Holocene, radiocarbon dates from Tomcat Cave are restricted to the late Holocene (2400 ± 60 ry BP to 1170 ± 60 ry BP)(Henrikson 2003).

The Late Holocene

In 1993, limited test excavations were performed at the Ogden Site along the Little Wood River near Richfield, Idaho (Henrikson 1993). These were deemed necessary to determine whether intact subsurface deposits were still present at the site, since faunal remains and stone artifacts had been reportedly collected from the eroding cutbank on the east side of the river over the last 30 years. The bulk of the faunal assemblage consisted of post cranial bison elements or specimens that could only be identified as “large bovid” (but are presumably bison because of the prehistoric context), leading to the conclusion that the locale represented at least one event of bison harvesting. However, periodic and seasonal flooding have likely mixed the cultural deposits, making it impossible to discern distinct occupations. An Elko Corner-notched point was associated with a concentration of bison bone at a depth of 40 centimeters, indicating the event could have occurred sometime early in the Late Holocene.

Wahmuza, overlooking the Fort Hall Bottoms in southeastern Idaho, is one of the few sites in southeastern Idaho known to possess house floors. The site is situated on a sandy bluff overlooking a riparian zone at the confluence of two creeks. The faunal assemblage indicates a broad spectrum foraging pattern that included deer, waterfowl, hares, marmots and trout, with bison present in small quantities in nearly all levels (Holmer et al. 1986). Seven radiocarbon dates ranging from 1920 ± 60 ry BP to 100 ± 80 ry BP indicate that the site was occupied from about 2000 years ago until well into the Protohistoric period.

Baker Caves I, II and III, adjoining lava tube caves located in the Wapi Lava Flow on the south central Snake River Plain, were excavated in the mid-1980s to prevent loss of archaeological material from looting. Although archaeological deposits were limited in Baker Caves I and II, Baker Cave III appears to have been occupied in late winter around 1400 years ago and then again around 900 years ago. Five radiocarbon dates ranging between 930 ± 60 ry BP and 810 ± 60 ry BP were recovered from a hearth in Activity Area A and two obsidian hydration dates suggest occupation between about 1200 and

1400 years ago in Area B, near the entrance. Bison appears to be the only large mammal recovered from the site and is represented by the remains of at least 17 individuals. The presence of fetal remains indicates a late winter occupation of the site and the distribution of skeletal elements also suggests that primary butchering occurred elsewhere (Plew et al. 1987).

In the late 1960s, Butler (1971) reported a Protohistoric bison jump near Challis, Idaho, located in an alpine area north of the Snake River Plain. His willingness to refer to the site as a “jump” was based on the placement of artifacts and bone at the base of a steep cliff face overlooking the Salmon River. Although several bison horn cores were recovered, the rest of the faunal assemblage was too decomposed to be identified. Using the number of Desert Side-notched projectile points recovered from the site to estimate the number of animals killed at the jump, Butler surmised that 20-30 animals had been dispatched. The lack of identifiable faunal remains, combined with Butler’s somewhat overstated interpretation of the site, has raised questions in recent years and a reanalysis of the site is currently underway (Cannon, personal communication 2002).

The Rock Springs Site, located in Oneida County, is a Late Holocene bison kill and processing site situated on a stream terrace near a narrow draw (Arkush 2002). The site, excavated by the Weber State University Archaeological Field School between 1994 and 1997, appears to contain at least seven episodes of bison butchering between A.D. 1050 and 1750. Hunting blinds located at strategic points above the draw suggest that the animals were likely driven through the “bottleneck” created by this topographic feature and dispatched. Despite the presence of at least seven distinct bone beds, the Rock Springs Site produced the remains of only 17 adult bison. Although seasonality could not be assigned to all of the bone beds in the site, fetal remains indicate some were early spring kills. However, the most extensive bone bed (Bone Bed 3) contains both mature bulls and cows, suggesting an early fall kill when bison herds were at their peak.

SECTION III

GEOSPATIAL ANALYSIS OF PREHISTORIC SITES

For decades archaeologists have searched for patterns in the archaeological record that might reveal the myriad variables influencing where humans choose to live. This search is based on the widely held assumptions that: 1) environmental factors play a strong role in such patterns, and 2) these patterns can be quantified and explained (Wheatley and Gillings 2002). The development of Geographic Information Systems, also known as GIS, and their ability to analyze large quantities of data has provided archaeologists with an extremely valuable tool suite. Programs such as ArcView and ArcMap, that utilize GIS concepts, can integrate archaeological information with geologic, topographic, hydrographic and other data sources within hours rather than months or years (Wheatley and Gillings 2002).

The NPS has asked the University of Oregon Museum of Natural and Cultural History to apply GIS in the analysis of new and existing archaeological data at the Craters of the Moon National Monument and Preserve in Idaho. This analysis will ultimately provide the NPS with a predictive model that will serve as a guide for the management of its cultural resources. The archaeological data from the Monument will also be tested against a deductive model already developed for the eastern Snake River Plain (Henrikson 2002).

Many applications of GIS currently used in archaeological analyses are inductive in nature. In other words, patterns in archaeological data are detected through observations and comparisons rather than being isolated through the testing of hypotheses (Warren 1990). This analysis inevitably incorporates an inductive approach because empirical observations are always essential if fact is to be related to theory. In fact, a combination of deductive and inductive methods has been applied in numerous GIS studies and scientific inquiries in general. Wheatley and Gillings (2002) point out that in spatial analysis, the approaches can not work independently of one another.

A geospatial analysis of archaeological data on BLM lands in southeastern Idaho indicates that the ephemeral ponds dotting the landscape of the Snake River Plain also influenced the distribution of prehistoric sites (Henrikson 2002). Ephemeral ponds provided a critical source of water and food for humans, large and small game and waterfowl in the spring and early summer. The numerous archaeological sites surrounding these features suggest that they were indeed a significant resource to the Shoshone. However, because the Monument also contains extensive lava edges as well as hundreds of ephemeral ponds, our current research efforts pose a tremendous opportunity to understand the role of these landscape features in the Shoshone seasonal round.

Methods

Numerous intensive areal surveys of large public land tracts on the eastern Snake River Plain have been conducted by the BLM in association with range fire rehabilitation efforts. These surveys usually occur within a month to two months following range fires and prior to reseeding activities. Because of the potential ground disturbance that can be caused by reseeding with a range-land drill, intensive archaeological inventories are carried out to ensure that properties potentially eligible to the National Register of Historic Places are not adversely affected by these federal undertakings. According to Idaho BLM and Idaho State Historic Preservation Office standards, “intensive” inventories (representing 100% coverage) dictate pedestrian transects that are not more than 30 meters apart.

Due to the combined efforts of the BLM, NPS and the University of Oregon, roughly 45,000 acres of the Monument have been intensively inventoried for archaeological resources (Figure 3.1). Although these surveys do not represent a random or stratified sample of the research area they have been sufficiently numerous and extensive to provide a good view of the region’s archaeology (see Appendix A). Many surveys have exceeded 10,000 acres and have involved a variety of distinct topographic features. Fire rehabilitation surveys are also conducted on terrain devoid of vegetation, providing excellent visibility of the ground surface. Most of the archaeological sites included in this study have been recorded within the last 15 years and contain useful descriptions of diagnostic artifacts and general information regarding site types. Thus the data are generally of high quality. (Appendix A presents the current available data on archaeological surveys within the Monument, including the year in which it was conducted, the total acreage and the agency or firm that performed the survey).

The study area includes a current total of 291 prehistoric sites and 306 prehistoric isolated finds (Figure 3.2, Appendix B). The BLM has established standardized policies for recording archaeological sites. “Sites” constitute any surface distribution of artifacts and debris that equals or exceeds 10 items. “Isolated finds” are distributions of less than ten items, unless characteristics such as topography and sediments indicate that the potential for buried deposits is high. Most isolates are projectile points or tool fragments not found in association with lithic debris. However, a scatter of less than 10 waste flakes situated in an area devoid of sediments (such as a lava flow) is also designated as an isolated find. For consistency, these parameters have been retained for this study.

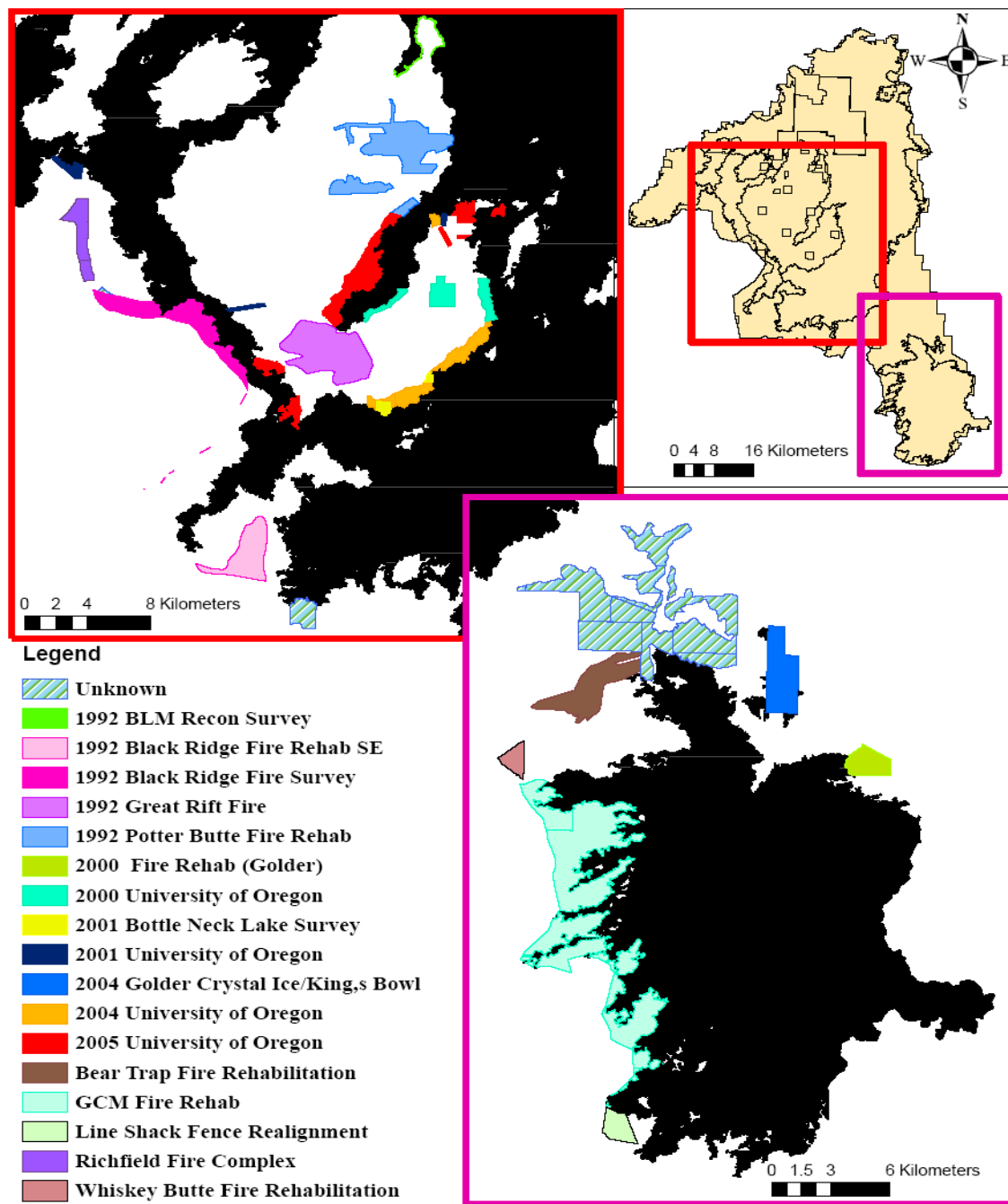


Figure 3.1. Intensive archaeological surveys conducted within the Craters of the Moon National Monument and Preserve.

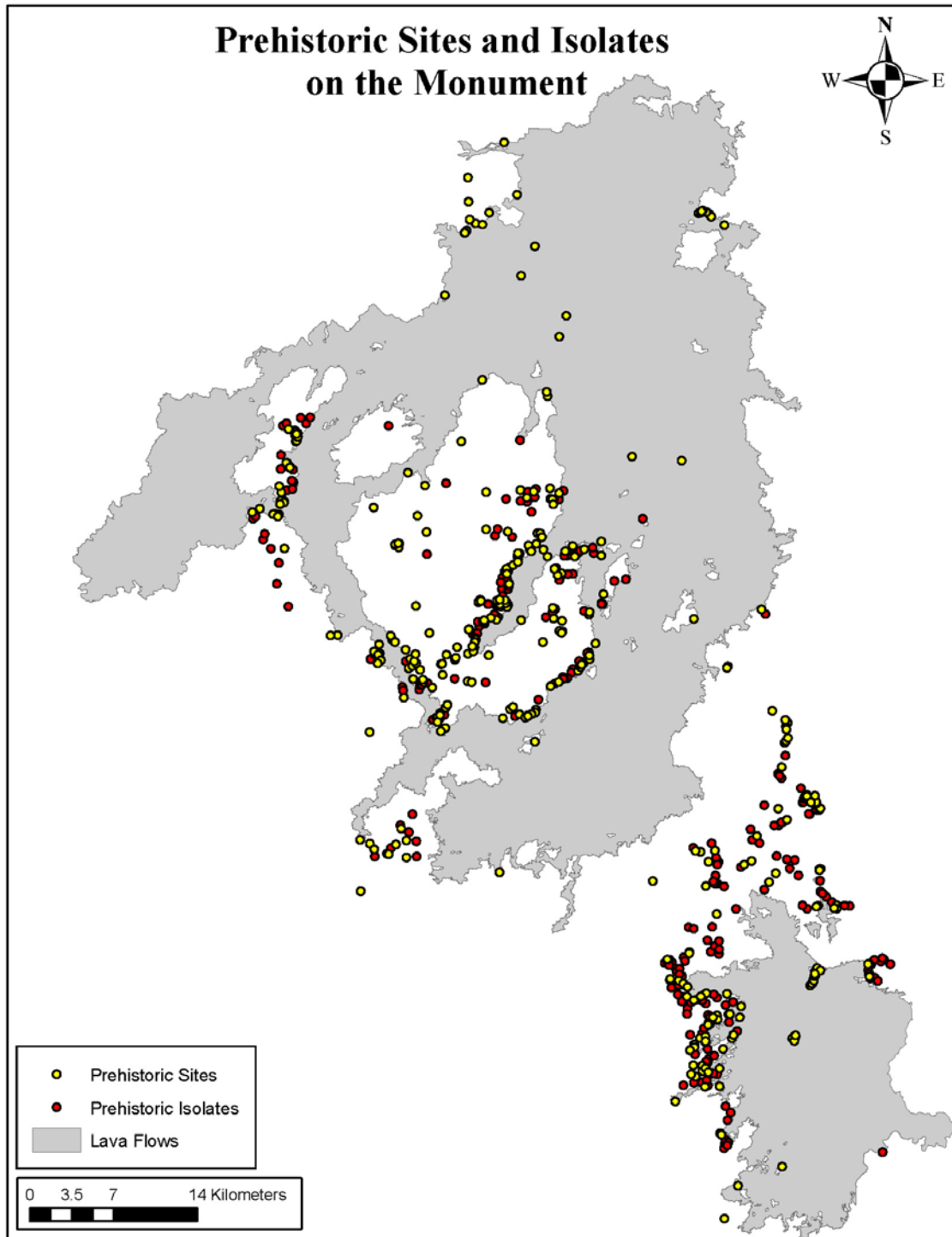


Figure 3.2. Distribution of recorded prehistoric sites and isolated finds on the Craters of the Moon National Monument and Preserve.

The site data here were provided by the Archaeological Survey of Idaho, which regularly enters all documented archaeological sites and isolated finds by county into a Microsoft Access database. The information in this database was manipulated using ArcGIS 9.1. It was necessary to separate the aboriginal sites into groupings based on information provided in the “attribute” field of the Access Database. This field often provided critical data regarding site type, such as the types of tools and diagnostics recovered or whether cultural features were noted. The following categories were assigned to aboriginal sites based on the physical descriptions provided in the attribute field: residential base, short-term base camp, base camp, field camp, hunting blind, trail, and isolated find. The specific attributes used to assign these categories are described below.

Residential Bases. Residential bases include a variety of flaked stone tools (projectile points, drills, scrapers, edge-modified flakes, ground stone, ceramics etc.) and fire-cracked rock. The presence of such items suggests multiple activities performed by small family groups, including women and children. Significantly, residential bases also include more permanent site furniture such as house floors, storage pits and evidence that multiple resources were being processed and consumed (Thomas 1983). Only three sites within the study area fit the criteria for a residential base.

Short Term Base Camps. For this research, short-term base camps include essentially the same range of artifacts found at a residential base but in lesser density, and lack physical evidence of houses or other more permanent structures that would suggest intensive, sustained occupation. The occupation of base camps is expected to last only a few weeks and would contain evidence of the processing and consumption of only seasonal resources. A total of 15 sites in the study area fit this description.

Field Camps. Field camps are defined as “task specific” locales associated with the procurement of a single resource and occupied for a very brief period of a day or two (Thomas 1983:79). The archaeological signature of field camps is one of a low degree of variability in artifact types. In this study, sites mainly comprised of waste flakes and a few flaked stone tools have been designated as field camps. A total of 273 sites within the study area have been designated as field camps. Because field camps likely represent hunting activities (e.g., kill sites, game surveillance locations or over-night “stop-off” points between kill sites and base camps), they appear to be randomly located throughout the sagebrush steppe.

Hunting Blinds. Some sites within the study area contain semi-circular rock structures or linear rock alignments. These sites are positioned in strategic locations near prominent topographic features in the sagebrush steppe and the surface remains are limited to waste flakes and projectile point fragments, thus reducing the possibility that the rock structures are houses. There are 5 sites that have been designated as hunting blinds.

Isolated Finds. As stated above, isolated finds are usually projectile points or tool fragments not found in association with other cultural debris. There are 306 documented isolated finds in the study area (see Figure 3.2).

Trails. Trails appear to have been created by aboriginal groups as a means of crossing rough Holocene a'a lava flows on the Monument. The trails consist of a narrow strip of crumbled and somewhat compacted lava, a result of repeated trampling. Although not usually visible from aerial photographs, they are readily visible during pedestrian surveys. Indications of a trail include broken bits of lava and color variation in the basalt. Trail heads often appear to be marked by a cairn of stacked rock. Several trails have been documented thus far in the Monument boundaries and many more are likely to be present.

Each of the site types, based on the description of artifacts provided in the database's attribute field, was assigned a code in ArcGIS. The site types are presented in Table 3.1 along with the number of sites of each category recorded in the study area.

Table 3.1. Codes and Numbers of Site Types recorded on the Craters of the Moon National Monument and Preserve.

Code	Site Type	Number in Study Area
1	Residential Base	3
2	Base Camp	15
3	Field Camp	273
4	Isolated Find	306
5	Hunting Blind	3
6	Trail	2

Projectile Point Chronology and Temporal Distribution of Sites on the Monument

An important aspect of the research rests in the ability of GIS to process data on the periods of occupation previously documented for archaeological sites within the study area. Diagnostic projectile points were recovered from roughly 38% of the sites and 25% of the isolated finds. The ability to assign a period of occupation to many localities within the Monument allows for an examination of the distribution of sites through time. In order to assign period designations to sites within the database, unique codes were assigned to the different types of diagnostic projectile points recovered from each site. Many sites contain multiple projectile point types indicating repeated occupation over thousands of years. The various combinations of projectile points found at different sites were assigned a unique code as well. The established time ranges for each projectile point were presented in Section II, Figure 2.1.

There are 177 sites in the study area that contain diagnostic projectile points, allowing for an assignment of a period or periods of occupation (Figure 3.3). There is one site

that contains an Early Holocene projectile point, while 29 sites contain points from the Middle Holocene, 128 contain Late Holocene projectile points, and 19 sites contain points from both the Middle and Late Holocene. Table 3.2 presents the codes and periods assigned to the various diagnostic artifacts or combinations of diagnostic artifacts recovered from archaeological sites within the study area.

Table 3.2. Projectile Points and Corresponding Code Combinations used to assign Periods of Occupation at Various Sites.

Code	Period	Projectile Point Combinations
1	Middle Holocene	Northern Side-notched (NSN)
2	Middle Holocene	Stemmed Indented Base (SIB)
3	Middle Holocene	McKean Lanceolate (McK)
4	Late Holocene	Elko Corner-notched (ECN)
5	Late Holocene	Rosespring/Eastgate/Rosegate (RG/RS)
6	Late Holocene	Avonlea (AV)
7	Late Holocene	Desert Side-notched (DSN)
8	Late Holocene	Ceramics (C)
9	Late Holocene	Cottonwood Triangular (CT)
10	Middle, Late Holocene	McK, ECN
11	Late Holocene	ECN, RG/RS, DSN
12	Middle, Late Holocene	NSN, McK, ECN, AV, CT, DSN
13	Late Holocene	ECN, DSN
14	Middle-Late Holocene	McK, RG/RS, DSN
15	Middle-Late Holocene	McK, DSN
16	Middle-Late Holocene	McK, SIB, ECN
17	Middle-Late Holocene	SIB, ECN, RG/RS
18	Middle Holocene	Humboldt (H)
19	Middle-Late Holocene	NSN, SIB, McK, ECN, DSN
20	Middle-Late Holocene	McK, ECN, RG/RS, DSN
21	Late Holocene	ECN, RG/RS
22	Middle-Late Holocene	SIB, RG/RS
23	Late Holocene	RG/RS, DSN
24	Middle-Late Holocene	SIB, McK, ECN, DSN
25	Middle Holocene	SIB, McK
26	Middle-Late Holocene	NSN, RG/RS
27	Middle-Late Holocene	H, C
28	Late Holocene	ECN, DSN, C
29	Late Holocene	DSN, C
30	Middle-Late Holocene	SIB, RS/RG, DSN
31	Early Holocene	Agate Basin (AB)
32	Late Holocene	AV, ECN
33	Middle-Late Holocene	ECN, McK, RG/RS
34	Middle-Late Holocene	NSN, DSN
35	Middle-Late Holocene	SIB, ECN, C
36	Middle-Late Holocene	McK, RS/RG, ECN, DSN, CT
37	Middle-Late Holocene	ECN, SIB

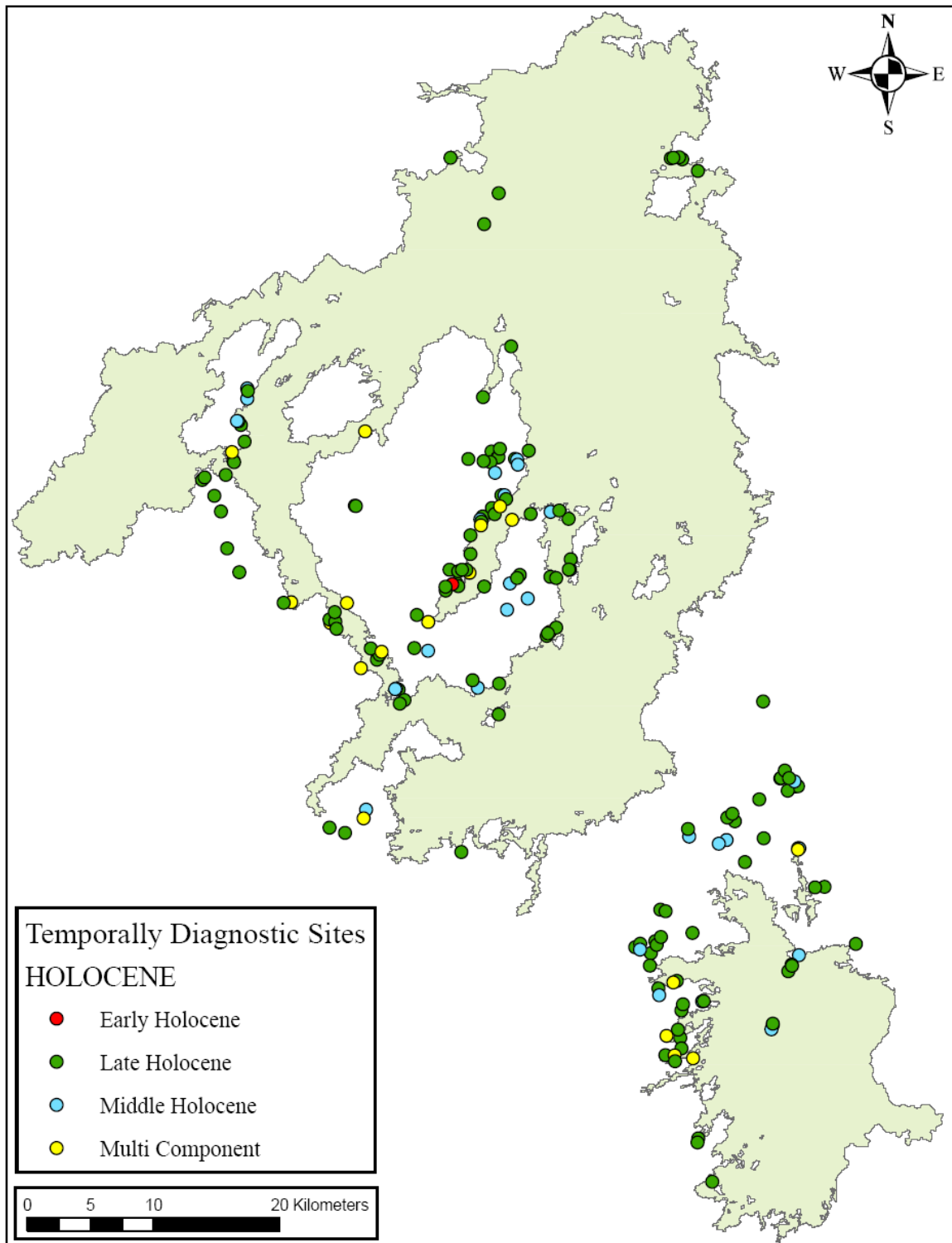


Figure 3.3. Prehistoric sites on the Craters of the Moon National Monument and Preserve containing temporally diagnostic artifacts.

Variables Considered in the Predictive Model

Predictive models require the examination of large data sets to determine what types of independent variables may have influenced the distribution and location of archaeological sites. The model proposed here assumes (as archaeological predictive models commonly do) that the settlement patterns selected by aboriginal groups were based on environmental variables (Warren 1990). Many inductive GIS analyses and predictive models have included elevation, slope, aspect, distance to water, vegetation communities and soil type as independent variables (Carmichael 1990, Ringe 1992).

In 1992, Brenda Ringe tested a predictive model for the Idaho National Laboratory, located just northeast of the Monument and found that variables such as slope and aspect do not appear to have a significant influence on prehistoric site distributions. Although these factors should ultimately be reevaluated through ArcGIS, the key variables relevant to this study are water, vegetation and lava flows. Because the arid Snake River Plain is characterized by isolated resource patches surrounded by less productive sagebrush steppe, the majority of archaeological sites are expected to occur either along linear river corridors or near ephemeral ponds. While the vegetation data currently available for southern Idaho are not precise enough to be useful here, the hydrographic data are quite detailed and can be used as proxy data for vegetation in this case. This is because, on the Snake River Plain, the vegetative community is sagebrush steppe unless ephemeral or perennial water sources are present.

Distance to Water

Residential bases, base camps, and field camps have different water requirements, and it is important to compare their respective distributions in relation to their distance from water. There are two key sources of water on the Snake River Plain: linear river corridors of the Snake, Big Wood and Little Wood River, and ephemeral ponds. While assessing the relationship of sites to linear river corridors is straightforward, there are no perennial water courses on the Monument. Therefore, this analysis will focus strictly on assessing site relationships to ephemeral ponds in the study area.

There are 464 ephemeral ponds scattered across the Monument that vary from less than 100 square meters to over 100,000 square meters in area (Figure 3.4). These features form when winter snowmelt and spring rains collected in areas of lower topographic relief than the surrounding terrain. In further examining the relationship between sites and ephemeral ponds it will be important to consider the potential factors that may influence pond productivity (i.e., water depth, temperature, salinity) but the task is too large to approach in detail here, and will be pursued in future research. For the purposes of the present study, the point of emphasis is that distance to water varies greatly with the seasons. Residential bases require nearby water at all seasons and this is supplied by river corridors. Base camps and field camps require nearby water during the time of year people use the sites in harvesting activities. The zone of ephemeral ponds provides nearby water but only for a very limited season.

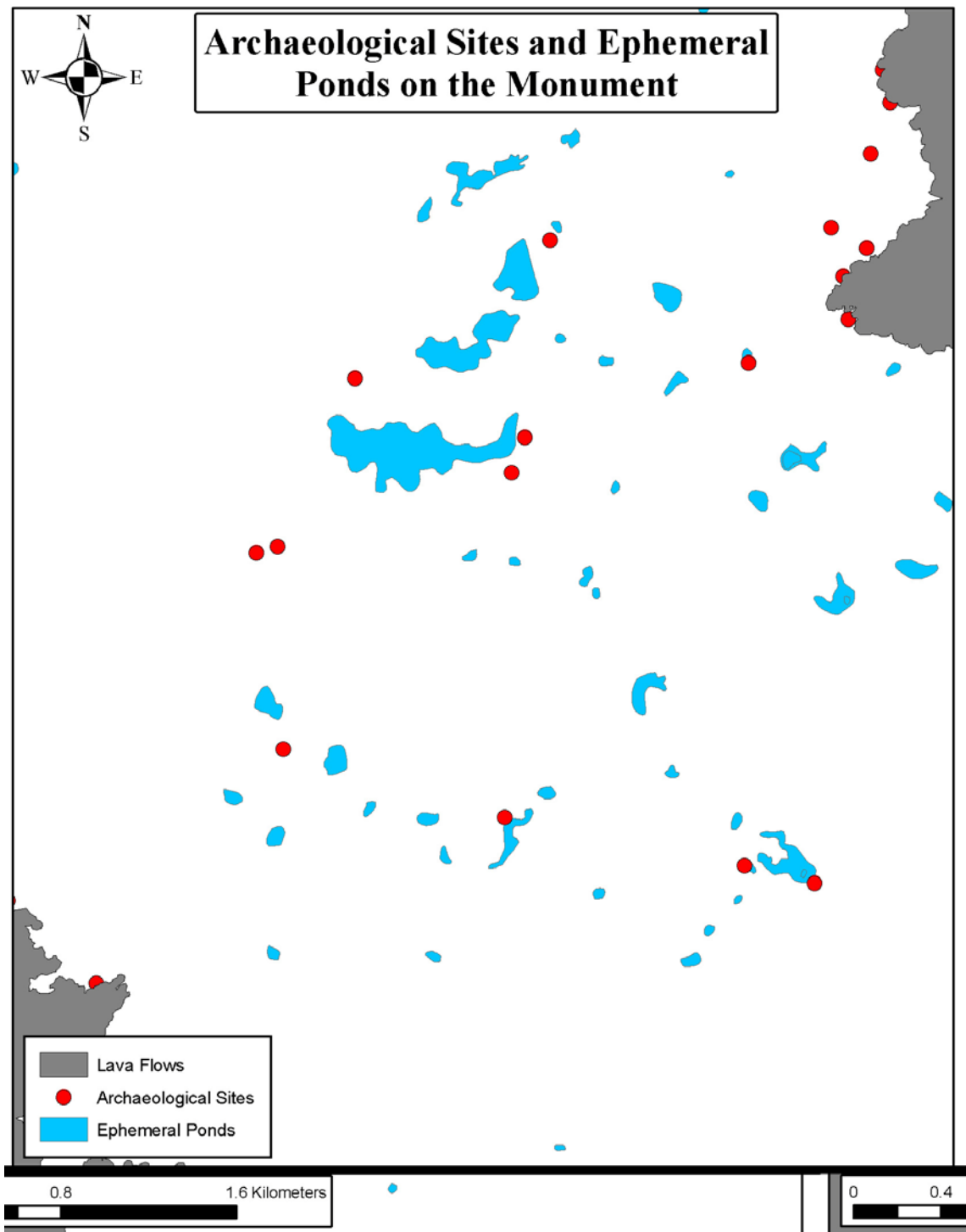


Figure 3.4. Ponds and archaeological sites within the Craters of the Moon National Monument and Preserve.

In a broader study conducted for the Shoshone Field Office of the BLM, Henrikson (2002) found that the distribution of prehistoric sites on the eastern Snake River Plain is emphatically not random, but strongly biased toward water. The water sources used in the analysis are modern sources recorded in the GIS data. Thus, the distribution of ancient sites is biased toward water sources that exist today, indicating that there has been no major shift in the location of water over the period covered by the archaeological sites. This assumption can also be made for ephemeral ponds within the Monument boundaries.

To examine whether the distribution of prehistoric sites on the Monument is biased toward water, site locations need to be compared with an equal number of randomly selected points. In this analysis, 291 random Universal Transverse Mercator (UTM) points were generated using a random waypoint extension in ESRI. Because previous archaeological surveys on the Monument have been limited to the sagebrush steppe surrounding Holocene lava flows, random waypoints were only generated in the non-lava portions of the park. The location of each random UTM point was then queried to determine its distance to water as indicated by modern GIS data. A graph of the distribution of prehistoric sites in relation to water is presented in Figure 3.5.

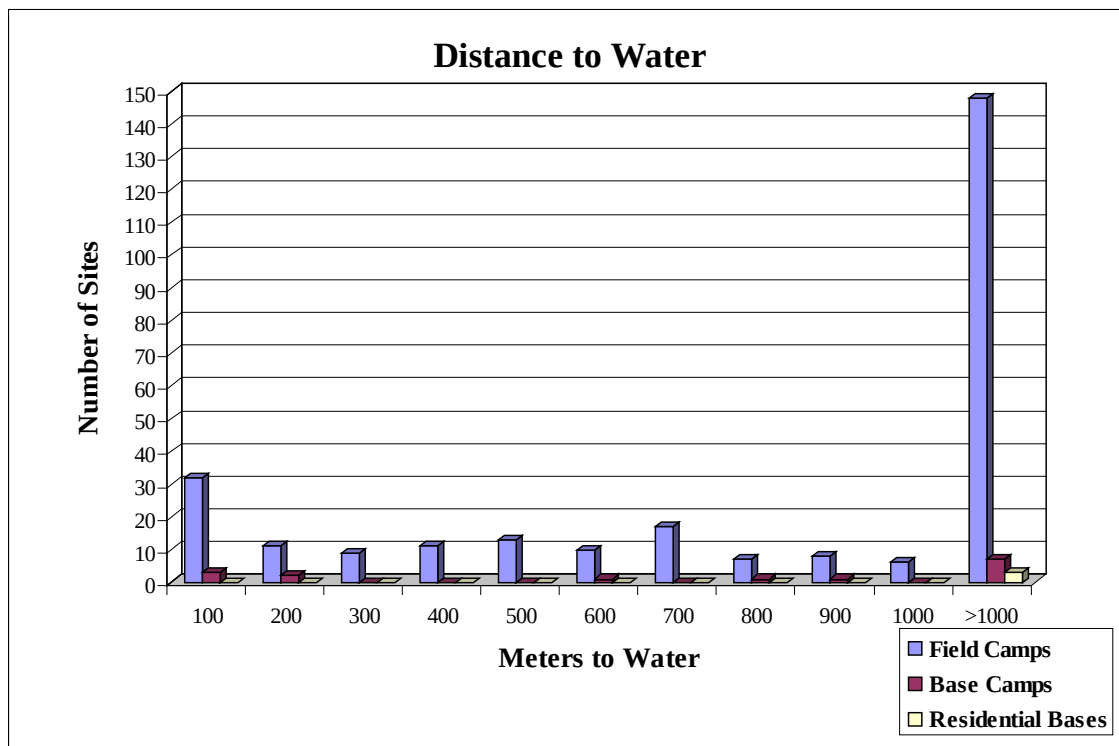


Figure 3.5. Distribution of prehistoric sites on the Craters of the Moon National Monument and Preserve in relation to water sources.

To measure the significance of the distribution of archaeological sites in relation to water, the Kolmogorov-Smirnov test was applied. This statistical procedure “examines

the difference between two samples which have been measured in ordinal categories [and] arranged into a set of cumulative proportions” (Thomas 1986:322).

The null hypothesis of this test maintains that there will be little difference in relationship to water between the cumulative proportions of prehistoric site locations and the distribution of random UTM points. The greater the difference between these proportions, the less likely it is that the null hypothesis is true. Table 3.3 compares the cumulative proportions of the prehistoric site locations and the random sample of UTM points.

Table 3.3. Comparison of Prehistoric Sites and Random UTM points in the Study Area in Relation to Distance to Water.

Distance to Water	Site Locations (N=291)		Random Points (N=291)		Difference
	Raw	Cum. %	Raw	Cum. %	
0-100 meters	35	12.03%	4	1.37%	.1056
0-200meters	48	16.49%	13	4.47%	.1203
0-300 meters	56	19.24%	28	9.62 %	.0962
0-400 meters	68	23.37%	50	17.18%	.0619
0-500 meters	81	27.84%	67	23.02%	.0481
0-600 meters	92	31.62%	80	27.49%	.0412
0-700 meters	109	37.46%	98	33.68%	.0378
0-800 meters	117	40.21%	111	38.14%	.0206
0- 900 meters	126	43.30%	118	40.55%	.0275
0-1000 meters	132	45.36%	123	42.27%	.0309
>1000 meters	291	100%	291	100%	0

The largest deviation between the two samples is seen in the number of prehistoric sites and random UTM points that are between 0 and 200 meters from water. This figure (0.1203%), referred to as the “D Statistic” in the Kolmogorov-Smirnov test, represents the “observed” difference between the cumulative proportions of prehistoric sites and random points that are located within 200 meters of water. The observed value of “D” must then be tested against the critical value of “D”, which in this case will be set at the 99% confidence interval (or $\alpha = 0.01$). The following formula will generate the critical value of “D” under these conditions:

$$1.63 \sqrt{\frac{n1+n2}{n1n2}} \quad \text{or} \quad 1.63 \sqrt{\frac{291+291}{291 \times 291}}$$

These calculations resulted in 0.1336 as the critical value of “D”. Because the observed value of “D” (0.1203) is below the critical value of “D”, the null hypothesis is not rejected. The difference between the locations of prehistoric sites and random points that are within 200 meters of water is not statistically significant. The geospatial analysis of the distribution of residential bases, base camps and field camps in relation to ephemeral ponds suggests that there is not a strong correlation between ponds and archaeological sites on the Monument (see Figure 3.5).

Distance to Lava

As mentioned above, previous research on the eastern Snake River Plain indicates that variables such as slope and aspect do not appear to have a significant influence on prehistoric site distributions. Instead, Ringe (1992) discovered higher frequencies of sites near the edge of the Cerro Grande flow than elsewhere. Her striking results indicated that although lava flows may have been barriers during and immediately following volcanic eruptions, they eventually became highly productive areas surrounded by less productive sagebrush steppe.

The Monument contains over 1500 kilometers of lava edge environments. While the results of previous archaeological surveys in the study area intuitively support Ringe's findings, this study aims to evaluate and quantify the relationship of specific site types to the lava edge on the Monument. A graph of the distribution of prehistoric sites in relation to the lava edge is presented in Figure 3.6.

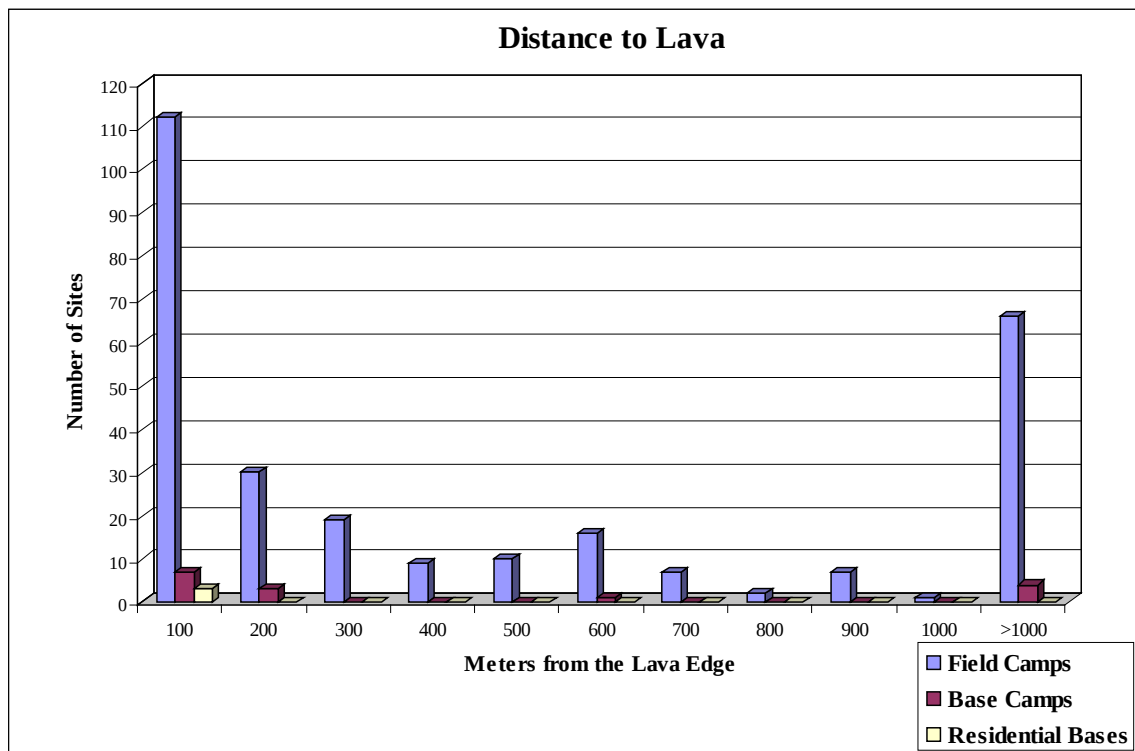


Figure 3.6. Distribution of prehistoric sites on the Craters of the Moon National Monument and Preserve in relation to Holocene lava flows.

To measure the significance of what appears to be a nonrandom distribution, a statistical exercise must be performed (as was done with the association between sites and water) to evaluate the relationship between prehistoric sites and Holocene basalt flows. Table 3.4 compares the cumulative proportions of site locations and random points with the distance to the lava edge.

Table 3.4. Comparison of Prehistoric Sites and Random UTM points in the Study Area in Relation to Distance to Lava.

Distance to Lava	Site Locations (N=291)		Random Points (N=291)		Difference
	Raw	Cum. %	Raw	Cum. %	
0-100 meters	122	41.92%	26	8.93%	.3299
0-200meters	155	53.26%	44	15.12%	.3814
0-300 meters	174	59.79%	57	19.59%	.4021
0-400 meters	183	62.89%	76	26.12%	.3677
0-500 meters	193	66.32%	85	29.21%	.3711
0-600 meters	200	68.73%	98	33.68%	.3505
0-700 meters	207	71.13%	107	36.77%	.3436
0-800 meters	209	71.82%	122	41.92%	.2990
0- 900 meters	216	74.23%	130	44.67%	.2955
0-1000 meters	217	74.57%	136	46.74%	.2784
>1000 meters	291	100%	291	100%	0

In Table 3.4, the largest deviation between the two samples rests in the number of prehistoric sites and random UTM points that are within 300 meters of the lava edge. Again, this figure (0.4021%), referred to as the “D Statistic” in the Kolmogorov-Smirnov test, represents the “observed” difference between the cumulative proportions of prehistoric sites and random points that are located within 300 meters of Holocene basalt flows. The critical value of “D” (at the 99% confidence interval, or $\alpha = 0.01$) has already been calculated at 0.1336 in the previous statistical exercise.

Because the observed value of “D” (0.4021) is well above the critical value of “D”, the null hypothesis is rejected. The difference between the locations of prehistoric sites and random points that are within 300 meters of the lava edge is statistically significant at the 99% confidence level. In other words, there appears to be a very strong positive correlation between lava edges and the distribution of archaeological sites on the Monument. In fact, all of the residential bases, 10 of the 15 base camps and a large percentage of field camps documented in the study area are located within 300 meters of the lava edge.

Residential Bases on the Monument

Three sites in the current sample meet the criteria of a residential base (Figure 3.7). All of these occur in somewhat unexpected locations. The Lost Lava Rings Site (10BT1749) consists of 13 circular basalt features situated in a sheltered lava embayment located about 300 meters inside the Craters of the Moon lava field. The site contains Intermountain Ware and Desert Side-notched points, indicating a very late Holocene occupation. Attached to the circular “house floors” are smaller, semi-circular rock rings that may have functioned as storage features. The selection of this location for a residential base seems odd, given the low biotic productivity of its surroundings. The Minidoka Flow, on which the site is located, is devoid of soil and vegetation. However, a small cave located on the southwest side of the embayment contains a deep pool of water generated from condensation as warm exterior air hits the interior walls of

the cave. Although this water may have supported use of the embayment, it is surely not the only factor involved in selecting this location as a residential base.

According to the SHPO database, Sites 10BN205 and 10BT1822 reportedly contain circular rock features in association with lithic scatters. Site 10BN205 is described as a "ring of rocks for a wikiup". Tools found at the site include one Elko Corner-notched point, one biface, two manos and one metate. Site 10BT1822 is described as a "circular rock structure overlooking a collapsed lava tube" with associated lithic debris. While these sites have provisionally been assigned as residential bases, both will require re-visitation to confirm this classification. Both of these sites are located on barren Holocene aged lava flows, similar to the Lost Lava Rings. In fact, Site 10BT1822 is situated almost five kilometers into the flow from the Laidlaw Park kipuka.

Base Camps on the Monument

A total of 15 sites in the study area meet the criteria of a base camp (Figure 3.8). Although base camps usually occur in open air locations, there are two base camps directly associated with cold storage caves (Henrikson 2002, 2003). These include Scaredy Cat Cave, located near Bear Den Butte in Laidlaw Park and Alpha Cave, located north of Crystal Ice Caves (see Figure 3.8). The surface lithic scatters at both sites contain a variety of flaked stone tools, ground stone, ceramics and fire-cracked rock indicating the processing and consumption of a variety of resources, including bison. Both of these sites have been subjected to subsurface investigations and are reported in Section V of this document.

Of the remaining 13 open base camps in the study area, 10 are located within 300 meters of the lava edge and 3 are situated at ephemeral ponds (Table 3.5). However, 3 base camps (10BN1097, Temporary No. 05-KM-23 and Temporary No. 05-KM-39) are conveniently located at ephemeral ponds immediately adjacent to the lava edge. It is predicted that additional base camps will be discovered in areas where these two types of features are in close proximity to each other. The Baker Caves (10BN153/154), like the Lost Lava Rings residential base, are actually located directly on a basalt flow (see Section V).

Eleven base camps contain diagnostic artifacts and can be assigned to specific periods. Projectile points found at 6 base camps (including the two cold storage caves) indicate multiple occupations that span the Middle and Late Holocene. Intermountain Ware ceramics and Desert Side-notched points were recovered from 5 base camps, indicating use of these sites until very recently. Multi-component base camps 10BN389 and 10BN861, located along the lava edge in Laidlaw Park, were subjected to test excavations in 2005. The results of these investigations are reported Section V.

Table 3.5. Location of Base Camps within the Craters of the Moon National Monument and Preserve.

Site	Name/Type	Location	Proj. Points	Period
10MA101	Open Base Camp	Ephemeral Pond	Unspecified	Undetermined
10MA114	Open Base Camp	Ephemeral Pond	SIB, Elko	Middle, Late Holocene
10MA143	Scaredy Cat Cave	Cave	McK, DSN	Middle, Late Holocene
10MA163	Open Base Camp	Lava Edge	DSN,RS	Late Holocene
10MA168	Open Base Camp	Lava Edge	DSN, Elko	Late Holocene
10BN389	Open Base Camp	Lava Edge	McK, RS, DSN, CT, Elko	Middle, Late Holocene
10BN967	Open Base Camp	Ephemeral Pond	Unspecified	Undetermined
10BN1097	Open Base Camp	Lava Edge/Ephemeral Pond	Unspecified	Undetermined
10BN861	Open Base Camp	Lava Edge	McK, RS, DSN, CT, Elko, NSN, AV	Middle, Late Holocene
10PR641	Alpha Cave	Cave	Elko, RS, McK	Middle, Late Holocene
05-KM-23	Open Base Camp	Lava Edge/Ephemeral Pond	Elko, RS, McK	Middle, Late Holocene
05-KM-39	Open Base Camp	Lava Edge/Ephemeral Pond	Ceramics, DSN	Late Holocene
10BN353	Open Base Camp	Lava Edge	Unspecified	Undetermined
10BN1066	Open Base Camp	Lava Edge	CT, DSN	Late Holocene
10BN153	Baker Caves	Lava Flow	RS,DSN	Late Holocene

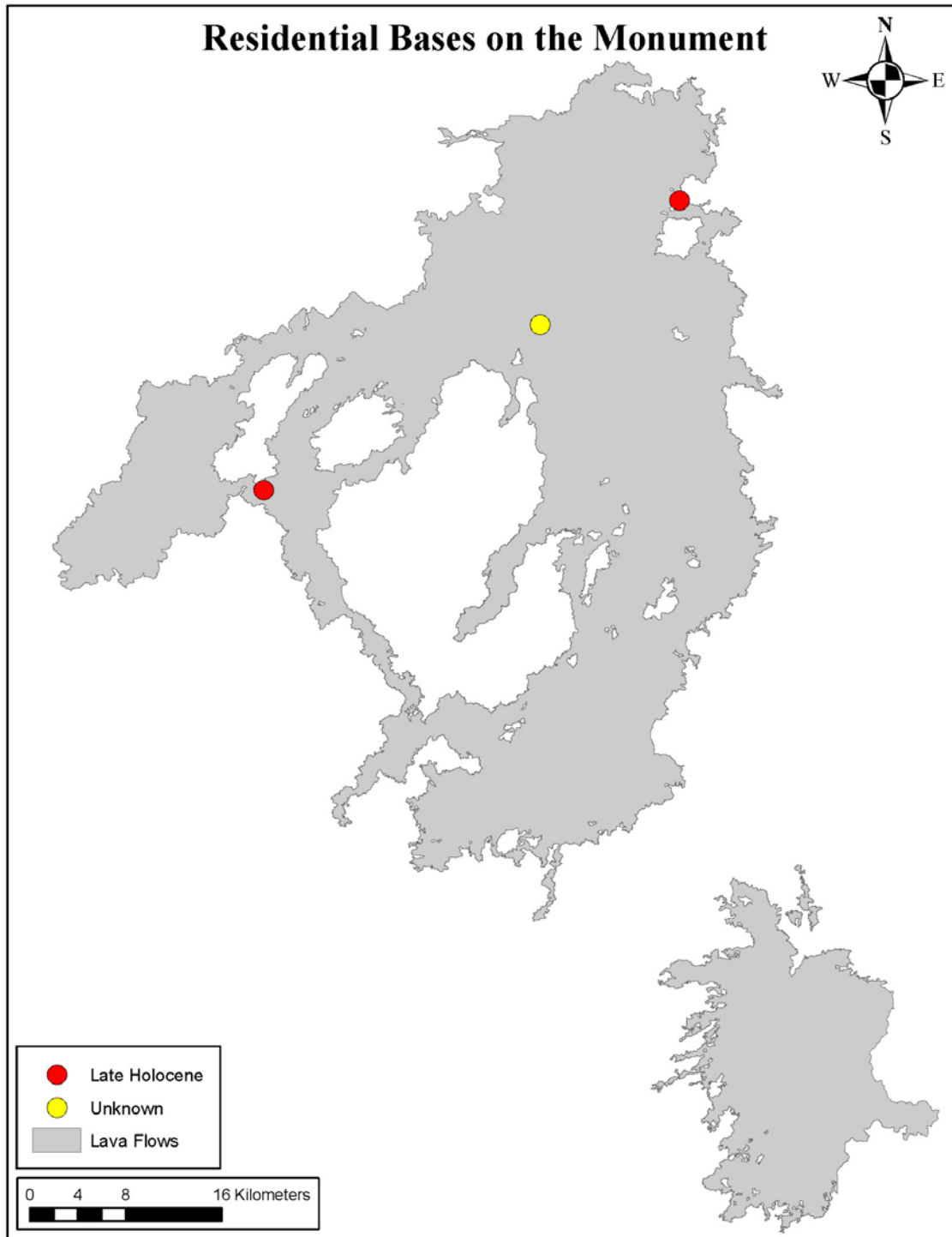


Figure 3.7. Documented residential bases on the Craters of the Moon National Monument and Preserve.

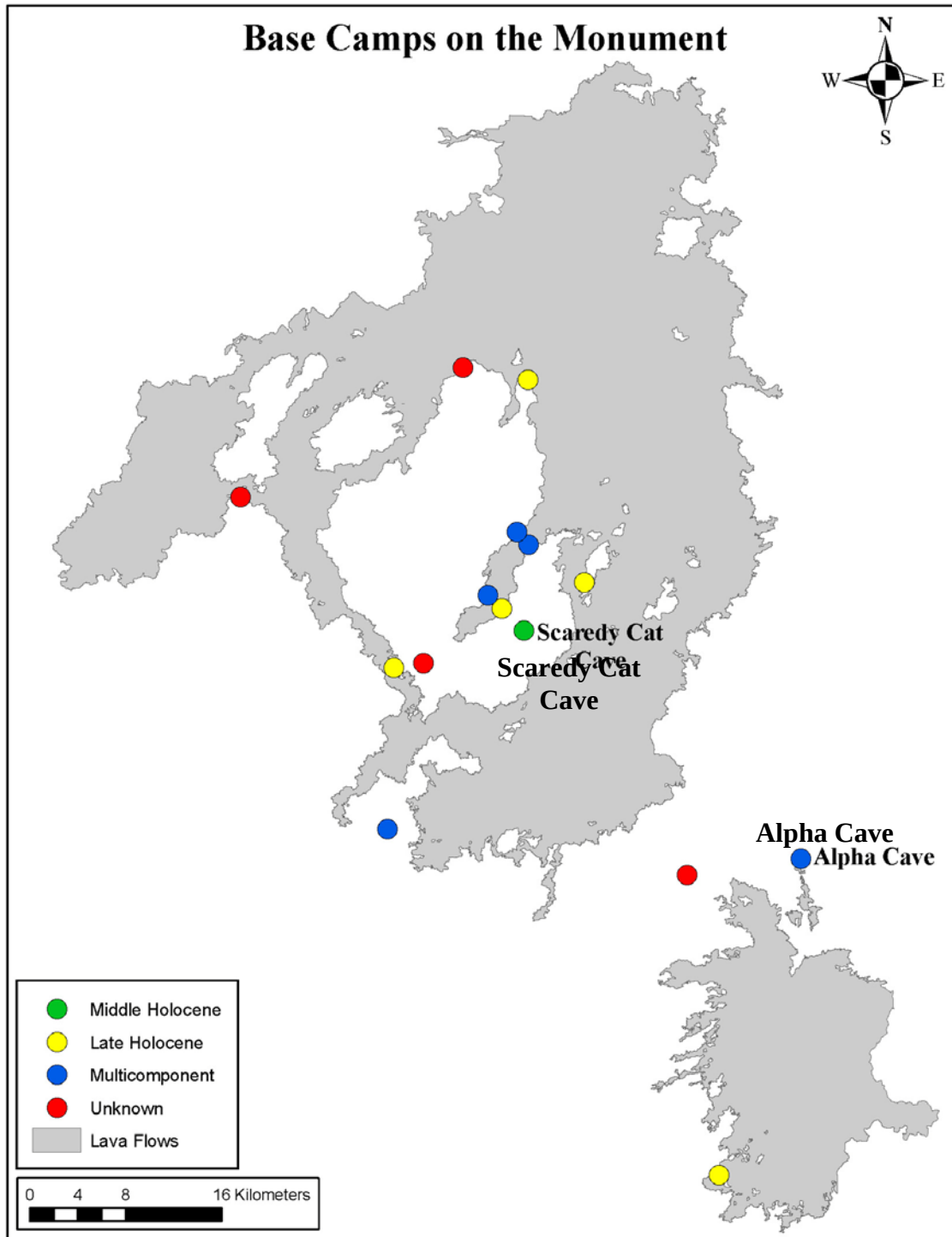


Figure 3.8. Documented base camps on the Craters of the Moon National Monument and Preserve.

Field Camps on the Monument

The vast majority of sites on the Monument, based on their limited assemblage of artifacts, have been classified as field camps (Figure 3.9). It should be noted that a certain percentage of sites in the study area have likely been inaccurately “typed” as field camps because the exposed assemblage did not contain ground stone or other elements associated with a base camp or residential base. In fact, it is suspected that many of the field camps documented in the immediate proximity of the lava edge or ephemeral ponds may indeed be base camps. Future revisits to these sites may provide sufficient data to reclassify them.

As discussed earlier, artifact assemblages associated with field camps include lithic debris scatters of more than ten waste flakes, projectile points, and animal processing tools such as utilized flakes, scrapers and multi-purpose tools. Of the 273 field camps on the Monument, 77 contain diagnostic projectile points. Intuitive analysis of these projectile points has dated 13 of the field camps to the middle Holocene and 64 of the field camps to the late Holocene, with fewer than 10 sites represented by multiple occupations spanning thousands of years.

Field camps are by definition associated with hunting activities. Therefore, their location could be influenced by topography, water and other variables, especially if they are related to the procurement of big game. In such cases, their position on the landscape may be predicted to be associated with landforms that would facilitate hunting drives or ambushes. A previous study (Henrikson 2002) found that distance to water influenced the location of field camps to some degree. However, the causal factor might be a reduction in hunting success as distance from water increases or perhaps limitation associated with transporting water to field camps.

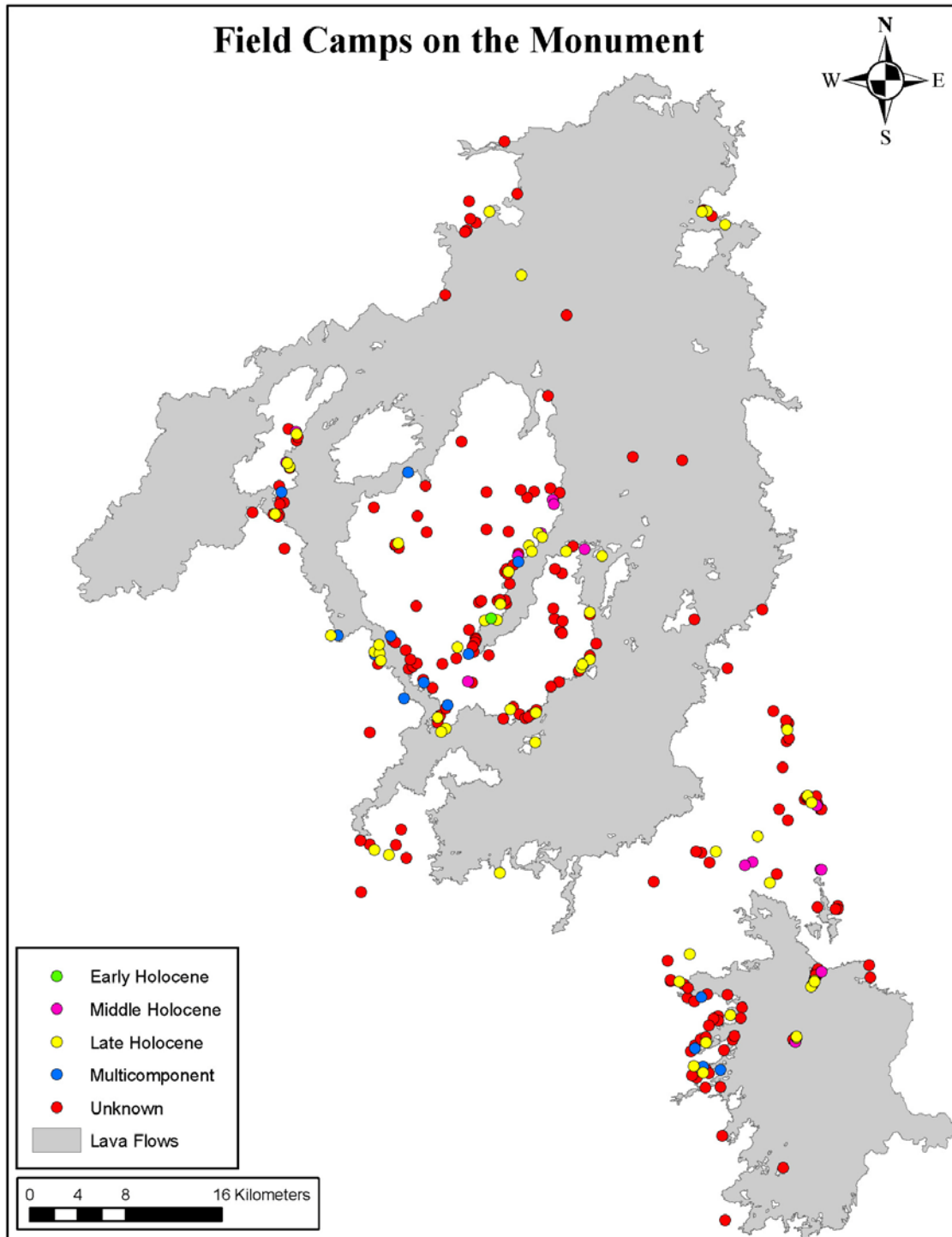


Figure 3.9. Documented field camps in the Craters of the Moon National Monument and Preserve.

Hunting Blinds on the Monument

One base camp (Scaredy Cat Cave) and four field camps on the Monument contain rock features interpreted as hunting blinds (Figure 3.10). If success in obtaining bison and other large game animals required narrow draws or “funnel” features on the landscape, hunting blinds would likely be situated near these features. A brief examination of the contour intervals exhibited on the DRGs (USGS 7.5 minute quadrangles) indicates that many rock features are located along the edges of prominent basalt ridges and landforms that could have been used by hunters to influence the movements of big game. Detailed analysis of these features is too large a task to be undertaken at present, but will be performed in future research through the examination of Digital Elevation Models (DEMs).

There are a number of rock structures located on the Monument that have been described as cairns. It is suspected that these include both prehistoric and historic features. Shepherders utilizing Laidlaw Park built numerous cairns which are believed to have been used for both navigation and as boundary markers. Based on intuitive observations, historic cairns are typically constructed of numerous basalt boulders and cobbles stacked up to five or six feet high. These cairns are usually recorded in open sagebrush steppe on prominent ridge tops, buttes or knolls. Historic trash scatters, including cans and bottle glass, are often found in association.

Prehistoric cairns are suspected to be less conspicuous. Rock features associated with prehistoric lithic scatters often consist of a limited number of rocks broadly stacked, no more than several feet high. Prehistoric cairns may also be distinguished by dense lichen communities sealing cracks between the boulders. Prehistoric cairns were likely used in much the same way as historic cairns and have been documented in direct association with what appear to be prehistoric trails across the lava (see Section V).

Analysis of the Temporal Distribution of Archaeological Sites

Previous research suggests that resource patches on the eastern Snake River Plain have not been dramatically affected by changes in climatic conditions over the last 8000 years (Henrikson 2002) and that the comparative distributions of Middle Holocene and Late Holocene sites exhibit little variation as well. In other words, the predicted locations of residential bases, base camps and field camps appeared to remain constant during much of the Holocene.

In order to test whether these patterns are reflected within the boundaries of the Monument, the sites assigned to each period were examined in relation to their distance to water and the lava edge in a similar fashion to exercises presented above (Tables 3.6 and 3.7). As previously stated, there are 177 sites in the study area that contain diagnostic projectile points. Because the early Holocene is represented by only one Agate Basin style point, this sample is too small to be included in the analysis. Many of the site locations on the Monument were utilized repeatedly during the middle Holocene

and late Holocene. Consequently, these multicomponent sites are included in the counts for both middle and late Holocene sites. There are a total of 48 sites containing Middle Holocene projectile points and 147 sites containing Late Holocene projectile points.

Although the Kolmogorov-Smirnov test performed above suggests that there is not a strong correlation between ponds and archaeological sites within the Monument boundaries overall, some differences may exist in the relationship between middle and late Holocene sites and these ephemeral water sources. Of the 48 sites assigned to the Middle Holocene, 6 (12%) are within 100 meters of ponds (Figure 3.10). One of these sites includes a base camp (see Table 3.5). Of the total number of late Holocene sites, only 6 (5%) are within this distance. While these percentages suggest that fewer archaeological sites were tethered to ephemeral ponds during the late Holocene, additional field data are needed to evaluate these results.

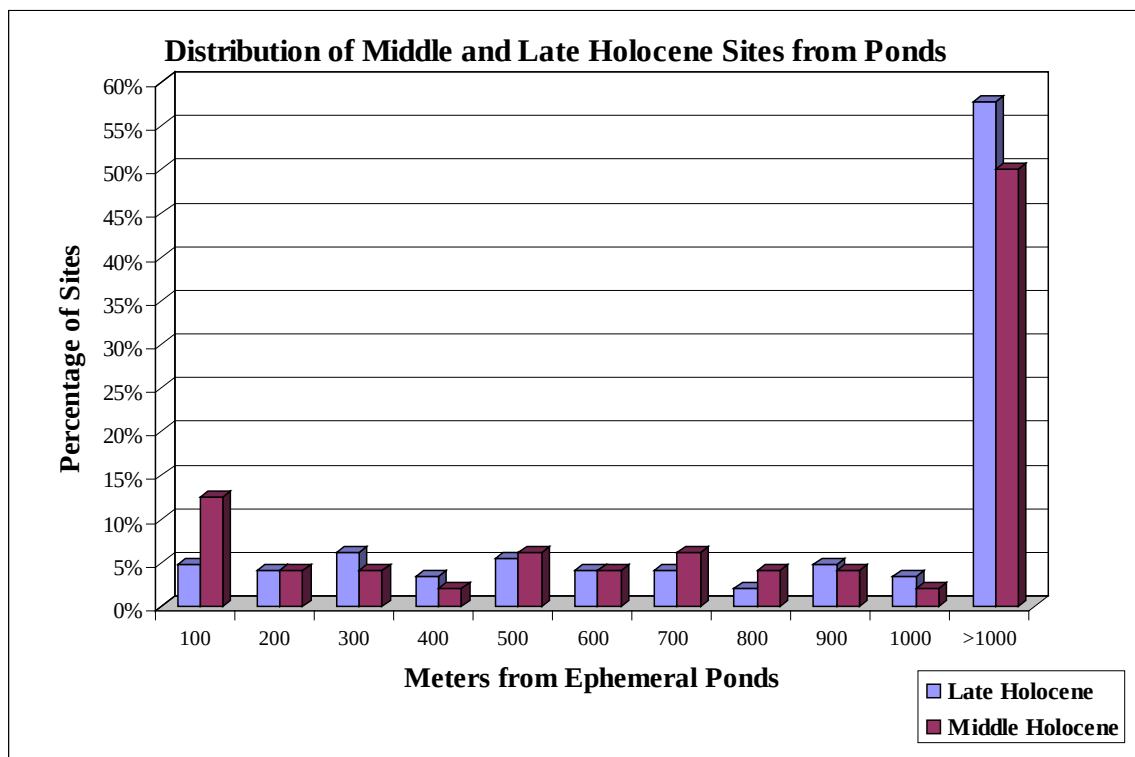


Figure 3.10. Distribution of middle and late Holocene sites in relation to water on the Craters of the Moon National Monument and Preserve.

Based on the Kolmogorov-Smirnov test, there appears to be a very strong positive correlation between lava edges and the distribution of archaeological sites within the Monument boundaries. Of the total number of sites assigned to the Middle Holocene, 56 (38%) are within 100 meters of the lava edge (Figure 3.11). Of the total number of late Holocene sites, 13 (28%) are within this distance. While field camps containing temporally diagnostic artifacts are included in these percentages, it should be noted that 8 of the 12 base camps located at the lava edge and the Lost Lava Rings residential base (located directly on a lava flow) were occupied during the late Holocene (see Table 3.5).

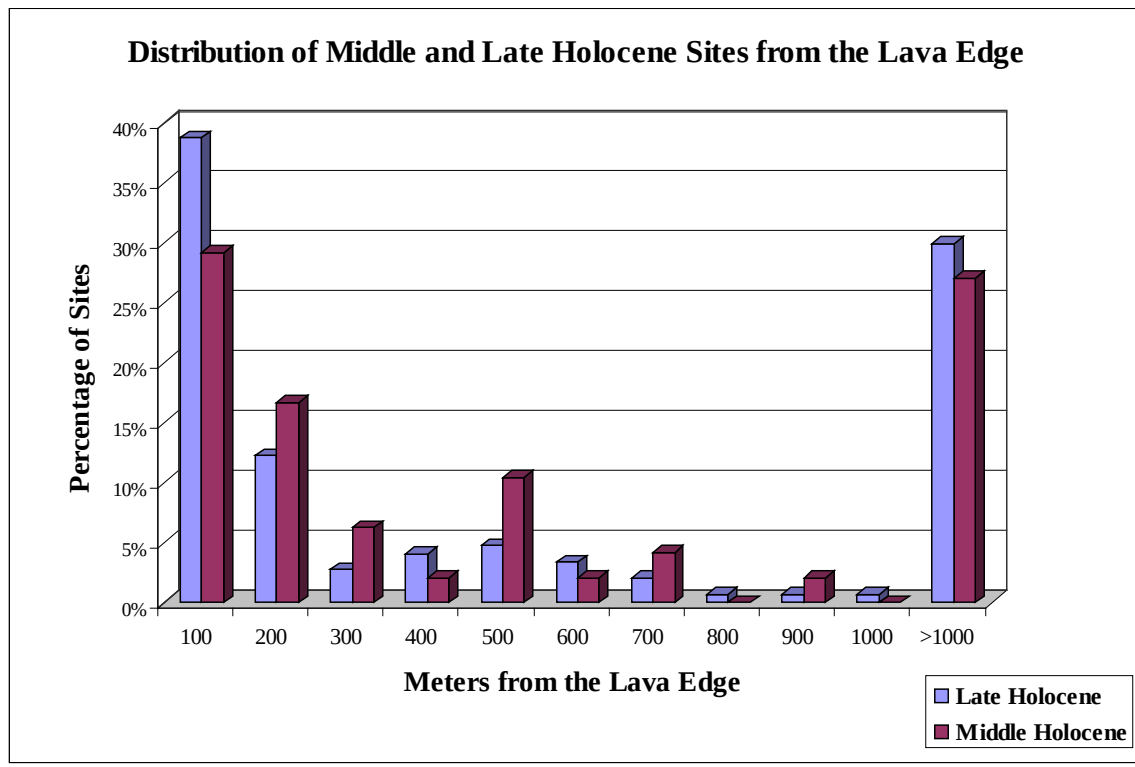


Figure 3.11. Distribution of middle and late Holocene sites in relation to the lava edge on the Craters of the Moon National Monument and Preserve.

Discussion

In examining the distribution of prehistoric sites within the Monument, some patterns emerge that appear to conflict with a predictive model developed for the eastern Snake River Plain (Henrikson 2002). The temporal distribution of sites in the broad region surrounding the Monument indicates that many ephemeral ponds were used repeatedly throughout the middle and late Holocene, giving evidence of long term reliance on these resource localities over millennia. However, the geospatial analysis performed here suggests that, in the area containing the Monument, recent basalt flows were utilized to a greater degree than ephemeral ponds located on the open sagebrush steppe. Although

additional information should be gathered, the existing data also suggest an increase in the utilization of the lava edge during the last 4000 years.

As stated earlier, some potential advantages of residing at lava edges have already been brought to light by Ringe's (1992) analysis of site distributions on the Idaho National Laboratory. During the winter, the lava edge captures drifting snow, which during spring and early summer months, provides essential moisture for grasses such as Great Basin Wild Rye, Indian Rice Grass and various forbs. These highly productive vegetation communities would have been attractive for both animals and humans. In addition, numerous alcoves and rockshelters along the lava edge provide shelter from the ever blowing wind. Depressions in the lava flow, created by excavating basalt, have been recorded near archaeological sites (see Section V). Although previously suspected to contain water, recent work by Mark O'Brien (2005) indicates that these features may contain water or ice through April.

Although climatic ameliorations during the late Holocene may have contributed to the productivity of lava edge environments, little paleoclimatic data is currently available to support this premise. Instead, recent discoveries on the Monument suggest that, during the last 4000 years, there were perhaps other incentives for camping at the lava edge. The more intense utilization of lava edges during the late Holocene may be correlated with an overall increase in site density in the region. The number of archaeological sites that can be assigned to the late Holocene on the Monument is more than double the number of middle Holocene sites (see Figure 3.3), suggesting that human populations were increasing on the eastern Snake River Plain during the last 4000 years.

One of these discoveries includes Site 10BN389, a late Holocene site located in Laidlaw Park (see Section V). The site contains all of the elements of a base camp, including stone tools, Intermountain Ware ceramics, ground stone and a large hearth feature dated to 700 ry BP. Just above the site, along the crest of the lava edge are numerous rock features that are too high above the plain to be hunting blinds and are much more suggestive of defensive structures or lookouts. From these vantage points, individuals could see great distances on the open plain.

This recent discovery has provided new insights regarding the inhospitable location of the Lost Lava Rings. Although water may have been a very attractive feature that would have encouraged use of the otherwise barren embayment, this location is more suggestive of a strategic defense location.

Conclusions

Based on the analysis of archaeological data within the Craters of the Moon National Monument and Preserve, Holocene lava flows clearly need to be considered in any investigation of pre-contact Shoshone settlement and subsistence patterns on the eastern Snake River Plain. The data indicate that, in the region containing the Monument, the lava edge was a preferred location whether groups intended to stay overnight or for

longer periods. Our analysis also suggests that human populations were growing during the late Holocene and that utilization of the lava edge also increased over the past 4000 years. While the attraction of lava edges may be associated with greater effective moisture, we currently do not have paleoclimatic data that supports this hypothesis. Instead, the presence of what appear to be defensive structures at base camp 10BN389 and the inhospitable location of the Lost Lava Rings residential base suggest that the variables responsible for site distribution patterns as well as the character of late Holocene sites on the eastern Snake River Plain may be more complex than previously thought. Although the availability of food and water were critical in the cold high desert, recent discoveries on the Monument suggest that intercommunity stress associated with late Holocene population pressures may have also greatly influenced where people chose to stay. These intriguing developments should be pursued as part of future investigations of the region.

SECTION IV

GEOCHEMICAL SOURCE ANALYSIS OF PROJECTILE POINTS

The spatial analysis of existing archaeological data gathered from the Monument will ultimately provide the NPS with a predictive model that will serve as a guide for managing its cultural resources. One aspect of the research involves a geochemical source analysis of diagnostic volcanic glass projectile points collected from the Monument over the last 25 years.

Previous geochemical studies of southern Idaho volcanic glass artifacts (Holmer 1997, Plager 2001, Thompson 2004) have already attempted to decipher patterns in the transportation and/or trade of volcanic glass within the region and beyond. In contrast, the current study focuses on the utilization of volcanic glass sources within a specific sector of the eastern Snake River Plain. The goals of this research are to examine how far volcanic glass projectile points found on the Monument have been transported from their original source and assess whether patterns in the data suggest direct procurement or exchange networks. The results of this analysis will also be considered with other facets of the archaeological record from the Monument to determine if changes in mobility and land use have occurred through time.

Methods

Roughly 30 sources of volcanic glass have been identified on the Snake River Plain and its periphery (Holmer 1997, Plager 2001). With such an abundance of readily available tool stone, it is no surprise that volcanic glass artifacts dominate the lithic assemblages of archaeological sites on the Monument. As such, the geochemical analyses involved in this research were more limited by funding than sample size.

Although previous studies of volcanic glass utilization on the Snake River Plain have included non-diagnostic artifacts and waste flakes (Holmer 1997, Plager 2001, Thompson 2004), diagnostic projectile points were considered much more useful in addressing temporal questions regarding the utilization of volcanic glass in the study area. The projectile point chronology for the eastern Snake River Plain presented in Section II was utilized in this analysis of archaeological data from the Monument and is summarized here (see Figure 2.1).

A total of 104 projectile points from the Monument were submitted for geochemical analysis (Appendix C). The majority of these were collected during intensive pedestrian surveys associated with large-scale fire rehabilitation efforts over the past twenty-five (25) years. To date, roughly 20% of the Monument has been intensively inventoried, resulting in the documentation of over 600 sites and isolated finds. Archaeological sites within the study area primarily consist of short-term base camps, field camps and isolated finds indicative of seasonal use, likely during the spring and fall when plant and animal resources were most plentiful.

To reduce sampling bias, points from a wide range of sites within the study area were selected for analysis (Figure 4.1). In many cases, several projectile points from multi-component sites were included. The geochemical analysis was performed by the Northwest Research Obsidian Laboratory. Points were attributed to a source only if their trace element values fell within two standard deviations of the known upper and lower limits of a source's chemical finger print (Skinner 2005A, 2005B, 2006).

The analysis included fifty (50) middle Holocene projectile points, of which eleven (11) were Northern Side-notched, twenty-eight (28) were Stemmed Indented-base and eighteen (18) were McKean lanceolate. Fifty four (54) late Holocene points were analyzed, including twenty four (24) Elko Corner-notched, twelve (12) Rose Spring and twenty (20) Desert Side-notched points (Figure 4.2). To date, no fluted points have been found on the Monument. There are only two projectiles that can likely be assigned to the early Holocene. These lanceolate specimens are similar to “Agate Basin” style points recovered from the Wasden Site (Butler 1968). The scarcity of early Holocene sites within the Monument is being considered in a larger study underway.

Results

Results of the research indicate that the volcanic glass utilized in projectile point manufacture originated from thirteen (13) different sources across southern Idaho (Figure 4.3). These sources include American Falls, Bear Gulch, Big Southern Butte, Brown's Bench, Cannonball Mountain, Malad, Owyhee, Teton Pass, Timber Butte, Wedge Butte and three unknown sources. Three (3) sources, including Big Southern Butte (33%), Brown's Bench (32%), and American Falls (15%) make up 80% of the assemblage. The remaining sources (Cannonball Mountain, Malad, Owyhee, Teton Pass, Timber Butte, Wedge Butte and those that have yet to be identified) account for roughly 20% of the sampled assemblage (Figure 4.4).

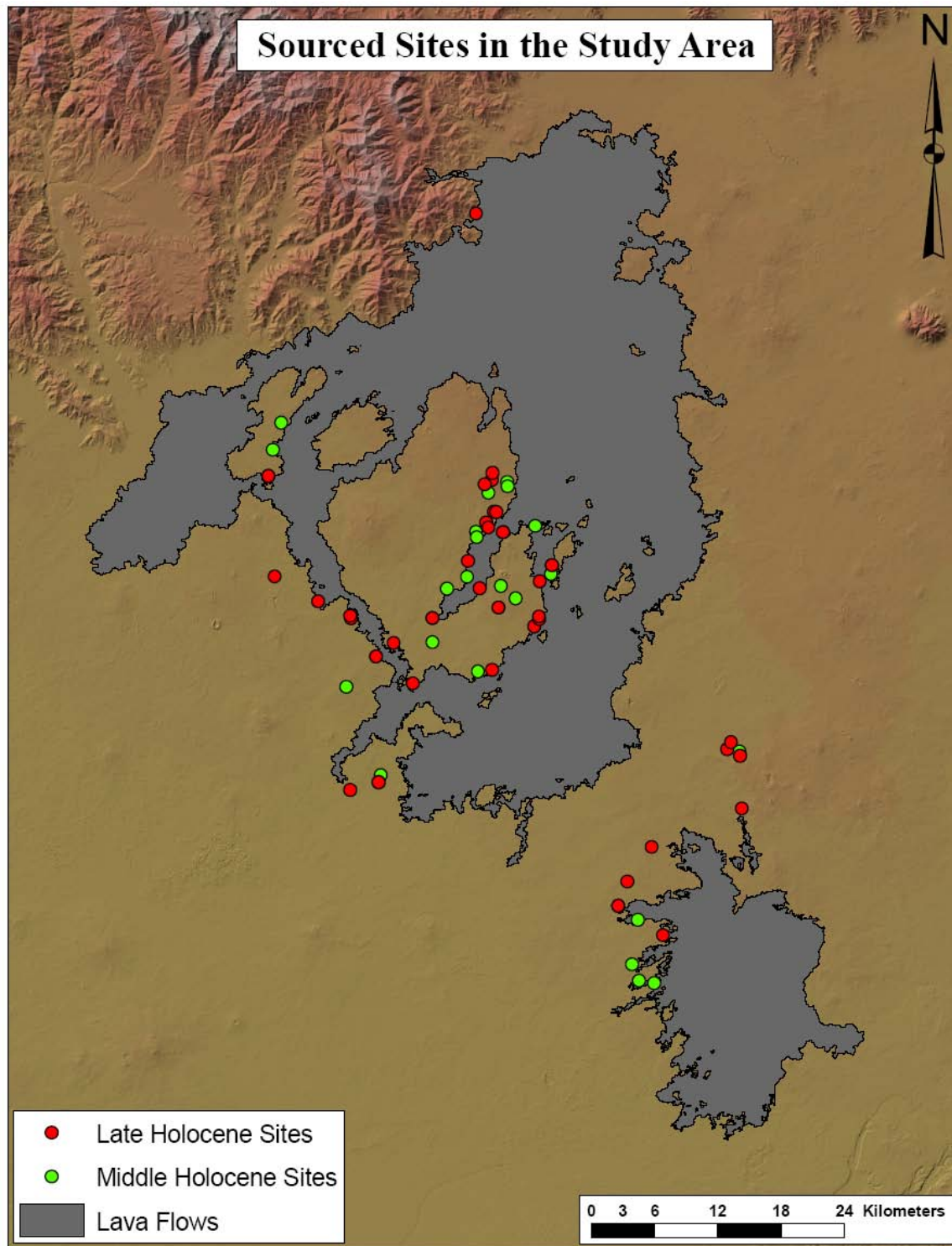


Figure 4.1. Distribution of projectile points included in the geochemical analysis. (Green dots indicate middle Holocene sites; red dots indicate late Holocene sites).

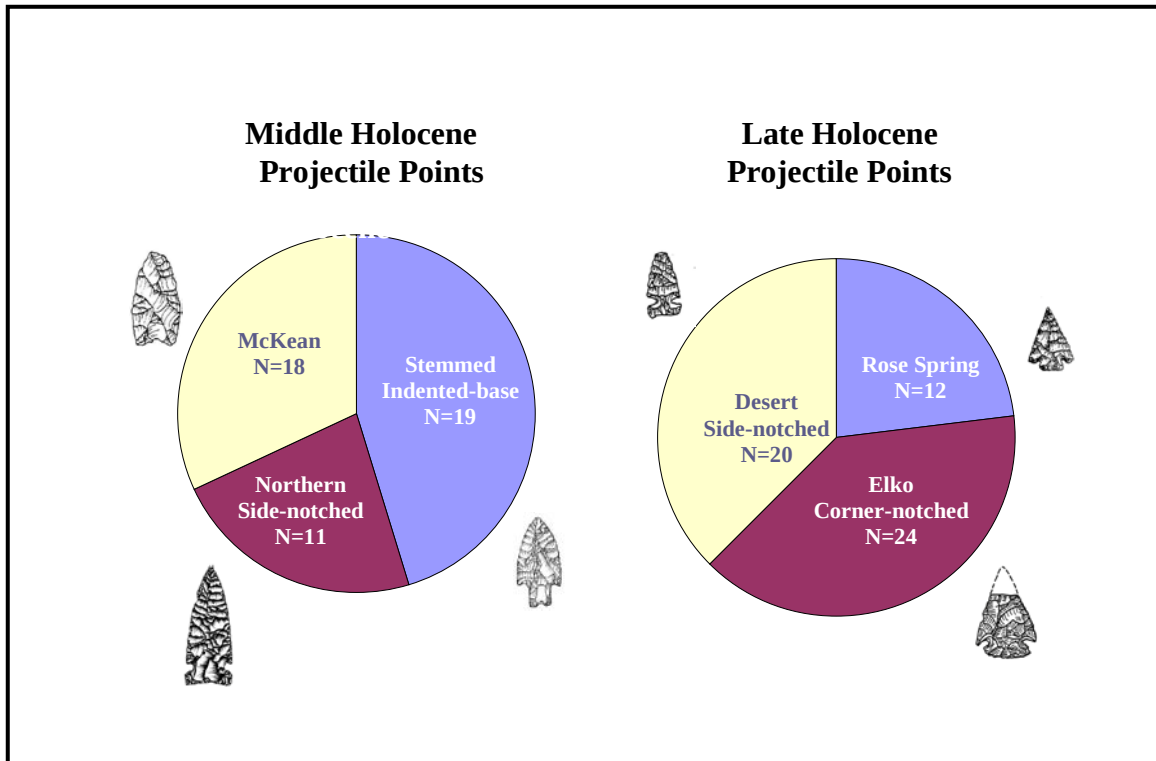


Figure 4.2. Projectile points from the Craters of the Moon National Monument and Preserve subjected to XRF analysis.

All of the sources represented in the sample of projectile points from the Monument are within 275 kilometers of the study area (Table 4.1). Big Southern Butte, Wedge Butte and the American Falls source, located between 35 and 65 kilometers away, are nearest to the Monument, while the Malad, Cannonball Mountain and Brown's Bench sources are all within 150 kilometers. The Teton Pass, Bear Gulch, Timber Butte and Owyhee sources are all in excess of 200 kilometers from the Monument. Distance from source was averaged for this analysis, although it should be noted that many of the volcanic glass sources identified in the study area are not represented by localized outcrops, but extend over large areas.

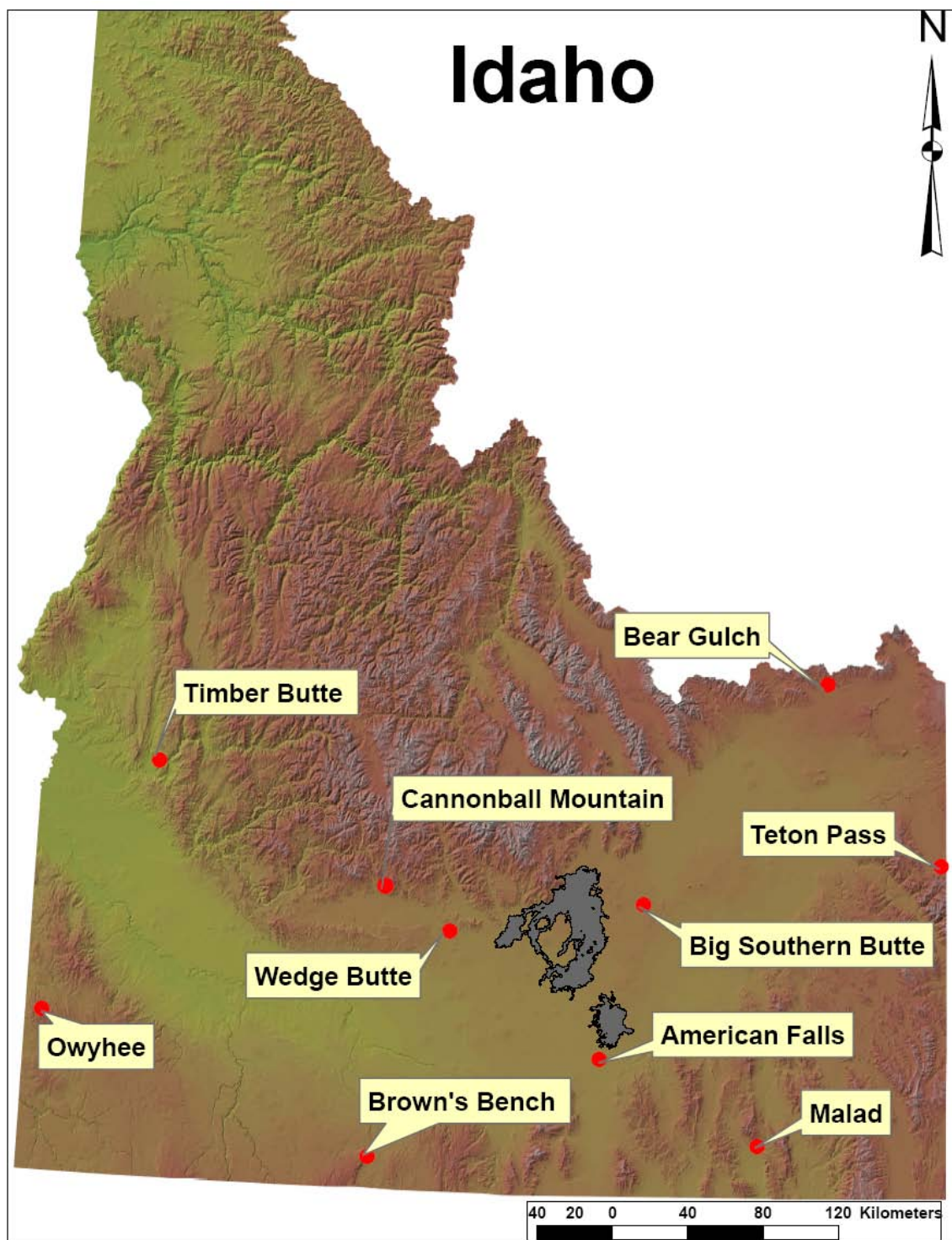


Figure 4.3. Location of volcanic glass sources represented in sample of projectile points from the Craters of the Moon National Monument and Preserve.

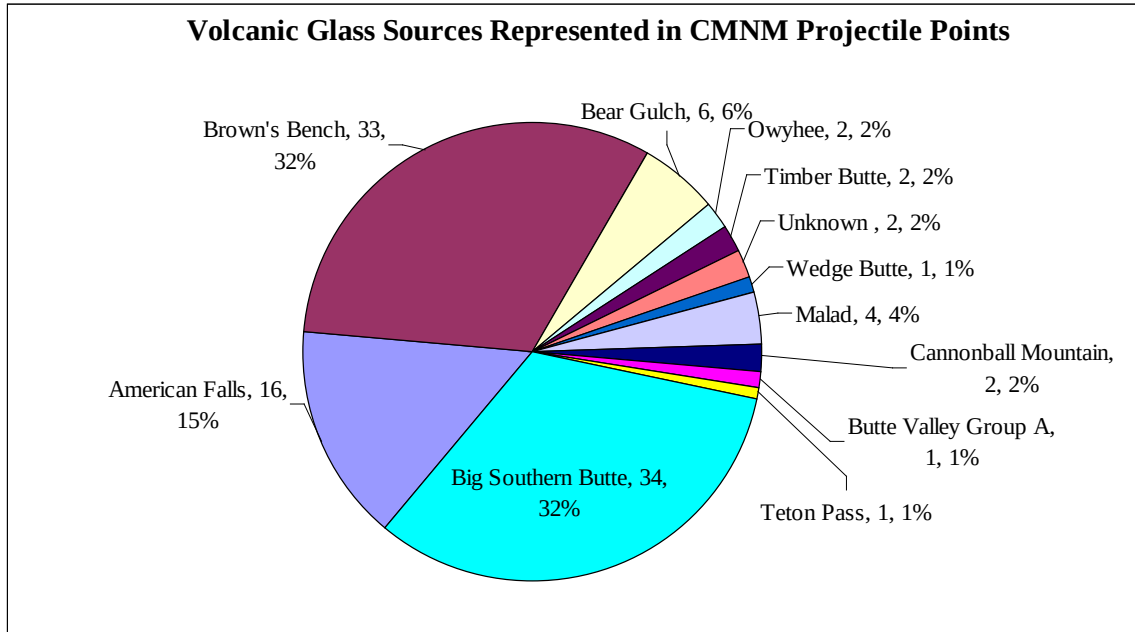


Figure 4.4. Distribution of volcanic glass sources represented in projectile point sample from the Craters of the Moon National Monument and Preserve.

Table 4.1. Distance of Volcanic Glass Sources Represented by Projectile Points from the Craters of the Moon National Monument and Preserve.

Source	Distance (km)	NSN	SIB	MCK	ECN	RS	DSN
American Falls	35	3	3	5	4	0	1
Big Southern Butte	35	4	3	4	7	6	9
Wedge Butte	65	0	0	0	0	1	0
Malad	100	1	1	1	0	0	1
Cannonball Mountain	110	1	1	0	0	0	0
Brown's Bench	150	2	10	7	8	4	2
Teton Pass	205	0	1	0	0	0	0
Bear Gulch	215	0	0	0	2	0	4
Timber Butte	240	0	0	0	1	0	1
Owyhee	275	0	0	0	0	0	2
Butte Valley Group A	Unknown	0	0	1	0	0	0
Unknown	Unknown	0	0	0	2	0	0
Total		11	19	18	24	11	20

Key: NSN=Northern Side-notched, SIB=Stemmed Indented-base, MCK=McKean, ECN=Elko Corner-notched, RS=Rose Spring, DSN=Desert Side-notched.

Although intuitive patterns may emerge from an examination of the distribution of volcanic glass sources identified from the geochemical analysis, it is essential to perform statistical procedures to evaluate whether such patterns are statistically significant or merely the product of sampling error. In order to compare the mean distance of volcanic glass sources for each projectile point type represented in the sample (Table 4.2), an analysis of variance was conducted (Drennan 1996). It should be noted that two McKean, two Elko corner-notched and one Rose Spring point were not included in the statistical analysis of source distances because their provenience is not yet included in the database.

The statistical analysis requires dividing the calculated within groups variance (SS_w) by the between groups variance (SS_B) to produce the F ratio:

$$F = \frac{SS_w}{SS_B}$$

OR

$$5.00 = \frac{26449.22}{5289.84}$$

The F ratio for 5 degrees of freedom between groups (the number of subsamples minus one) and 92 degrees of freedom within groups (total sample size minus the number of subsamples) is 3.25 at the 95% confidence interval. Because the F ratio for the study sample exceeds this at 5.00, the mean source distances documented for the different projectile points/periods are statistically significant. In other words, there is less than a 5% probability that the differences in mean source distances between periods is due to sampling error.

Table 4.2. Temporal Trends in Source Distances from Study Area.

Point Type	Period (yrs B.P.)	No.	Mean Distance From Source	Standard Deviation	Variance
Desert Side-notched	750-150	20	118.11	524.08	105028.66
Rose Spring	1700-700	11	67.98	157.46	24793.75
Elko Corner-notched	3500-1300	22	108.43	289.26	83673.56
McKean Lanceolate	5000-3500	16	95.78	173.30	30033.08
Stemmed Indented-base	5000-3000	19	113.76	216.47	46861.69
Northern Side-notched	7500-5000	11	86.95	296.21	87745.83

Discussion

Previous archaeological research on the eastern Snake River Plain has demonstrated that the same resource localities were utilized over millennia as part of a highly mobile subsistence strategy. Although the acquisition of the horse may have further increased

mobility during the last few hundred years, it may be useful to compare the ethnographic seasonal round of the Lemhi Shoshone and Bannock, as reported by Steward (1938), Swanson (1972) and Murphy and Murphy (1960, 1986) with patterns of regional volcanic glass utilization on the Monument.

The Shoshone and Bannock who wintered in the Fort Hall bottoms just north of American Falls dispersed in small groups across the eastern Snake River Plain each spring (Figure 4.5). These small groups usually entailed about six families on horseback led by an “elderly man”. Some would travel west to Shoshone Falls to fish during the spring salmon runs, while others turned east across the continental divide into Wyoming in search of bison. Some headed into the South Hills for elk, deer, berries, and pinyon nuts and still others moved northwest across the Snake River Plain to harvest camas on the Camas Prairie along with the western Shoshone. Steward (1938) noted that no individual group travelled in the same direction two years in a row, but that at least one individual included in each group was knowledgeable of the terrain and resources of their destination.

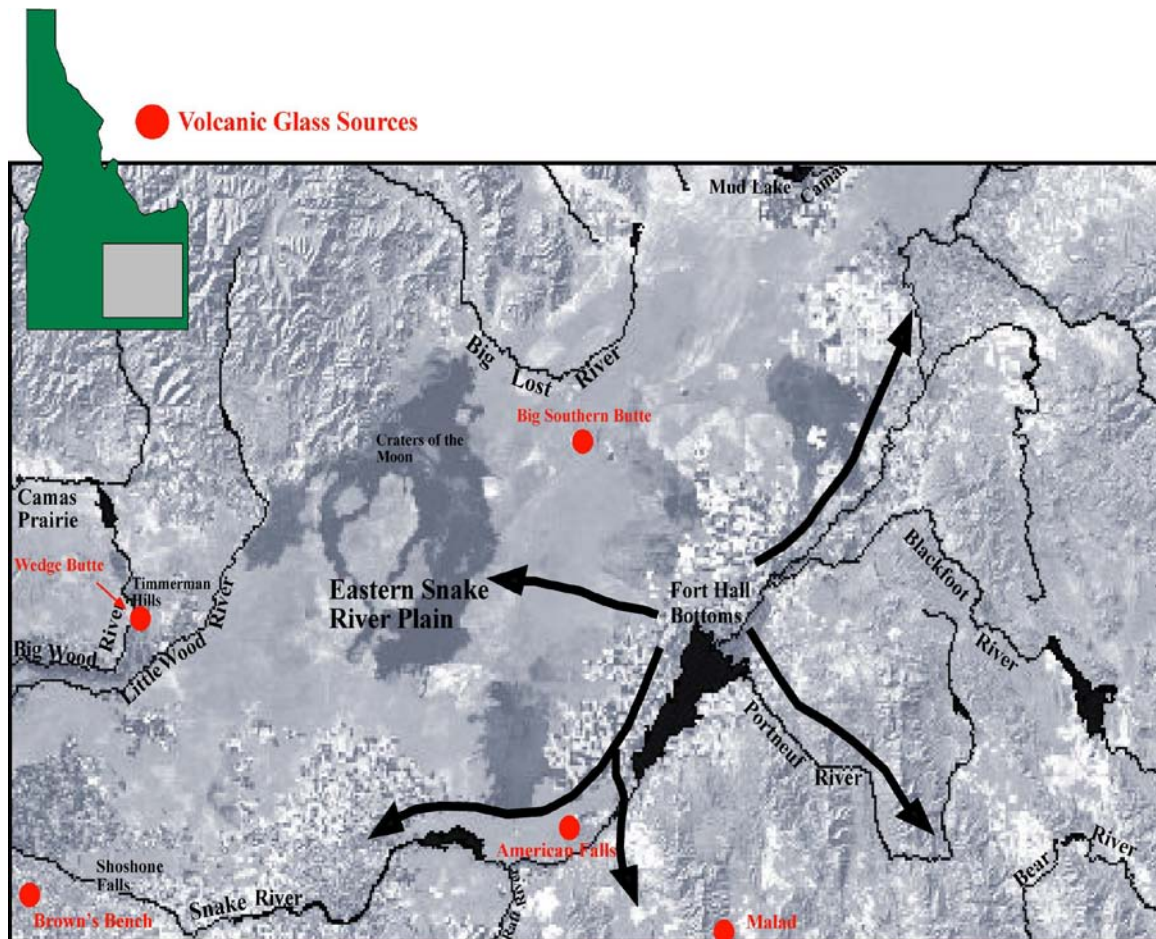


Figure 4.5. Ethnographic seasonal movements of the Shoshone-Bannock (adapted from Murphy and Murphy, 1986) showing the locations of volcanic glass sources.

If regional subsistence patterns have remained relatively stable for the past 8000 years, the consistently high frequency of Big Southern Butte, American Falls and Brown's Bench volcanic glass represented in projectile points from the Monument is anticipated (see Figure 4.5). Volcanic glass from Big Southern Butte could have easily been procured by groups moving northwest across the Snake River Plain to the Camas Prairie and this source apparently produced glass of sufficient quality well into the late Holocene (see Table 4.1). The American Falls source, which comprises fifteen percent (15%) of the Monument sample, could have been accessed directly by groups traveling along the Snake River corridor to and from Shoshone Falls. However, its frequency appears to decrease during the late Holocene.

Although Brown's Bench is at the outermost reaches of the seasonal round, finished tools or raw material from this source could have easily been acquired directly or through exchange with related groups while harvesting salmon west of Shoshone Falls. The Brown's Bench source, like Big Southern Butte, appears to have been consistently utilized over the past 7500 years.

The Wedge Butte source, located near the Timmerman Hills just south of the Camas Prairie (see Figure 4.5), is poorly represented in the study area (see Table 4.1) and in other sample assemblages from the region (Bailey 1992). However, Wedge Butte volcanic glass (often referred to as "snowflake" obsidian) contains inclusions or phenocrysts that made it more difficult to work than other readily available sources (Titmus 2005, personal communication).

Only four percent (4%) of the sampled projectile points from the Monument originate from the Malad source. Located south of the Fort Hall Bottoms, Malad obsidian could have been procured while harvesting resources in the South Hills (see Figure 4.5). If the pre-contact Shoshone alternated their movements every year, volcanic glass from this "local" source would be expected to occur in greater numbers on the Monument. However, other geochemical analyses have demonstrated that only a limited number of tools made of Malad obsidian extend north onto the eastern Snake River Plain (Holmer 1997). This pattern is unlikely to be a reflection of the quality of the source, since Malad material has traveled great distances outside the region (Thompson 2004).

Cannonball Mountain glass is also poorly represented in the Monument sample (see Table 4.1). Although this source is located just north of the Camas Prairie, an important summer destination for the Shoshone-Bannock (see Figures 4.3 and 4.5), significant quantities of Cannonball Mountain material instead have appeared in Owyhee County sites on the western end of the Snake River Plain (Plager 2001).

The most notable pattern emerging from this source analysis is the occurrence of more distant volcanic glass sources in late Holocene projectile points, specifically Elko Corner-notched and Desert Side-notched points. With the exception of a single Stemmed Indented-base point sourced to Teton Pass, middle Holocene points from the Monument are represented by volcanic glass sources less than 150 kilometers away. While these local sources (i.e., Big Southern Butte and Brown's Bench) still dominate the late

Holocene assemblage, the Bear Gulch, Timber Butte and Owyhee sources (all in excess of 200 kilometers from the study area) are represented only in late Holocene points. This trend has been previously observed in other geochemical analyses of southern Idaho volcanic glass artifacts (Reed 1985, Holmer 1997, Plager 2001).

Conclusions

Previous archaeological research on the eastern Snake River Plain suggests that climatic and vegetational change over the last 8000 years did not significantly alter long-term site distribution patterns, and by implication, was not sufficient to alter subsistence practices in the region in any major way (Henrikson 2002). This continuity is also reflected in the high frequency of local volcanic glass sources represented in the projectile point types sampled from the Monument. Big Southern Butte, Brown's Bench and American Falls obsidian could have easily been acquired during the seasonal round and transported to the study area in the form of blanks or finished projectile points. This pattern of local source utilization has emerged in previous studies, leading Holmer (1997:192) to discount the possibility "of complex trade systems and redistribution centers" on the eastern Snake River Plain.

However, based on the analysis of variance, a statistically significant increase appears in the mean distance in which volcanic glass was transported during the late Holocene. More distant sources represented in the sample of Desert Side-notched points suggest an increase in mobility or greater contact between groups occupying the Snake River Plain after 750 years B.P. Direct procurement of local volcanic glass was still the favorite strategy and an important component of the seasonal round. However, judging from the higher frequency of sites on the Monument from this time period, increasing human populations may have served as the catalyst for increased interaction between groups.

While the geochemical analysis has greatly enhanced our understanding of aboriginal mobility and land use in the region encompassing the Monument, questions emerge regarding the relatively low frequency of "local" sources, such as Cannonball Mountain or Malad, in eastern Snake River Plain assemblages. Additional geochemical studies, beyond the boundaries of the Monument, are likely to reveal patterns in the distribution of volcanic glass that challenge our current assumptions regarding the nature and degree of interaction between pre-contact peoples inhabiting southern Idaho.

SECTION V

EXCAVATED SITES ON THE MONUMENT

Seven archaeological sites on the Monument have been subjected to subsurface investigations within the past 25 years (Figure 5.1). These include Baker Caves (10BN153 and 154), Scaredy Cat Cave (10MA30/143), Bowl Crater (10BN1066), Alpha Cave (10PR641), the Roasting Rock Site (10BN389), Catchment Cove (10BN861) and the Drifting Gene Site (10MA421). Baker Caves I and III were formally excavated as an emergency archaeological salvage operation by the BLM and Boise State University in 1985 (Plew et al. 1987). Test excavations at Scaredy Cat Cave, conducted in 1996, 2000 and 2001 by the Shoshone Field Office and the University of Oregon, were designed to evaluate the site's eligibility to the National Register of Historic Places (NRHP) and address research questions regarding pre-contact cold storage practices (Henrikson 2003, 2004). Subsurface investigations at Bowl Crater were instigated as part of an Archaeological Resources Protection Act (ARPA) investigation to evaluate whether intact cultural deposits were still present at the site (Hoffert et al. 2005). The Roasting Rock, Catchment Cove and Drifting Gene sites were tested during the 2005 University of Oregon Archaeological Field School to gain information on the geomorphology of open sites on the eastern Snake River Plain. Limited test excavations were also performed at Alpha Cave in 2005 to determine whether intact cultural deposits were still present in the cave.

Baker Caves

Baker Caves I, II and III are adjoining lava tube caves located in the southern portion of the Wapi Lava Flow (Figure 5.2). The site was reported to the Burley District BLM by Mark Baker in 1985. Because of the intact nature of the cultural deposits, the site was excavated immediately after being reported to the BLM to prevent loss of archaeological material from looting. Although cultural deposits were limited in Baker Caves I and II, Baker Cave III contained evidence of hearths along with a great variety of artifacts (Figure 5.3). These included Desert Side-notched and Rose Spring projectile points, a hafted knife, bifaces, scrapers, shaft abraders, grinding slab fragments, bone tools, stone and bone pendants, bone tube beads, stone pipe bowls and cordage (Plew et al. 1987). All of the artifacts were contained in very shallow, rocky sediments.

The extensive and varied nature of the artifact assemblage indicates that the site was used as a seasonal base camp. Five radiocarbon dates ranging between 930 ± 60 ry BP and 810 ± 60 ry BP were recovered from a hearth in Baker Cave III. In addition, two obsidian hydration dates suggest occupation between about 1200 and 1400 years ago. These dates are confirmed by the Desert Side-notched and Rose Spring points recovered from the excavations. Bison appears to be the only large mammal recovered from the site and is represented by the remains of at least 17 individuals. The presence of fetal remains indicates a late winter occupation of the site and the distribution of skeletal elements also suggests that primary butchering occurred elsewhere (Plew et al. 1987).

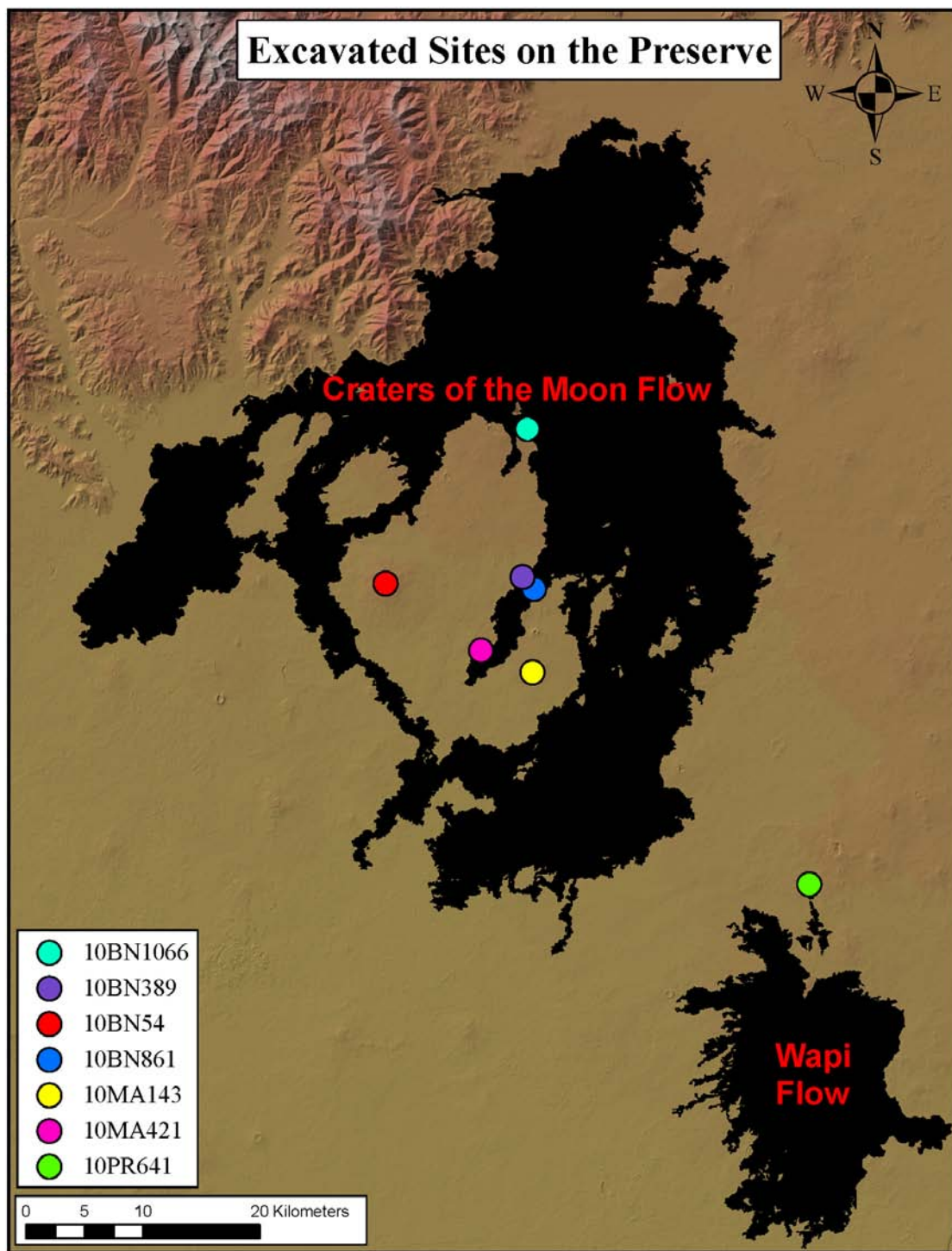


Figure 5.1. Excavated sites within the boundaries of the Craters of the Moon National Monument and Preserve.

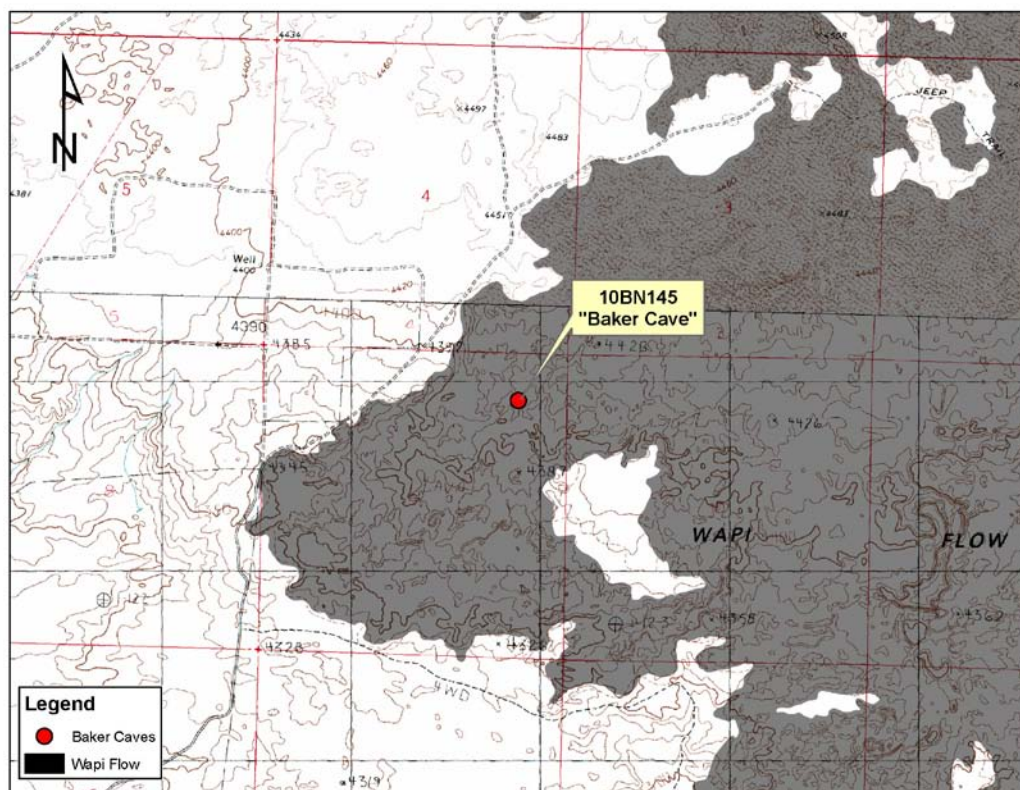


Figure 5.2. Location of Site 10BN145 on the Lake Walcott East 7.5 minute quad.

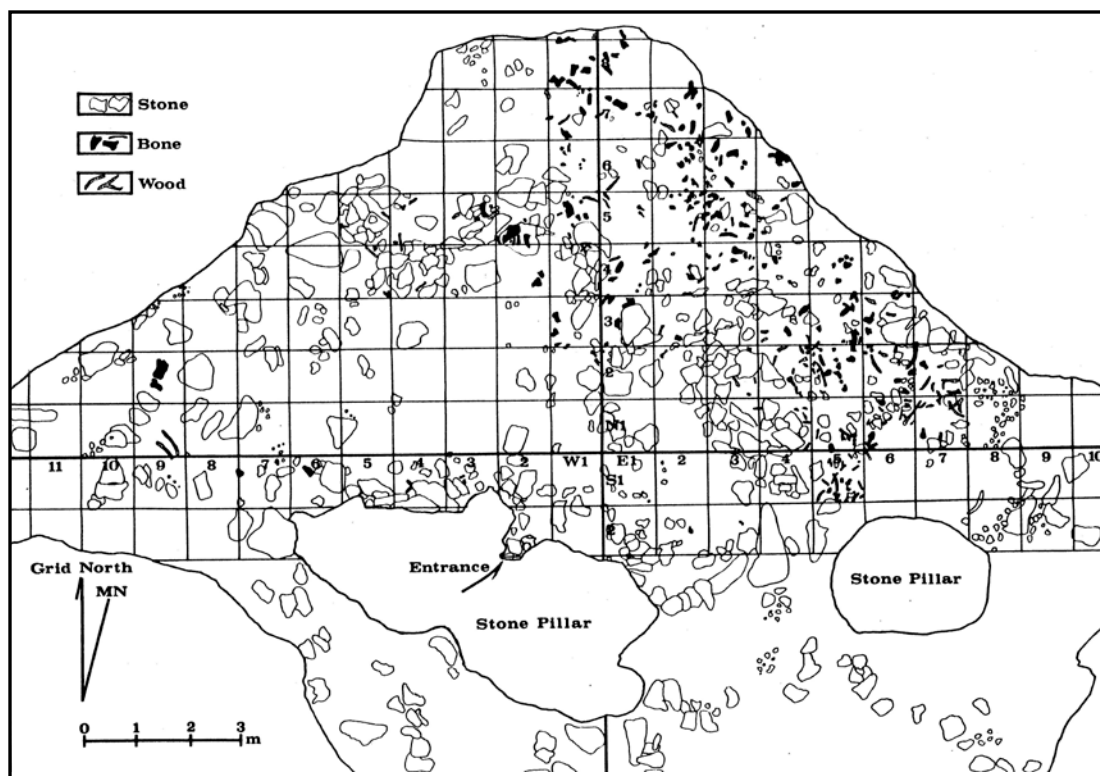


Figure 5.3. Plan view of Baker Cave III (from Plew et al.1987).

Management Recommendations

Following the excavations, an interpretive sign was placed at a trailhead at the edge of the flow. However, over the past few decades, the site has not been consistently monitored. During a 2005 visit, BLM Archaeologist Lisa Cresswell noted “looters piles” of debitage and bone as well as displaced sediments in the cave interiors (Cresswell, personal communication 2005). While it is unknown whether intact cultural deposits are still present, the site should be nominated to the NRHP. In order to monitor site visitation patterns over the next year, registers have been posted in Baker Caves I and III.

Scaredy Cat Cave (10MA30/143)

Scaredy Cat Cave is located in Laidlaw Park southeast of Bear Den Butte (Figure 5.4). The site was initially recorded by T. Hubbard in 1982 as part of a BLM cave survey and assigned the trinomial 10MA30. Hubbard recorded the lithic scatter surrounding the cave as containing point fragments, bifaces, cores and large amounts of debitage. Hubbard also noted a hunting blind located southeast of the cave. While his examination of the cave interior appears to have been cursory, he did collect a tibia with “cut marks” and submitted it to the paleontology department of ISU. He also noted ice in the cave. The site was re-recorded in 1996 and was assigned another trinomial (10MA143) by the Idaho State Historic Preservation Office. The 1996 recording (by L.S. Henrikson) documented the contents of the cave interior and prompted additional research.

The terrain surrounding the cave is composed of open, rolling sagebrush steppe, with a collapsed portion of a lava tube situated immediately to the northwest. The cave is roughly 50 meters long and between 10 and 20 meters wide. The ceiling height ranges from less than 2 to over 5 meters (Figure 5.5). The cave has a west-facing entrance chamber with a high ceiling and a moderate downward slope. A wall of boulders separates the entrance from the central chamber. This wall may have been constructed by prehistoric groups attempting to prevent warm drafts from entering the central chamber. The relatively level central chamber is partially covered with roof fall but also includes areas where fine silt and cultural deposits are exposed. The rear chamber slopes steeply upward and is covered with massive roof fall boulders. The central chamber is 34 degrees Fahrenheit while both the entrance and rear chambers are between 50-60 degrees Fahrenheit during the summer months.

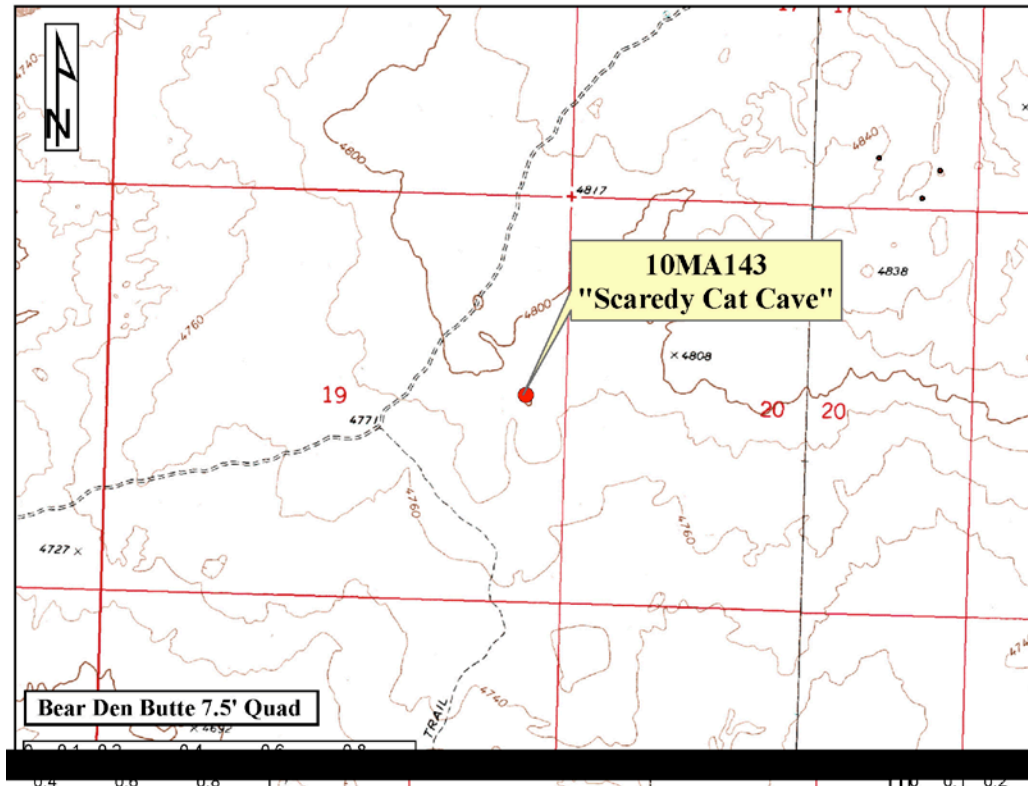


Figure 5.4. Location of Site 10MA143 on the Bear Den Butte 7.5 minute quad.

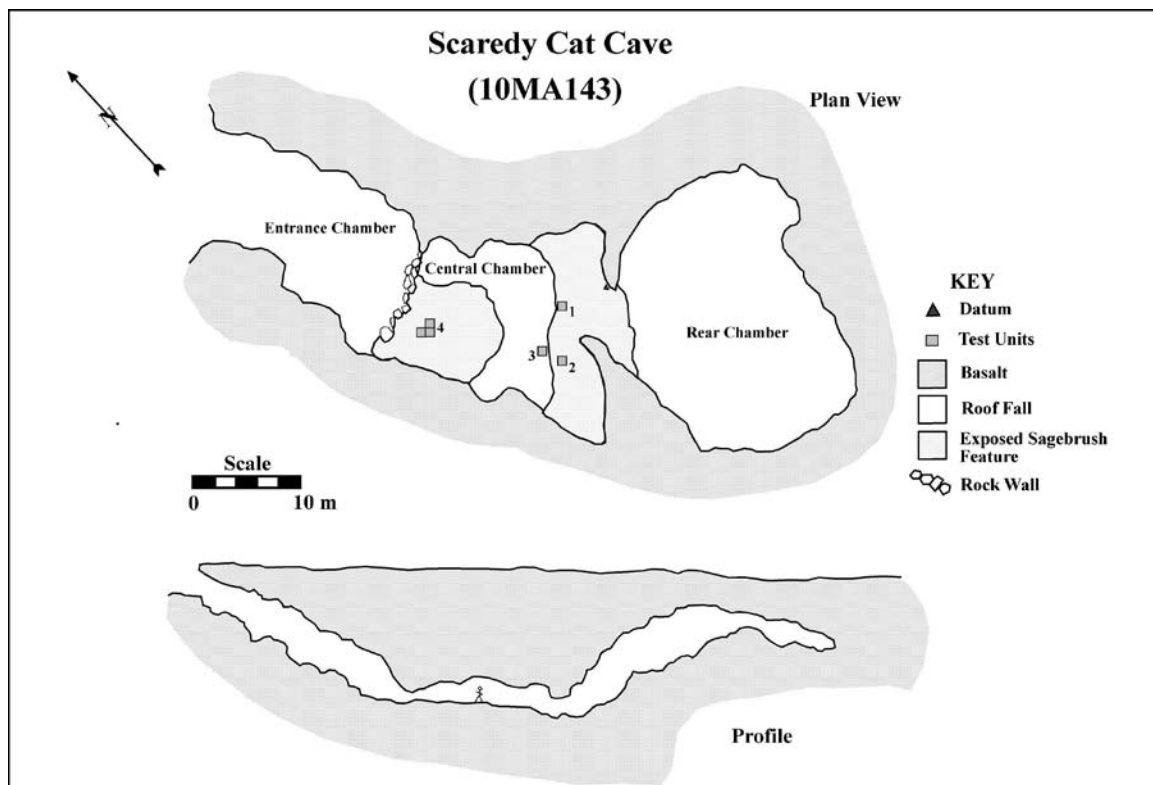


Figure 5.5. Plan view and profile of Scaredy Cat Cave (10MA143).

The central chamber of Scaredy Cat Cave contained a scatter of surface artifacts when recorded in 1996 (Figure 5.6). These included 29 stone hammer fragments, 16 antler tines (Figure 5.7), 20 bones identified as bison, bear and coyote, 11 bone fragments of large mammals, three “digging” sticks and 1 small fragment of coiled basketry. Because the cave also appears to have been used as a bear den prehistorically (Yohe and Henrikson 1998), the bone fragments of *Ursus* and *Canis* found on the surface of the central chamber are not considered to be associated with the cultural occupation of the cave. The surface fragments of other large mammals may be the result of both cultural and carnivore activity.

Following the rediscovery of the site in 1996, test excavations were conducted by the Shoshone Field Office of the BLM to determine the nature and extent of cultural deposits in the cave interior. The test excavations not only provided sufficient information to recommend that the site be considered eligible to the National Register of Historic Places, but also prompted the construction of a gate to ensure that the cave would not be subjected to illegal excavations. Additional test excavations were conducted both inside and outside the cave in 2000 and 2001 by the University of Oregon Archaeological Field School to collect data for a dissertation research project.

1996 Interior Test Excavations

In 1996, a total of six 1x1-meter test units were placed in the front and rear portions of the central chamber where the spongy, “buoyant” feel of the sediments indicated the presence of sagebrush features (see Figure 5.5). Rows of sagebrush stalks could also be seen between roof fall boulders in the central portion of the chamber. After removing roughly 5 centimeters of aeolian sediments from the surface of Test Unit 1, the surface of the sagebrush feature was still apparent (Figure 5.8). Although sagebrush stalks, bone fragments, antler and ground stone fragments were recovered from all the test units, Test Unit 4 exhibited the deepest and most intact accumulation of cultural deposits (Figure 5.9). The contents of Test Unit 4 consisted of seven distinct strata, presenting an alternating series of complete and decomposed sagebrush stalks, charcoal and ash. Although the cultural deposits may extend beyond a depth of 70 centimeters, excavation ceased in Test Unit 4 because the deposits were too frozen to continue. The artifacts and ecofacts recovered from Test Unit 4 are presented in Table 5.1 below.

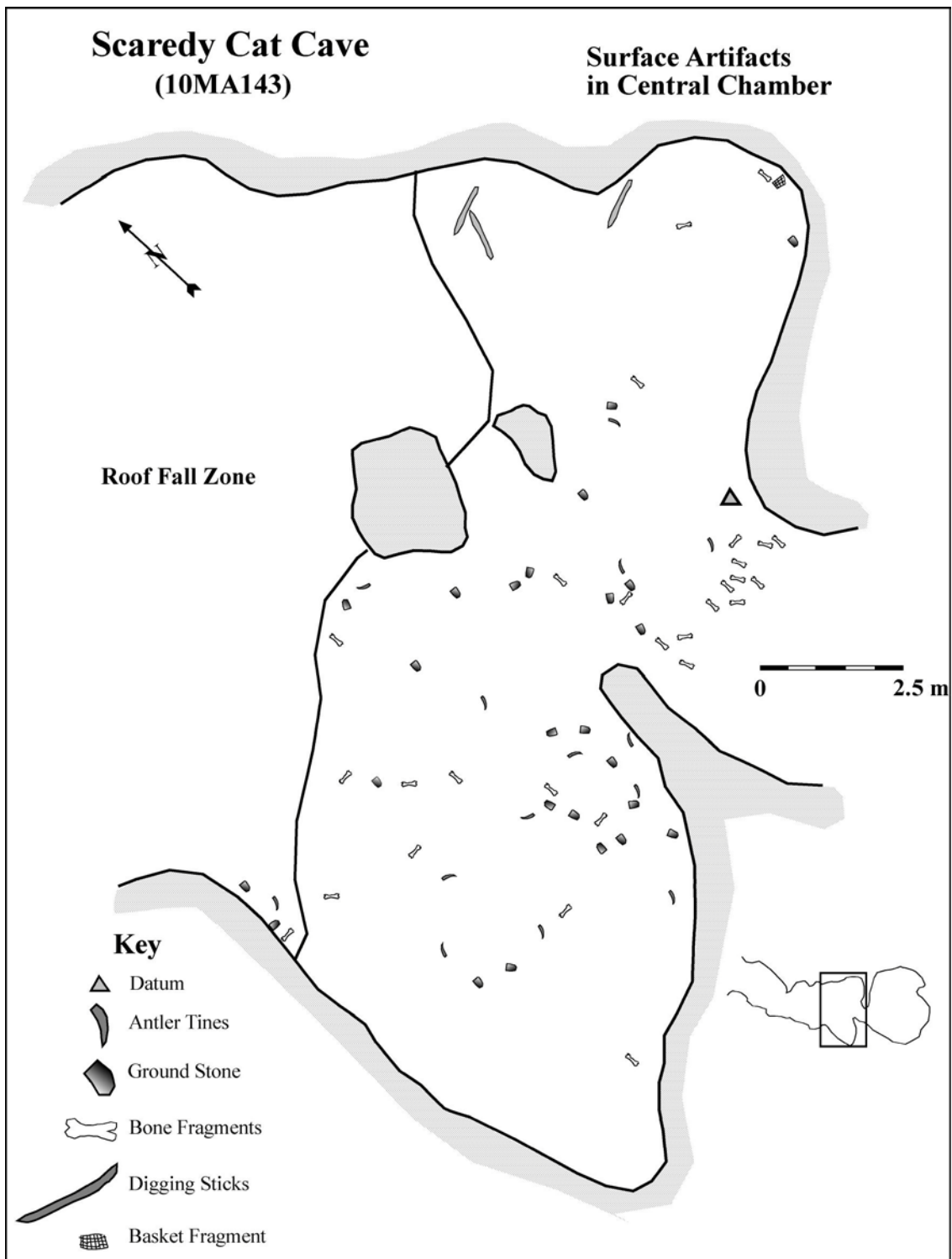


Figure 5.6. Plan view of surface artifacts in the central chamber of Scaredy Cat Cave, as noted in 1996.

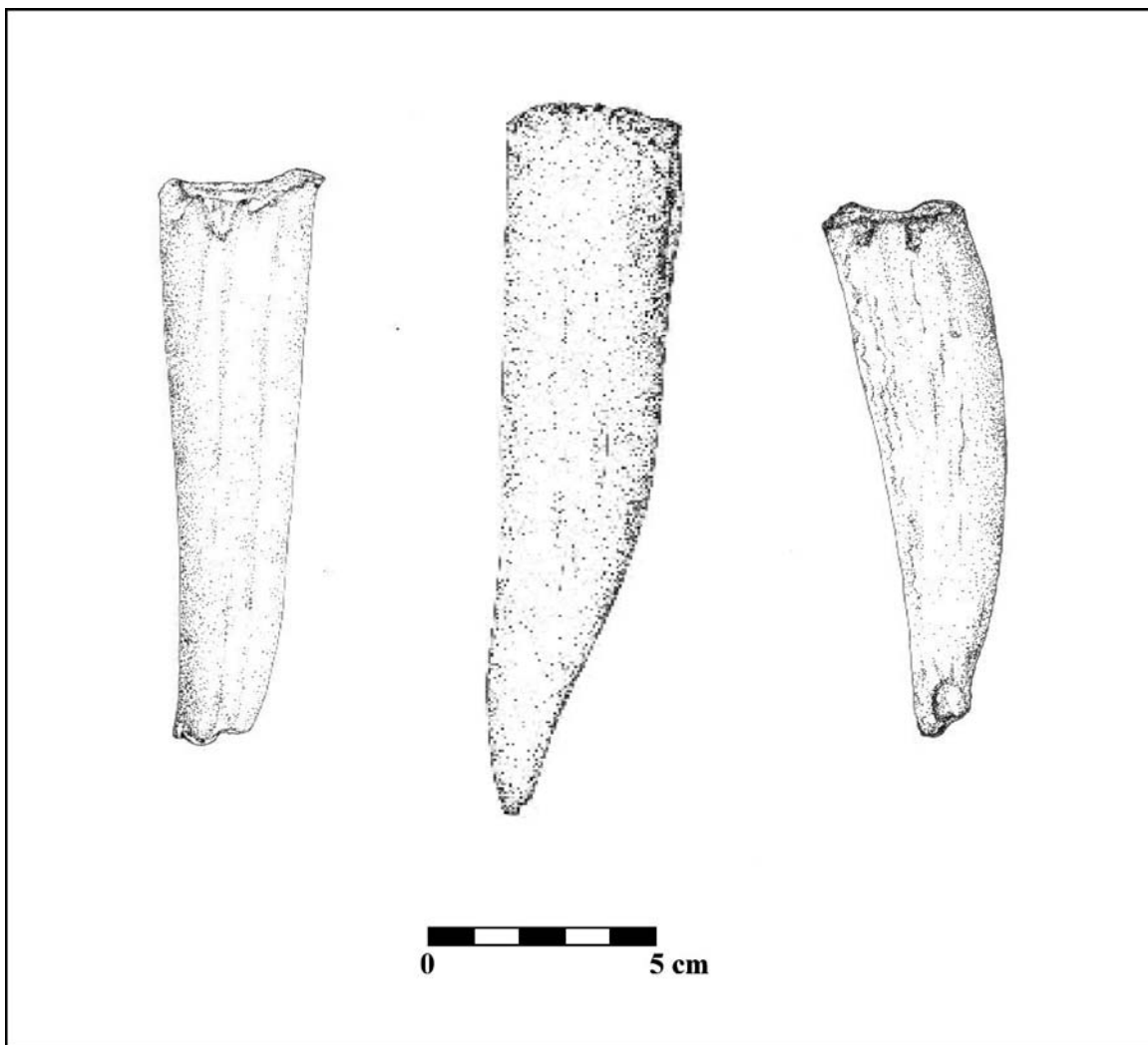


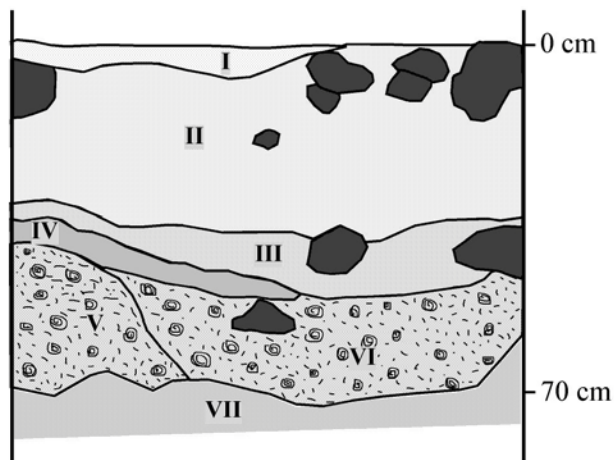
Figure 5.7. Antler tines from the interior of Scaredy Cat Cave (10MA143).



Figure 5.8. Surface of sagebrush feature in Test Unit 1.

Scaredy Cat Cave (10MA143)

Test Unit 4 Profile



Stratum I: Loose brown silt and sagebrush charcoal (20% organic content).

Stratum II: Compacted brown silt and unburned sagebrush fragments.

Stratum III: Ash, charcoal and partially burned sagebrush stalks.

Stratum IV: Charcoal concentration.

Stratum V: Partially burned sagebrush stalks and gray ash.

Stratum VI: Partially burned sagebrush stalks.

Stratum VII: Ice, frozen sagebrush.

 Angular basalt cobbles.

Figure 5.9. Profile of Test Unit 4 in the central chamber of Scaredy Cat Cave (10MA143).

Table 5.1. Artifacts and ecofacts recovered from Test Unit 4 in Scaredy Cat Cave.

Materials	0-10 cm	10-20	20-30	30-40	40-50	50-60	60-70	Total
Stone Hammers	2	3	2	3	-	1	-	11
Antler Fragments	2	1	1	4	6	3	-	17
Antler Tips	2	-	-	-	-	2	2	6
Points/Knives	2	-	-	-	-	1	-	2
Waste Flakes	8	5	-	2	1	-	-	16
Lg. Mammal Bone	19	4	9	1	-	1	-	34
Rodent Bone	14	-	-	-	-	-	-	14
Total	49	13	12	10	7	8	2	101

Faunal Assemblage An analysis of the faunal material from Scaredy Cat Cave identified 182 individual fragments. Of these, three are unmodified rodent remains and 53 are canid and ursid remains that were recovered from the surface of the cave floor. A total of 33 diagnostic faunal remains recovered from the 1996 and 2000 test units are listed in Table 5.2. While many of these could be identified as *Bison bison*, some could only be designated as large artiodactyl or large mammal. The remaining 96 specimens appear to be artiodactyl or large mammal long bone fragments.

Table 5.2. Identifiable Bison and Large Artiodactyl Bones from Scaredy Cat Cave.

Element	Total	Fragment	Complete	Proximal	Distal	Left	Right
Rib	15	15	-	-	-	-	-
Horn Core	1	1	1	-	-	-	-
Cranial	1	1	-	-	-	-	-
Scapula	2	2	-	1	-	1	-
Metapodial	3	3	-	-	3	-	-
Radius	1	1	-	1	-	1	-
Femur	4	4	-	4	-	2	2
Tibia	3	3	-	-	3	3	-
Ulna	1	1	-	1	-	1	-
Vertebrae	2	2	-	-	-	-	-
Totals	33	33	1	7	6	8	2

Radiocarbon Dates. Ten samples of burned sagebrush taken from the storage features were submitted for standard radiocarbon dating (Table 5.3).

Table 5.3. Radiocarbon Dates from Scaredy Cat Cave.

Location	C-14 Age	Sample#/Type	δ 13C	Calib. Age (BP)
TU1 15 cm b.s.	4210±60 BP	Beta -97541/Charcoal	-24.3	4862 – 4604
TU1 55 cm b.s.	5740±80 BP	Beta -97545/Organic	-25.6	6685 – 6395
TU2 10 cm b.s.	3900±70 BP	Beta -97542/Charcoal	-26.2	4450 – 4146
TU2 30 cm b.s.	3810±70 BP	Beta -97543/Ash	-26.8	4412 – 4067
TU2 50 cm b.s.	8190±100 BP	Beta -97544/Charcoal	-25.8	9436 – 8979
TU3 10 cm b.s.	3840±70 BP	Beta -97546/Charcoal	-25.4	4421 – 4076
TU4 Strat. II	6370±90 BP	Beta -97547/Charcoal	-24.3	7432 – 7154
TU4 Strat. III	6680±80 BP	Beta -97548/Ash	-25.3	7664 – 7430
TU4 Strat. V	6850±70 BP	Beta-107793/Charcoal	-25.0	7792 – 7571
TU4 Strat. VI	6930±60 BP	Beta-107794/Charcoal	-25.0	7867 – 7660

Based on a Student's t-test, the radiocarbon dates indicate at least six distinct storage episodes in the central chamber. The earliest episode is represented by a single date with a calibrated age ranging between 9400 and 8900 years ago from the bottom of Test Unit 2. The dates from Test Unit 4 represent at least two separate storage episodes between 7000 and 7800 years ago. Two individual episodes occurring at roughly 6500 and 4700 years ago are represented in the Test Unit 1 deposits. The last episode of cold storage is represented by a cluster of three dates between 4400 and 4000 years ago from Test Units 2 and 3. These dates are statistically similar at the 95% confidence interval and may represent a single storage event.

2000/2001 Above Ground Test Excavations

While previous archaeological research at Scaredy Cat Cave primarily focused on the activities taking place in the cave interior, the cultural remains surrounding the mouth of the cave should be considered when trying to understand the function of the cave in a regional context. The dense lithic scatter surrounding the cave extends for nearly 100 meters in all directions and is comprised of tools and secondary and tertiary waste flakes of a wide range of material types (Figure 5.10). Biface fragments, scrapers, drills, expedient tools, Intermountain Ware ceramics and numerous projectile points have also been recovered from the surface. Projectile points spanning the last 7500 years (including Northern Side-notched, Stemmed Indented-Base, Elko Corner-notched, Rose Spring and Desert Side-notched) indicate that the site has repeatedly functioned as a base camp even after cold storage activities had apparently ceased in the cave interior (Figure 5.11).

In the summer of 2000, seven test probes were excavated in a deep, linear depression located roughly 200 meters northwest of the entrance of Scaredy Cat Cave (Figure 5.12). This feature represents a collapsed portion of a lava tube system that includes the cave and several others located to the southeast and northwest. Over 100 meters long, the

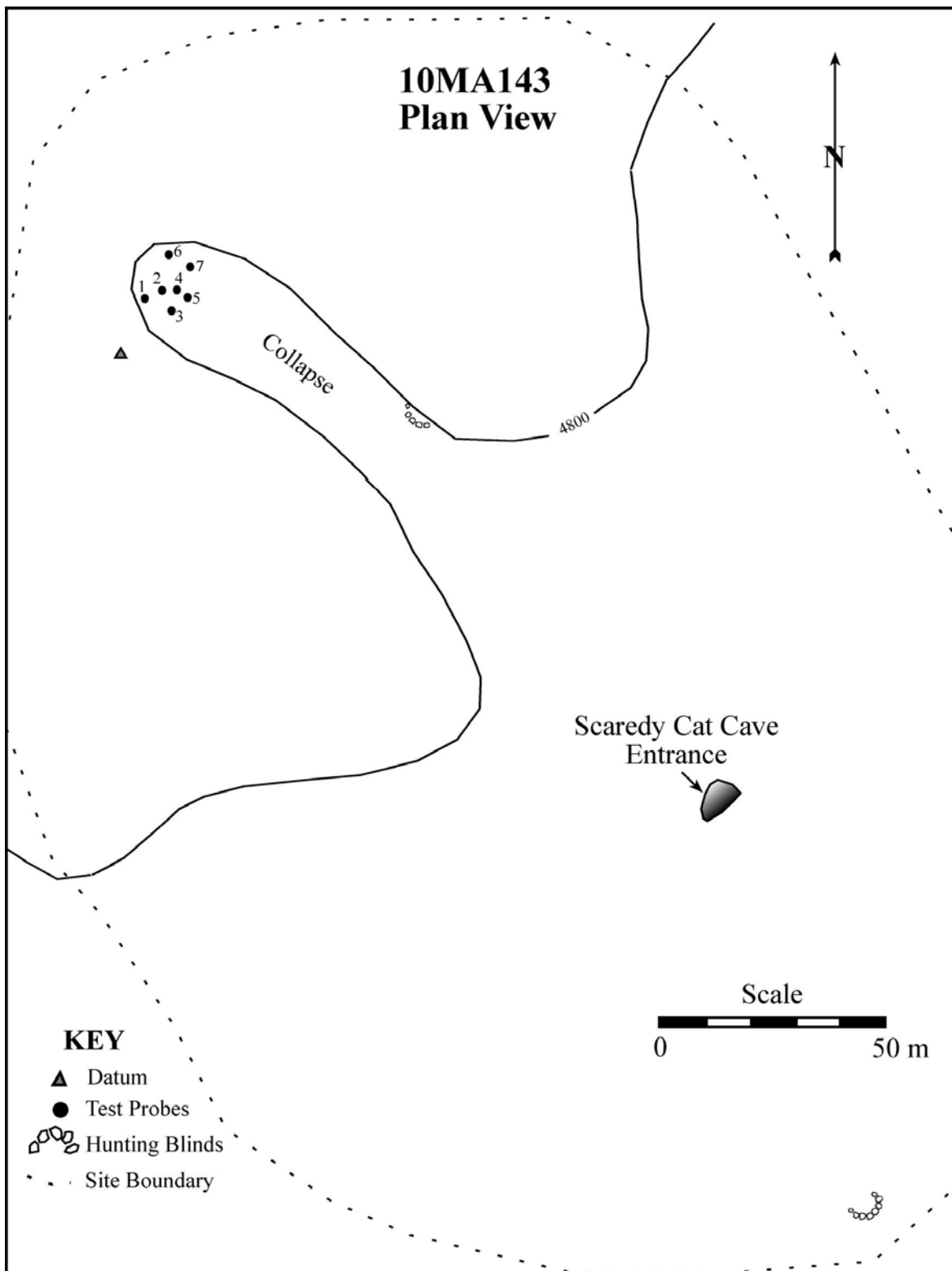


Figure 5.10. Plan view of Site 10MA143, showing the location of the cave, collapse and site boundary.

depression's north, south and western walls are covered with basalt boulders. However, the eastern side of the depression is open and level with the surrounding terrain. A hunting blind, constructed of basalt boulders, is situated on the depression's northeast side (see Figure 5.10). The depression is quite conspicuous in relation to the surrounding topography and could have served as a natural trap or "funnel" for large game.

The test probes were 50 centimeters in diameter and were excavated in 10cm levels. If possible, the probes were excavated to a depth of 50 to 60cm. Table 5.4 summarizes the artifacts and ecofacts recovered from these probes.

Table 5.4. Artifacts and Ecofacts from 2000 Surface Probes at Scaredy Cat Cave.

Probe	0-10 cm	10-20	20-30	30-40	40-50	50-60	Total
1	7 tertiary flakes	2 tertiary flakes	1 tertiary flake 2 bone frags.	1 McKean pt.	2 tertiary flakes	-	15
2	1 tertiary flake	-	-	4 bone frags.	-	-	5
3	-	-	-	-	-	-	0
4	3 tertiary flakes	3 tertiary flakes	-	-	1 tertiary flake 1 bone frag.	3 bone frags.	11
5	-	-	-	-	-	3 tertiary flakes	3
6	-	-	-	-	-	-	0
7	5 tertiary flakes	6 tertiary flakes 1 bone frag.	1 tertiary flake	2 tertiary flakes	6 tertiary flakes	10 tertiary flakes	31
Total	16	12	4	7	10	16	65

A total of 65 artifacts and ecofacts were recovered from the test probes. All the waste flakes are less than a centimeter in diameter, representing the finishing stages of tool manufacture and re-sharpening activities. One volcanic glass McKean lanceolate point (FS 542-1, see Figure 5.11) was recovered from the 30-40cm level of Shovel Probe 1, located just outside a small alcove at the west end of the collapse. Fragmentary faunal remains recovered from Probes 1, 2, 4 and 7 could only be identified as large mammal. One artiodactyl molar fragment was also recovered from the 30-40cm level of Probe 2. Test Probes 3 and 6 were sterile.

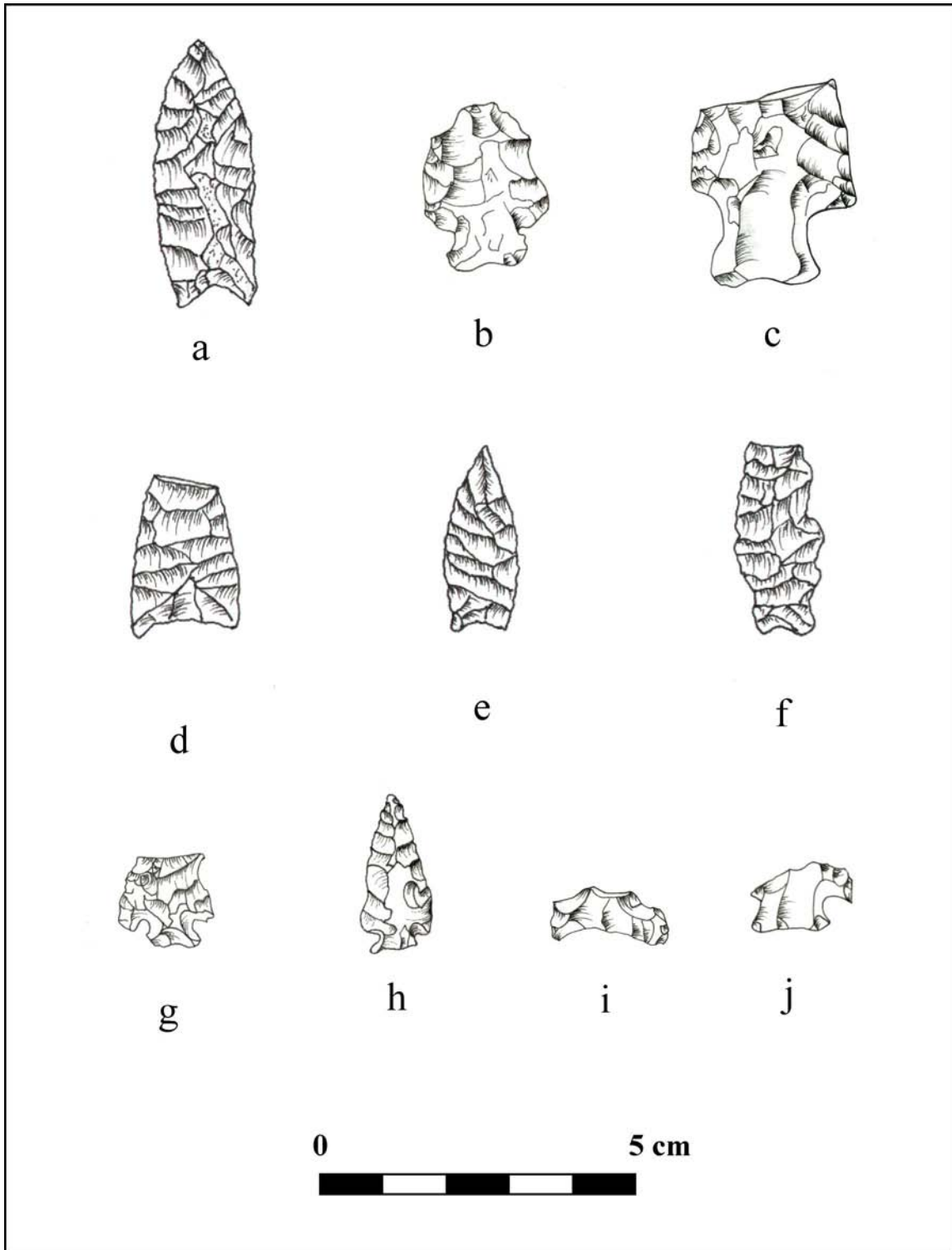


Figure 5.11. Projectile points from the interior and exterior of Scaredy Cat Cave (10MA143): a) 205-1; b) 215-1; c) 206-1; d) 208-1; e) 542-1; f) 218-1; g) 213-1; h) 217-1; i) 214-1; j) 210-1.

In 2001, four test units were placed in selected locations within the 10MA143 depression adjacent to Scaredy Cat Cave (see Figure 5.12) to gain additional information about the cultural deposits. Units 1, 2 and 4 were one by one meter in size and were excavated to 40 centimeters below surface. These units were placed in the floor of the depression while Test Unit 3 was placed in a small rockshelter just below the basalt rim on the west end of the collapse. This unit included three one by one meter grids assigned A, B and C. Grid A was excavated to a depth of 70 centimeters below surface. Grids B and C were excavated to 90 centimeters below surface. All units were excavated in 10cm levels.

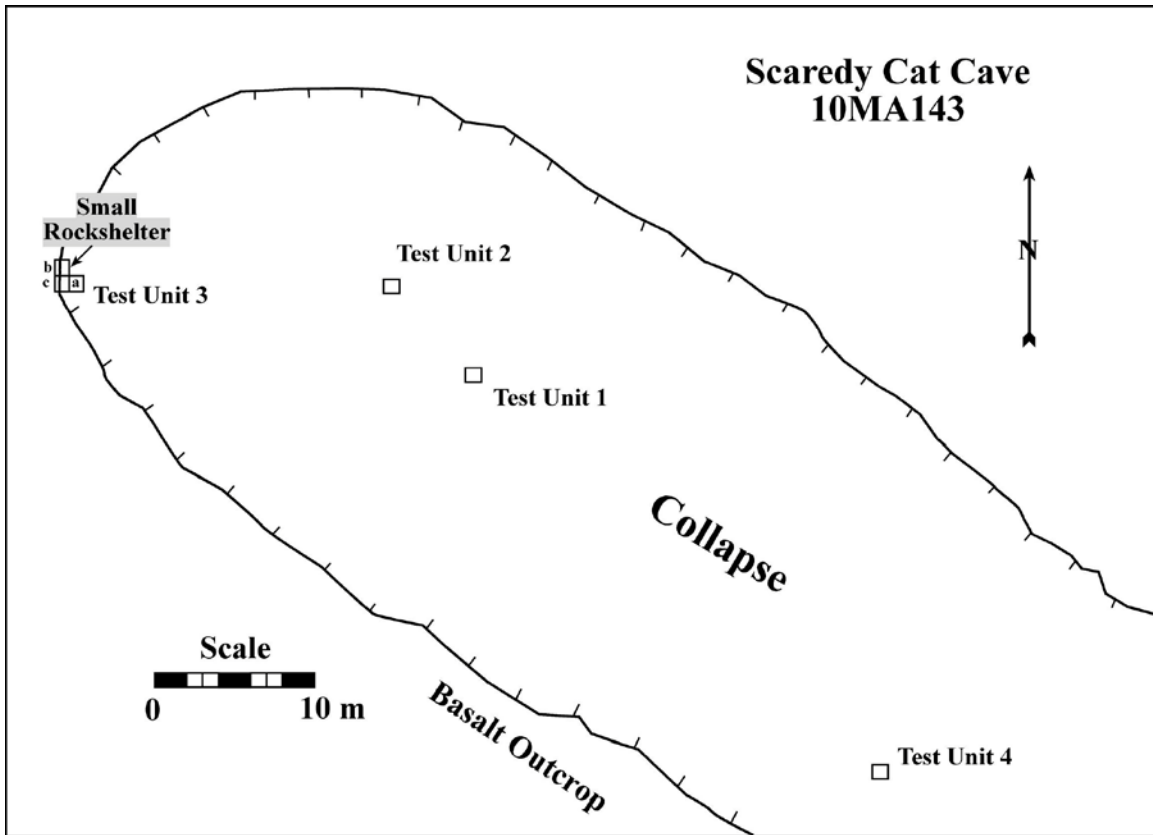
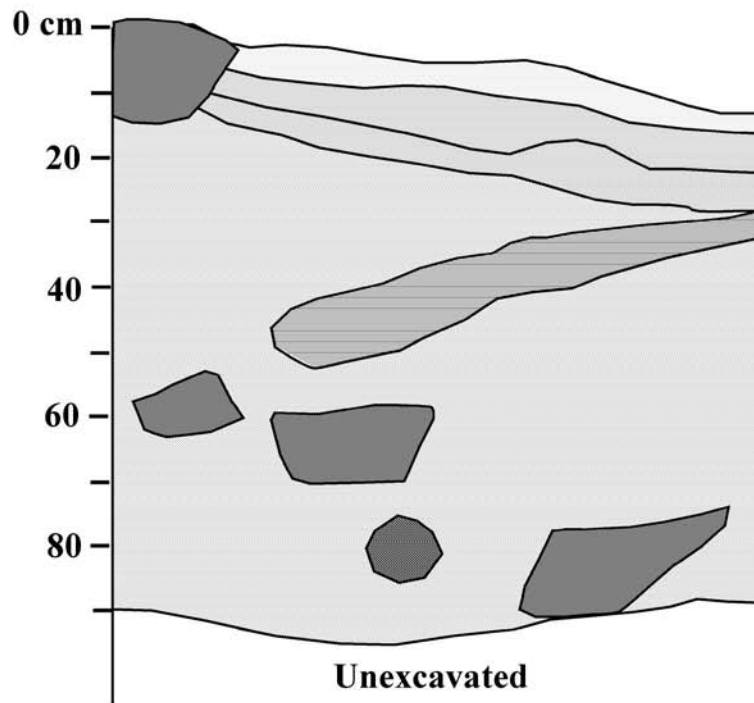


Figure 5.12. Plan view of exterior test units in the collapse located west of Scaredy Cat Cave.

Except for Test Unit 3, the sediments exposed in all units were homogeneous, tan to light brown deposits of sandy silt that increased in compaction with depth. Small sub-angular basalt cobbles were sparsely scattered throughout the deposits. In Test Unit 3, the sediments exhibited slight changes in color and sand to silt ratios (Figure 5.13). The deposits also contained angular basalt cobbles and boulders, which eventually terminated the excavation.

10MA143 Depression

Test Unit 3 - Grid B North Wall Profile



-  **Stratum I:** Light brown, loosely compacted, fine sandy silt with organics (grass rootlets and plant debris).
-  **Stratum II:** Light brown, moderately compacted, medium sandy silt.
-  **Stratum III:** Orange-brown, moderately compacted, medium sandy silt.
-  **Stratum IV:** Gray-brown, moderately compacted, medium sandy silt.
-  **Stratum V:** Light brown, moderately compacted, medium sandy silt with small, angular basalt pebbles.



Basalt cobbles



Krotovina

Figure 5.13. Profile of Test Unit 3 in depression near Scaredy Cat Cave.

At least two possible hearths were encountered in Grid A of Test Unit 3. These included a small circular ash and charcoal concentration situated at a depth of 10 centimeters below surface and a circular ash and charcoal concentration at a depth of 20 centimeters below ground surface. Both “hearth” were less than 40 centimeters in diameter and less than five centimeters thick. Because the upper ash concentration was so close to the surface, it was decided that a date would be processed from a single fragment of bitterbrush charcoal from the lower hearth. An AMS date of 130 ± 40 radiocarbon years B.P. was generated from the charcoal fragment (Beta –164592), which produced a calibrated date of AD 1660 to 1950 (Cal BP 290 to 0).

Cultural deposits were primarily contained within the upper 30 centimeters of Test Units 1, 2 and 4 and further excavation of these units was hindered by highly compacted silt deposits. The only flaked stone tools recovered from Test Units 1, 2 and 4 include a silicate scraper from the 40-50cm level of Test Unit 1 and a silicate perforator from the 20-30cm level of Test Unit 4. The diagnostic projectile points and most of the stone tools were recovered from Test Unit 3, located in the rockshelter. Diagnostic projectile points from Test Unit 3 include one volcanic glass Desert Side-notched point from the 0-10 centimeter level of Grid B, one Rose Spring point from the 10-20cm level of Grid C, one Eastgate point from the 20-30cm level of Grid C (Figure 5.14), and one McKean lanceolate point from the 60-70cm level of Grid C. Other stone tools include eight non-diagnostic projectile point fragments, twelve biface fragments, and flake tools. The stone tools recovered from Test Unit 3 are listed in Tables 5.5, 5.6 and 5.7 below. All tools are volcanic glass with the exception of three silicate bifaces, one from Grid B and two from Grid C.

Table 5.5. Flaked Stone Tools from Test Unit 3, Grid A at 10MA143.

Type	0-10 cm	10-20	20-30	30-40	40-50	50-60	60-70	Total
Point	2	1	-	-	-	-	-	3
Biface	1	-	-	-	-	3	-	4
EMF	1	-	-	-	-	-	-	1
Total	4	1	0	0	0	3	0	8

Table 5.6. Flaked Stone Tools from Test Unit 3, Grid B at 10MA143.

Type	0-10 cm	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	Total
Point	1 (DSN)	-	-	-	-	-	1	1	-	3
Biface	-	-	-	3	-	-	-	-	-	3
EMF	-	-	-	-	-	1	-	-	-	1
Total	1	0	0	3	0	1	1	1	0	7

Table 5.7. Flaked Stone Tools from Test Unit 3, Grid C at 10MA143.

Type	0-10 cm	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	Total
Point	2	1 (RS)	1 (EG)	-	-	-	1 (MK)	-	-	5
Biface	1	2	-	-	-	1	-	-	-	4
EMF	-	-	-	-	-	-	-	-	-	0
Total	3	3	1	0	0	1	1	0	0	9

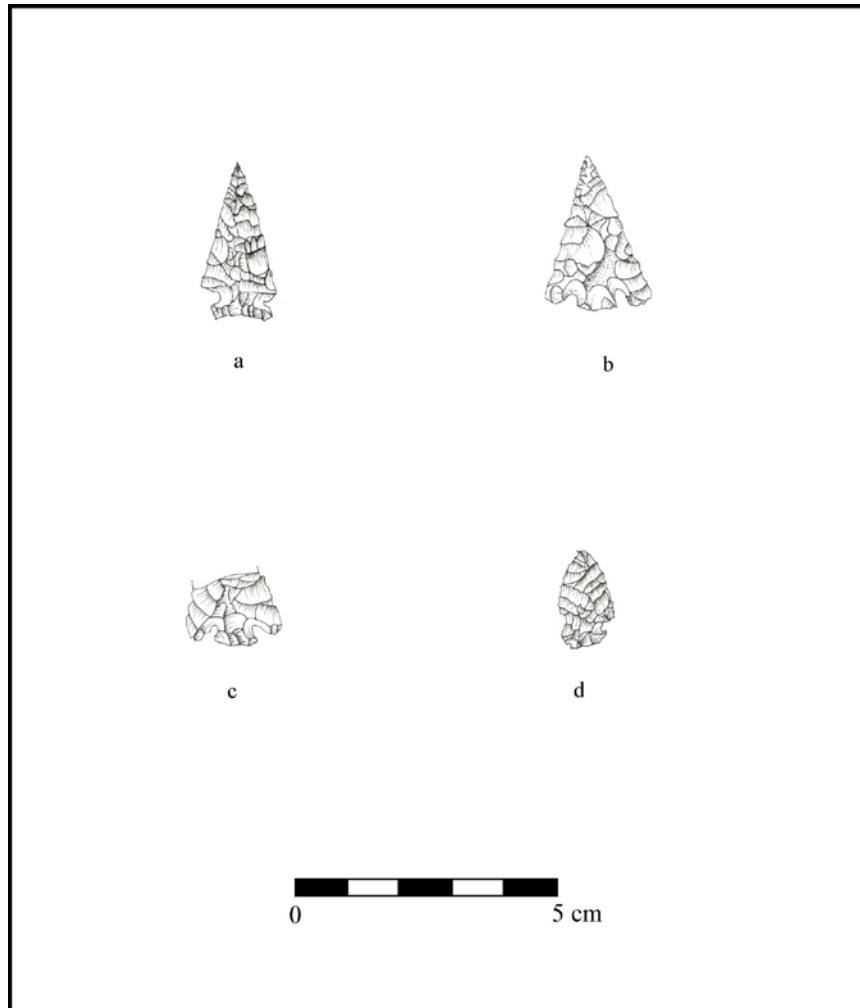


Figure 5.14. Projectile points recovered from exterior Test Unit 3 at 10MA143: a) 537-1; b) 536-1; c) 514-1; d) 535-1.

A total of 1094 waste flakes were recovered from the test units in 2001 (Table 5.8). Of these, 98.5% are interior (tertiary) flakes, 1% are secondary and 0.5% are primary flakes. Material types include volcanic glass (84% of the assemblage), cryptocrystalline silicate (15%) and basalt (1%). A total of five Intermountain Ware ceramic sherds were also recovered from the test units. These include a large body sherd (roughly five centimeters long) from the 10-20cm level of Test Unit 4 and four small body sherds (less than a centimeter in size) from the 10-20cm level of Test Unit 1.

Table 5.8. Waste Flakes Recovered from the 2001 Excavations Near the Mouth of Scaredy Cat Cave (10MA143).

Level	TU 1	TU 2	TU 3A	TU 3B	TU 3C	TU 4	Total
0-10 cm	37 interior	14 interior	31 interior 2 secondary	33 interior 1 secondary	14 interior 1 primary	6 interior	139
10-20 cm	89 interior 1 secondary	22 interior	52 interior 2 secondary	49 interior	70 interior 1 secondary	2 interior	288
20-30 cm	62 interior	23 interior	20 interior	26 interior	60 interior	9 interior	200
30-40 cm	62 interior	25 interior 1 secondary	28 interior	24 interior	32 interior	3 interior	175
40-50 cm	14 interior	19 interior 2 secondary 1 primary	13 interior	25 interior	48 interior 1 secondary	6 interior	129
50-60 cm	-	-	23 interior	33 interior	20 interior	-	76
60-70 cm	-	-	10 interior	15 interior 1 secondary	18 interior	-	43
70-80 cm	-	-	-	4 interior	18 interior 1 primary	-	23
80-90 cm	-	-	-	4 interior	17 interior	-	21
Total	265	107	181	215	301	26	1094

Of the 167 faunal remains recovered from the 2001 test excavations (Table 5.9), 22 are artiodactyl tooth enamel fragments and 140 are shattered bits of bone that, for the most part, could not be classified as either small or large mammal. None of the fragments exhibited evidence of charring. One fragment of burned long bone from a large mammal was exposed in the 10-20cm level of Test Unit 3 (Grid A). It was extremely friable and could not be recovered intact. A total of four fragments have been identified as rodent bone.

Table 5.9. Faunal Remains Recovered from the 2001 Excavations near the Mouth of Scaredy Cat Cave (10MA143).

Level	TU 1	TU 2	TU3A	TU3B	TU3C	TU4	Total
0-10 cm	4	1	2	8	2	0	17
10-20 cm	12	19	1	10	0	0	42
20-30 cm	10	6	2	3	4	0	25
30-40 cm	3	1	24	5	0	0	33
40-50 cm	4	0	5	14	9	0	32
50-60 cm	-	-	0	6	2	-	8
60-70 cm	-	-	1	7	0	-	8
70-80 cm	-	-	-	0	0	-	0
80-90 cm	-	-	-	1	1	-	2
Total	33	27	35	54	18	0	167

Discussion

The projectile points and ceramics recovered from the depression adjacent to the mouth of Scaredy Cat Cave in 2000 and 2001 do not correspond well with the radiocarbon dates generated from excavations inside the cave. Although earlier projectile points such as Northern Side-notched, McKean and Stemmed Indented-base points have been recovered from the ground surface surrounding the cave mouth, a component corresponding in age to the cold storage activities in the cave is essentially absent, although one McKean point

came from the 60-70cm level of Test Unit 3. No cultural features are present in the lower levels of the rockshelter and there is a decrease in the number of waste flakes. Faunal remains are virtually absent; although a large fragment of artiodactyl tooth enamel was recovered from the 80-90cm level of Grid C.

If earlier cultural deposits are present in the floor of the depression, they are contained within or below the unexcavated, highly compacted silt. Greater depths in Test Unit 3 (in the rockshelter) could not be reached because of large boulders in the floor. It is also possible that, as is common on the eastern Snake River Plain, thousands of years of cultural deposition are conflated within very shallow aeolian deposits. These findings would indicate that the depression and alcove were not intensively used as processing locations or habitation areas. Instead, the interior waste flakes and projectile fragments recovered from Test Unit 3 indicate hunting and resharpening activities. This contrasts with the archaeological remains surrounding the cave mouth, which include stone tools and artifacts more suggestive of a base camp where a broader range of activities likely occurred.

Management Recommendations

Following the test excavations in 1996, the Gem State Grotto installed an iron gate at the front of the central chamber in Scaredy Cat Cave to protect the large quantity of cultural deposits that remain intact inside the cave. Because these deposits have tremendous potential to provide invaluable information on regional prehistory, the site should be nominated to the NRHP. Access to the cave is strictly controlled by the BLM Shoshone Field Office archaeologist. BLM biologists are allowed to enter to the cave to monitor resident bat populations on a seasonal basis. The lithic scatter surrounding the cave and in the adjacent depression (see Figure 5.10) is likely subject to illegal surface collection on a consistent basis.

Bowl Crater (10BN1066)

Site 10BN1066 is situated at a series of small, north facing rockshelters on the northern rim of Bowl Crater (Figure 5.15). The crater is an extinct cinder cone located on the north end of a small finger of the Laidlaw Park kipuka adjacent to the Holocene aged Sawtooth lava flow. The site was initially reported to BLM archaeologist Lisa Cresswell in 2000 by a concerned member of the public. Cresswell documented the illegal excavations in the shelters and recorded the surface artifact assemblage, which included Desert Side-notched projectile points, Intermountain Ware ceramic sherds and a large slab metate.

In 2004, additional archaeological investigations were initiated at the site to evaluate the nature of the cultural deposits in conjunction with an ARPA investigation (Hoffert et al. 2005). These efforts also included rehabilitating the site. Eight 50x50cm test units were placed near the mouth of three shelters (Figure 5.16). Artifacts recovered from the units include Cottonwood Triangular projectile points, biface fragments, retouched flakes and

an Intermountain Ware ceramic fragment. Additional cultural debris included 587 waste flakes of obsidian, cryptocrystalline silicates and basalt and 80 calcined bone fragments.

Management Recommendations

Based on the results of the 2005 field investigations, Hoffert surmised that less than 5% of the site had been damaged by illegal excavations and should be considered eligible to the NRHP (Hoffert et al. 2005). However, due to the site's isolated location, regular monitoring may be difficult.

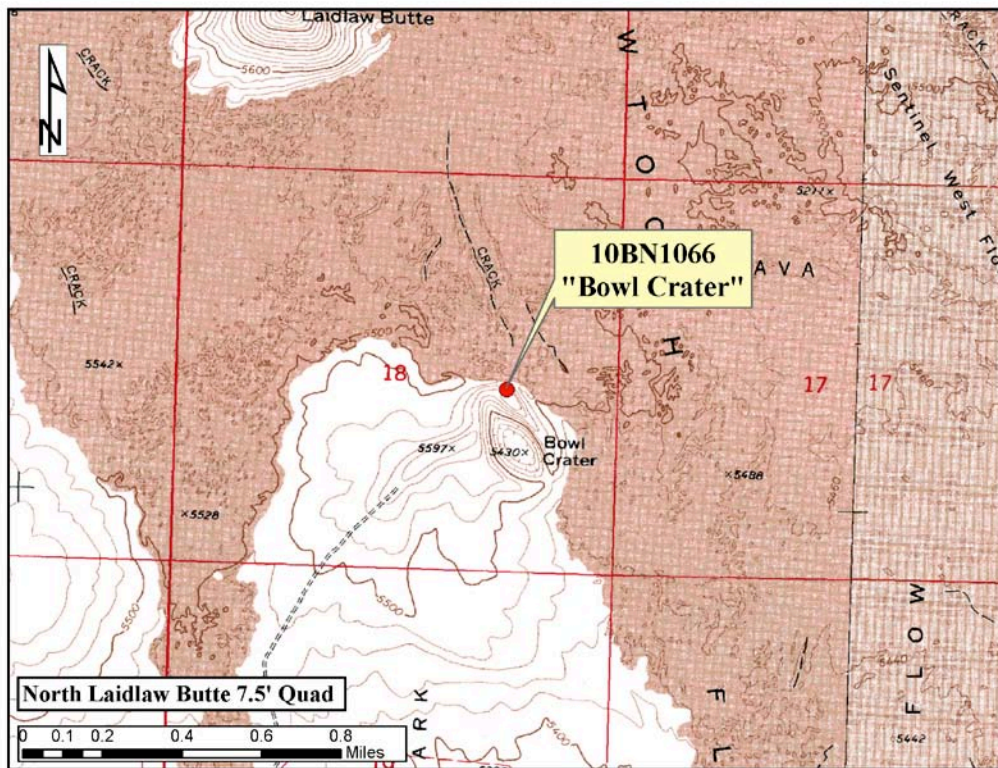


Figure 5.15. Location of Site 10BN1066 (Bowl Crater) on the North Laidlaw Butte 7.5 minute quad.

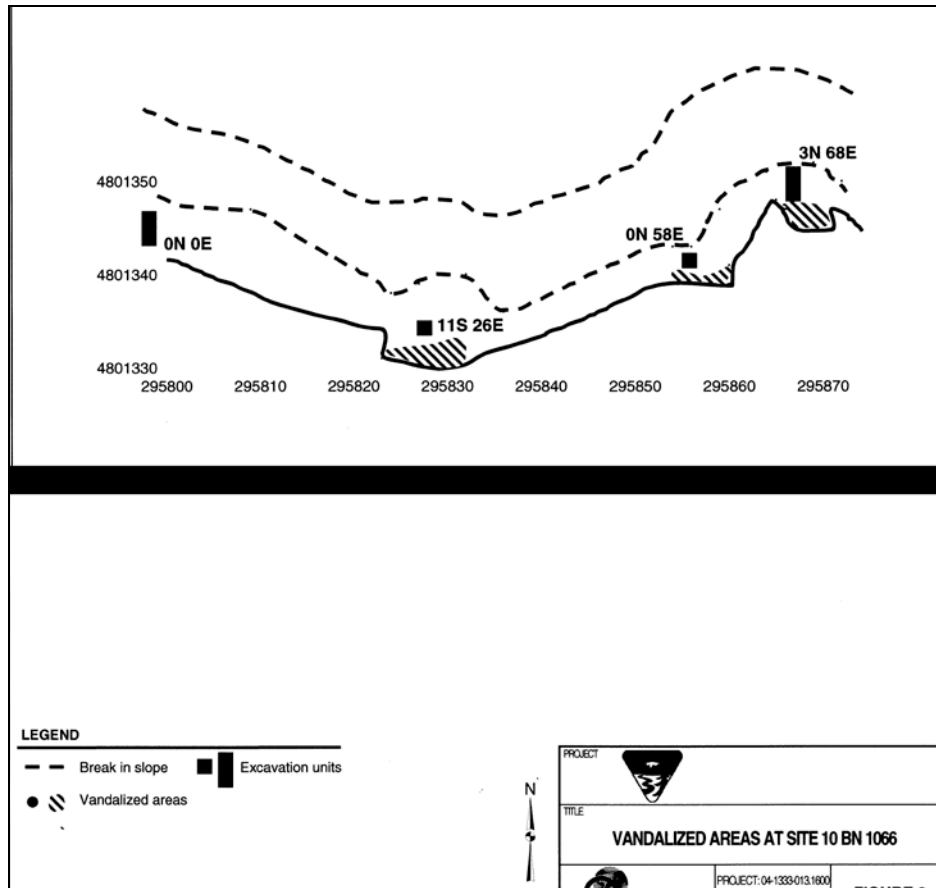


Figure 5.16. Plan view of site 10BN1066 showing location of test units and vandalized areas within the shelters (from Hoffert et al. 2005).

Alpha Cave (10PR641)

Alpha Cave is part of a complex of four interconnected lava tubes surrounded by an extensive exterior lithic scatter on the east side of the Great Rift, just north of Kings Bowl (Figures 5.17 and 5.18). The site was first recorded in 1994, after being reported to the Pocatello Resource Area BLM by Duane Reynolds of Twin Falls, Idaho. During the initial recording, a total of seven projectile points and point fragments, an Intermountain Ware ceramic fragment and a hammer stone were collected from the lithic scatter outside the caves (Truitt 1994). Bison bone, elk antler tines, burned sagebrush stalks and hammer stones were noted within the interior of the western-most cave in the complex, suggesting the existence of another cold storage cave. However, these artifacts were not collected at the time. The other caves in the complex were not thoroughly explored at that time. During the initial recording, the caves were named “Reynolds Caves”. However, the cave containing the antler tines, sagebrush and bison bone has subsequently been referred to as “Alpha Cave” (see Figure 5.18).

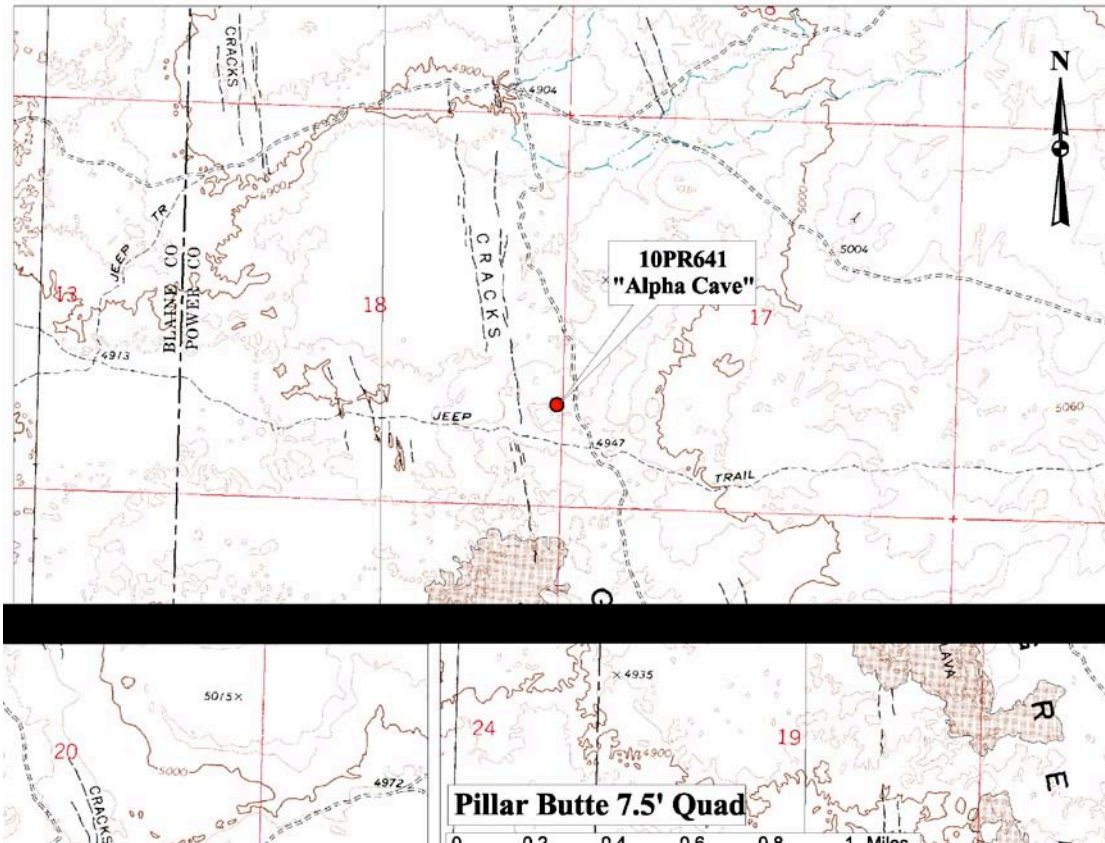


Figure 5.17. Location of Site 10PR641 (Alpha Cave) on the Pillar Butte 7.5 minute quad.

In 2003, the site was revisited during the Class III Cultural Resource Inventory of Crystal Ice Cave and Kings Bowl (Hoffert 2004). One large corner-notched point and one unidentified point fragment were noted in the surface lithic scatter. Burned sagebrush stalks and bone were still visible inside Alpha Cave. Based on the information provided by Hoffert, no unauthorized excavations had occurred at the site since the initial recording in 1994.

Alpha Cave appears to be a segment of a lava tube that has partially collapsed, forming a “donut-shaped” chamber. The cave is roughly 30 meters in length from east to west and 25 meters north to south (Figure 5.19). The ceiling height ranges from less than 2 to over 5 meters (Figure 5.20). The cave has a narrow, east-facing entrance, which opens to a large “room” with a high ceiling and a steep downward slope. Temperatures in the cave range from 45 degrees Fahrenheit near the entrance to roughly 27 degrees Fahrenheit in the southwest section, which is also lowest in elevation (see Figure 5.20). Portions of the cave contain large roof fall boulders, making passage difficult (see Figure 5.19). The northeast section of the cave is almost completely blocked by roof fall.

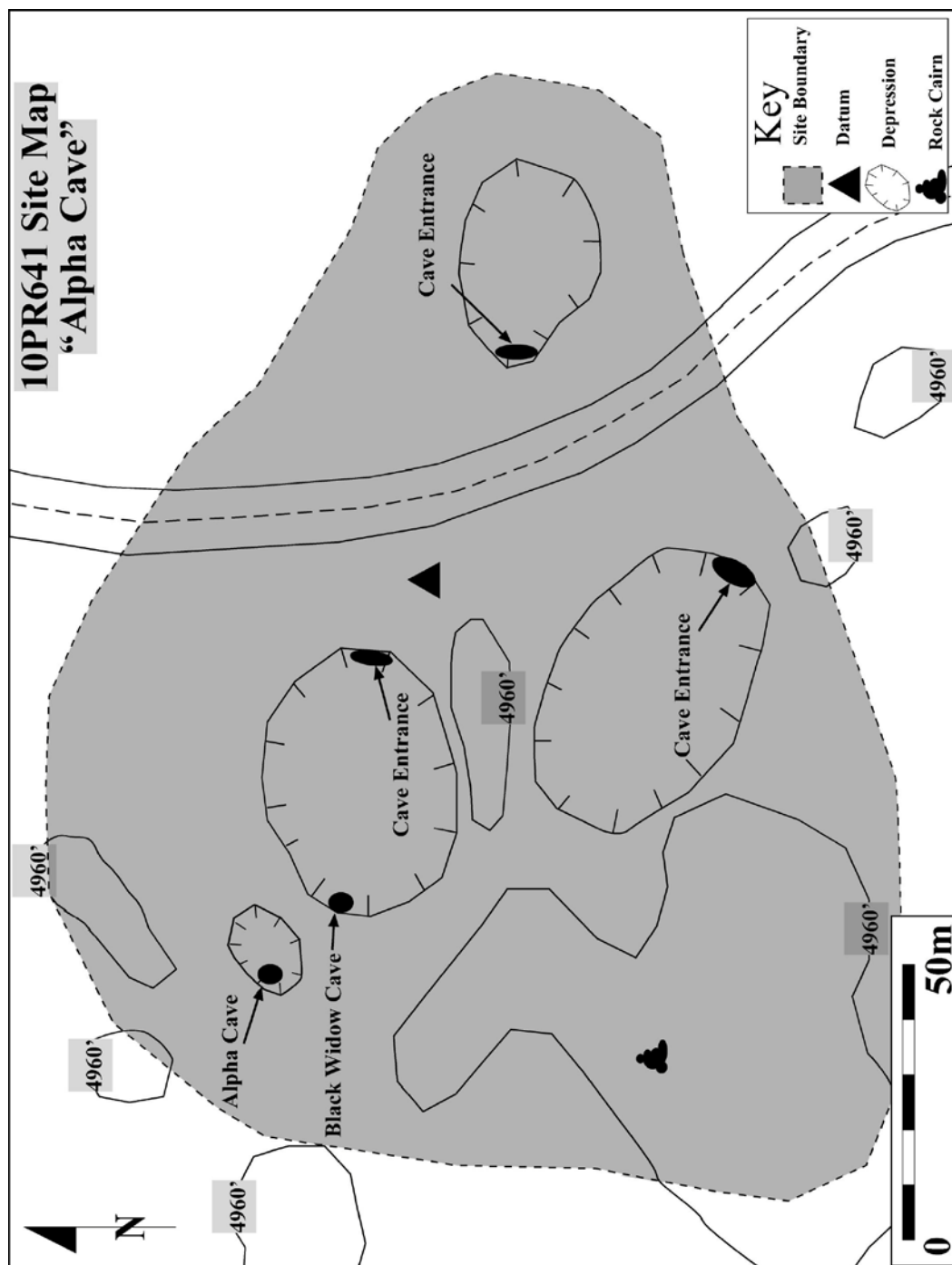


Figure 5.18. Map of 10PR641 showing the location of lava tubes, depressions and the extent of the surface lithic scatter.

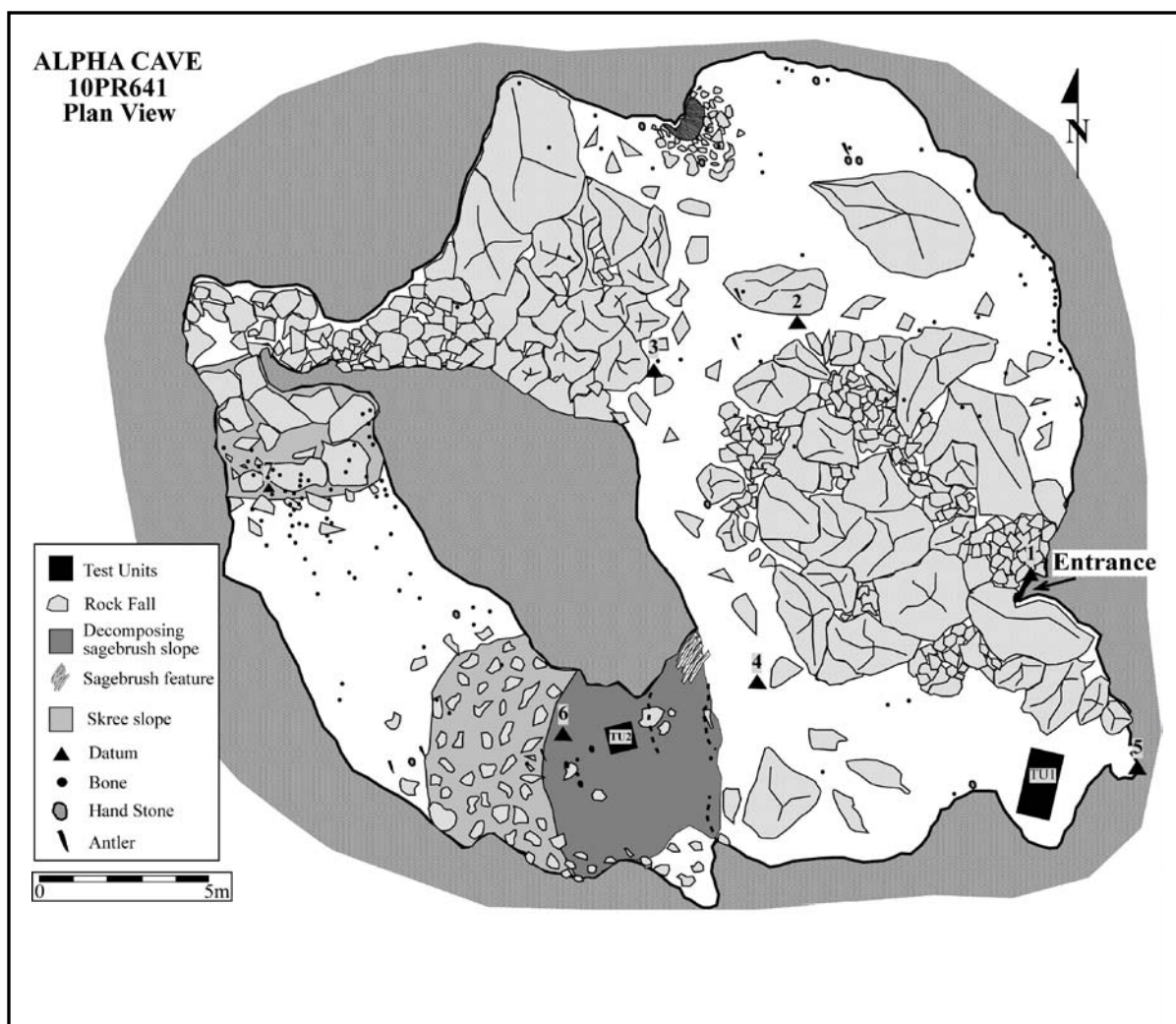


Figure 5.19. Plan view of Alpha Cave showing the location of test units, sagebrush features and surface artifacts.

The 2005 investigations at the site were designed to map the interior of Alpha Cave as well as map and collect interior surface artifacts, including bone, antler and stone (see Figure 5.19). The presence of sagebrush stalks was also an indication that the cave had been used for cold storage of bison meat (see Figures 5.19 and 5.20). Limited test excavations were performed to determine the nature and extent of the cultural deposits within Alpha Cave and to evaluate its eligibility to the NRHP.

Alpha Cave (10PR641)

Profile

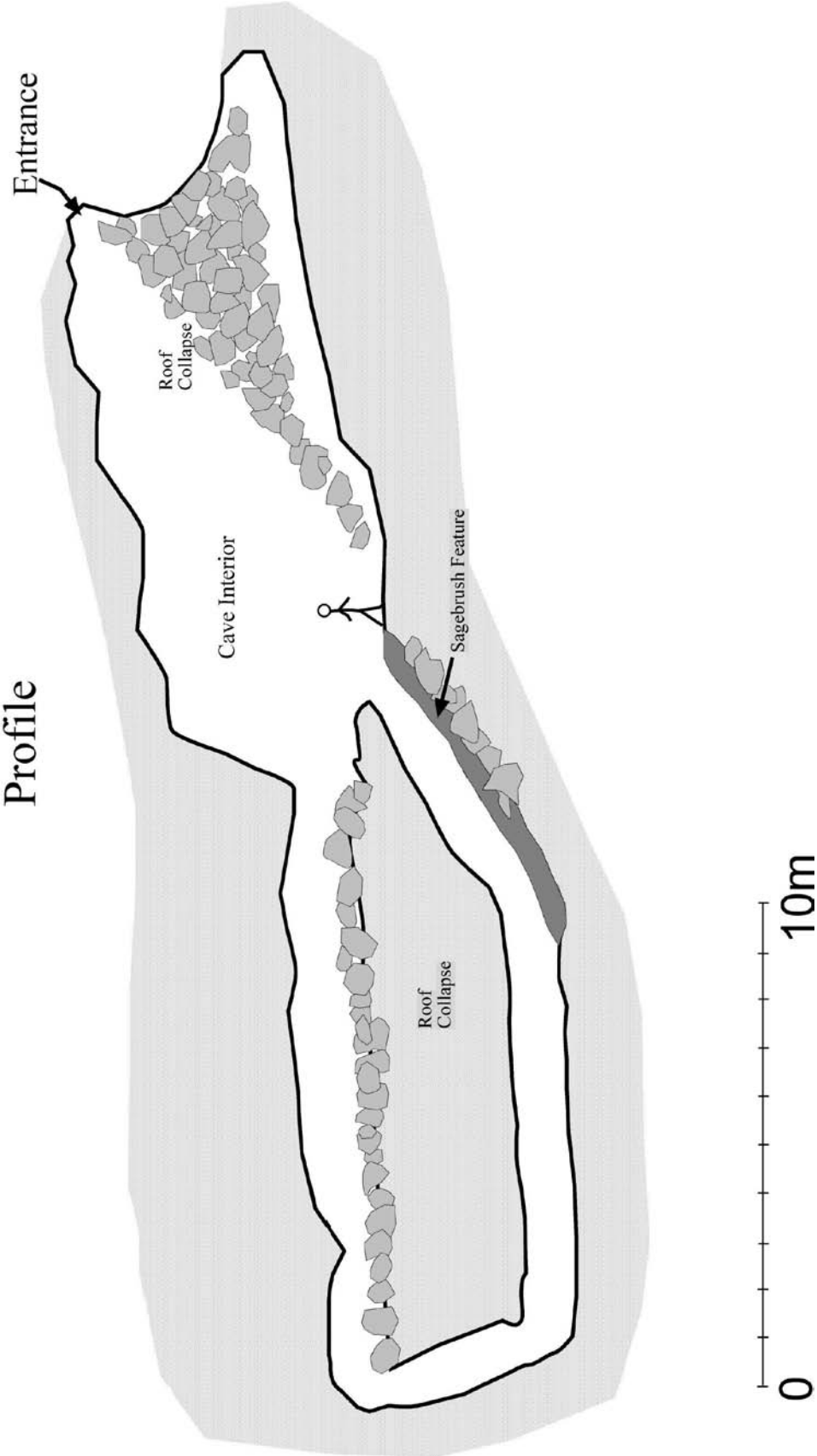


Figure 5.20. Profile of Alpha Cave, showing the location of the sagebrush feature.

Interior Surface Assemblage

Roughly 280 faunal specimens, fourteen (14) elk antler fragments and twelve (12) ground stone implements were collected from the interior surface of Alpha Cave during the 2005 mapping efforts (see Figure 5.19). The elk antler tines (Figure 5.21) resemble specimens collected from other cold storage caves in the region (Henrikson 2003), however, some are in relatively poor condition due to excessive moisture in the cave interior. The ground stone tools include pestles, pestle fragments, and rounded river cobbles also typical of other cold storage caves (Figures 5.22 and 5.23).



Figure 5.21. Antler tines collected from the interior surface of Alpha Cave.



Figure 5.22. Hand stone collected from the floor of Alpha Cave.



Figure 5.23. Hand stone collected from the floor of Alpha Cave.

The faunal remains scattered throughout Alpha Cave primarily consisted of bison bone (Figure 5.24), indeterminate fragments of large mammal bone, canid remains and a few small mammals. A total of 109 diagnostic faunal remains were identified as *Bison bison* or large artiodactyls well within the size range of bison. Other taxa identified in the assemblage include *Cervus canadensis* (elk), *Odocoileus hemionus* (mule deer), *Antilocapra americana* (antelope), *Canis lupus* (wolf), *Canis latrans* (coyote), *Taxidea taxus* (badger), *Marmota flaviventris* (yellow-bellied marmot), *Sciurus* sp. (ground squirrel) and *Lepus californicus* (jackrabbit). An analysis of the surface faunal assemblage is currently underway (see Appendix D).



Figure 5.24. Bison elements recovered from the floor of Alpha Cave in 2005.

2005 Test Excavations

The 2005 test excavations included a 1x2 meter unit (Test Unit 1) placed in a small, elevated “nook” in the southeast corner of the cave (see Figure 5.19) and a 1x1 meter unit (Test Unit 2) positioned near the base of sloping, highly organic sediments in the deepest section of the cave.

The elevated area containing Test Unit 1 was relatively level and characterized by loose, sandy sediments with little rock fall. Because the air temperature was 10-15 degrees warmer in this portion of the cave, the “nook” would have provided a more comfortable atmosphere than deeper sections of the cave.

Test Unit 2 was placed in dark, moist sediments that appear to be the decomposing remnants of a cold storage feature that has collapsed or slumped during a roof fall episode. Several antler tines, hand stones and bison cranial fragments were collected from the base of the slope just below the feature (see Figure 5.19). The sediments are comprised of dark brown silt, charcoal, and burned and unburned sagebrush fragments. A row of sagebrush stalks (typical of the cold storage features in Bobcat, Tomcat and Scaredy Cat caves) is still intact against the cave wall adjacent to the slope (Figure 5.25).



Figure 5.25. Row of sagebrush stalks still intact along the cave wall in Alpha Cave.

Test Unit 1 Sediments. Sediments in Test Unit 1 consisted of fine, medium brown silty sand with increasing moisture and compaction noted with depth (Figure 5.26). The sediments also contained small, angular and subangular basalt pebbles, which are likely roof spall. No stratigraphy was discernable in the deposits. Due to time constraints, Test Unit 1 was only excavated to a maximum depth of 25cm below surface in Quad A (see Figure 5.26). While the depth of the cultural deposits in this portion of the cave has not been determined, basalt boulders in the floor of Test Unit 1 suggest that sediments may be relatively shallow.

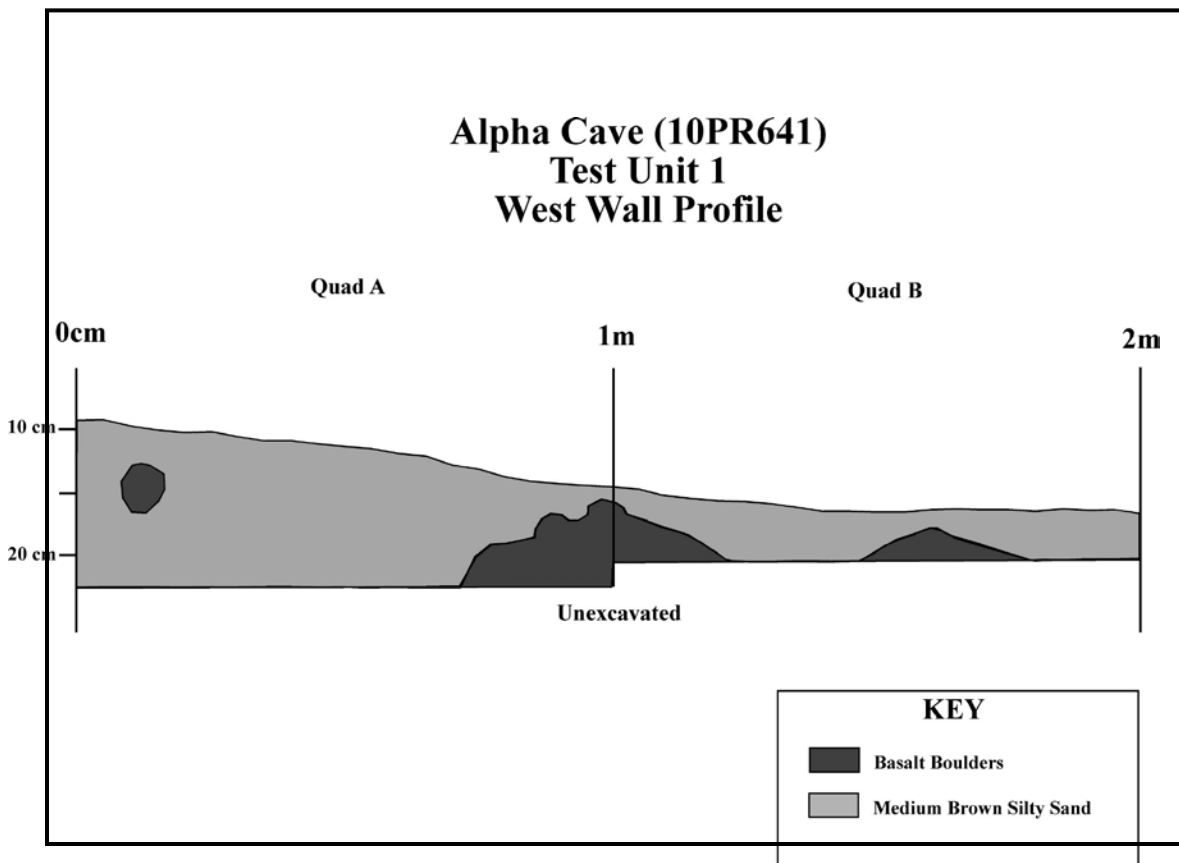


Figure 5.26. West wall profile of Test Unit 1.

Test Unit 2 Sediments. The top 30cm of Test Unit 2 consisted of moist or partially frozen charcoal, sagebrush fragments and decomposing sagebrush stalks (Figure 5.27). Angular and subangular basalt cobbles were also present and may have been introduced by occasional roof fall. A narrow lens of silty sand, located in the northern half of the unit, may be aeolian soils originating from cracks in the cave ceiling or sediments that were introduced during a roof fall episode. The sediments encountered below 30cm consisted of completely frozen sagebrush fragments, charcoal and dark brown silt. Little or no stratigraphy could be discerned in the deposits, suggesting that the sagebrush feature is either not intact or severely decomposed.

A sample of the sediments from the 50-55cm level of Test Unit 2 was submitted to the Laboratory of Archaeological Sciences at California State University, Bakersfield for immunological protein residue analysis. The sediments reacted positively to cervid (elk/deer) and rat antiserum (Parr 2006).

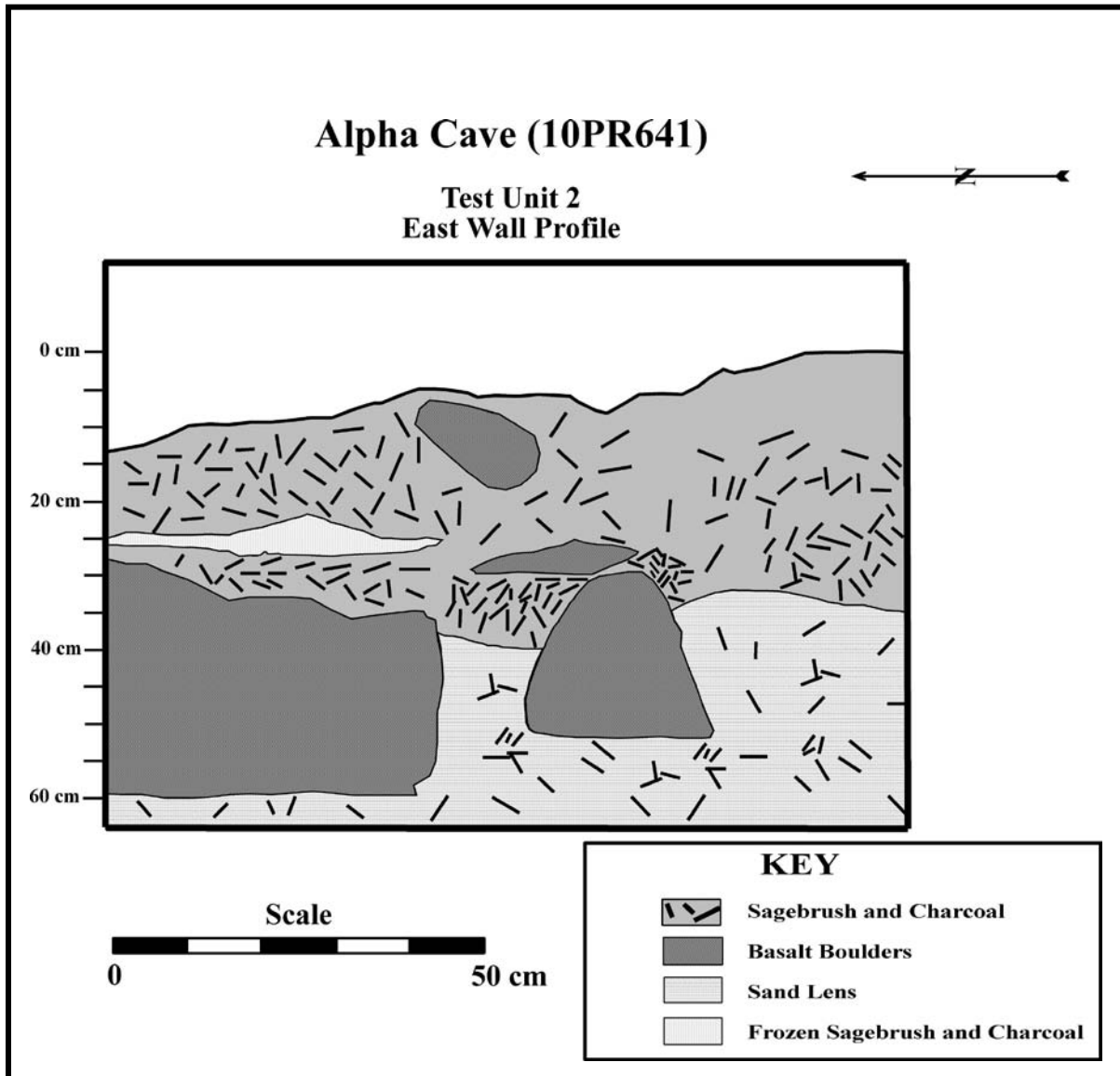


Figure 5.27. East wall profile of Test Unit 2 in Alpha Cave, showing the composition of the cold storage feature.

Lithic Assemblage

Relatively few lithics have been recovered from previously excavated cold storage caves on the Snake River Plain (Henrikson 2003). However, Test Unit 1 in Alpha Cave produced 445 waste flakes and three stone tools. Roughly 95% of the debitage is in the tertiary stage, indicating that lithic reduction inside the cave was primarily associated with resharpening activities (Table 5.10). Volcanic glass is the predominant material type, representing 97% of the assemblage, with cryptocrystalline silicate and basalt flakes comprising the remainder.

Table 5.10. Distribution of Waste Flakes Recovered from Test Units 1 and 2 in Alpha Cave.

TU/Unit: Quad	Surface			0-5cm			5-10cm			10-15cm			15-20cm			20-25cm			Total		
	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T
TU1:A			1		2	22	2	1	98	1	5	83		5	117	1	2	31	4	15	352
TU1:B												16		2	77					2	93
Total			1		2	22	2	1	98	1	5	99		7	194	1	2	31	4	17	445
Level Total	1			24			101			105			201			34			466		

Key: P=Primary reduction stage, S=Secondary reduction stage, T=Tertiary reduction stage.

Stone tools recovered from Test Unit 1 include two volcanic glass Rose Spring projectile points (Figure 5.28) and a volcanic glass biface fragment. Field Specimen 209-01 was recovered from the 5-10cm level of Quad A and Field Specimen 213-01 was recovered from the 15-20cm level of Quad B. The biface fragment was recovered from near the surface of Quad A.

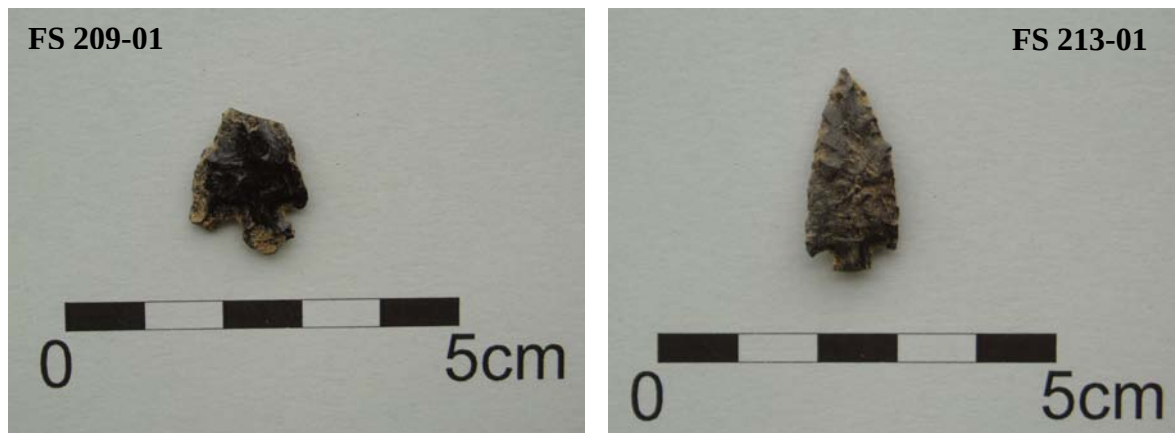


Figure 5.28. Rose Spring projectile points from Test Unit 1 in Alpha Cave.

No waste flakes were recovered from Test Unit 2. However, one volcanic glass scraper (FS 201-01) was recovered from the 25-30cm level and one volcanic glass Elko Corner-notched point (FS 205-01) was recovered from the 55-60cm level of the unit (Figure 5.29). Two projectile points and the scraper from the 2005 test excavations were submitted to the Laboratory of Archaeological Sciences at California State University, Bakersfield for immunological protein residue analysis. No residues were gleaned from the Rose Spring point from Test Unit 1 or the scraper from Test Unit 2. However, The Elko point (FS 205-01) reacted positively to bovine antiserum (Parr 2006).

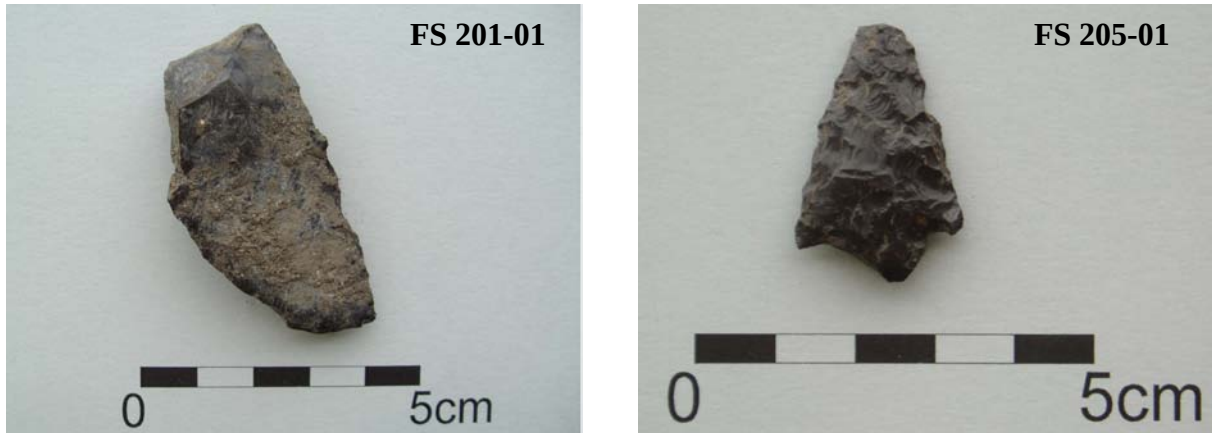


Figure 5.29. Volcanic glass scraper and Elko Corner-notched point from Test Unit 2 in Alpha Cave.

Excavated Faunal Assemblage

Of the roughly 160 faunal remains recovered from the 2005 test excavations, 37 were identified as large mammal. These primarily included long bone fragments and artiodactyl tooth enamel (Table 5.11). None of the large mammal remains appeared charred or burned. However, the majority of the long bone fragments from Test Unit 2 are green fractured. Two specimens were identified as *Bison bison*. These include one complete incisor from the 15-20cm level of Test Unit 1, Quad B and a complete phalanx from the 0-5cm level of Test Unit 1, Quad A.

Two antler spalls and one antler tip fragment were recovered from Test Unit 2. The antler tip fragment was recovered from the 15-20cm level (Figure 5.30) and the antler spalls were recovered from the 35-40cm and the 50-55cm levels, respectively. One small, highly polished and notched bone ornament was recovered from the 20-25cm level of Test Unit 2 (Figure 5.31).

Of the remaining specimens, 127 are rodent remains that exhibit no evidence of butchering marks or breakage indicative of human modification or consumption and appear to be of natural origin (Table 5.12).

Table 5.11. Numbers of Large Mammal Remains from the 2005 Test Excavations in Alpha Cave.

	TU1 Quad A	TU1 Quad B	TU2	Total
0-5cm	4	0	0	4
5-10cm	0	0	0	0
10-15cm	5	0	0	5
15-20cm	10	2	0	12
20-25cm	1	-	2	3
25-30cm	-	-	0	0
30-35cm	-	-	0	0
35-40cm	-	-	9	9
40-45cm	-	-	3	3
45-50cm	-	-	0	0
50-55cm	-	-	1	1
55-60cm	-	-	0	0
Total	20	2	15	37

Table 5.12. Numbers of Small Mammal Remains from the 2005 Test Excavations in Alpha Cave.

	TU1 Quad A	TU1 Quad B	TU2	Total
0-5cm	8	3	0	11
5-10cm	3	0	0	3
10-15cm	1	42	0	43
15-20cm	32	15	0	47
20-25cm	19	-	1	19
25-30cm	-	-	0	0
30-35cm	-	-	0	0
35-40cm	-	-	4	4
40-45cm	-	-	0	0
45-50cm	-	-	0	0
50-55cm	-	-	0	0
55-60cm	-	-	0	0
Total	63	60	5	127



Figure 5.30. Tip of antler tine recovered from Test Unit 2 in Alpha Cave.

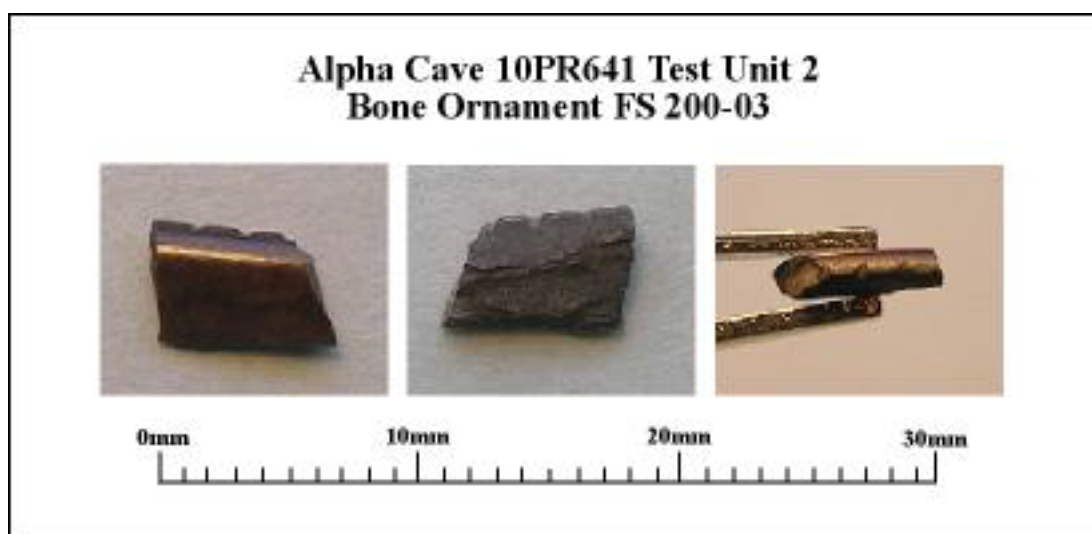


Figure 5.31. Highly polished and notched bone ornament from Test Unit 2 in Alpha Cave.

Radiocarbon Dates

One radiocarbon sample was processed for Alpha Cave. The sample of charred sagebrush was recovered from the sagebrush feature in Test Unit 2 at a depth of 50-55cm below surface. Standard radiometric techniques produced a conventional age of 4300 ± 60 ry BP, which has been calibrated to between 4980 and 4720 calendar years BP (at 2 sigma). While this date corresponds with radiocarbon dates recovered from cold storage features in Scaredy Cat Cave (see Table 5.3), late Holocene projectile points recovered from Test Unit 1 in Alpha Cave suggest that cold storage may have taken place in the cave for several thousand years. Additional radiocarbon samples should be processed to understand the length of time in which the cave was used for this purpose.

Black Widow Cave

During the mapping and test excavations within Alpha Cave, another cave was discovered on the east side of the same collapse (see Figure 5.18). There are two entrances to Black Widow Cave in the depression, both of which are very narrow, rocky and nearly vertical. Another, more accessible, entrance is located in the depression to the east. Black Widow Cave is an elongated, low chamber that appears to be a small, intact segment of the original lava tube that also includes Alpha Cave. The cave is roughly 20 meters long and five meters wide with a relatively level, sandy floor. Due to a low, protruding roof, the cave must be negotiated in a crouching position (Figure 5.32).

Seven individual pictograph panels were discovered during initial inspection of the cave (see Figure 5.32). These panels are located on ceiling boulders throughout the cave and consist of rows of what are often referred to as “tally marks” (Figure 5.33). All of the pictographs appear to have been done red ochre. Although the pictographs in Black Widow Cave may not be associated with the artifact assemblage in adjacent Alpha Cave, similar panels of tally marks have been previously documented in Bobcat Cave (Henrikson 1996).

Surface artifacts and bone were collected from the floor of Black Widow Cave during the mapping activities. These include two projectile points (Figure 5.34), an antler tine fragment and 30 faunal remains (see Appendix D). These include 23 specimens that have been identified as *Bison bison* or large mammal within the size range of bison.

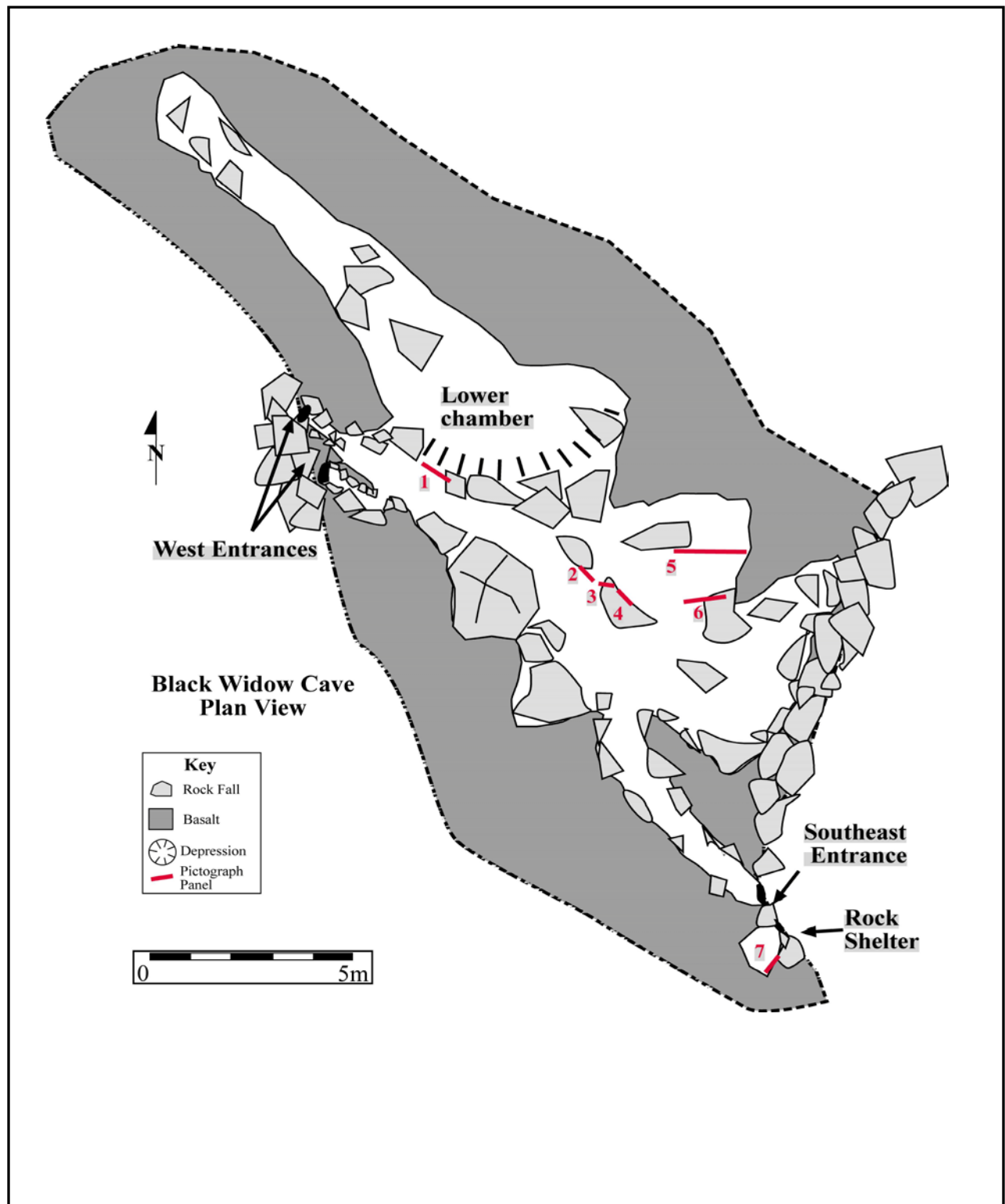


Figure 5.32. Plan view of Black Widow Cave, showing the location of pictograph panels.



Figure 5.33. Red ochre tally marks comprising Panel No. 5 in Black Widow Cave.



Figure 5.34. Projectile point fragments from the interior of Black Widow Cave.

Management Recommendations

Based on the 2005 investigations in Alpha Cave and the discovery of pictograph panels in Black Widow Cave, it is apparent that the Site 10PR641 complex contains intact cultural deposits having tremendous potential to provide valuable information on regional prehistory. Therefore, the site should be nominated to the NRHP. Unlike Scaredy Cat Cave, access to the caves in the Site 10PR641 complex is not controlled. Due to the extremely limited nature of the 2005 test excavations in Alpha Cave, only a tiny fraction of the priceless information contained in the cave has been extracted at this point. If subjected to looting, much of this data would be lost. An iron gate installed at the entrance of Alpha Cave would eliminate this threat. Other caves in the complex, including Black Widow Cave, also likely contain buried cultural deposits that could be severely damaged by illegal excavations. It is suspected that the lithic scatter surrounding the caves (see Figure 5.18) is subject to unauthorized surface collection on a consistent basis.

The Roasting Rock Site (10BN389)

The Roasting Rock Site was initially recorded in 1991 as part of the Black Ridge Fire Rehabilitation efforts conducted by the Shoshone District BLM (Henrikson and Henrikson 1992). The site is situated along the western edge of the “Thumb”, northwest of Lava Butte (Figure 5.35) at was has been referred to as “Indian Crossing” by local ranchers. When the BLM established a jeep trail across the lava flow at this location in the 1950s, an “Indian trail” was reportedly obliterated in the process.

Immediately following a 1991 range fire, sediments at the site were deflating due to wind erosion. As a result, dense concentrations of debitage were exposed, along with tools and ceramic fragments. A total of six point fragments (one McKean lanceolate, one small stemmed, one small corner-notched, one small lanceolate, one small triangular and one large corner-notched point) were collected (Figure 5.36). A small basalt metate, basalt grinding slab fragment and basalt pestle fragment were also collected. Tools noted but not collected during the 1991 recording include eleven biface fragments, five edge-modified flakes, one scraper, one small side-notched point fragment, one small corner-notched point fragment, one large side-notched base fragment and one corner-notched point fragment (Henrikson and Henrikson 1992).

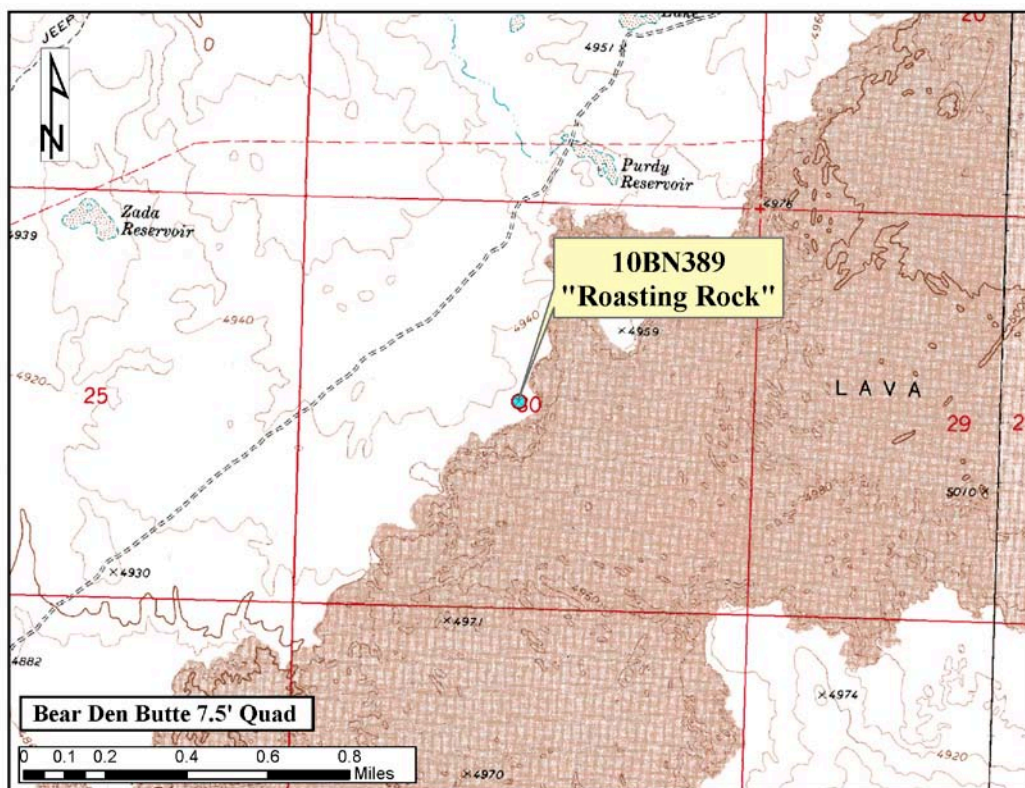


Figure 5.35. Location of 10BN389 (the Roasting Rock Site).

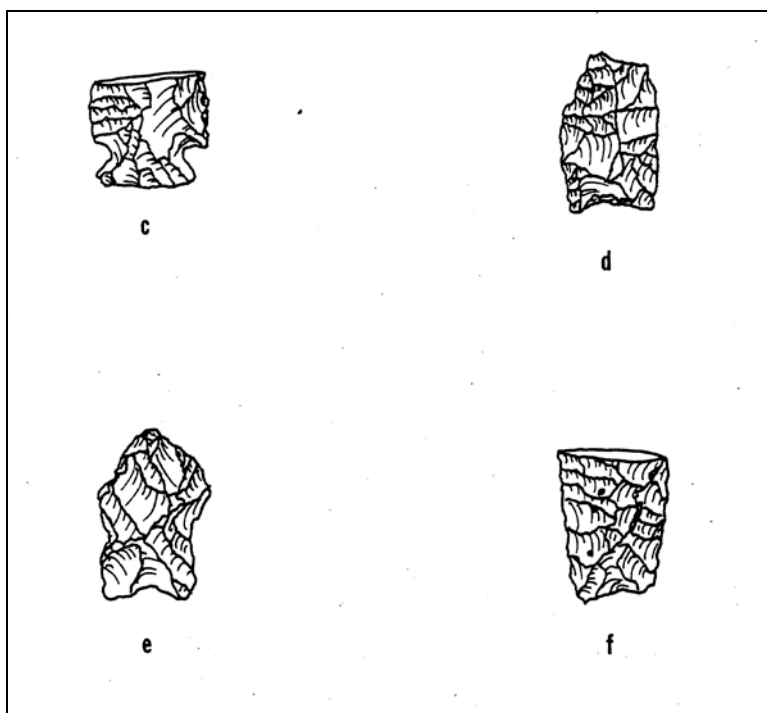


Figure 5.36. Sample of projectile points collected from 10BN389 in 1992.

In 1991, a total of 80 Intermountain Ware ceramic sherds were collected from four loci within the site. The largest number of sherds was collected from three neighboring loci situated in the southern portion of the site against the lava edge (Figure 5.37). A depression located within the flow roughly five meters from the lava edge at the southern end of the site appears to have been created by removing basalt cobbles and boulders from a small area to create a pool or water catchment. It is unknown whether the feature is prehistoric. The high density and variety of artifactual debris suggested that the site probably served as a seasonal base camp for hunting and plant processing activities. The depression could have provided water during the spring and early summer months.

Historic and modern debris, including several rusty stove parts, purple glass fragments, tin cans, porcelain and wire, are concentrated along the lava flow edge in the southeastern portion of the site near the road. These items are likely associated with two historic basalt foundations or structures located at the edge of the flow (see Figure 5.37). These could have served as holding pens for livestock or shelters from inclement weather. The site was recommended as eligible to the NRHP in 1992 (Henrikson and Henrikson 1992).

2005 Test Excavations

The presence of ceramics, ground stone and a wide range of stone tools suggested that the Roasting Rock site was a base camp with multiple occupations spanning the middle and late Holocene. However, because of the continuous deflation and accretion of sediments on the sagebrush steppe, which is often exacerbated by fire, it is difficult to fully assess the nature of sites without conducting subsurface investigations. The site was thus revisited in 2005 and test excavations were performed to determine the character and extent of the subsurface cultural deposits.

Test excavations at the site included eight (8) 1 x 2 meter test units located in the portion of the site located north of the road (see Figure 5.37; Figure 5.38). This area appeared to be accreting dunal deposits against the lava edge. Sediments south of the road were severely deflated and appeared shallow and highly compacted. Test Units 1 and 7 were placed immediately adjacent to each other following the exposure of what appeared to be a rock feature. Five of the units (1, 2, 4, 6 and 7) were placed in accreting sediments near the edge of the basalt flow. The remaining units (3, 5, and 8) were placed at varying intervals between the road and the lava edge. Units were excavated in 5cm levels, and sediments were screened through 1/8th inch mesh. All units were mapped to absolute coordinates with handheld GPS units; all coordinates refer to the UTM grid referenced to the NAD83 datum.

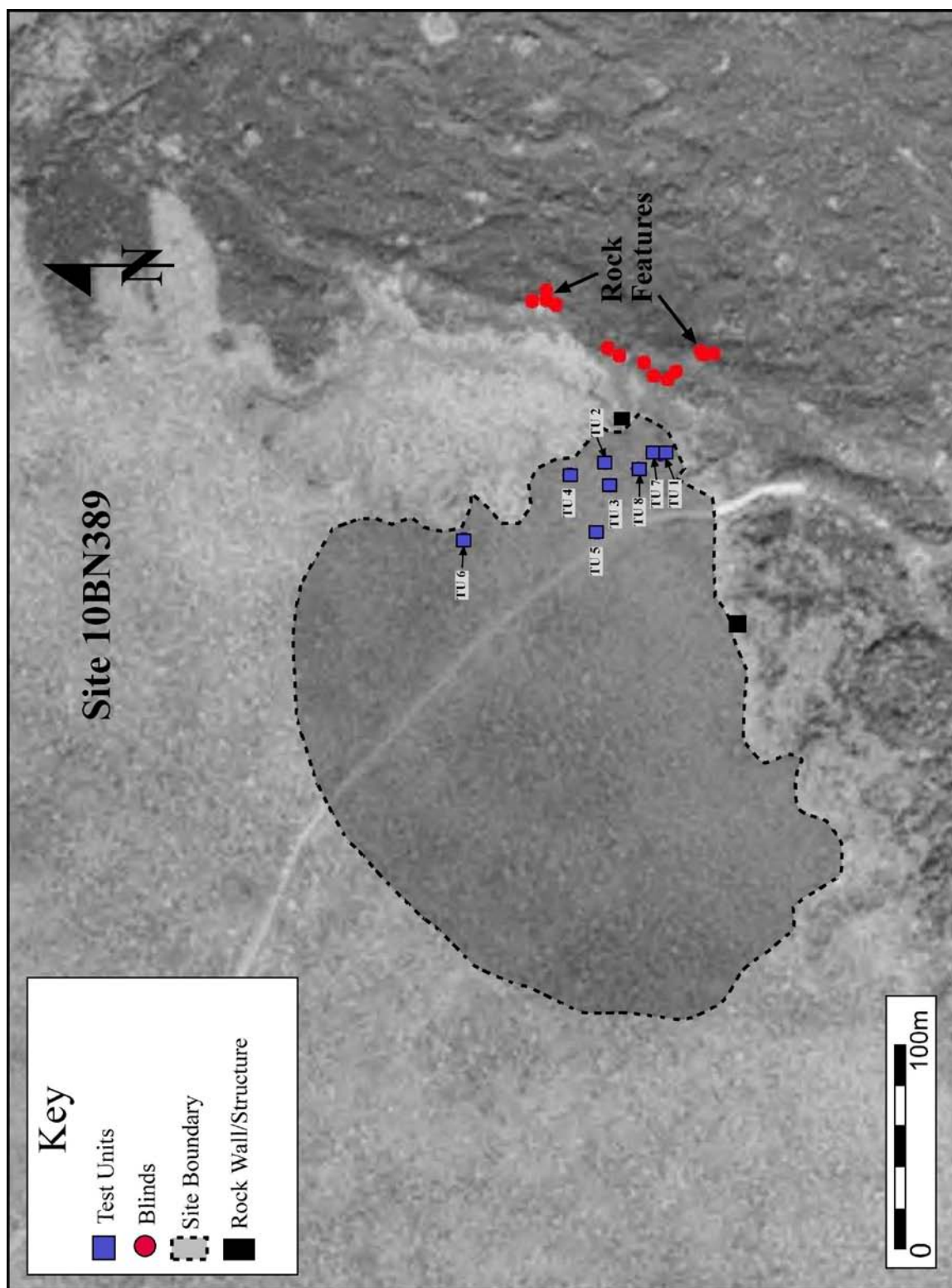


Figure 5.37. Site 10BN389, showing the location of test units and rock features.

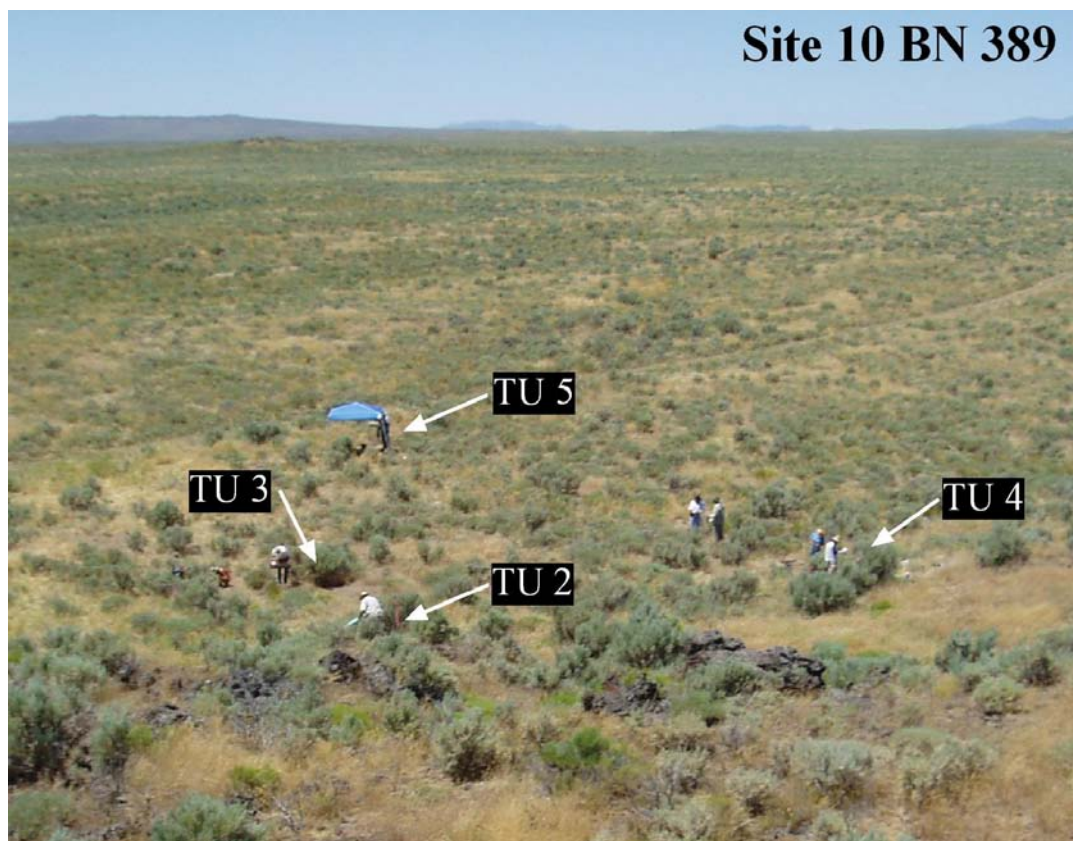


Figure 5.38. Facing west from atop the recent lava flow at the Roasting Rock site (10BN389).

Stratigraphy

Sediments were accumulating in portions of the site near the lava edge. Test units in these areas contained three to four stratigraphic layers. Three strata were present Units 1, 2, 4, 6 and 7 (Figure 5.39). Stratum I in these units was comprised of uncompacted, well-sorted, tan, sandy silts with minimal quantities of angular and subangular basalt pebbles and cobbles. The uncharacteristically wet spring of 2005 resulted in a relatively high amount of vegetal and root material in this layer. Stratum II, encountered at roughly 10cm below ground surface, also contained well sorted, tan, sandy silts, but exhibited increased compaction and higher clay content. Stratum III, noted at a depth of 20cm below surface in most units, was characterized by increased compaction with greater quantities of angular and subangular basalt gravel and cobbles. In Test Units 3 and 5, located in deflating sediments 25-30 meters away from the lava edge, the upper three stratigraphic layers were thinner, and a fourth stratigraphic layer of very compacted, blocky clay silt began to emerge at roughly 30cm below surface. In addition to increased compaction and clay content, Stratum IV was also characterized by inclusions of 5-10cm clay nodules. This stratigraphic layer likely underlies the other units as well.

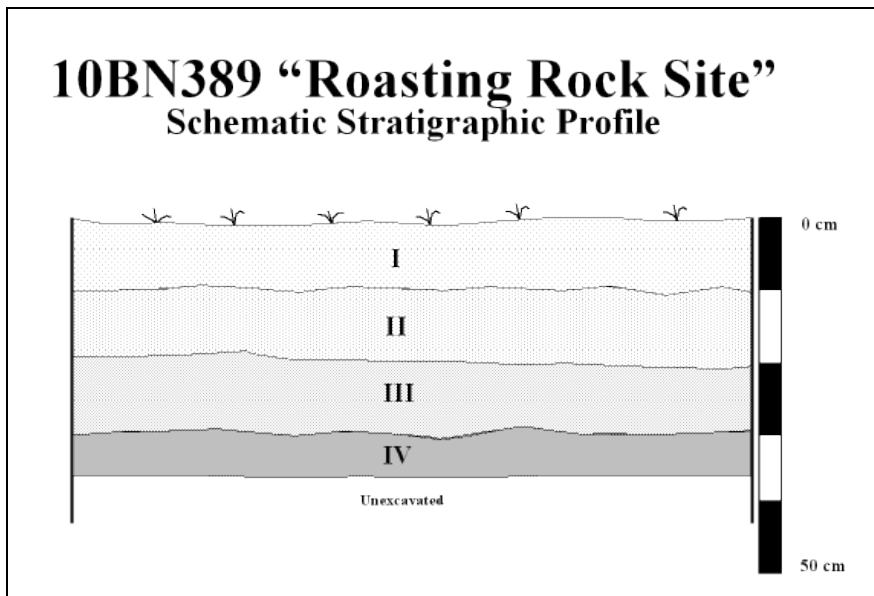


Figure 5.39. Schematic stratigraphic profile of site 10BN389.

Lithic Assemblage

The 2005 test excavations recovered significant quantities of debitage along with stone tools and tool fragments. Test Unit 1, Quad B produced a complete volcanic glass Avonlea projectile point from the 10-15cm level (Table 5.13). Test Unit 2, Quad A produced two biface fragments, one from the 10-15cm level, and one from the 20-25cm level. Test Unit 3, Quad A produced a thin, nondiagnostic opaque volcanic glass projectile point tip from the 10-15cm level. Test Unit 6, Quad A produced an opaque volcanic glass biface fragment from the 20-25cm level. Another volcanic glass biface was recovered from wall fall cleanup in Test Unit 4 (Figure 5.40).

Over 3600 waste flakes were recovered from the test units (Table 5.14). 98.5% of the debitage was in the tertiary reduction stage. Primary and secondary flakes were recovered from Test Units 2 and 7, but in extremely low numbers (roughly 5%). Black volcanic glass, fine grained basalt and a wide variety of cryptocrystalline silicates (CCS) were present. Opaque volcanic glass made up 51% of the lithic debris. Silicates made up 43% of the assemblage and basalt flakes comprised 6%. Though all units contained proportions of all three materials, the bulk of the CCS (1075 flakes, or 68% of the CCS total) was recovered from Test Unit 4. Basalt debitage was more evenly distributed across the test units. However, Unit 4 also contained the highest proportion of the total count (65 flakes equaling 28%). Most of the basalt flakes were larger than the volcanic glass and CCS flakes.

Table 5.13. Stone Tools Recovered During the 2005 Test Excavations at 10BN389.

	TU1	TU2	TU3	TU4	TU5	TU6	TU7	TU8	Total
Point Fragment			1	1					2
Projectile Point	1								1
Biface		2		1		1			4
Total	1	2	1	2	-	1	-	-	7



Figure 5.40. Stone tools recovered from the test excavations at Site 10BN389.

Faunal Assemblage

A total of 880 bone and tooth enamel fragments were recovered during the 2005 test excavations (Appendix E). Faunal elements were present in all units other than Unit 5; remains were recovered in comparatively minimal amounts in Unit 6. The vast majority of faunal remains consisted of burned and unburned indeterminate small mammal bone

fragments. However, 9 large mammal bone fragments were recovered in association with the roasting feature in Test Unit 1/7. These elements included one thoracic vertebrae identified as *Bison bison*, large mammal vertebral fragments and one rib fragment. Artiodactyl tooth enamel fragments were noted in Units 1, 3, 4, 6 and 8.

Unit 1/7 Hearth/Rock Feature

A dense concentration of basalt cobbles, charcoal and stained soil was exposed at a depth of 25cm in Test Units 1 and 7, located near the lava edge (see Figure 5.37). The feature was roughly 1.3 meters in diameter and 30cm thick (Figures 5.41 and 5.42). Large fragments of charred sagebrush were present under many of the cobbles. The densest concentration of charcoal, ash and reddened sand was situated directly below the rocks and extended to a depth of roughly 50cm below surface (Figure 5.43). A small scatter of bone fragments, consisting of a large, unburned *Bison bison* vertebrae and rib fragment were wedged between rocks in the southern part of the feature (see Figure 5.41). With the exception of these, relatively few faunal remains were recovered Test Units 1 and 7.

The feature contained 84 volcanic glass, 2 cryptocrystalline silicate and 3 basalt waste flakes (see Table 5.14). All were interior reduction flakes with the exception of one volcanic glass decortication flake. Because the majority of the debitage is volcanic glass, it is suspected that tool maintenance occurred at this location prior to the creation of the feature and is not directly related to its function or purpose.

The feature likely functioned as an oven or roasting pit with sagebrush stalks stacked and ignited to create a bed of coals and hot ash. Basalt cobbles placed directly on the coals would have been heated effectively for cooking purposes. Soil beneath the cobbles was blackened or reddened and greasy, suggesting that liquids cooked out of meat may have leached into the heated substrate. A sample of the soil recovered directly below the basalt cobbles was submitted to California State University, Bakersfield, for immunological analysis. The soil reacted positively to grouse antiserum (Parr 2006).

Radiocarbon Dates. A large fragment of a single, charred sagebrush stalk from the feature was submitted to Beta Analytic (Beta-214959) for standard radiometric analysis. The sample produced a conventional age of 700 ± 60 years BP, which has been calibrated to between 690 to 640 calendar years BP (at 2 sigma). This date indicates that the roasting feature is likely directly associated with the late Holocene component of the site represented by Intermountain Ware ceramics, Avonlea and Desert Side-notched projectile points.

Table 5.14. Distribution of Waste Flakes in the 2005 Test Excavations at 10BN389.

TU: Quad Feature	0-5cm			5-10cm			10-15cm			15-20cm			20-25cm			25-30cm			30-35cm			35-40cm			WF/WS Feature			Total		
	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T			
TU1:A			12			27	1		34			14			8			5			15			2				1		117
TU1:B			21			38			31			39		3	21	1		15		1	9							1	4	174
TU1:C			7		1	24			22		2	26	1	1	21			7			34					5	1	4	146	
TU2:A			1			9			33			24			64		1	23		1	10							2	164	
TU2:B			1			8			36			52		1	111	1	4	34		2	29							1	7	271
TU3:A						4			68			47			18			38			22									197
TU3:B			5			368			225			184			51			42			9					1				885
TU4:A			1			77			379			270	1		110			31								33	1			901
TU4:B									52		4	150		2	146			25			3							6		376
TU5:A									5			3			1			3												12
TU5:B									3						2			1												6
TU6:A						4			10			4																		18
TU6:B						2			2			16																		20
TU7:A		1	2	1		40	4	15	86			3			10												5	16	141	
Feature																									1	1	87	1	1	87
TU8			2			10			11			16			29		3	9			22							3		99
Total		1	52	1	1	611	5	15	997		6	848	2	7	592	2	8	224		4	153			2	1	1	126	11	43	3614
Level Total	53			613			1017			854			601			243			157			2			128			3668		

Key: P=Primary reduction stage, S=Secondary reduction stage, T=Tertiary reduction stage, WF= Wall Fall, WS= Wall Slump, RF= Rock Feature.



Figure 5.41. Surface of rock feature in Test Units 1 and 7 at 10BN389 (note charred sagebrush and large vertebrae in foreground).



10BN389

**Test Unit 1/7
Rock Feature**

Scale

0 50 cm

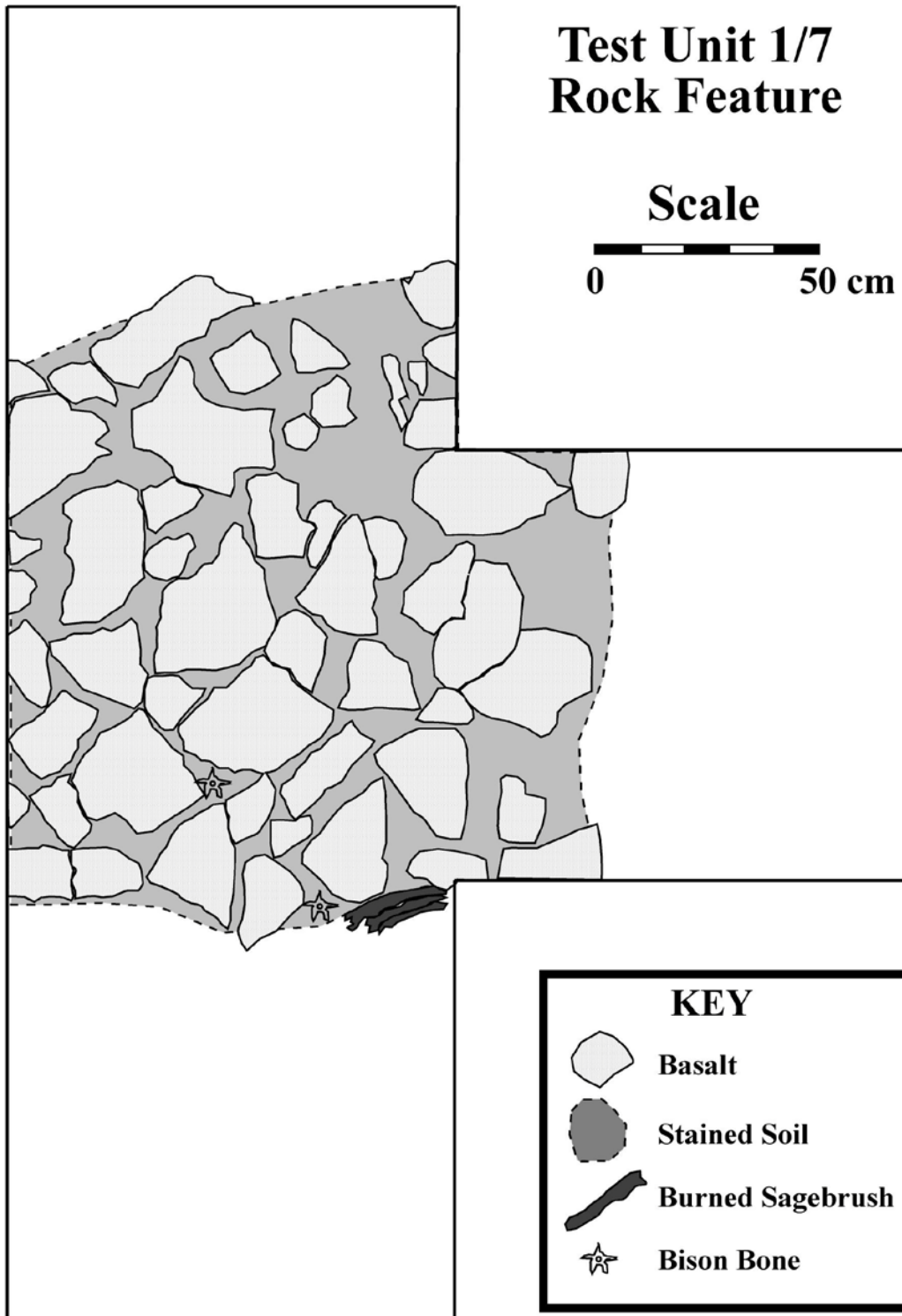


Figure 5.42. Plan view of rock feature in Unit1/7 showing the distribution of basalt cobbles and stained soil.

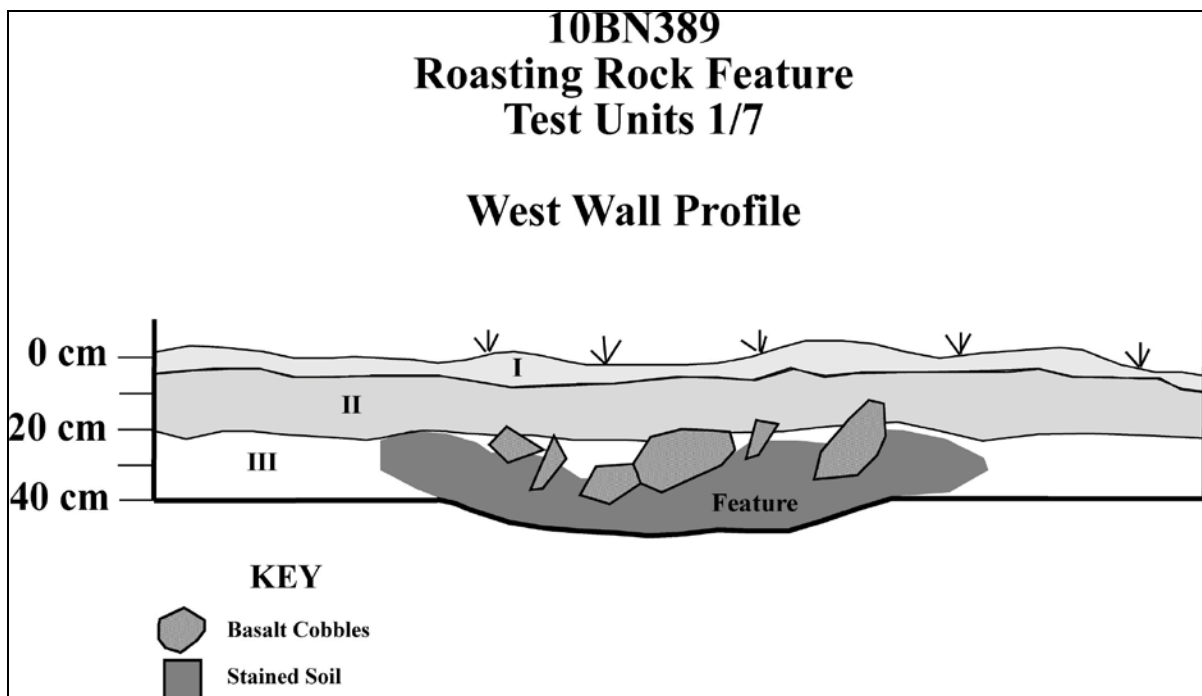


Figure 5.43. Profile of Rock Feature in Test Units 1 and 7 at Site 10BN389.

Lava Flow Features

While conducting test excavations, 11 rock features were discovered on high points in the Holocene aged lava flow immediately east of the site (see Figure 5.37). These features range from one to three meters in diameter and have a variety of forms (Figures 5.44 and 5.45). Some appear to be circular or semicircular walls of stacked rocks; in the case of semicircles, the arc of stacked rocks faces outwards with the lee of the wall opening into the flow. Large or irregular rocks have been removed from the center of these features to create a compressed, lightly concave floor of small cobbles of approximately uniform size (20-25cm in diameter). Variations in the features included walls that were created more through removal of interior rocks than through stacking, creating shallow depressions with minimal walls. Some of the depressions were isolated on the very highest points of the flow, while others occurred in clusters of two and three within 20 feet of each other. The exact purpose of the rock features is unknown, but their placement at high elevations overlooking the plain to the west suggests use as game lookouts or defense. No debitage, tools, or other artifacts were noted at any of the rock features.

In addition to the semicircular features atop the lava ridges, several depressions were noted in the talus slope along the lava edge approximately due east of Test Units 1 and 7. The depressions, approximately 1.5m in diameter and 0.5m deep, were formed through removal of rocks from the slope rather than by building up walls of rock.



Figure 5.44. Semicircular rock feature on basalt flow at 10BN389 (clipboard included for scale).



Figure 5.45. Circular rock feature on basalt flow at 10BN389.

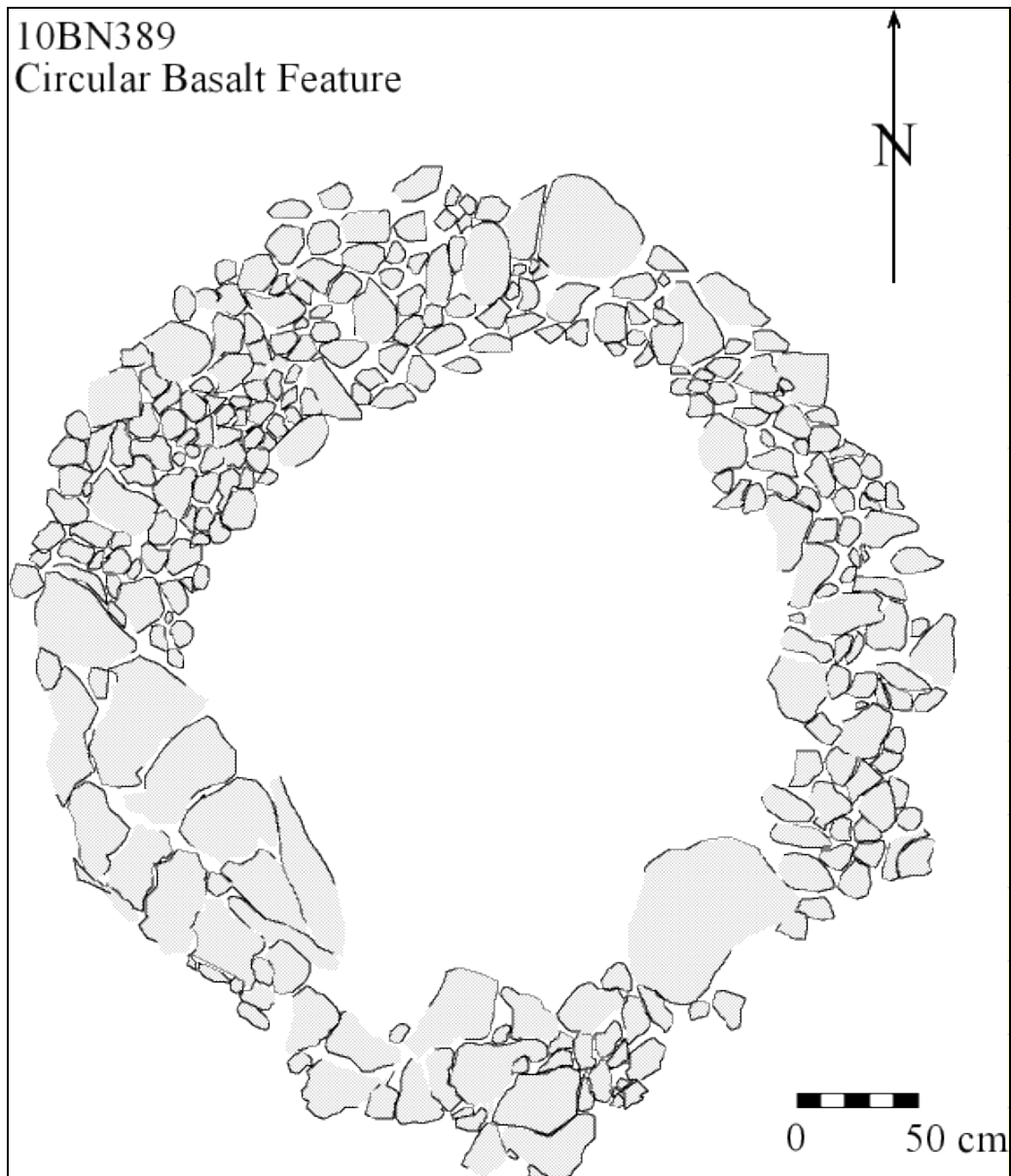


Figure 5.46. Planview of a circular rock feature atop the basalt flow at site 10BN389.

Management Recommendations

Site 10BN389 was nominated to the NRHP after its initial recording in 1991. The results of the 2005 excavations, which demonstrate the presence of intact, buried cultural deposits at the site, lend added support to this nomination. Rock features, such as the one exposed in Test Units 1/7, are only rarely encountered in open sites on the eastern Snake River Plain and have the potential to provide new insight into regional prehistoric subsistence strategies. Although the 2005 test excavations did not expose additional features, it is possible that others exist in accreting sediments near the lava edge. Based on the radiocarbon date from the feature, Intermountain Ware ceramics, ground stone and

Desert Side-notched points, the site served as a seasonal base camp during the very late Holocene. It is suspected that the rock features located on the recent basalt flow adjacent to the site were also created during this time period and may have functioned as lookouts. Because the site is accessible to the public by road, regular monitoring by BLM staff is recommended. Although no obvious signs of looting were noted at the site, it is likely that the area is visited by local surface collectors; 4 wheeler tracks were noted along the lava edge near the site at the time of the 2005 excavations.

Catchment Cove (10BN861)

10BN861, the Catchment Cove site (Figure 5.47), was initially recorded in 1996 during a reconnaissance survey conducted by the BLM (Henrikson 1996). The site is located on the east side of the “Thumb” in Laidlaw Park, directly east of the 10BN389 (the Roasting Rock Site) at the location referred to as “Indian Crossing”.

During the initial recording, one McKean lanceolate point was collected and a broad, sparse distribution of obsidian and CCS waste flakes was noted on the surface. In July of 2004, the site was revisited and a much higher density of artifacts was visible. Diagnostic projectiles recovered during the 2004 survey include two Cottonwood Triangular points, three Avonlea points, two Rose Spring points, two Elko Corner-notched points and two Northern Side-notched points (Figure 5.48). Four nondiagnostic projectile point fragments and several biface fragments were also reported, including one unusually serrated biface fragment (Figure 5.49), as well as numerous debitage concentrations totaling over 1400 flakes. Black volcanic glass, basalt and a vast array of CCS types were present in these concentrations and in lighter densities throughout the site. The crew also noted a small rock shelter at the east end of the site, along the lava edge (Figure 5.50). Only a few flakes were noted in the interior of the shelter, which was rocky, with little sediment.

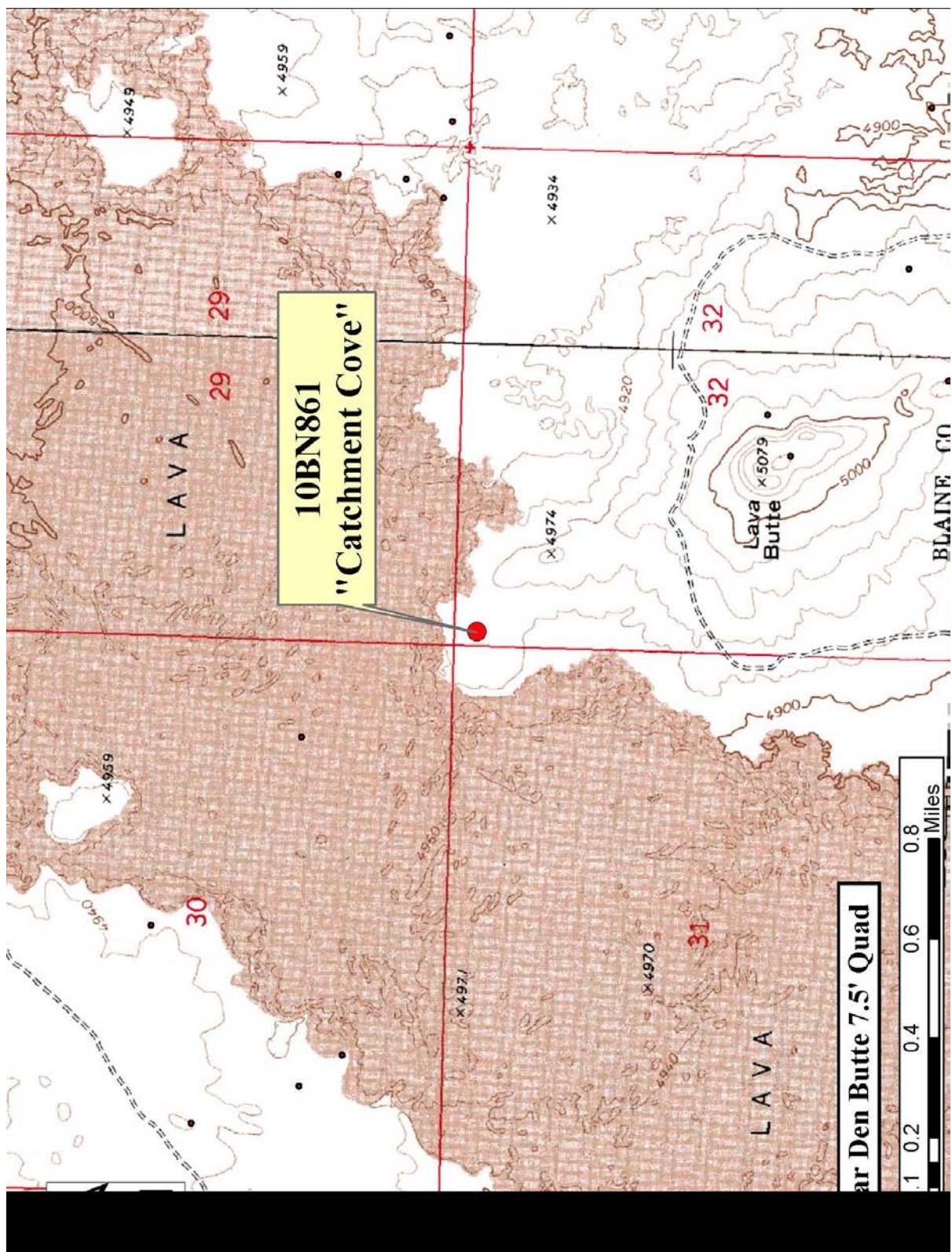


Figure 5.47. USGS quad showing the location of 10BN861 (Catchment Cove).



Figure 5.48. Stone tools collected from the surface of Site 10BN861 in 2004. A, Desert Side-notched; B-C, Avonlea; D-E, Cottonwood Triangular; F-G, Rose Spring; H-I, Elko; J-K, Northern Side-notched.



Figure 5.49. Irregularly notched biface fragment collected from the surface of Site 10BN861 in 2004.



Figure 5.50. Rockshelter located on east end of Site 10BN861 in 2004.

2005 Test Excavations

Due to the density and variety of surface artifacts recovered during the 1996 and 2004 surveys, the University of Oregon Archaeological Field School conducted test excavations at the site in 2005 to investigate the potential for intact, subsurface cultural deposits. Numerous lithic concentrations were scattered irregularly over approximately 176,500 square meters within the 10BN861 site boundary (Figure 5.51). One Rose Spring point, two grinding slab fragments, and several ceramic fragments were noted on the surface of 10BN861 in 2005 (Figures 5.52 and 5.53). Test units were placed in the most substantial of these concentrations. These included one 2x2 meter unit and five 1x2 meter units. Two test units (Units 1 and 6) were placed roughly 20 meters west of the BLM jeep trail bisecting the site, with the remaining 4 units placed at irregular intervals to the east (see Figure 5.52). Test Units 4 and 5 were placed in accreting sediments near the mouth of the rock shelter identified in 2004. Material was excavated in 5cm levels, and screened through 1/8th inch mesh. All units were mapped to absolute coordinates with handheld GPS units; all coordinates refer to the UTM grid referenced to the NAD83 datum.

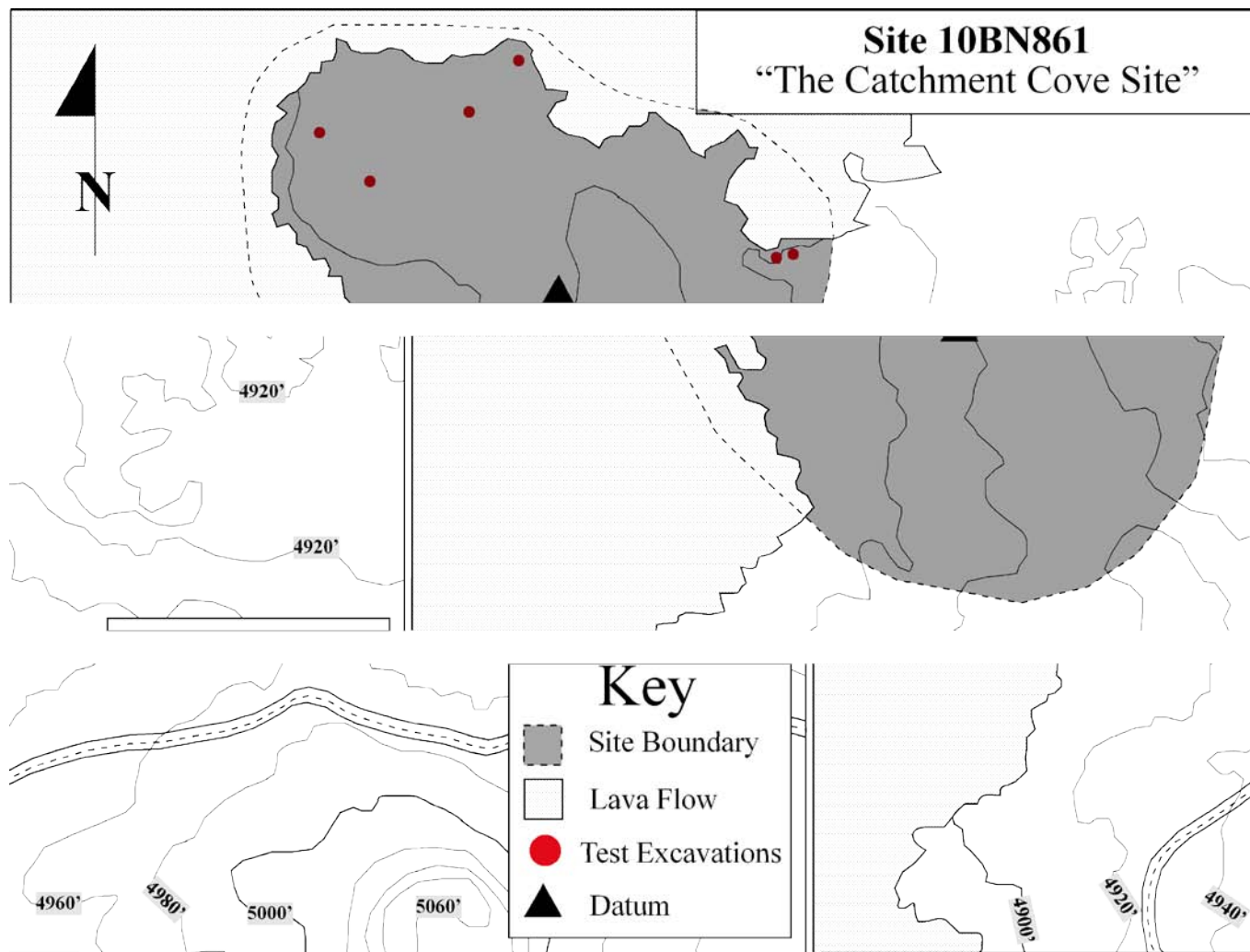


Figure 5.51. Site map of 10BN861, the Catchment Cove site.

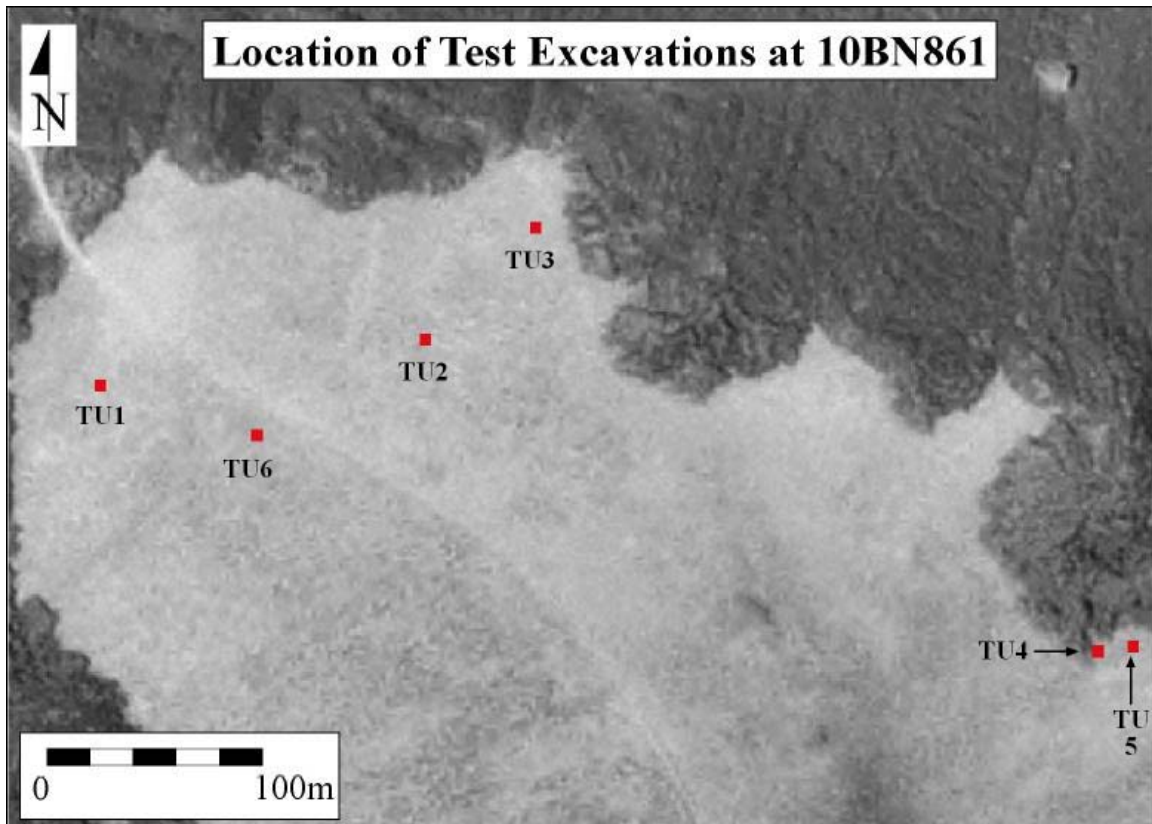


Figure 5.52. Orthophoto showing the placement of test units from the 2005 excavations at site 10BN861.

Stratigraphy

Sediments at the site appear to be severely deflated and cultural deposits in all test units were extremely compacted with little depth (Figure 5.53). Deposits at the surface in all units consisted of loose aeolian tan silty loam. Color varied little with depth in Units 1, 2, 3, 4, and 6, but compaction increased dramatically below 10cm. Unit 5, located roughly two hundred meters northeast of the other units (see Figure 5.51), was located in accreting sediments abutting the lava flow, near the rock shelter recorded in 2004. Sediments on the surface of this unit were the same as the other units, but the aeolian surface material was underlain by darker loam, which had a consistency suggestive seasonal inundation by water. Excavations were ceased in all units due to a combination of cultural sterility and impassibility resulting either from hardpan-like clay silts (Units 1, 5, 6) or the presence of basalt slabs across the bottom of the unit (Units 2 and 3). Test Unit 4 was not excavated below 5cm due to time constraints.

A caliche layer was exposed just above the basalt slab floor of Unit 3. The layer emerged at 55cm, and was tightly packed into the surface of the rocks lining the unit at 60cm below surface.

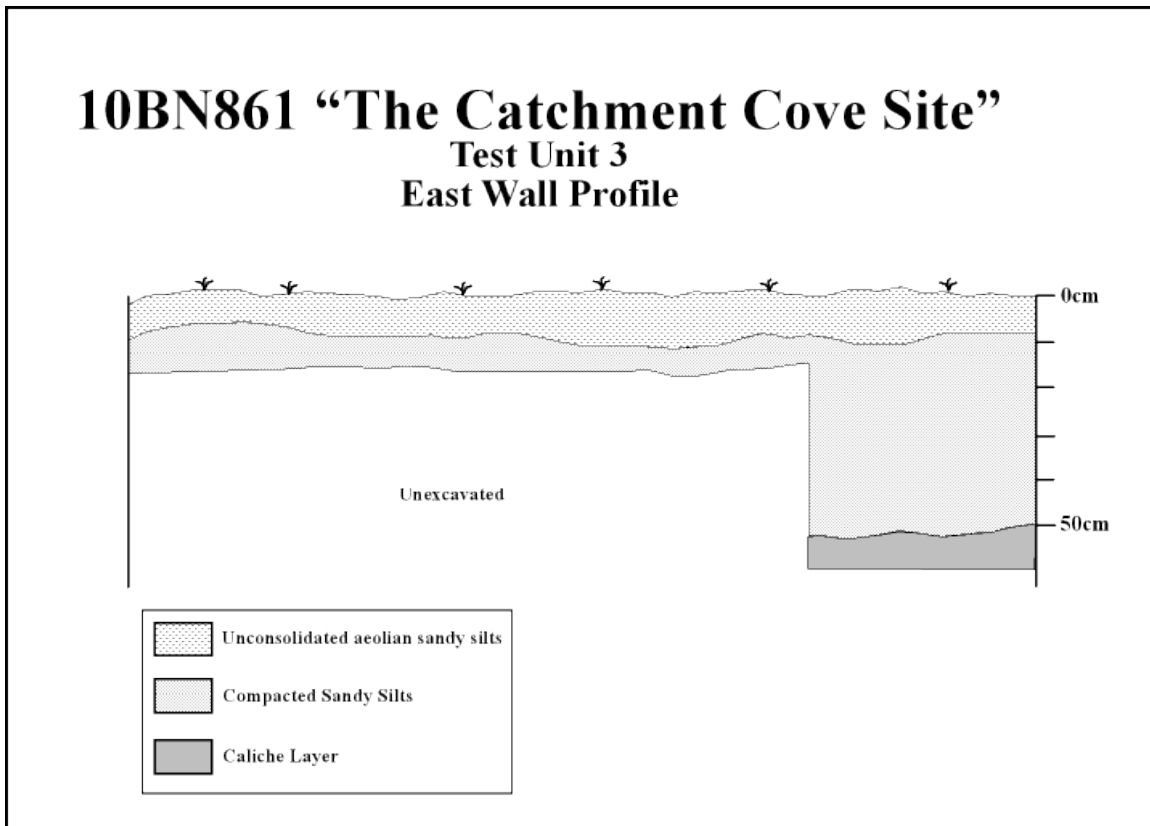


Figure 5.53. Stratigraphic profile of the east wall of Test Unit 3 at Site 10BN861.

Lithic Assemblage

All test units produced moderate quantities of debitage, along with a limited number of fragmentary and complete projectile points (Figure 5.54). Unit 3, Quad B produced a complete volcanic glass late Holocene “Bliss” projectile point and a nondiagnostic volcanic glass projectile point tip from the 5-10cm level. Test Unit 2, Quad A produced one nondiagnostic volcanic glass projectile point tip from the 5-10cm level. A Rose Spring projectile point with a missing tip was also recovered from the surface near Unit 2 (Table 5.15).

One piece of ground stone was recovered from the surface of Test Unit 2 (Figure 5.55). Composed of vesicular basalt, this 16 x 13 x 2.5cm specimen has been shaped, either through grinding or pecking, and the vesicles on one face are smoothed, indicating that it functioned as a grinding slab.



Figure 5.54. Projectile points (Bliss, top left; Rose Spring, top right) and point tips collected during the 2005 excavations at site 10BN861.

Table 5.15. Stone Tools Recovered During the 2005 Test Excavations at 10BN681.

	TU2	TU3	TU4	Surface	Total
Point Fragment		1	1		2
Projectile Point		1		1	2
Ground Stone	1				1
Total	1	2	1	1	5



Figure 5.55. Ground stone grinding slab recovered from the surface of Test Unit 2 during the 2005 excavations at site 10BN861.

294 waste flakes were recovered from the test units (Table 5.16). Waste flakes were present in all units. Approximately 92% of the debitage was in the tertiary reduction stage. Primary and secondary flakes were recovered in Test Units 2, 3 and 6, but these flakes account for less than 8% of the total lithic assemblage. Black volcanic glass and an array of cryptocrystalline silicates were present. Black volcanic glass made up 88% of the lithic debris. Silicates made up the remaining 12% of the assemblage.

Ceramic Assemblage

A total of 15 fragments of unmarked Intermountain Ware were recovered during the 2005 excavations (Figure 5.56; Table 5.17). The largest fragment, recovered from Test Unit 3, Quad B at the 5-10cm level, was 7cm x 4.5cm. The remaining sherds were approximately 1-2cm in diameter; thickness was a fairly uniform 0.5cm. Test Unit 3 also recovered one fragment from the surface, a total of three sherds from the 5-10cm level of Quad B, and three each from the 10-15cm level of Quads A and B. One fragment was recovered from the surface of Test Unit 5. The 0-5 cm level of Test Unit 6 contained one fragment in Quad C and two in Quad D. One more fragment was recovered from Quad D at the 10-15cm level.

Table 5.16. Distribution of Waste Flakes Recovered during Excavations at 10BN861.

TU/Unit: Quad	Surface			0-5cm			5-10cm			10-15cm			15-20cm			20-25cm			25-30cm			Total		
	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T	P	S	T
TU1: A						2			1															3
TU1: B									3			2			3			1						9
TU2: A					1	1		3	17	2	3	34			15			9				2	7	76
TU2: B							1	2	24			12			9		1	5			3	1	3	53
TU3: A									2			9			2		2	2					2	15
TU3: B			3			3			16		2	19		1	8								3	49
TU4: A						5			6															11
TU6: A					3	15			8			5											3	28
TU6: B						2			1															3
TU6: C						11			1			3												15
TU6: D				2		7			2													2		9
Total			3	2	4	46	1	5	81	2	5	84		1	37		3	17			3	5	18	271
Level Total	3			52			87			91			38			20			3			294		

Key: P=Primary reduction stage, S=Secondary reduction stage, T=Tertiary reduction stage,



Figure 5.56. Intermountain Ware potsherds recovered during the 2005 excavations at 10BN861.

Table 5.17. Ceramics collected during the 2005 excavations at site 10BN861.

Depth	TU3	TU5	TU6	Total
Surface	1	1		2
0-5cm			3	3
5-10cm	3			3
10-15cm	6		1	7
Total	10	1	4	15

Faunal Assemblage

A total of 487 bones, and bone and tooth enamel fragments were recovered during excavations (Appendix F). Remains were found only in Test Units 1, 2 and 3. The bulk of recovered elements were indeterminate small mammal fragments, although Test Unit 3

contained one larger indeterminate bone fragment at the 15-20cm level. An artiodactyl tooth enamel fragment was recovered from Test Unit 3, Quad A in the 10-15cm level. One piscine or reptilian vertebral element (sp. unknown) was recovered from Quad A in the 10-15cm level. Artiodactyl tooth enamel was also recovered from Unit 2, Quad A at the 5-10cm level (three fragments), 15-20cm level (two fragments), and 20-25cm level (three fragments), and Quad B at the 5-10cm level (2 fragments) and 10-15cm level (seven fragments).

Lava Features

During excavations, the recent basalt flow adjacent to the site was explored, and numerous circular and semicircular blind features, trails and potential water catchments were identified (Figures 5.57 through 5.60). Many of the circular features were of similar construction to those found at 10BN389 located across the lava flow (see Figure 5.57). They contained slightly concave floors lined with compacted rocks of similar size, and walls either built by stacking larger rocks around the edge of the floor, or by removing larger rocks from the center to create a depression within the flow. Circular features were occasionally accompanied by an adjacent low rock stack. No lithic debris or other artifacts were found in association with the rock features.

Two major trails into the lava were discovered in 2005. Visible at a distance as red colored streaks on the grey-black flow (Figure 5.58), up close the trails are further distinguished from the surrounding flow by rounded and worn basalt cobbles among highly angular basalt comprising the rest of the flow. The “Catchment Trail” extends into the flow just north of Test Unit 3 for roughly 100 meters and terminates at what appear to be water catchments. The catchments consist of 1.5m diameter depressions 1-1.5m deep created by the removal of large rocks from the center. Unlike the other features, no uniform floor exists in the catchments. They are deeper and narrower, and located at the bottom of low ‘swales’ in the basalt flow. Though the catchments were dry at the time of their recording, they likely hold seasonal snowfall for an unknown period during winter and spring. This hypothesis is supported by the presence of historic period metal buckets and cans at some of the catchments.

A second trail was discovered (see Figure 5.57) between the modern jeep trail and the trail to the catchments. The entrance to the “Finger Cutoff” trail is visible in the first embayment east of the jeep trail that bisects 10BN861. The trail continues northeast across the lava flow for approximately a mile, exiting on the north side of the flow at the center of a small kipuka several hundred meters north of 10BN389. In some places, the trail crosses portions of the flow characterized by boulders too large to break down to form a path. In such areas, the trail becomes less visible, and is indicated instead by regularly placed low rock stacks, typically not more than 40cm high and consisting of 3 to 4 large basalt cobbles. In areas where visibility was particularly low, stacks were more prominent. All rock stacks were recorded with a GPS unit. At one stack, near the northern mouth of the trail, a broken, historic period horseshoe was wedged in among the rocks. No other artifacts were noted along the trail. A projectile point and several volcanic glass flakes were recorded in the northern kipuka during a brief reconnaissance survey conducted by the University of Oregon in 2000 (Henrikson 2001).

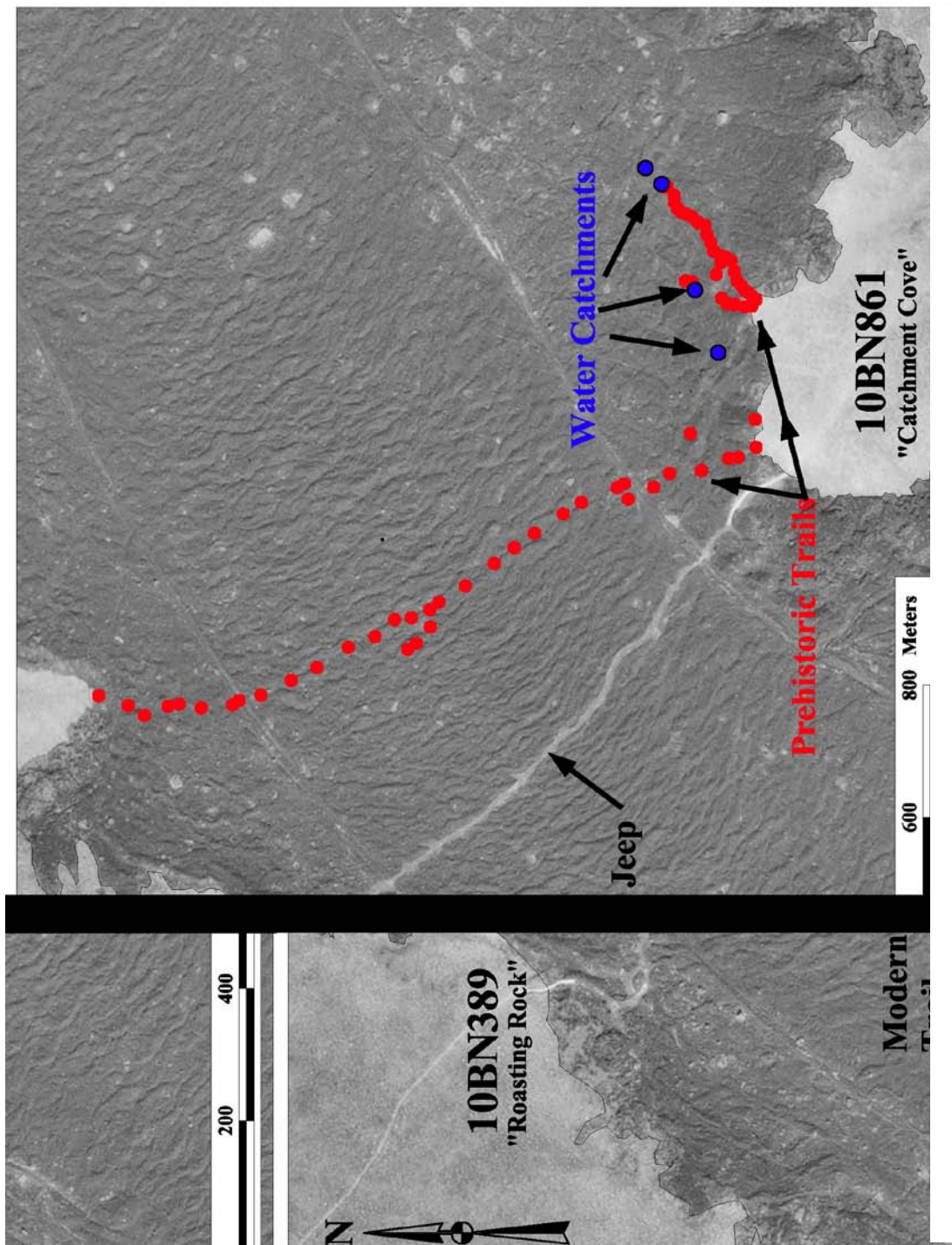


Figure 5.57. Orthophoto showing the relationship of 10BN389 and 10BN861, as well as the location of the Finger Cutoff trail and water catchments near 10BN861.



Figure 5.58. Facing north near the northern mouth of the Finger Cutoff trail, white arrows indicate a section of the trail. A large cairn is on the right.



Figure 5.59. Catchment feature in the lava flow north of site 10BN861.



Figure 5.60. One of several circular rock features along the edge of the lava flow at 10BN861.

Management Recommendations

Based on the results of the 2005 excavations and previous surveys in 2004 and 1996, site 10BN861, the Catchment Cove site, should be considered eligible for nomination to the NRHP. Though sediments at the site appear to be deflated, the surface of the site contains a large quantity of debitage, ceramic fragments, ground stone fragments, diagnostic projectile points, point fragments and bifaces indicative of a seasonal base camp. Projectile points recovered from the site also suggest that this locale was visited repeatedly for thousands of years. It is also likely that portions of the site abutting the lava flow may contain intact, buried cultural deposits. No obvious signs of looting were noted at the site, however, it is likely that the area is visited by local surface collectors. During excavations, University of Oregon archaeologists were monitored by four-wheeler riders who drove through the site area, but did not approach the team. Four-wheeler tracks were noted along much of the lava edge during the 2005 surveys. Regular monitoring of the site by BLM staff is recommended.

The Drifting Gene Site (10MA421)

The Drifting Gene Site was initially discovered and recorded during the 2005 University of Oregon Archaeological Field School. The site consists of a sparse lithic scatter surrounding an ephemeral pond adjacent to the lava edge (Figures 5.60, 5.61 and 5.63). Dense vegetation obscured the ground surface at the time of survey. One diagnostic point and one mahogany obsidian biface fragment were located during the pedestrian survey. The projectile point (Figure 5.62) is caramel-colored cryptocrystalline silicate and is typologically similar to projectile points recovered from the Wasden Site (Butler 1968). That Wasden Site contained an extensive “bison bone bed” associated with lanceolate points buried below Mazama tephra. Radiocarbon dates of 7100 ± 350 ry BP, 7750 ± 210 ry BP, and 8160 ± 260 ry BP were extracted from bone and charcoal found beneath the volcanic ash (Butler 1968). Because the lanceolate points from the Wasden site were similar in age and morphology to lanceolate points found at the Pine Spring site (Sharrock 1966), Butler labeled them as “Agate Basin”.

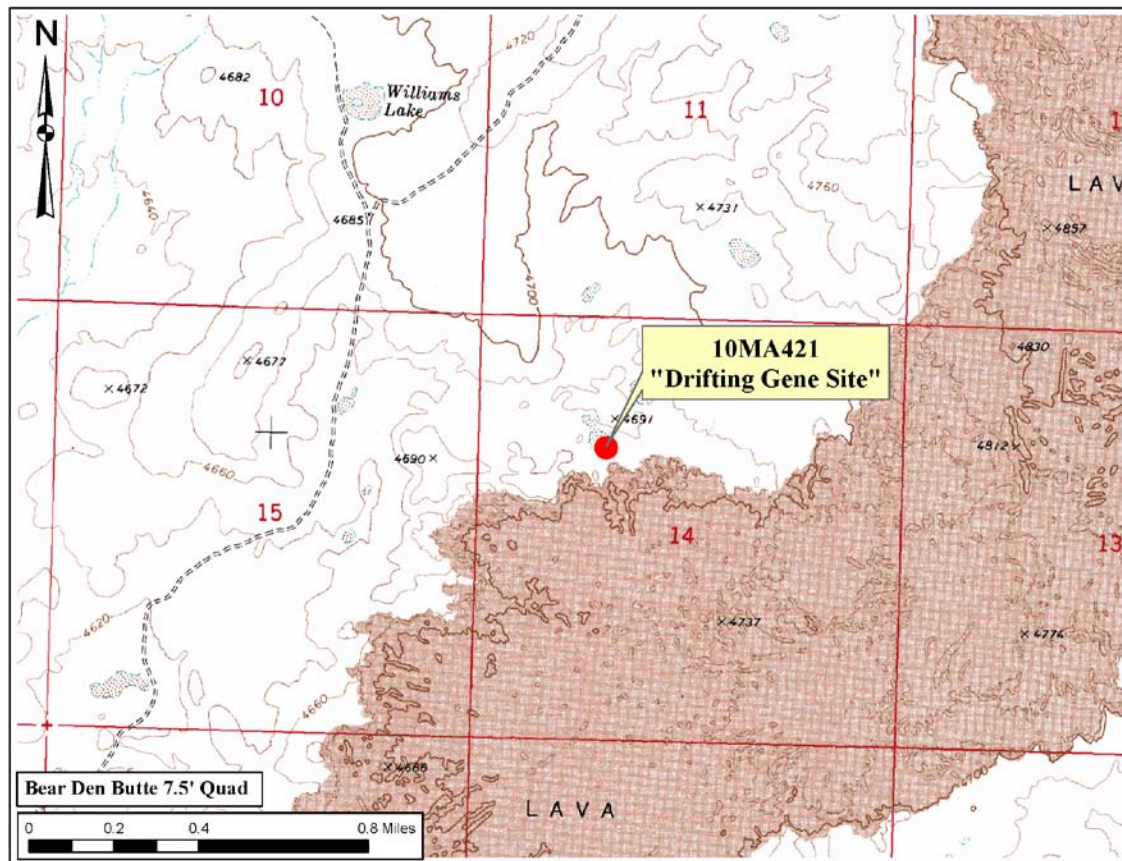


Figure 5.61. Area map showing location of site 10MA421.

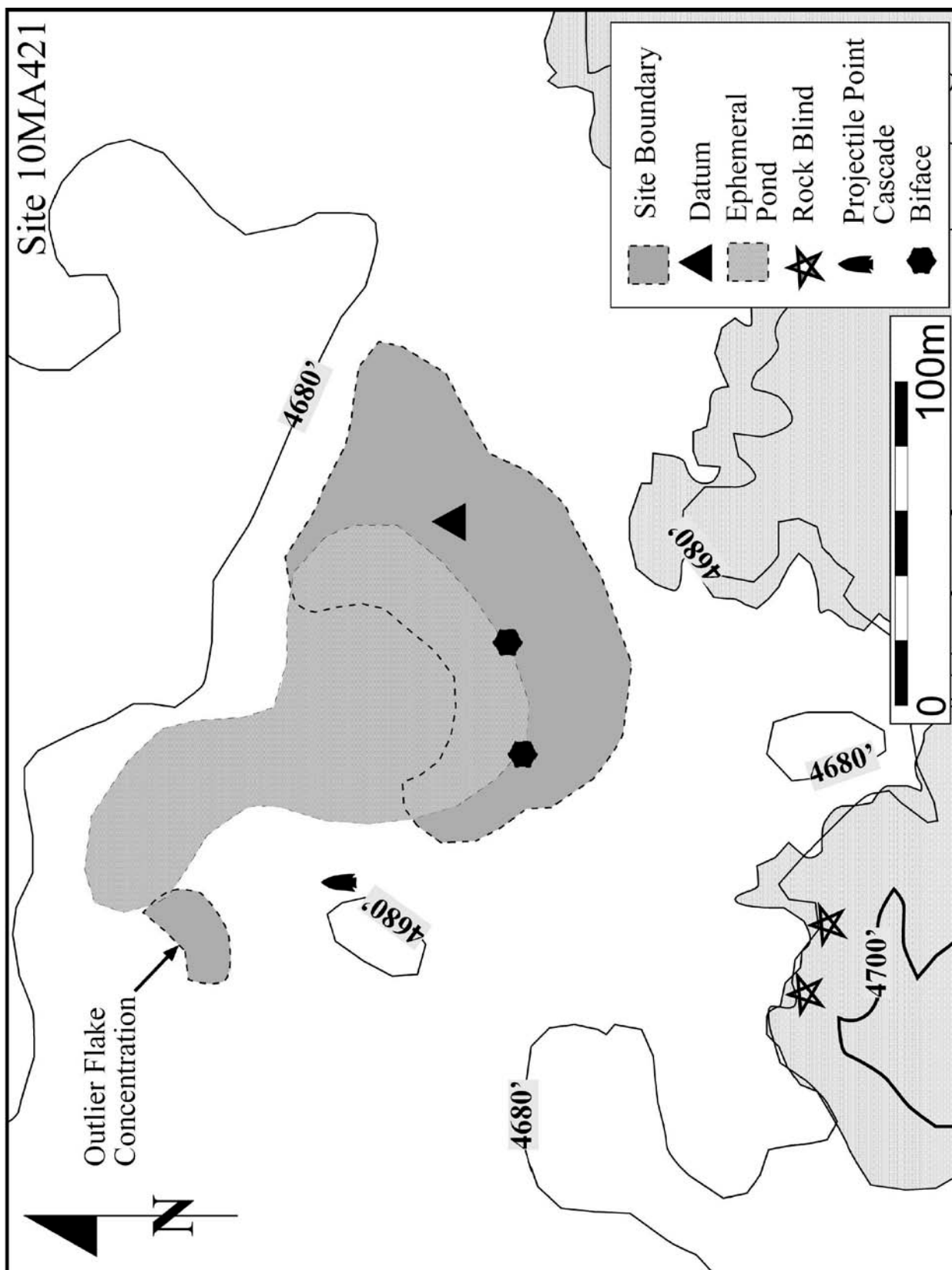


Figure 5.62. Site map for site 10MA421, showing locations of test units.



Figure 5.63. Agate Basin style projectile point recovered during pedestrian survey of Site 10MA421.

Because of the potential antiquity of the projectile point recovered from the Drifting Gene Site, limited test excavations were conducted on July 25 and 26, 2005. The excavations consisted of one (1) 1 x 1 meter unit and eleven (11) 50 x 50 cm units placed in accreting sediments along the periphery of the ephemeral pond (see Figure 5.61). Material was excavated in 10 cm levels, and screened through 1/8th inch mesh. All units were mapped to absolute coordinates with handheld GPS units; all coordinates refer to the UTM grid referenced to the NAD83 datum. Units were assigned additional address coordinates referenced to two arbitrary site datum points (see Figure 5.61, “D1 and D2”).

Stratigraphy

Test units were generally placed at 20 meter intervals. Test Units 1 through 6 were located in sandy, unconsolidated sediments along the southern edge of the ephemeral pond. Test Units 7-12 were placed in dunal deposits along the edge of a small basalt lobe on the west side of the ephemeral pond. While the sediments in Test Units 1-6 became extremely compacted at relatively shallow depths, Test Units 7-12 were comprised of sandy deposits to depths exceeding a meter.

Sediments in Units 1-6 consisted of three primary stratigraphic layers (Figure 5.64). The uppermost layer, Stratum I, consists of light brown, loose, silty aeolian sediments. This stratum also contains grass and rootlets and small, subangular basalt cobbles. Stratum II is more compacted and comprised of coarser, dark brown silty, sand. Roots and organic

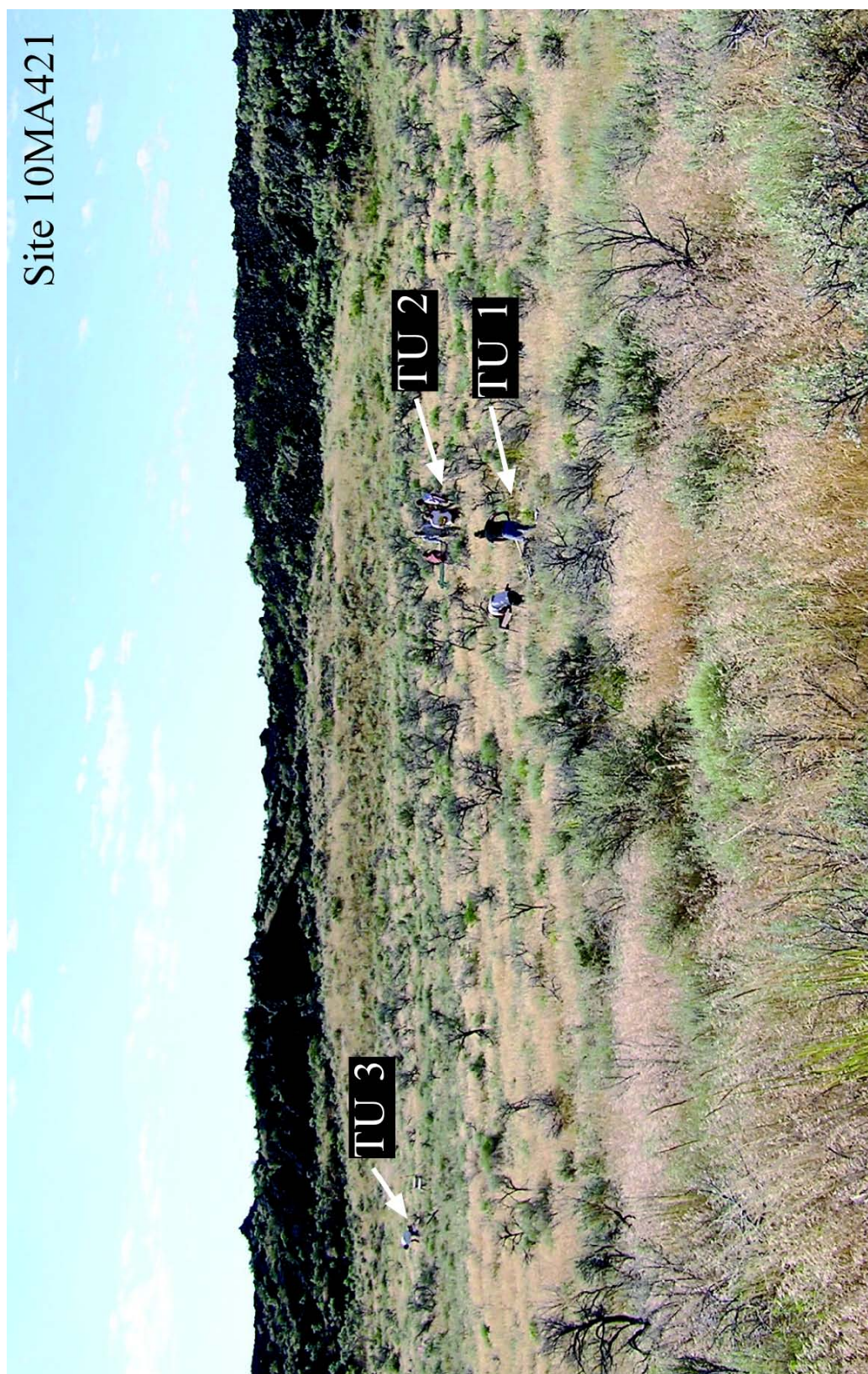


Figure 5.64. Several test units at 10MA421, viewed facing southeast from atop a basalt lobe on the west side of the site.

matter drop to negligible levels in this stratum, with only minimal quantities of subangular basalt cobbles. The sediments in Stratum III consist of a highly compacted light tan clayey loam. No rocks or gravels are present in this layer, with the exception of Test Unit 5, which was terminated at 50cm due to the presence of a large subangular basalt slab running across floor of the unit.

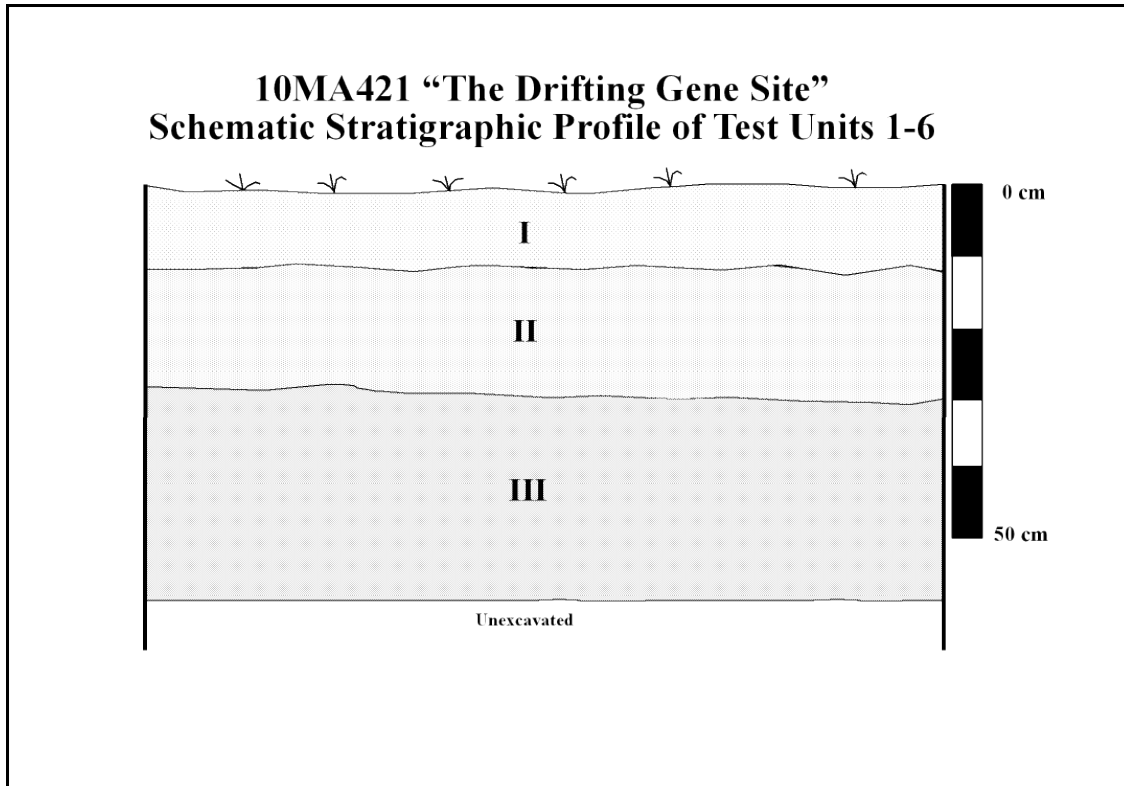


Figure 5.65. Schematic stratigraphic profile of 10MA421 test units 1-6, located along the edge of the ephemeral pond.

In Test Units 7-12, located in the dunal deposits at the base of the lobe, Strata I through III are underlain by two additional strata (Figure 5.65). Stratum IV begins around 50cm below surface. Strata IV and V are comprised of light tan clayey loam, with clay content and compaction increasing with depth. An ash lens was encountered in Unit 10 at a depth of 95cm below surface. The lens, covering the floor of the unit continues to a depth of 105cm. The ash appears to be volcanic tephra, similar to Mazama ash in consistency and color. A sample of the ash was collected for further analysis.

Drifting Gene Site (10MA421)

Test Unit 10 East Wall Profile

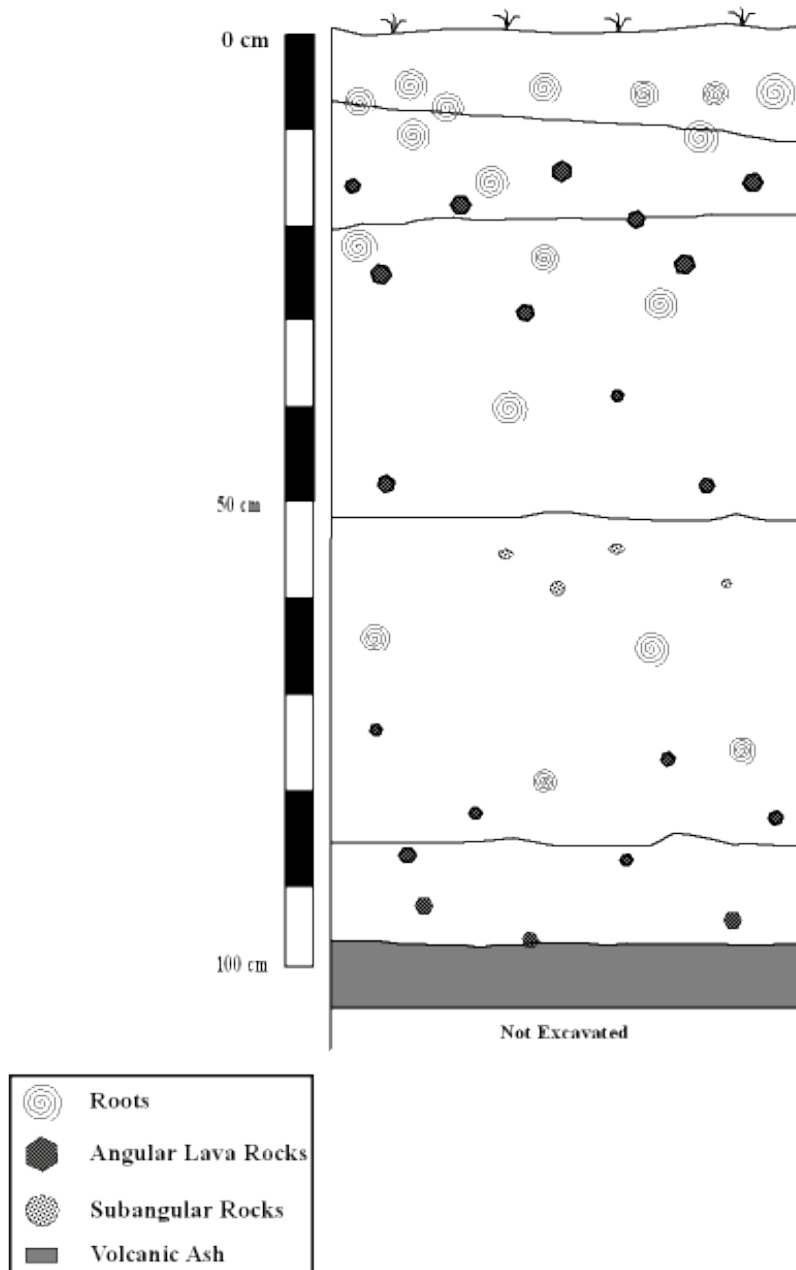


Figure 5.66. Stratigraphic profile of the east wall of Test Unit 10, located in accreting sediments on the edge of the basalt lobe at the western edge of 10MA421.

Excavated Lithic Assemblage

Sediments at the site were mostly devoid of cultural materials, however seven (7) of the units produced a total of 45 waste flakes (Table 5.18). Flakes were sparsely scattered throughout 70cm of deposits, with 84% (38 flakes) in the top 40cm. Obsidian was the dominant material type, representing roughly 87% (39 flakes) of the total assemblage, with CCS making up the remaining 13% (6 flakes). Small, interior flakes comprised 96% of the total lithic assemblage. Five of the six CCS flakes were interior flakes; the remaining flake was a secondary reduction flake. Thirty-eight of the thirty-nine obsidian flakes were interior flakes; the remaining flake was a broken primary reduction flake weighing 0.4g. No diagnostic projectile points, or other tools or perishables were recovered during the course of excavations.

Table 5.18. Distribution of Waste Flakes Recovered during Excavations at 10MA421.

TU/Unit:	0-10cm			10-20cm			20-30cm		
Quad	P	S	T	P	S	T	P	S	T
TU1			1						
TU2:A			2			7		1	4
TU7:A						2			2
TU8									
TU10			1						
TU11									1
TU12			6			1			
Total			10			10		1	7
Level Total	10			10			8		

TU/Unit:	30-40cm			40-50cm			50-60cm		
Quad	P	S	T	P	S	T	P	S	T
TU1									
TU2:A									
TU7:A									
TU8	1		4						6
TU10									
TU11									
TU12						1			2
Total	1		4			1			8
Level Total	5			1			8		

Key: P=Primary reduction stage, S=Secondary reduction stage, T=Tertiary reduction stage

Table 5.18 (continued). Distribution of Waste Flakes Recovered during Excavations at 10MA421.

TU/Unit:	60-70cm			70-80cm			80-90cm		
Quad	P	S	T	P	S	T	P	S	T
TU1									
TU2:A									
TU7:A			2						
TU8									
TU10									
TU11									
TU12									
Total			2						
Level Total	2			-			-		

TU/Unit:	90cm-1m			Wall fall			Total		
Quad	P	S	T	P	S	T	P	S	T
TU1						1			2
TU2:A								1	13
TU7:A									6
TU8							1		10
TU10									1
TU11									1
TU12									10
Total						1	1	1	43
Level Total	-			1			45		

Key: P=Primary reduction stage, S=Secondary reduction stage, T=Tertiary reduction stage

Faunal Assemblage

The 2005 test excavations at the Drifting Gene site produced a very limited assemblage of faunal remains. In all, three of the twelve test units produced a total of nine bone and tooth enamel fragments (Appendix G). Two nondiagnostic small mammal bone fragments were recovered from the 10-20cm level, and two similar fragments were found in the 20-30cm level of Test Unit 2. Test Unit 7 produced three fragments of artiodactyl tooth enamel, possibly calcined, from the 30-40cm level. One nondiagnostic small mammal bone fragment was recovered from the 50-60cm level of Test Unit 8.

Management Recommendations

Although the Drifting Gene site contains relatively limited subsurface cultural deposits in areas subjected to test excavations, the recovery of what appears to be an early Holocene projectile point from the surface suggests that the site may yet have the potential to provide much needed information on early regional prehistory. The presence of volcanic tephra at substantial depths in Test Unit 10 indicates considerable aeolian deposition in portions of the site. Due to the limited nature of the test units, a very early occupation of the site should not be ruled out at this point. Therefore, the site should be considered potentially eligible to the NRHP until determined otherwise. Regular monitoring of the site is recommended.

SECTION VI

The 19th Century Shoshone-Bannock Seasonal Round

The eastern Snake River Plain, above Shoshone Falls, was occupied by Fort Hall and Lemhi Shoshone and Bannock groups. According to Steward (1938), Swanson (1972) and Murphy and Murphy (1986), the Shoshone and Paiute-speaking Bannocks who wintered in the Fort Hall bottoms just north of American Falls dispersed each spring in a number of directions. These small groups usually entailed about six families on horseback led by an “elderly man”. Some travelled west to Shoshone Falls to fish during the spring salmon runs, while others turned east across the continental divide into Wyoming in search of bison (Figure 6.1). Some headed into the South Hills for elk, deer, berries, and pinyon nuts and still others moved northwest across the Snake River Plain to harvest camas on the Camas Prairie along with the western Shoshone. In the early fall, additional groups often moved east, over the continental divide, into western Montana and Wyoming to stage communal buffalo hunts. Following the hunts, groups returned to the Fort Hall Bottoms for winter. However, if bad weather came before they returned, they were forced to spend the winter on the eastern side of the divide.

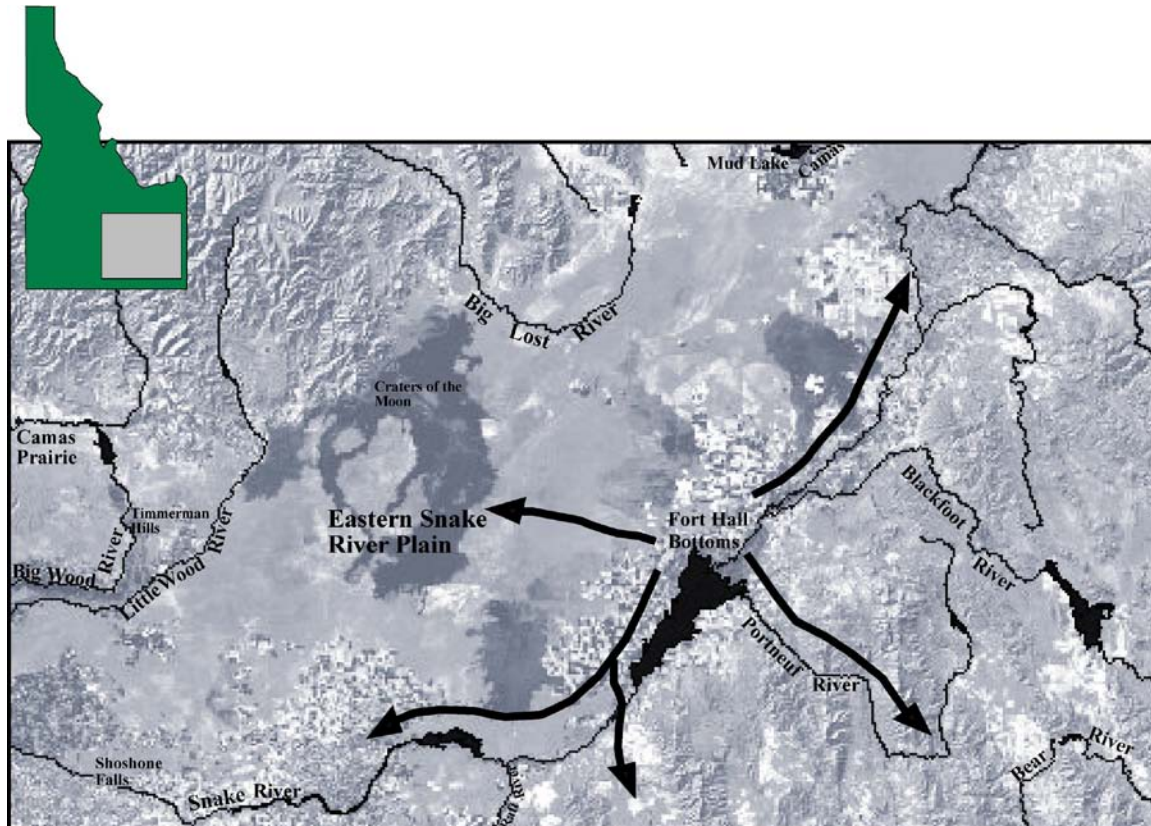


Figure 6.1. Routes of springtime movements among Shoshone-Bannock wintering in the Fort Hall Bottoms (from Murphy and Murphy 1986).

Steward (1938) noted that no individual group travelled in the same direction two years in a row, but that at least one individual included in each group was knowledgeable of the terrain and resources of their destination.

Steward (1938) believed that the Shoshone and Bannock of the Fort Hall Bottoms did not employ this subsistence round until after the acquisition of the horse. In fact, he presented a rather bleak picture of the eastern Snake River Plain, referencing historical journals that describe the area as desolate, arid and limited in resources, especially game. Prior to their acquisition of the horse, Steward believed the Shoshone groups occupying the eastern Snake River Plain had a similar economy to that of the Western Shoshone, who lived below the falls. As he saw it, although it was a lengthy journey on foot, eastern groups travelled to Salmon Falls for salmon or far across the desolate plains to the Camas Prairie, for these were the only reliable resources available.

Based on current evidence, the 19th Century Shoshone-Bannock seasonal round also suggests that a broad range of foods were included in the diet. Although some people left the Fort Hall Bottoms to pursue bison in western Montana and Wyoming, many others pursued a variety of resources across the Snake River Plain, in the South Hills and the Camas Prairie.

Lowie (1909), Steward (1938) and Murphy and Murphy (1960) provided much subsistence information in their ethnographies of the Shoshone-Bannock. Turner et al. (1986), building on their work, gathered additional information in the early 1980s from several Shoshone-Bannock informants regarding geographic place names and natural resources. The research started from the fact that language expresses “cognitive, semantic, or ethnoscientific categories of reality” (Turner et al. 1986:6). The analysis identified how the Shoshone language organized living creatures according to their specific relationship with water (i.e., do they live under water or along the shore?) and listed plants and animals named as having “edible parts” (Tables 6.1 and 6.2).

Table 6.1. Animals with Edible Parts (Turner et al. 1986).

fish	elk	squirrel	duck
salmon	bison	cottontail	birds
salmon eggs	horse	jackrabbit	crane
Dolly varden trout	deer	snowshoe rabbit	goose
sucker	moose	rabbit	
springtime salmon	bighorn sheep	mountain squirrel	
wood salmon	antelope	rockchuck	
white fish			
trout			

Table 6.2. Plants with Edible Parts (Turner et al. 1986).

<i>Allium</i> sp. (wild onion)	<i>Camassia quamash</i> (camas)
<i>Descurainia sophia</i> (tansy mustard)	<i>Rubus parviflorus</i> (thimble berry)
<i>Ribes aureum</i> (wax currant)	<i>Ribes</i> spp. (gooseberry)
<i>Crataegus rivularis</i> (river hawthorn)	<i>Rosa</i> sp. (wild rose)
<i>Prunus virginiana</i> (chokecherry)	<i>Fragaria</i> sp. (wild strawberry)
<i>Malva neglecta</i> (cheese weed, mallow)	<i>Epilobium angustifolium</i> (fireweed)
<i>Vaccinium</i> sp. (huckleberry)	<i>Asclepias speciosa</i> (milkweed)
<i>Sambucus</i> spp. (elderberry)	<i>Lomatium dissectum</i> (desert parsley)
<i>Perideridia gairdneri</i> (yampa)	<i>Plantago major</i> (indian wheat)
<i>Urtica dioica</i> (stinging nettle)	

The lists offer a good picture of the most important regionally available and ethnographically utilized food resources. However, such food resources are not randomly encountered across the Snake River Plain, but are concentrated in a few relatively rich resource patches. These include linear patches along the few perennial water sources in the region, ephemeral ponds, and cold storage caves.

Table 6.3 presents a representative list of resources that would have been available in each of the resource patches identified on the eastern Snake River Plain. This list also includes gophers and grasses, which have been identified as being important in other parts of the Great Basin (Simms 1987) and would likely have been included in the diet of the Shoshone-Bannock.

Table 6.3. Plants and Animals Available in Snake River Plain Resource Patches.

Linear River Corridors	Ephemeral Ponds	Cold Storage Caves
Bison	Bison	Bison
Deer	Deer	Water
Antelope	Antelope	
Jackrabbit	Jackrabbit	
Marmot	Marmot	
Cottontail Rabbit	Cottontail Rabbit	
Waterfowl	Waterfowl	
Sage Grouse	Sage Grouse	
Fish	Gopher	
Gophers	Squirrel	
Squirrel	Sunflower	
Sunflower	Wild Rye	
Wild Rye	Rice Grass	
Rice Grass	Shrimp	
Sedge	Sedge	
Squirreltail Grass	Squirreltail Grass	

The availability of each of these resources on the eastern Snake River Plain varies according to season. Linear river patches, with their consistent moisture and good soils, contain the widest variety of resources. In springtime, ephemeral ponds provide fresh water and a population of freshwater crustaceans (fairy and tadpole shrimp) that also attract waterfowl. Fresh water is a primary draw for large and small game species common to the area. Cold storage caves contain water at any season, and during periods of such use, previously cached meat stores. Fluctuations in the abundance of resources must have occurred from year to year and over longer intervals as well however, due to short-term fluctuations in moisture regimes. During drought conditions certain ephemeral ponds may not have been available, forcing a heavier reliance on resources at somewhat greater distances, or on linear river corridors.

Shoshone Falls, located in the Snake River Canyon just east of Twin Falls, Idaho, was the easternmost limit of anadromous fish runs along the Snake River. According to Steward (1938), this prominent geologic feature (which rises over 200 feet within the river canyon) created distinct differences between the subsistence practices of groups living below the falls and those living above it. The Shoshone groups residing below the falls relied on fishing as a principal food source. However, root and seed crops also represented an important part of their resource base as with other plateau groups (Meate 1990). Following the spring salmon runs, small family groups dispersed, moving north over the Bennett Hills to the Camas Prairie where camas and other root crops were available throughout the summer (Statham 1982). The Camas Prairie, with its numerous natural springs, plentiful game and extensive marshlands, not only provided more than adequate subsistence during the summer months, it also served as an important hub of trade between Northern Shoshone, Nez Perce, Flathead and Pend d'Oreilles during historic times (Liljeblad 1957). Most of the camas harvested by the Northern Shoshone was processed and dried for transport back for storage in their winter encampments along the river (Steward 1938).

Large Game Hunting

Shoshone-Bannock groups were among the earliest Native Americans to acquire horses from the Spanish in the late 1600s and many ethnographers speculated that attaining the horse led the Shoshone-Bannock to acquire many Plains cultural traits (Lowie 1909, Murphy and Murphy 1960:326, Steward 1938, Liljeblad 1972). However, there is no evidence from the archaeological record that the subsistence round changed dramatically following the acquisition of the horse (Henrikson 2002). Although mass bison kills were common on the Great Plains throughout prehistory, no mass bison kills have been discovered on the eastern Snake River Plains and Shoshone-Bannock informants reported that bison were never driven over cliffs (Murphy and Murphy 1960:309).

According to the ethnographic data, bison hunting among the Shoshone-Bannock was a cooperative effort conducted primarily during the fall (Lowie 1924, Murphy and Murphy 1960, Steward 1938). One account of a pedestrian bison hunt describes four or five men on snowshoes driving a small group of bison into deep snow and dispatching some of them with bows and arrows. A good hunter might kill one or two animals and the entire

group would help transport the meat and hide back to camp (Lowie 1924). An equestrian hunt required each hunter to have at least two horses (Murphy and Murphy 1960). One horse was used for traveling, and the other was used during the hunt. The latter was “a swift horse trained to run closest to the buffalo while avoiding the animal’s horns. The herd was surrounded and run, and the flanking hunters shot arrows and launched spears at the prey. When a buffalo was killed, the hunter threw an arrow or some personal, identifying possession on the carcass to mark it as his” (Murphy and Murphy 1960:309). Steward (1938:204) also reported that equestrian hunts involved dispatching bison with fast horses, with each hunter killing no more than three or four bison.

In contrast, deer and antelope were often taken by individuals or small groups of hunters. “To supplement the food laid up during the summer, small groups, but never the entire band, went into the plains west of the Snake River to hunt antelope” (Steward 1938:205). “Antelope hunting west of the Continental Divide called for some joint endeavor, though not on the scale of the buffalo hunt” (Murphy and Murphy 1960:308).

Food Sharing

Shoshone-Bannock food sharing practices are not well documented, however some ethnographic data exists to indicate that the rules for sharing bison meat differed from those associated with other game. Steward (1938:204) reports that older men were responsible for butchering bison immediately following a successful hunt and dispersed the meat “equally among all the families”.

However, deer and antelope were not shared as widely and when shared, close kin received the largest amounts (Steward 1938). “A man could not divide his kill of deer or antelope among all the neighboring families as was customary among the Western Shoshone. But women from the related families which made up his own cluster of camps came to his house to receive shares, close relatives receiving more than others” (Steward 1938:205). According to Lowie (1909:185), due to “the scarcity of food, the customary distribution of [smaller] game among all of the members of a band seems to have been suspended at times, each hunter preserving his booty for himself and his immediate family”.

Ethnographers report that bison meat represented a significant portion of the diet during winter months (Murphy and Murphy 1960:307). In order to preserve meat for lengthy periods, it was “dried and pounded and placed in large rawhide bags” and stored within individual households (Murphy and Murphy 1960:307). There is no mention of freezing meat during the colder months. Winter caches were often established for plant foods and were not located inside family dwellings:

“Food caches were maintained near camp, but they were generally resorted to only in the spring, when the dried food kept in the lodges was exhausted. The location of the cache was known only to the family that made it. Caches and their contents were considered private property. Dried roots and berries, and salmon were generally kept in the underground caches, but not meat” (Murphy and Murphy 1960:327).

SECTION VII

SUMMARY

Due to the combined efforts of the BLM, the NPS and the University of Oregon, roughly 45,000 acres of the Monument have been intensively inventoried for archaeological resources (see Figure 3.1). Although these surveys do not represent a random or stratified sample of the research area they have been sufficiently numerous and extensive to provide a good view of the region's archaeology (see Appendix A). Through these efforts, over 600 prehistoric cultural resources have been documented on the Monument (Figure 7.1, see Appendix B). In addition, at least seven prehistoric archaeological sites on the Monument have been subjected to subsurface investigations within the past 25 years (see Figure 5.1). These include Baker Caves (10BN153 and 154), Scaredy Cat Cave (10MA30/143), Bowl Crater (10BN1066), Alpha Cave (10PR641), the Roasting Rock Site (10BN389), Catchment Cove (10BN861) and the Drifting Gene Site (10MA421). The Roasting Rock, Catchment Cove and Drifting Gene sites were tested during the 2005 University of Oregon Archaeological Field School to gain information on the geomorphology of open sites on the eastern Snake River Plain. Limited test excavations were also performed at Alpha Cave in 2005 to determine whether intact cultural deposits were still present in the cave.

In examining the distribution of prehistoric sites within the Monument, some patterns emerge that appear to conflict with a predictive model developed for the eastern Snake River Plain (Henrikson 2002). The temporal distribution of sites in the broad region surrounding the Monument indicates that many ephemeral ponds were used repeatedly throughout the middle and late Holocene, giving evidence of long term reliance on these resource localities over millennia. However, the study performed here suggests that, in the area containing the Monument, recent basalt flows were utilized to a greater degree than ephemeral ponds located on the open sagebrush steppe. Depressions in the lava flow near many archaeological sites are now suspected of containing water through the spring months (see Section V).

Based on the geospatial analysis of site distribution patterns on the Monument (see Section III), site density increases significantly within a distance of 300 meters of the lava edge. Using this distance as the delineating factor, roughly 22,900 acres of "lava edge" has been intensively surveyed within the Monument and roughly 261 prehistoric cultural resources (including prehistoric sites and isolates) have been recorded as part of these surveys. Based on these results, the density of prehistoric sites encountered along the lava edge is roughly 0.01sites/acre.

Almost an equal amount (roughly 21,400 acres) of the open sagebrush steppe within the Monument has been intensively surveyed, with the documentation of 90 prehistoric cultural resources (both sites and isolates) in these areas. Therefore, the estimated density of prehistoric sites in open steppe is roughly 0.004sites/acre. Of course, it should be noted that the frequency of sites encountered on open steppe may be influenced by the density of ephemeral ponds in a given area.

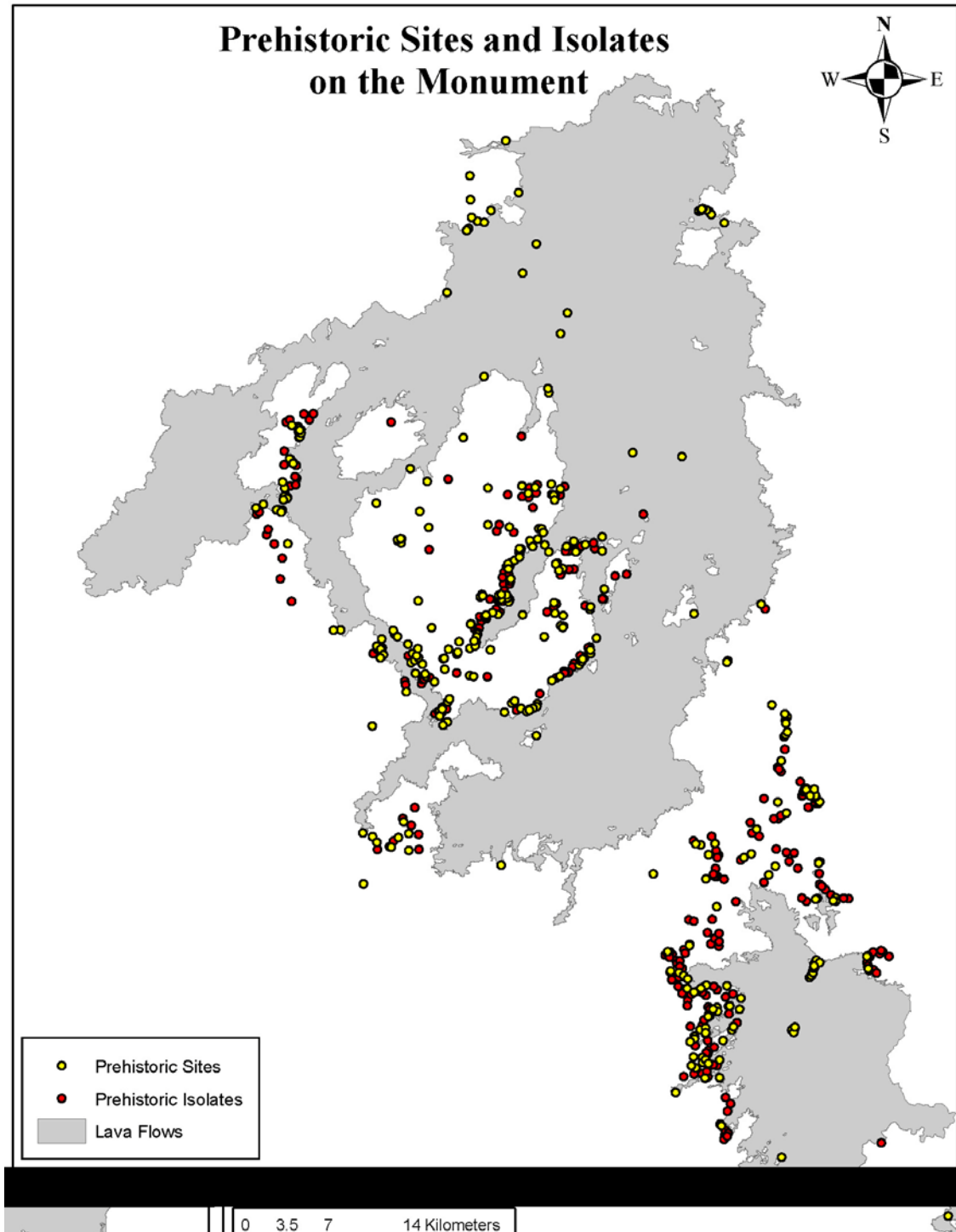


Figure 7.1. Distribution of recorded prehistoric sites and isolated finds on the Monument.

While over 600 prehistoric sites and isolated finds are presently known to exist within the Monument, as of 2005, only 18% of the Monument has been intensively inventoried (of the 250,000 acres not covered in basalt flows). There are at least 50,000 acres of lava edge and 150,000 acres of open steppe that have yet to be explored. Based on the results of previous surveys, there are likely to be an additional 500 cultural resources (both prehistoric sites and isolates) encountered at the lava edge and 600 additional cultural resources found on the sagebrush steppe. It is more than likely that some of these resources will consist of seasonal base camps and, perhaps, residential bases. In addition, aboriginal trails recorded during the 2005 archaeological investigations at 10BN389 and 10BN861 may represent only the “tip of the iceberg”. It is suspected that numerous trails cross the basalt flows within the Monument. Locating and documenting these trails will lead to greater insights into the prehistoric use of the area.

Due to the density of prehistoric archaeological sites likely to be encountered within 300 meters of the lava edge, these areas should be considered “high archaeological sensitivity” zones (Figure 7.2). Unless subsurface investigations can be performed, these zones should generally be avoided by any ground disturbing activities. In addition, the lava edge requires regular monitoring by BLM and NPS personnel to reduce the potential for illegal surface collection and excavations. Based on the 2005 test excavations at 10BN389, it is apparent that accreting sediments along the lava flows can obscure significant subsurface cultural deposits and features.

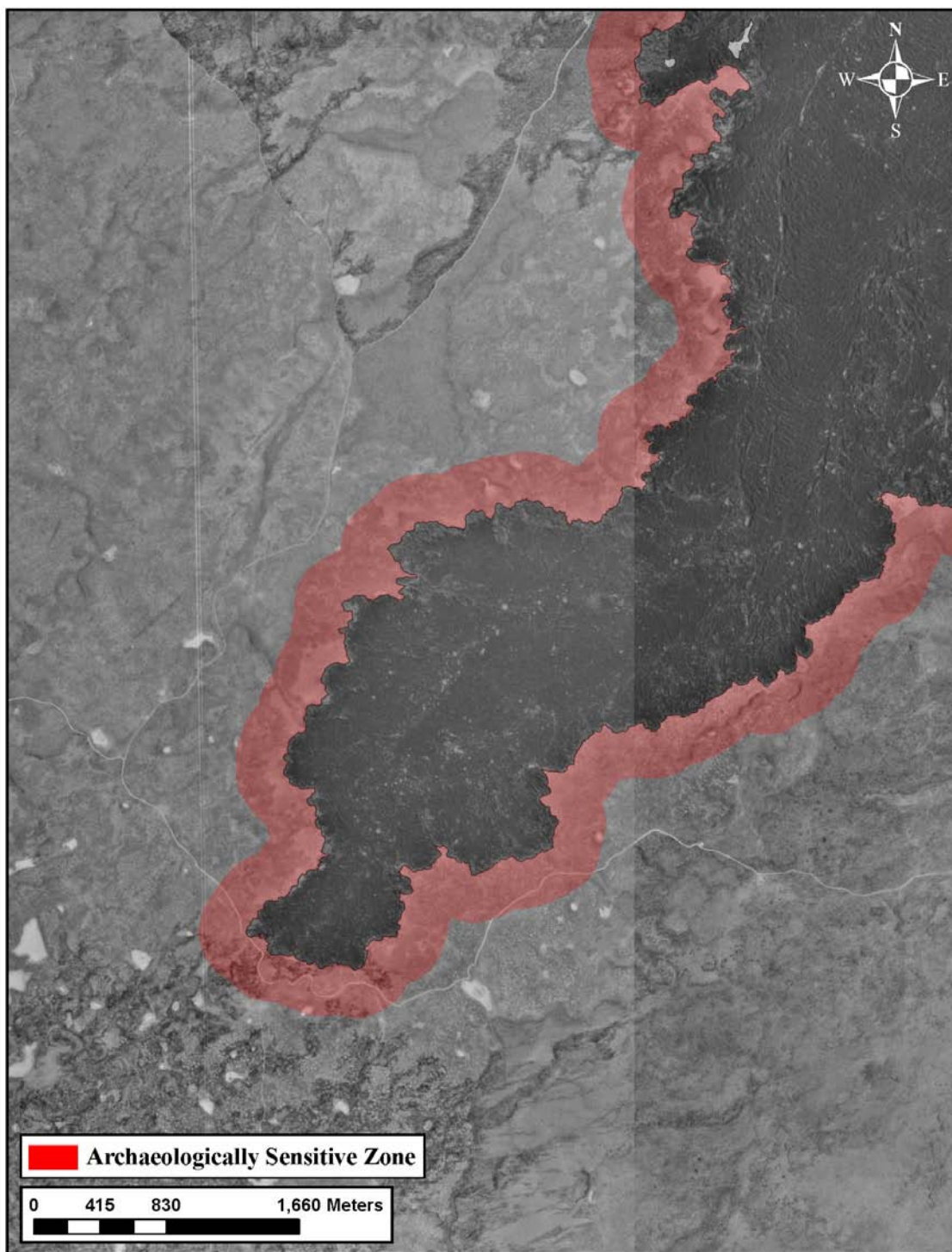


Figure 7.2. Example of High Archaeological Sensitivity Zone on the Monument.

RECOMMENDATIONS

Based on the analysis of prehistoric archaeological data within the Craters of the Moon National Monument and Preserve, Holocene lava flows clearly need to be considered in any investigation of pre-contact Shoshone settlement and subsistence patterns on the eastern Snake River Plain. The data indicate that, in the region containing the Monument, the lava edge was a preferred location whether groups intended to stay overnight or for longer periods. Recent test excavations on the Monument also suggest that, during the last 4000 years, there were perhaps less obvious incentives for camping at the lava edge. The more intense utilization of lava edges during the late Holocene may be correlated with an overall increase in site density in the region. The number of archaeological sites that can be assigned to the late Holocene on the Monument is more than double the number of middle Holocene sites.

The presence of what appear to be defensive structures at base camp 10BN389 and the inhospitable location of the Lost Lava Rings residential base suggest that the variables responsible for site distribution patterns as well as the character of late Holocene sites on the eastern Snake River Plain may be more complex than previously thought. Although the availability of food and water were critical in the cold high desert, recent discoveries on the Monument suggest that intercommunity stress associated with late Holocene population pressures may have also greatly influenced where people chose to stay. These intriguing developments should be pursued as part of future investigations of the region. Based on the geospatial analyses performed here, is predicted that an additional 1100 prehistoric sites and prehistoric isolated finds are likely to be encountered during future surveys within the Monument.

As noted in the introduction, the information regarding previous archaeological surveys on the Monument is currently incomplete. A more accurate GIS database of previous investigations should be constructed in the near future. This database should include the numerous small compliance surveys conducted by the BLM or NPS (including those performed by Idaho State University in the 1960s and 1990s) as well as the large fire rehabilitation surveys conducted by the Burley and Idaho Falls field offices of the BLM. In addition, those sites and isolates recorded in the original Monument boundaries need to be incorporated into the cultural resource inventory.

Some irregularities exist in the artifact records and site documentation, particularly for those sites recorded within the original Monument boundaries. While the artifacts collected by Sneed (1967) and others are currently housed at the Craters of the Moon National Monument and Preserve Headquarters, specimens collected during the numerous BLM fire rehabilitation surveys are curated at the Southeastern Repository of the Archaeological Survey of Idaho. Upon completion of the GIS database, a comprehensive artifact catalog should be created for all specimens recovered during previous pedestrian surveys and/or subsurface investigations on the Monument. Although many of the projectile points from previous BLM surveys have been used in obsidian sourcing studies (see Section IV), other artifacts (including the specimens collected by Sneed) have never been examined or analyzed. Once the catalog is complete, the

appropriate analyses should be performed. Following this, decisions should be made regarding the most suitable curatorial facility for these items.

Although not within the scope of the current study, research should be conducted on the numerous historic sites that have been documented within the Monument. Many of these are associated with 19th and 20th Century sheep herding and ranching activities and can provide valuable insights into early Euroamerican use of the area. The northern end of the Monument also contains Goodale's Cutoff of the Oregon Trail.

If the predictions regarding site densities are accurate, the Monument contains nearly 1500 prehistoric sites that may be eligible to the NRHP. Previous test excavations at open base camps such as 10BN389 and 10BN861 clearly indicate sufficient intact subsurface deposits to warrant NRHP eligibility and many more base camps are likely to be discovered during future surveys. In addition, due to their significant contribution to our understanding of regional prehistory, Baker Caves (10BN153 and 154), Scaredy Cat Cave (10MA30/143) and Alpha Cave (10PR641) are also recommended as eligible.

Because of the huge volume of potentially significant properties within its boundaries, it is recommended that the Monument be nominated as a National Register District and afforded the protection that such a designation can provide.

Appendix A: Intensive Archaeological Surveys on the CMNM

Year	Square Meters	Square Miles	Acres	Survey Name
Unknown	189171.759	0.631	403.934	Unknown
1996	3878263.520	1.497	958.336	Richfield Fire Complex
1996	1007701.450	0.389	249.007	Richfield Fire Complex
Unknown	2938095.071	1.134	726.016	Unknown
Unknown	7692563.997	2.970	1900.866	Bear Trap Fire Rehab
Unknown	3603544.572	1.391	890.452	Fire Rehab (GCM)
Unknown	19409337.709	7.494	4796.133	Fire Rehab (GCM)
Unknown	11697047.712	4.516	2890.392	Fire Rehab (GCM)
Unknown	259544.971	0.221	141.570	Fire Rehab (GCM)
Unknown	2226089.070	0.859	550.076	Line Shack Fence Realignment
Unknown	1543819.320	0.596	381.485	Whiskey Butte Fire Rehab
2000	2929600.715	1.131	723.917	Fire Rehab (Golder)
Unknown	2830749.624	1.093	699.491	Unknown
Unknown	105770.910	0.041	26.549	Unknown
Unknown	626855.673	0.242	154.899	Unknown
Unknown	519632.175	0.201	128.403	Unknown
Unknown	28424864.857	10.974	7023.533	Unknown
1992	555529.008	0.214	137.274	1992 BLM Recon Survey
1992	16733644.497	6.461	4134.957	1992 Great Rift Fire Rehab
2001	1159070.767	0.448	286.411	2001 UO Laidlaw Park Survey
2001	614903.338	0.237	151.945	2001 UO Laidlaw Park Survey
2001	956462.751	0.369	236.346	2001 UO Laidlaw Park Survey
2001	316720.718	0.122	78.263	2001 UO Laidlaw Park Survey
2001	506191.660	0.195	125.082	2001 UO Laidlaw Park Survey
1992	946015.843	0.365	233.765	1992 Potter Butte Fire Rehab
1992	3325809.782	1.284	821.822	1992 Potter Butte Fire Rehab
1992	13439061.919	5.189	3320.851	1992 Potter Butte Fire Rehab
1992	8323427.308	3.214	2056.755	1992 Black Ridge Fire Rehab SE
1992	11221172.463	4.333	2772.801	1992 Black Ridge Fire Rehab
2000	1125350.945	0.434	278.079	2000 UO Laidlaw Park Survey
2000	1970175.589	0.761	486.839	2000 UO Laidlaw Park Survey
2000	2885798.650	1.114	713.094	2000 UO Laidlaw Park Survey
2004	6549557.044	2.529	1618.424	2004 UO East Laidlaw Park Survey
2005	1250094.829	0.483	308.904	2005 UO Laidlaw Park Thumb Survey
2005	1366549.119	0.528	337.680	2005 UO Laidlaw Park Thumb Survey
2005	1552755.025	0.600	383.693	2005 UO Laidlaw Park Thumb Survey

Appendix A: Intensive Archaeological Surveys on the CMNM

2005	142382.415	0.055	35.183	2005 UO Laidlaw Park Thumb Survey
2005	431551.086	0.167	106.638	2005 UO Laidlaw Park Thumb Survey
2005	366146.699	0.141	90.476	2005 UO Laidlaw Park Thumb Survey
2005	7970562.965	3.077	1969.561	2005 UO Laidlaw Park Thumb Survey
2004	6561903.935	0.000	1600.000	2004 Golder Crystal Ice/King's Bowl

Appendix C. Results of Geochemical Analysis of Selected Points from the CMNM.

Trinomial/Specimen Number	Projectile Point Type	Obsidian Source
04-SH-16 01	Avonlea	Big Southern Butte
04-SH-16 03	Avonlea	Big Southern Butte
04-SH-16 04	Cottonwood Triangular	Big Southern Butte
10MA166-1	Desert Side-notched	Big Southern Butte
10BN391-3	Desert Side-notched	Big Southern Butte
10MA143	Desert Side-notched	Big Southern Butte
10MA163-009	Desert Side-notched	Big Southern Butte
05-SH-31	Desert Side-notched	Big Southern Butte
04-ML-08 01	Desert Side-notched	American Falls
10LN335-1	Desert Side-notched	Big Southern Butte
10BN343-1	Desert Side-notched	Malad
10BN273/1	Desert Side-notched	Brown's Bench
10BN273-1	Desert Side-notched	Brown's Bench
10MA168	Desert Side-notched	Bear Gulch
10PR306	Desert Side-notched	Bear Gulch
04-KM-10-01	Desert Side-notched	Bear Gulch
10LN176-8	Desert Side-notched	Owyhee
10BN220-3	Desert Side-notched	Bear Gulch
10BN390-1	Desert Side-notched	Owyhee
10MA0163-001	Desert Side-notched	Timber Butte
10BT74 - 851b	Rose Spring	Big Southern Butte
10BT74 - 851a	Rose Spring	Brown's Bench
10BT74 - 851c	Rose Spring	Brown's Bench
10BN364-1	Rose Spring	Big Southern Butte
04-ML-03	Rose Spring	Big Southern Butte
Craters of Moon - 304	Rose Spring	Big Southern Butte
04-ML-01-01	Rose Spring	Big Southern Butte
10MA100-13	Rose Spring	Wedge Butte
10MA78-1	Rose Spring	Big Southern Butte
10PR641 FS 213-1	Rose Spring	Brown's Bench
Craters of Moon - 925	Rose Spring	Brown's Bench
10BN132-1	Rose Spring	Unknown Basalt

Appendix C (continued). Results of Geochemical Analysis of Selected Points from the CMNM.

Trinomial/Specimen Number	Projectile Point Type	Obsidian Source
10PR641 FS 205-1	Elko	American Falls
10PR299 BTF-2-89	Elko	American Falls
10BT82 - 515	Elko	Big Southern Butte
10BN366-1	Elko	Big Southern Butte
10BN398-1	Elko	Big Southern Butte
10MA163 FS-10	Elko	Big Southern Butte
05-SH-33	Elko	American Falls
10MA88-1	Elko	Big Southern Butte
10LN176-6	Elko	Big Southern Butte
10MA79-1	Elko	American Falls
10MA110-3	Elko	Big Southern Butte
10LN176-3	Elko	Brown's Bench
10LN176-31	Elko	Brown's Bench
10BN132-2	Elko	Brown's Bench
10BN521 (1)	Elko	Brown's Bench
10BN220-5	Elko	Brown's Bench
05-KM-05	Elko	Brown's Bench
10BN399-1	Elko	Brown's Bench
10BN198-1	Elko	Brown's Bench
10BN365-1	Elko	Bear Gulch
04-SH-16 02	Elko	Bear Gulch
04-KM-05-01	Elko	Timber Butte
04-KM-22	Elko	Unknown 1
10MA114-1	Elko	Unknown 1
Craters of Moon - 2355	Gatecliff Split-stemmed	Big Southern Butte
04-SH-13	Knife	Brown's Bench
04-KM-05-02	McKean	Big Southern Butte
05-KM-23	McKean	Big Southern Butte
10MA143	McKean	American Falls
10-MA-143	McKean	American Falls
10-MA-143	McKean	American Falls
10MA100-17	McKean	American Falls
10LN176-12	McKean	Big Southern Butte
05-SH-02	McKean	American Falls
10BN538-4	McKean	Big Southern Butte
10MA85-1	McKean	Brown's Bench
10MA68	McKean	Brown's Bench
10MA88-2	McKean	Brown's Bench
10BN515-1	McKean	Brown's Bench
10BN220-2	McKean	Brown's Bench
10BN213	McKean	Brown's Bench
10BN373-1	McKean	Brown's Bench
10BN861-1	McKean	Butte Valley Group A?
10MA274	McKean	Malad

Appendix C (continued). Results of Geochemical Analysis of Selected Points from the CMNM.

Trinomial/Specimen Number	Projectile Point Type	Obsidian Source
10BN538-1	Stemmed Indented Base	American Falls
10MA154-1	Stemmed Indented Base	Big Southern Butte
05-KM-08	Stemmed Indented Base	Big Southern Butte
10LN176-30	Stemmed Indented Base	Big Southern Butte
05-KM-28	Stemmed Indented Base	American Falls
10LN176-11	Stemmed Indented Base	American Falls
10LN176-1	Stemmed Indented Base	Cannonball Mountain
10BN562-3	Stemmed Indented Base	Malad
10MA114-2	Stemmed Indented Base	Brown's Bench
10MA73-1	Stemmed Indented Base	Brown's Bench
10MA91-8	Stemmed Indented Base	Brown's Bench
10MA88-5	Stemmed Indented Base	Brown's Bench
10LN176-7	Stemmed Indented Base	Brown's Bench
10MA100-18	Stemmed Indented Base	Brown's Bench
10MA0155	Stemmed Indented Base	Brown's Bench
10MA0159-1	Stemmed Indented Base	Brown's Bench
10MA0168-011	Stemmed Indented Base	Brown's Bench
10PR302-2	Stemmed Indented Base	Brown's Bench
10MA97-1	Stemmed Indented Base	Teton Pass
10BN383-1	Northern Side-notched	Big Southern Butte
04-KM-16	Northern Side-notched	Big Southern Butte
10MA91	Northern Side-notched	American Falls
10BN132-6	Northern Side-notched	Big Southern Butte
10BN382-1	Northern Side-notched	American Falls
10BN215-5	Northern Side-notched	American Falls
10MA91-2	Northern Side-notched	Cannonball Mountain
10BN553-2	Northern Side-notched	Malad
05-KM-14 (05 MT ISO 7)	Northern Side-notched	Brown's Bench
04-KM-05	Northern Side-notched	Brown's Bench
10BT11 - 534	Northern Side-notched	Big Southern Butte

Appendix D. Results of Analysis of Faunal Remains Collected during the 2005 Excavations at Site 10PR641.

FS#	Test/Level	Taxon	Element	Side	End	br	ub	gf	df	b
354-1	LC Surface	<i>Bison bison</i>	1st Phalanx				X		X	
362-4	LC Surface	<i>Bison bison</i>	1st Phalanx				X		X	
373-6	LC Surface	<i>Bison bison</i>	1st Phalanx				X		X	
421-1	LC Surface	<i>Bison bison</i>	1st Phalanx				X		X	
551-4	LC Surface	<i>Bison bison</i>	1st Phalanx				X		X	
301-1	Black Widow Cave	<i>Bison bison</i>	1st Phalanx				X		X	Rodent
360-2	LC Surface	<i>Bison bison</i>	2nd Phalanx				X		X	
506-2	LC Surface	<i>Bison bison</i>	2nd Phalanx				X		X	
564-3	LC Surface	<i>Bison bison</i>	2nd Phalanx				X		X	
323-1	LC Surface	<i>Bison bison</i>	3rd Phalanx	Left			X		X	
366-3	LC Surface	<i>Bison bison</i>	3rd Phalanx				X		X	Rodent
403-1	LC Surface	<i>Bison bison</i>	3rd Phalanx				X		X	
423-2	LC Surface	<i>Bison bison</i>	3rd Phalanx				X		X	
438-12	LC Surface	<i>Bison bison</i>	3rd Phalanx				X		X	
406-1	MC Surface	<i>Bison bison</i>	3rd Phalanx				X		X	
570-41	MC Surface	<i>Bison bison</i>	3rd Phalanx				X		X	
312-1	Black Widow Cave	<i>Bison bison</i>	Acetabulum	Left			X		X	
434-1	LC Surface	<i>Bison bison</i>	Acetabulum Fragment	Left	Exterior		X		X	
438-11	LC Surface	<i>Bison bison</i>	Acetabulum Fragment	Left			X		X	Rodent
373-3	LC Surface	<i>Bison bison</i>	Acetabulum Fragment	Right			X		X	
591-1	MC Surface	<i>Bison bison</i>	Acetabulum Fragment	Left			X		X	
513-3	LC Surface	<i>Bison bison</i>	Astragulus				X		X	
563-1	LC Surface	<i>Bison bison</i>	Astragulus				X		X	
451-2	MC Surface	<i>Bison bison</i>	Calcaneous				X		X	
309-2	Black Widow Cave	<i>Bison bison</i>	Calcaneous	N/A			X		X	Rodent

IND= Indeterminate; M= Mammal SM= Small Mammal; LM= Large Mammal; TE= Tooth Enamel; gf= green fractured; df= dry fractured;
b= butcher/gnaw marks

Appendix D (continued). Results of Analysis of Faunal Remains Collected during the 2005 Excavations at Site 10PR641.

FS#	Test/Level	Taxon	Element	Side	End	br	ub	gf	df	b
565-1	MC Surface	<i>Bison bison</i>	Calcaneous Fragment		Proximal		X		X	
551-3	LC Surface	<i>Bison bison</i>	Carpal- Cunieform				X		X	
369-1	LC Surface	<i>Bison bison</i>	Cranial Fragment				X		X	
411-5	MC Surface	<i>Bison bison</i>	Cranial Fragment				X		X	
450-1	LC Surface	<i>Bison bison</i>	Femur (head)	Right	Proximal		X		X	
307-1	Black Widow Cave	<i>Bison bison</i>	Femur (head)				X		X	
310-2	Black Widow Cave	<i>Bison bison</i>	Femur (head)				X		X	
386-1	LC Surface	<i>Bison bison</i>	Femur (Medial Condyle)	Right	Distal		X		X	Rodent
513-2	LC Surface	<i>Bison bison</i>	Glenoid Fossa	Right			X		X	
376-1	LC Surface	<i>Bison bison</i>	Glenoid Fossa Portion	Right	Proximal		X		X	
377-1	LC Surface	<i>Bison bison</i>	Glenoid Fossa Portion	Right	Proximal		X		X	Rodent
432-1	LC Surface	<i>Bison bison</i>	Humerus Fragment	Right	Proximal		X		X	
554-1	LC Surface	<i>Bison bison</i>	Indeterminate				X		X	
308-1	Black Widow Cave	<i>Bison bison</i>	Long Bone Fragment				X		X	
305-1	Black Widow Cave	<i>Bison bison</i>	Long Bone Fragment				X		X	
309-1	Black Widow Cave	<i>Bison bison</i>	Long Bone Fragment				X		X	
426-1	LC Surface	<i>Bison bison</i>	Mandible Fragment	Right	Anterior		X		X	
305-2	Black Widow Cave	<i>Bison bison</i>	Metacarpal				X		X	
554-2	MC Surface	<i>Bison bison</i>	Metatarsal				X		X	
514-2	LC Surface	<i>Bison bison</i>	Metatarsal Fragment		Distal		X		X	
316-5	Black Widow Cave	<i>Bison bison</i>	Metatarsal Fragment	Right	Proximal		X	X		
412-2	LC Surface	<i>Bison bison</i>	Occipital Condyle	Left			X		X	Rodent
362-3	LC Surface	<i>Bison bison</i>	Patella				X		X	
366-2	LC Surface	<i>Bison bison</i>	Patella				X		X	Rodent
374-1	LC Surface	<i>Bison bison</i>	Patella				X		X	

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b= butcher/gnaw marks

Appendix D (continued). Results of Analysis of Faunal Remains Collected during the 2005 Excavations at Site 10PR641.

FS#	Test/Level	Taxon	Element	Side	End	br	ub	gf	df	b
410-1	LC Surface	<i>Bison bison</i>	Patella				X		X	Rodent
563-4	LC Surface	<i>Bison bison</i>	Patella				X		X	
571-2	LC Surface	<i>Bison bison</i>	Patella				X		X	
563-3	LC Surface	<i>Bison bison</i>	Patella				X		X	
401-1	MC Surface	<i>Bison bison</i>	Radial Fragment	Right	Proximal		X	X		Rodent
566-1	MC Surface	<i>Bison bison</i>	Radial Plateau	Left			X		X	
377-2	LC Surface	<i>Bison bison</i>	Rib				X		X	
373-4	LC Surface	<i>Bison bison</i>	Rib Fragment		Shaft		X		X	Rodent
375-1	LC Surface	<i>Bison bison</i>	Rib Fragment		Shaft		X		X	
572-1	LC Surface	<i>Bison bison</i>	Rib Fragment				X		X	
461-4	MC Surface	<i>Bison bison</i>	Rib Fragment				X		X	
315-1	Black Widow Cave	<i>Bison bison</i>	Rib Fragment				X		X	
316-1	Black Widow Cave	<i>Bison bison</i>	Rib Fragment				X		X	
382-1	MC Surface	<i>Bison bison</i>	Scapula Fragment	Left	Proximal		X		X	
555-3	MC Surface	<i>Bison bison</i>	Scapula Fragment	Right	Inferior/distal		X		X	
420-2	LC Surface	<i>Bison bison</i>	Scapula Fragment				X		X	Rodent
518-1	LC Surface	<i>Bison bison</i>	Scapula Fragment				X	X		
433-1	LC Surface	<i>Bison bison</i>	Temporal Fragment				X		X	
376-2	MC Surface	<i>Bison bison</i>	Tibia Fragment	Left	Proximal		X		X	
508-1	LC Surface	<i>Bison bison</i>	Tibia Fragment	Right	Distal		X	X		
409-1	MC Surface	<i>Bison bison</i>	Tibia Fragment	Right	Distal		X	X	X	
304-1	Black Widow Cave	<i>Bison bison</i>	Tibia Fragment	Right	Distal		X		X	
431-4	LC Surface	<i>Bison bison</i>	Tibial Fragment (lateral)	Right	Distal		X		X	
215-01	TU1B: 15-20	<i>Bison bison</i>	Tooth				2			
200-01	TU2: 20-25	<i>Bison bison</i>	Tooth				2			

IND= Indeterminate; M= Mammal SM= Small Mammal; LM= Large Mammal; TE= Tooth Enamel; gf= green fractured; df= dry fractured;
b= butcher/gnaw marks

Appendix D (continued). Results of Analysis of Faunal Remains Collected during the 2005 Excavations at Site 10PR641.

FS#	Test/Level	Taxon	Element	Side	End	br	ub	gf	df	b
463-1	LC Surface	<i>Bison bison</i>	Ulna	Left	Proximal		X		X	
362-1	LC Surface	<i>Bison bison</i>	Ulna Fragment	Right	Proximal		X		X	
513-1	LC Surface	<i>Bison bison</i>	Ulna Fragment	Right	Proximal		X		X	
519-1	LC Surface	<i>Bison bison</i>	Vertebrae				X		X	
519-3	LC Surface	<i>Bison bison</i>	Vertebrae				X		X	
378-1	LC Surface	<i>Bison bison</i>	Vertebrae (cervical 5th)				X		X	
311-1	Black Widow Cave	<i>Bison bison</i>	Vertebrae (Cervical)				X		X	
500-1	LC Surface	<i>Bison bison</i>	Vertebrae (Lumbar Transverse Process)	Right			X		X	
464-4	LC Surface	<i>Bison bison</i>	Vertebrae (Thoracic)	Right	Body		X		X	
438-2	LC Surface	<i>Bison bison</i>	Vertebrae (Thoracic)				X		X	Rodent
416-1	MC Surface	<i>Bison bison</i>	Vertebrae (Thoracic)				X		X	
461-1	MC Surface	<i>Bison bison</i>	Vertebrae (Thoracic)				X		X	
311-2	Black Widow Cave	<i>Bison bison</i>	Vertebrae (Thoracic)				X		X	
431-3	LC Surface	<i>Bison bison</i>	Vertebrae Fragment				X		X	
464-5	LC Surface	<i>Bison bison</i>	Vertebrae Fragment		Body		X		X	
509-1	LC Surface	<i>Bison bison</i>	Vertebrae Fragment				X		X	
438-3	LC Surface	<i>Bison bison</i>	Vertebrae Fragment (Body)		Anterior		X		X	
310-1	Black Widow Cave	<i>Bison bison</i>	Vertebrae Fragment (Body)				X		X	
456-1	MC Surface	Cf. <i>B. bison</i>	Humerus (Condyle)		Prox		X		X	Rodent
361-1	MC Surface	Cf. <i>B. bison</i>	Long Bone Fragment				X	X		
404-2	MC Surface	Cf. <i>B. bison</i>	Long Bone Fragment				X		X	
416-2	MC Surface	Cf. <i>B. bison</i>	Long Bone Fragment				X		X	
451-1	MC Surface	Cf. <i>B. bison</i>	Long Bone Fragment				X	X		
458-1	MC Surface	Cf. <i>B. bison</i>	Long Bone Fragment		Shaft		X		X	

IND= Indeterminate; M= Mammal SM= Small Mammal; LM= Large Mammal; TE= Tooth Enamel; gf= green fractured; df= dry fractured;
b= butcher/gnaw marks

Appendix D (continued). Results of Analysis of Faunal Remains Collected during the 2005 Excavations at Site 10PR641.

FS#	Test/Level	Taxon	Element	Side	End	br	ub	gf	df	b
559-2	MC Surface	<i>Cf. B. bison</i>	Metatarsal				X		X	
455-1	MC Surface	<i>Cf. B. bison</i>	Radial Fragment		Distal		X		X	
461-3	MC Surface	<i>Cf. B. bison</i>	Rib	Right			X		X	Rodent
328-1	MC Surface	<i>Cf. B. bison</i>	Rib Fragment		Shaft		X		X	
428-1	MC Surface	<i>Cf. B. bison</i>	Rib Fragment				X		X	Rodent
452-1	MC Surface	<i>Cf. B. bison</i>	Rib Fragment		Shaft		X		X	Rodent
555-12	MC Surface	<i>Cf. B. bison</i>	Rib Fragment				X		X	
555-4	MC Surface	<i>Cf. B. bison</i>	Rib Fragment				X		X	
555-5	MC Surface	<i>Cf. B. bison</i>	Rib Fragment		Distal		X		X	Rodent
555-7	MC Surface	<i>Cf. B. bison</i>	Rib Fragment				X		X	Rodent
555-8	MC Surface	<i>Cf. B. bison</i>	Rib Fragment				X		X	
411-1	MC Surface	<i>Cf. B. bison</i>	Scapula Fragment		Distal Border		X		X	

IND= Indeterminate; M= Mammal SM= Small Mammal; LM= Large Mammal; TE= Tooth Enamel; gf= green fractured; df= dry fractured;
b= butcher/gnaw marks

Appendix E. Results of Analysis of Faunal Remains Collected during the 2005 Excavations at Site 10BN389.

Test/Quad: Level(cm)	FS#	Taxon	Element	Side	End	br (g)	ub (g)	gf	df	b	Total Weight (g)
TU1A: 1(0-5)	600-02	IND SM					1 (0.4)		1		0.4g
TU1A: 2(5-10)	601-02	IND SM				2 (0.2)	2 (0.3)		4		0.5g
TU1A: 3(10-15)	602-02	IND SM				15 (4.7)	7 (0.7)		22		5.4g
TU1A: 3(10-15)	602-02	IND M	TE				1 (0.1)		1		0.1g
TU1A: 4(15-20)	603-02	IND SM				15 (3.3)	4 (1.2)		19		4.5g
TU1A: 5(20-25)	604-02	IND SM				2 (0.4)	4 (<0.1)		6		0.4g
TU1A: 6(25-30)	605-02	IND SM					15 (2.8)		15		2.8g
TU1A: 6(25-30)	605-02	IND M	TE				3 (1.5)		3		1.5g
TU1A: 7(30-35)	606-02	IND SM					2 (0.3)		2		0.3g
TU1A: 7(30-35)	606-02	IND LM	Cf. Rib/LB				2 (5.8)		2		5.8g
TU1A: 7(30-35)	606-03	IND LM	Cf. Rib/LB			2 (10.7)			1		10.7g
TU1A: 8(35-40)	607-02	IND SM					3 (0.5)		3		0.5g
TU1B: 1(0-5)	608-02	IND SM					1 (0.2)		1		0.2g
TU1B: 2(5-10)	609-02	IND SM					8 (0.3)		8		0.3g
TU1B: 3(10-15)	610-03	IND SM					21 (1.1)		21		1.1g
TU1B: 4(15-20)	611-02	IND SM					15 (1.0)		15		1.0g
TU1B: 5(20-25)	612-02	IND SM					2 (0.1)		2		0.1g
TU1B: 6(25-30)	613-02	IND SM					1 (<0.1)		1		<0.1g
TU1B: 7(30-35)	614-02	IND SM					1 (0.2)		1		0.2g

IND= Indeterminate; M= Mammal SM= Small Mammal; LM= Large Mammal; TE= Tooth Enamel; gf= green fractured; df= dry fractured;
b= butcher/gnaw marks

Appendix E (continued). Results of Analysis of Faunal Remains Collected during the 2005 Excavations at Site 10BN389.

Test/Quad: Level(cm)	FS#	Taxon	Element	Side	End	br (g)	ub (g)	gf	df	b	Total Weight (g)
TU1C: 2(5-10)	616-02	IND SM				8 (0.5)	8 (0.7)		16		1.2g
TU1C: 3(10-15)	617-02	IND SM					2 (0.2)		2		0.2g
TU1C: 3(10-15)	617-02	IND M	TE				2 (0.2)		2		0.5g
TU1C: 4(15-20)	618-02	IND SM					1 (0.2)		1		0.2g
TU1C: 5(20-25)	619-02	IND SM				7 (0.4)	7 (0.5)		14		0.9g
TU1C: 7(30-35)	621-02	IND SM				12 (0.8)	22 (2.5)		34		3.3g
TU1C: 7(30-35)	621-03	Bison	Rib		Prox		1 (13.4)		1		13.4g
TU1C: 7(30-35)	621-03	IND LM				1 (7.8)			1		
TU1C: Clean up	622-02	IND SM				4 (0.7)	5 (0.2)		9		0.9g
TU1C: Wall Slump	622-04	IND SM					3 (0.1)		3		0.1g
TU2A: 3(10-15)	702-03	IND SM				4 (0.1)	4 (0.7)		8		0.8g
TU2A: 4(15-20)	703-02	IND SM				1 (<0.1)	3 (0.4)		4		0.4g
TU2A: 5(20-25)	704-03	IND SM					3 (0.2)		3		0.2g
TU2A: 7(30-35)	706-02	IND SM					8 (1.1)		8		1.1g
TU2B: 3(10-15)	709-02	IND SM				12 (0.5)	1 (<0.1)		13		0.5g
TU2B: 4(15-20)	710-02	IND SM					1 (0.2)		1		0.2g
TU2B: 5(20-25)	711-02	IND SM				3 (<0.1)	7 (0.1)		10		0.1g
TU2B: 7(30-35)	713-01	IND SM					1 (0.1)		1		0.1g

IND= Indeterminate; M= Mammal SM= Small Mammal; LM= Large Mammal; TE= Tooth Enamel; gf= green fractured; df= dry fractured;
b= butcher/gnaw marks

Appendix E (continued). Results of Analysis of Faunal Remains Collected during the 2005 Excavations at Site 10BN389.

Test/Quad: Level(cm)	FS#	Taxon	Element	Side	End	br (g)	ub (g)	gf	df	b	Total Weight (g)
TU3A: 4(15-20)	552-02	IND M	TE				1 (0.2)		1		0.2g
TU3A: 5(20-25)	553-02	IND SM				4 (0.4)	3 (0.1)		7		0.5g
TU3A: 6(25-30)	554-02	IND SM				1 (<0.1)	2 (0.1)		3		0.1g
TU3A: 7(30-35)	555-02	IND SM				1 (0.1)	1 (<0.1)		2		0.1g
TU3B: 2(5-10)	557-02	IND SM				23 (1.0)	22 (1.2)		45		2.2g
TU3B: 3(10-15)	558-02	IND SM				23 (0.7)	16 (0.7)		39		1.4g
TU3B: 4(15-20)	559-02	IND SM				46 (2.7)	16 (1.3)		62		4.0g
TU3B: 5(20-25)	560-02	IND SM				7 (0.5)	2 (0.1)		9		0.6g
TU3B: 6(25-30)	561-02	IND SM				6 (0.3)	8 (0.4)		14		0.7g
TU3B: 7(30-35)	562-02	IND SM					1 (<0.1)		1		<0.1g
TU4A: 2(5-10)	811-02	IND SM				1 (<0.1)	3 (0.3)		4		0.3g
TU4A: 3(10-15)	800-02	IND SM				4 (0.3)			4		0.3g
TU4A: 4(15-20)	801-02	Mouse	Cranial frag				1 (0.9)		1		0.9g
TU4A: 4(15-20)	801-03	IND SM				16 (2.7)	1 (<0.1)		17		2.7g
TU4A: 5(20-25)	802-02	Mouse	Vertebrae				22(0.3)		22		0.3g
TU4A: 5(20-25)	802-02	Mouse	Mandible	L/R			2 (0.5)		2		0.5g
TU4A: 5(20-25)	802-02	Mouse	Scapulae	L/R			2 (<0.1)		2		<0.1g
TU4A: 5(20-25)	802-02	Mouse	Humeri	L/R			2 (0.1)		2		0.1g
TU4A: 5(20-25)	802-02	Mouse	Ulnae	L/R			2 (<0.1)		2		<0.1g
TU4A: 5(20-25)	802-02	Mouse	Radii	L/R			2 (<0.1)		2		<0.1g
TU4A: 5(20-25)	802-02	Mouse	Os coxae	L/R			2 (0.1)		2		0.1g
TU4A: 5(20-25)	802-02	Mouse	Femora	L/R			2 (0.1)		2		0.1g
TU4A: 5(20-25)	802-02	Mouse	Tibiae/Fibulae	L/R			2 (0.1)		2		0.1g
TU4A: Wall Fall	804-02	IND SM				1 (<0.1)			1		<0.1g

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b= butcher/gnaw marks

Appendix E (continued). Results of Analysis of Faunal Remains Collected during the 2005 Excavations at Site 10BN389.

Test/Quad: Level(cm)	FS#	Taxon	Element	Side	End	br (g)	ub (g)	gf	df	b	Total Weight (g)
TU4B: 4(15-20)	806-02	IND SM					3 (1.4)		3		1.4g
TU4B: 5(20-25)	807-02	IND SM				2 (0.1)	4 (0.3)		6		0.4g
TU4B: 5(20-25)	807-02	IND TE					1 (0.1)		1		0.1g
TU6B: 6(25-30)	757-02	IND SM					1 (0.1)		1		0.1g
TU6B: 6(25-30)	757-02	IND TE					1 (<0.1)		1		<0.1g
TU7A: 3(10-15)	626-02	IND SM					8 (1.6)		8		1.6g
TU7A: 4(15-20)	627-01	IND SM					9 (0.9)		9		0.9g
TU7A: 5(20-25)	628-02	IND SM				2 (1.6)	3 (0.2)		5		1.8g
TU7A: 6(25-30)	629-02	IND SM					37 (3.5)		37		3.5g
TU7A: 6(25-30)	629-02	IND LM					3 (6.1)		3		6.1g
TU7A: 7(30-35)	630-01	IND SM				1 (0.1)	10 (4.7)		11		4.8g
TU7RF1	631-02	IND SM				3 (0.4)	12 (1.6)		15		2.0g
TU8: 2(5-10)	508-02	IND SM				1 (<0.1)	10 (0.8)		11		0.8g
TU8: 4(15-20)	510-02	IND SM				94 (24.6)	32 (8.2)		126		32.8g
TU8: 5(20-25)	511-02	IND SM				46 (8.6)	26 (5.1)		72		13.7g
TU8: 5(20-25)	511-02	IND TE					1 (0.6)		1		0.6g
TU8: 6(25-30)	512-02	IND SM				8 (0.8)	4 (0.3)		12		1.1g
TU8: 6(25-30)	512-02	IND SM	Cranial frag				1 (0.2)		1		0.2g
TU8: 7(30-35)	513-02	IND SM				9 (5.8)	9 (0.6)		18		6.4g

**IND= Indeterminate; M= Mammal SM= Small Mammal; LM= Large Mammal; TE= Tooth Enamel; gf= green fractured; df= dry fractured;
b= butcher/gnaw marks**

Appendix F. Results of Analysis of Faunal Remains Collected during the 2005 Excavations at Site 10BN861.

Test/Quad: Level(cm)	FS#	Taxon	Element	Side	End	br (g)	ub (g)	gf	df	b	Total Weight (g)
TU1A: 3(10-15)	141-02	IND SM					2 (0.1)		2		0.1g
TU1B: 5(20-25)	145-02	IND SM					2 (<0.1)		2		<0.1g
TU2A: 2(5-10)	122-03	IND M	TE				3 (1.0)		3		1.0g
TU2A: 2(5-10)	122-03	IND SM					4 (0.6)		4		0.6g
TU2A: 3(10-15)	123-02	IND SM				44 (3.1)	19 (1.3)		63		4.4g
TU2A: 3(10-15)	123-02	IND SM	LB frag				1 (0.2)		1		0.2g
TU2A: 3(10-15)	123-02	Reptile/Fish	vertebrae				1 (<0.1)		1		<0.1g
TU2A: 4(15-20)	124-02	IND SM	cranial frag				1 (0.4)		1		0.4g
TU2A: 4(15-20)	124-02	IND M	TE				2 (0.2)		2		0.2g
TU2A: 4(15-20)	124-02	IND SM	LB frags				3 (0.2)		3		0.2g
TU2A: 4(15-20)	124-02	IND SM				11 (0.5)	23 (2.0)		34		2.5g
TU2A: 5(20-25)	125-02	IND M	TE				3 (0.2)		3		0.2g
TU2A: 5(20-25)	125-02	IND SM	cranial frag				1 (0.2)		1		0.2g
TU2B: 2(5-10)	126-02	IND M	TE				2 (<0.1)		2		<0.1g
TU2B: 2(5-10)	126-02	IND SM	LB frags				3 (0.3)		3		0.3g
TU2B: 2(5-10)	126-02	IND SM				52 (3.5)	33 (2.3)		85		8.5g
TU2B: 3(10-15)	127-02	IND M	TE			2 (<0.1)	5 (0.2)		7		0.2g
TU2B: 3(10-15)	127-02	IND M	mandible	left			1 (1.8)		1		1.8g
TU2B: 3(10-15)	127-02	IND SM				105 (4.1)	40 (4.0)		145		8.1g
TU2B: 4(15-20)	128-02	IND SM				22 (2.1)	14 (0.7)		36		2.8g
TU2B: 5(20-25)	129-02	IND SM				8 (0.3)	7 (0.2)		15		0.5g

IND= Indeterminate; M= Mammal SM= Small Mammal; LM= Large Mammal; TE= Tooth Enamel; gf= green fractured; df= dry fractured;
b= butcher/gnaw marks

Appendix F (continued). Results of Analysis of Faunal Remains Collected during the 2005 Excavations at Site 10BN861.

Test/Quad: Level(cm)	FS#	Taxon	Element	Side	End	br (g)	ub (g)	gf	df	b	Total Weight (g)
TU3A: 3(10-15)	105-03	IND SM					4 (0.5)		4		0.5g
TU3A: 3(10-15)	105-03	IND M	TE				1 (0.3)		1		0.3g
TU3A: 4(15-20)	106-02	IND SM					1 (0.1)		1		0.1g
TU3A: 5(20-25)	108-02	IND SM					1 (0.1)		1		0.1g
TU3B: 1(0-5)	101-02	IND SM					1 (<0.1)		1		<0.1g
TU3B: 2(5-10)	103-04	IND SM					3 (0.4)		3		0.4g
TU3B: 3(10-15)	104-03	IND SM					3 (0.2)		3		0.2g
TU3B: 4(15-20)	107-02	IND SM					1 (0.4)		1		0.4g
TU3B: 4(15-20)	107-02	IND LM					1 (2.2)		1		2.2g

**IND= Indeterminate; M= Mammal SM= Small Mammal; LM= Large Mammal; TE= Tooth Enamel; gf= green fractured; df= dry fractured;
b= butcher/gnaw marks**

Appendix G. Results of Analysis of Faunal Remains Collected during the 2005 Excavations at Site 10MA421.

Test/Quad: Level(cm)	FS#	Taxon	Element	Side	End	br (g)	ub (g)	gf	df	b	Total Weight (g)
TU2/A: 2(10-20)	107-02	IND SM					2 (0.1)		2		0.1g
TU2/A: 3(20-30)	108-02	IND SM					2 (0.1)		2		0.1g
TU7/A: 4(30-40)	110-01	IND M	TE			3 (0.6)			3		0.6g
TU7/A: 4(30-40)	110-01	IND SM					1 (<0.1)		1		<0.1g
TU8: 6(50-60)	113-02	IND SM					1 (0.1)		1		0.1g

**IND= Indeterminate; M= Mammal SM= Small Mammal; LM= Large Mammal; TE= Tooth Enamel; gf= green fractured; df= dry fractured;
b= butcher/gnaw marks**

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