PONDS, RIVERS AND BISON FREEZERS: EVALUATING A BEHAVIORAL ECOLOGICAL MODEL OF HUNTER-GATHERER MOBILITY ON IDAHO'S SNAKE RIVER PLAIN

by

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Archaeological evidence indicates that cold storage of bison meat was consistently practiced on the eastern Snake River Plain over the last 8000 years. Recent excavations in three cold lava tube caves have revealed a distinctive artifact assemblage of elk antler tines, broken handstones, and bison bone in association with frozen sagebrush features. Similar evidence has also been discovered in four other caves within the region.

A patch choice model was utilized in this study to address how the long-term practice of caching bison meat in cold caves may have functioned in prehistoric subsistence patterns. Because the net return rate for bison was critical to the model, the hunting success of fur trappers occupying the eastern Snake River Plain during the early 1800s, as recorded in their daily journals, was examined and quantified.

According to the model, the productivity of cold storage caves must be evaluated against the productivity of other patches on the eastern Snake River Plain, such as ephemeral ponds and linear river corridors from season to season and year to year. The model suggests that residential bases occurred only within river resource patches while ephemeral ponds and ice caves would contain sites indicative of seasonal base camps.

The predictions of the model were tested against documented archaeological data from the Snake River Plain through the examination of Geographic Information Systems data provided by the Idaho Bureau of Land Management. The results of this analysis indicate that seasonal base camps are directly associated with both ephemeral and perennial water sources, providing strong support for the model's predictions. Likewise, the temporal distribution of sites within the study area indicates that climate change over the last 8000 years was not dramatic enough to alter long-term subsistence practices in the region. The long-term use of multiple resource patches across the region also confirms that, although the high return rates for bison made them very desirable prey, the over-all diet breadth for the eastern Snake River Plain was broad and included a variety of large and small game and plant foods. Bison and cold storage caves were a single component in a highly mobile seasonal round that persisted for some 8000 years, down to the time of written history in the 19th Century.

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Dedicated to the memory of my mother,
Roxanna Pauline Nelson

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CHAPTER I

INTRODUCTION

Archaeological investigations of cold lava tube caves on the eastern Snake River Plain in southern Idaho have revealed evidence of long-term cold storage of meat by prehistoric hunter-gatherers living in the region (Henrikson 1996). The use of these cold caves as "freezers" appears to be a unique phenomenon never before documented in North America. However, the significance of these caves rests not in the surprise they engender but in their contribution to our understanding of how storage practices influence the mobility of hunter-gatherers. Storage is generally accepted to be a labor-intensive "coping strategy" that reduces the risks associated with seasonal or long-term fluctuations in resource availability (Binford 1980, Ingold 1983, Thomas 1983, Rowley-Conwy and Zvelebil 1989, Goland 1991). These "bison freezers" have important implications for understanding the long-term development of aboriginal lifeways and they challenge Steward's (1938) contention that the subsistence patterns of the contact period Shoshone-Bannock tribes contrasted strongly with those of earlier occupants of the eastern Snake River Plain.

Although wintertime frozen meat caches have been documented among hunter-gatherers in far northern climates (Binford 1978), the cold caves on the mid-latitude

Snake River Plain provided the means to freeze meat throughout the year, despite significantly warmer temperatures during the summer months. Evidence of storage in the Great Basin has consistently been equated with "settling down", and storage caches have been found in association with numerous sedentary and semi-sedentary communities within the region (O'Connell 1975, Oetting 1989, Kelly 1995, Prouty 1995).

However, the cave sites are devoid of structures or features that would suggest long-term residence. Instead, the artifact scatters that surround the caves are indicative of short-term encampments. It appears that storage of bison meat, consistently practiced on the eastern Snake River Plain over the last 8000 years, was an enduring component of the highly mobile lifestyle of the aboriginal inhabitants. This unique and intriguing adaptation therefore has the potential to provide archaeologists with a greater understanding of the factors that influence hunter-gatherer mobility strategies.

Because it is critical to present assurances at an early stage of the analysis that these sites were indeed used for cold storage and not for some other purpose, the results of archaeological research conducted at Bobcat, Scaredy Cat and Tomcat Caves are presented in Chapter II. This information is followed by theoretical and analytical elaboration in Chapters III through VII. Briefly, all three caves revealed elk antler tines, broken hand stones, and bison bones in association with masses of frozen sagebrush stalks. Analysis of the artifacts suggested that antler tine "ice picks" and ground stone "hammers" had been used to recover frozen bison meat as needed from these elaborate sagebrush storage features.

Although research has focused mainly on the three caves mentioned above, at least four more apparent cold lava tube "meat lockers" have been found on the eastern Snake River Plain in the last 10 years. These include Fortress, Alpha, Wolffang and Bearpaw caves. All seven caves exhibit unique structural features that set them apart from other caves in the region in that they appear to maintain a constant ambient temperature that hovers near freezing the year around and either have visible ice accumulations or frozen sediment deposits on the floor (Henrikson 1996). Further research at these caves will surely yield additional insights, but my purpose here is to summarize the available data and examine their implications.

For my study, additional research was conducted in the immediate vicinity of four different caves to gain information on site function and gather insights on why bison appear to be the preferred source of meat for cold storage. Test excavations were conducted outside Scaredy Cat Cave (10MA143), Tomcat Cave (10LN74), Bison Heights (10LN636) and Wilson Butte Cave (10JE4). This research, which contributed clues to regional bison procurement strategies, is also reported in Chapter II.

To address why deliberate efforts to place bison meat in cold storage did not “contribute to” sedentism in regional settlement patterns, I seek insights from the theoretical approach of behavioral ecology. In investigating the role of bison and storage in aboriginal subsistence, hypotheses generated through the quantitative analysis of behavioral ecological models can be evaluated against the archaeological evidence within the caves and throughout the region.

In evaluating what model might be most applicable to the eastern Snake River Plain, it is necessary to assess the region's environment. 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 hundreds of lava tube caves. These features were created primarily by pahoehoe basalt flows from low shield volcanoes and fissure eruptions ranging from Pliocene to Holocene in age (Greeley and King 1977). The Snake River, the region's only major waterway, transects the Plain in an east to west arc. Because of the incline of the 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.

Although simple models focused on diet breadth and prey choice have been commonly used in archaeological research in the Great Basin, the Snake River Plain environment is best suited to the application of a patch choice model. The region is comprised of a variety of relatively rich resource patches, including linear corridors along perennial water sources, ephemeral ponds, and cold storage caves surrounded by less productive sagebrush steppe. Patch choice models evaluate how long a forager should remain within a patch, and rank the return rates for different resource patches. These differ from diet-breadth models because search and travel times are included in estimating the return rate of an entire patch (Kelly 1995: 91). These models also predict that in situations where different resources are distributed in various isolated locales across the landscape, foragers will select the patch or patches that generate the highest average energy return rate when travel, search and handling time are all considered (Hawkes et al. 1982).

While the return rates of some resources may remain constant until exhausted, most are characterized by decelerating returns. The resource patches on the Snake River Plain are all comprised of resources with such diminishing return rates. Thus, the patch choice model would predict the decision to relocate to an alternate patch when the return rates for the occupied patch fall "below the average return rate for the entire environment" (Kelly 1995).

A key element of my research is a quantitative examination of the potential tradeoffs and decisions involved in the selection of resource patches on the eastern Snake River Plain. Chapters III and IV are devoted to this task. The productivity of river corridors, ephemeral ponds and ice cave patches, (i.e., the net caloric return rates of resources available within each of these patches), are presented and compared on a seasonal basis.

Another critical component of the model includes assessing the role of bison in aboriginal subsistence. The cave research indicates that only bison meat was kept in cold storage. The remains of other ungulates are virtually absent from the faunal assemblages. This is in strong contrast to Julian Steward's (1938) arguments that bison were not an important resource to the aboriginal inhabitants of the region until equestrian hunters could travel across the continental divide to access the large herds of plains bison in Wyoming and Montana. Although (as will be shown) Steward's claim was largely supposition, it raises the potential relevance of examining the seasonal round of the 19th Century Shoshone-Bannock in this study. Steward argued that the seasonal round of the equestrian Shoshone-Bannock was significantly different from the prehistoric seasonal round because he believed that pedestrian hunters could not successfully acquire bison. Chapter V is partly devoted to an examination of the ethnographic seasonal round and an evaluation of Steward's contentions.

Although large "plains-style" bison jumps have yet to be found in Idaho, bison have been recovered from numerous localities in the region, including Wilson Butte Cave (Gruhn 1961), Owl Cave (Butler 1968), the Birch Creek Rockshelters (Swanson 1972) and Baker Cave (Plew et al. 1987). In fact, based on the many bison bones found at these sites, Gruhn, Butler and Swanson were all argued that bison were a significant economic resource to the ancient inhabitants of the region. But, despite their observations, the relative importance of bison in the prehistoric diet has yet to be demonstrated. The patch choice model presented here will address net caloric return rates of bison in comparison with other resources and investigate aspects of bison behavior and hunting techniques specific to the eastern Snake River

Plain that may be relevant to understanding why bison would have been exclusively selected for cold storage.

To evaluate the viability of the patch choice model, it will be critical to quantitatively consider archaeological site distributions across the eastern Snake River Plain. Over the past 15 years, intensive archaeological surveys of large public land tracts have been conducted on Bureau of Land Management (BLM) land in southeastern Idaho in order to plan for the protection of significant archaeological sites from disturbance during range fire rehabilitation efforts. While these surveys do not represent a random or stratified sample of the research area, they do represent a large and varied sample. The total area covered over the past decade exceeds 500,000 acres and involves a variety of topographic features, including lava flows, rivers, ephemeral ponds and broad expanses of sagebrush steppe. Through data sharing efforts with the Archaeological Survey of Idaho, all of the recorded archaeological data collected on the eastern Snake River Plain have been entered into the BLM's Geographic Information Systems (GIS) database for management and research purposes. Although older site records are missing some critical information, these make up only a small percentage of the data. Most of the sites have been recorded within the last 15 years and, in keeping with a quite detailed and specific protocol, contain useful descriptions of diagnostic artifacts, assemblages and general information regarding site types. Diagnostic artifacts such as projectile points and pottery provide relative dates for site occupation, and the range of artifacts represented provide clues to site function. While there are some inherent problems associated with using surface data in the study of prehistoric subsistence patterns, reviewing the existing archaeological data for the eastern Snake River Plain nevertheless provides a useful test of the proposed model. Chapters VI and VII are devoted to this research task. I conclude this introduction with a summary overview of the contentions and structure of the dissertation, as follows.

Physical evidence from Bobcat, Scaredy Cat and Tomcat Caves indicates that cold storage of bison meat was consistently practiced on the Snake River Plain over the last 8000 years. Storage caves functioned as resource patches that, along with ephemeral ponds and linear river corridors, were regularly included in the seasonal round of the aboriginal inhabitants. Chapter II describes and interprets the physical features of Bobcat, Scaredy Cat and Tomcat Caves and the distinctive archaeological remains they contain. It also reports the results of field research conducted outside the caves and at nearby sites in the course of investigating bison procurement techniques. Chapter III presents the theoretical assumptions of behavioral ecology and describes how models based on this approach can be used to illuminate the issues at hand.

Chapter IV presents a quantitative patch choice model for the eastern Snake River Plain, including net return rates for many resources potentially available within linear river corridors, ephemeral ponds and cold storage caves. In this chapter, the net return rate of bison hunting is extrapolated from fur trappers' narratives of the early 1800s and make it possible to estimate the place of bison in the relative ranking of resources potentially available on the eastern Snake River Plain prehistorically. Topics associated with bison acquisition in the region are also discussed. Chapter V presents the regional prehistory of the eastern Snake River Plain and the ethnographic data pertinent to this study, giving special attention to the bearing of both classes of evidence on Steward's contentions about late historic changes in Shoshone-Bannock cultural ecology. It also specifies the projectile point chronology that is used in the GIS analysis (below).

Chapter VI presents a Geographic Information Systems analysis of archaeological survey data from the eastern Snake River Plain. The GIS analysis defines and examines similarities and differences in the distribution of sites across the landscape during Early, Middle and Late Holocene time periods. It also examines differential site distributions associated with significant topographic features. Chapter VI also compares the patch choice model of Chapter IV against the results of the GIS analysis to evaluate how well the distribution of sites corresponds with the predictions of the model, and thus helps to elucidate the role of bison and cold storage in aboriginal subsistence strategies.

Chapter VII summarizes the physical evidence for cold storage, significant factors associated with bison hunting in the region, and the influence of storage on other elements of the subsistence pattern. It shows how attention to these variables provides important insights into eastern Snake River Plain prehistory and hunter-gatherer lifeways in general.

CHAPTER II

FIELD RESEARCH

The lava tube caves and open sites reported in this research are all located on the sagebrush steppe of the eastern Snake River Plain. Sediments consist primarily of aeolian deposited silty or sandy loams, with most accumulations occurring on the lee sides of prominent land features. The native vegetation includes *Artemisia tridentata* (big sagebrush), *Artemisia tripartita* (three-tip sagebrush), *Purshia tridentata* (bitterbrush), *Tetradymia canescens* (horsebrush), *Chrysothamnus puberulus* (rabbitbrush), and *Gutierrezia sarothrae* (snakeweed) as the dominant shrubs. 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 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), *Dendragapus obscurus* (blue grouse), and *Centrocerous 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 vast numbers 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.

The cold lava tube caves included in this study were formed during Pleistocene pahoehoe and a'a basalt flows that cover most of the eastern portion of the plain (Greeley and King 1977). While hundreds of lava tube caves have been documented in the region, only a few exhibit unique structural features that allow them to maintain a constant ambient temperature of 2 degrees Celsius or below the year round and sustain visible ice accumulations or frozen sediment deposits in the deepest zones. Cultural deposits indicative of storage are located only in such caves.

Research History

In 1987 a joint research project was initiated between the Bureau of Land Management and Idaho State University to conduct test excavations at Bobcat Cave (10BM56), located south of Atomic City, Idaho. These tests revealed elk antler tines, broken handstones, and bison bones contained within a frozen feature of sagebrush stalks. Analysis of the artifacts from the cave suggested that antler tine "ice picks" and stone "hammers" had been used to extract frozen bison meat from the sagebrush feature, where it had been put in cold storage roughly 4200 years ago (Henrikson 1996).

Since the discovery at Bobcat Cave, at least 6 more apparent lava tube "meat lockers" have been found on the Snake River Plain (Figure 1). These include Alpha (10PR641), Wolffang (10PR188) and Bearpaw (10PR319) caves managed by the BLM Idaho Falls Field Office and Scaredy Cat (10MA143), Tomcat (10LN74) and the Fortress caves (10LN267) administered by the BLM Shoshone Field Office. Similar artifact assemblages, including antler tines, broken handstones, bison bone and sagebrush stalks, have been documented in all seven caves (Henrikson 2000).

Scaredy Cat Cave was the subject of follow-up investigations in 1996 because of its relatively pristine condition and accessibility. Based on the radiocarbon dates from Scaredy Cat Cave, it appeared that the sites were primarily used during the Middle Holocene between 8000 and 4000 years ago (Yohe and Henrikson 1998). Although I initially argued that these storage facilities likely represented a “coping strategy” for seasonal and perhaps long-term fluctuations in resource availability during the climatically stressful Middle Holocene, this hypothesis has not been supported by the most recent evidence.

Test excavations conducted at Tomcat Cave in the summer of 2000 also revealed the remains of extensive charcoal and sagebrush deposits, antler, handstones and bison bone. However radiocarbon dates indicate that the earliest evidence of cold storage occurred there only 2000 years ago, several thousand years later than at

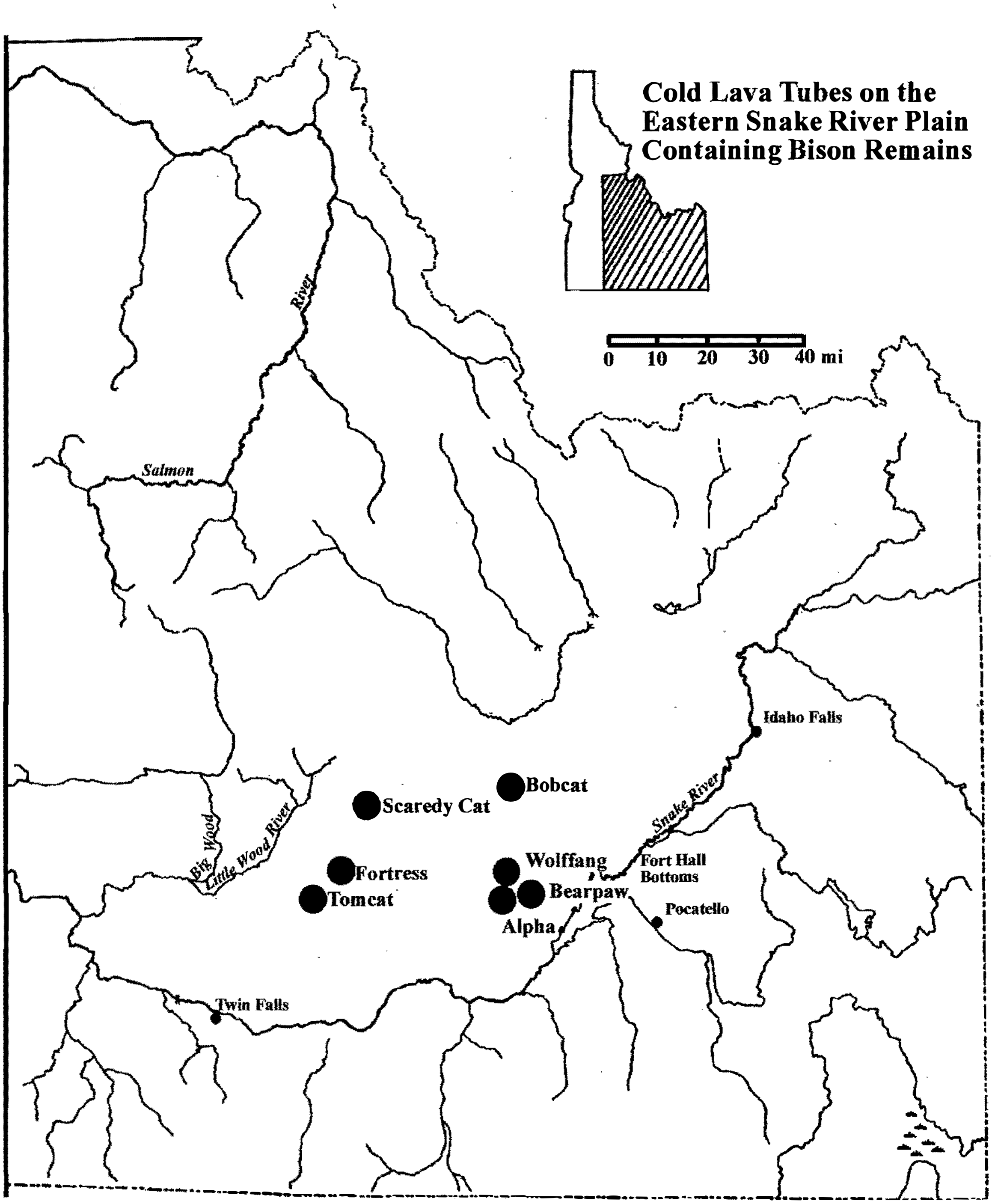


Figure 1. Cold Storage Caves on the Eastern Snake River Plain (modified from Butler 1978).

Scaredy Cat and Bobcat Caves. An antler tine from the Fortress Cave recently produced a date of roughly 1400 years BP. The other three caves have yet to be investigated beyond an initial recording.

To further understand the function of these cave sites and how they may have been integrated in aboriginal settlement and subsistence patterns, my research expanded in the summer of 2000 and 2001 to include surface artifact scatters immediately outside the caves and in the surrounding region. In the summer of 2000, test excavations were conducted immediately outside the entrance of Tomcat Cave and at Bison Heights, a lithic scatter with associated rock features located roughly one mile south of Tomcat Cave. In the summer of 2001, additional test excavations were performed in a narrow draw near the entrance of Scaredy Cat Cave, within a similar feature near Wilson Butte Cave and at selected locations at Bison Heights. A summary of the research within the caves is presented below, followed by a discussion of the results generated from the 2000 and 2001 field seasons.

Bobcat Cave

Bobcat Cave is located on open sagebrush steppe about eight miles from Big Southern Butte. The cave includes two separate lava tubes, with upper and lower chambers connected by a narrow tunnel (Figure 2). Accessible portions of the cave extend for a length of roughly 70 meters, with a maximum width of about 20 meters. The lower chamber forms a U shape, and the center is occupied by roof fall.

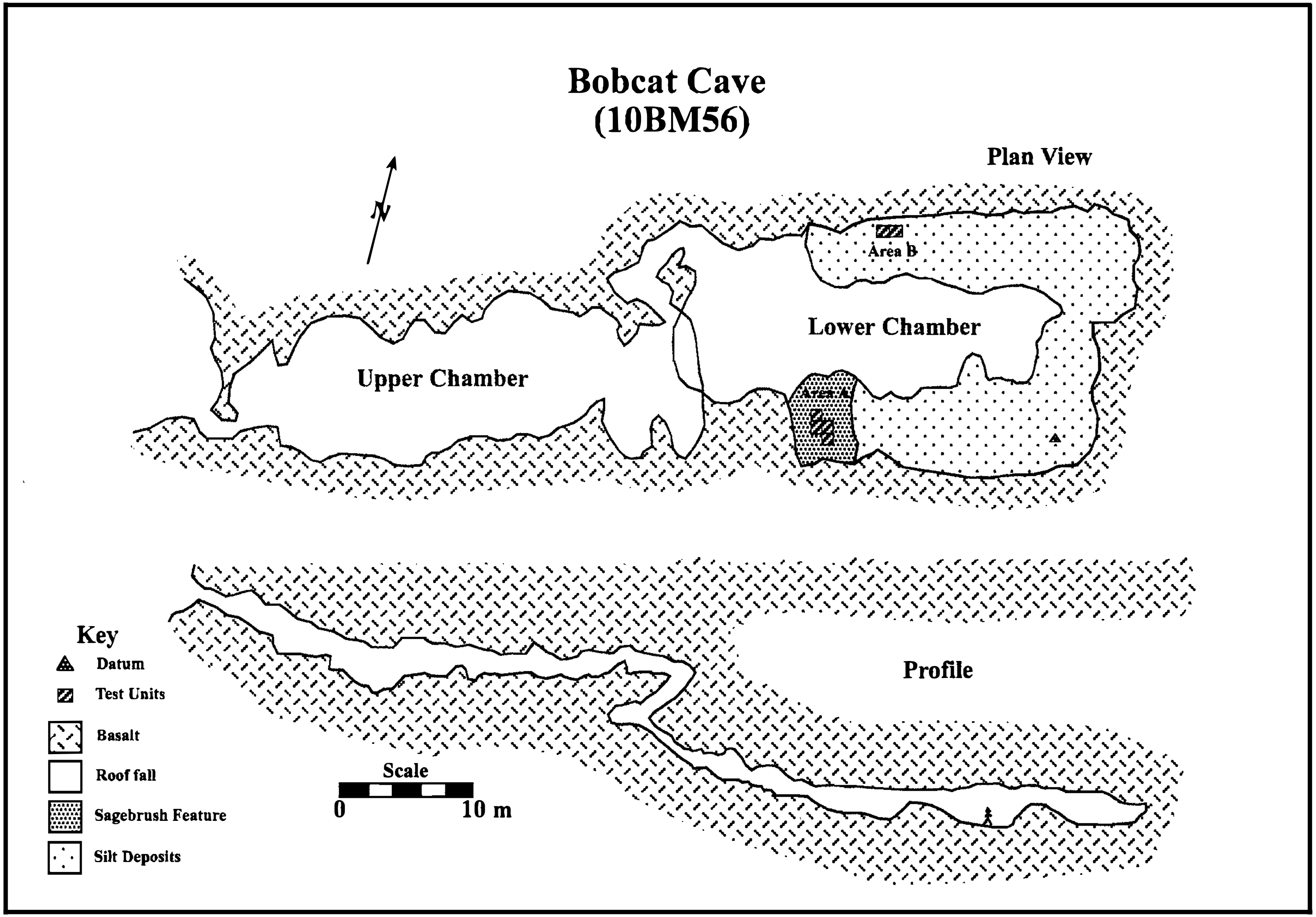


Figure 2. Plan view and profile of Bobcat Cave (10BM56).

the other. The resulting cave is complex, with upper and lower chambers connected by a narrow "squeeze". The west-facing cave entrance is narrow, rocky and steep, and must be "dropped" into from a basalt rubble depression above. The temperature in the upper chamber of the cave is at least 20 degrees warmer than that of the lower chamber, hovering at 55 degrees Fahrenheit during summer and early fall; no readings have been taken during winter. The tunnel leading to the lower chamber opens from the northeast corner of the upper chamber (see Figure 2) and must be entered in a crouching position. The lower chamber forms a U shape, with the center occupied by a large amount of roof fall. The chamber floor surrounding the roof fall is comprised of small basalt pebbles and cobbles mixed with fine silt deposits.

Approximately three cubic meters of sediment were excavated in the lower chamber of the cave during the 1987 and 1989 seasons. A total of six 1x1-meter grid units were opened, four in Area A and two in Area B (see Figure 2). Area B was excavated to a depth of 30 centimeters below the surface. The sediments in this test unit consisted of a gray silt (which appears to filter through cracks in the ceiling), burned and unburned fragments of sagebrush, and angular basalt cobbles and boulders. The excavation was halted when basalt bedrock was encountered.

The surface sediments in the vicinity of Area A were much higher in organic content and noticeably darker than in other parts of the lower chamber. They were primarily composed of burned and unburned sagebrush fragments (Figure 3). An ash concentration located on the surface of Stratum II appeared to be an informal fire basin. The Area A test excavations also revealed a purposefully constructed

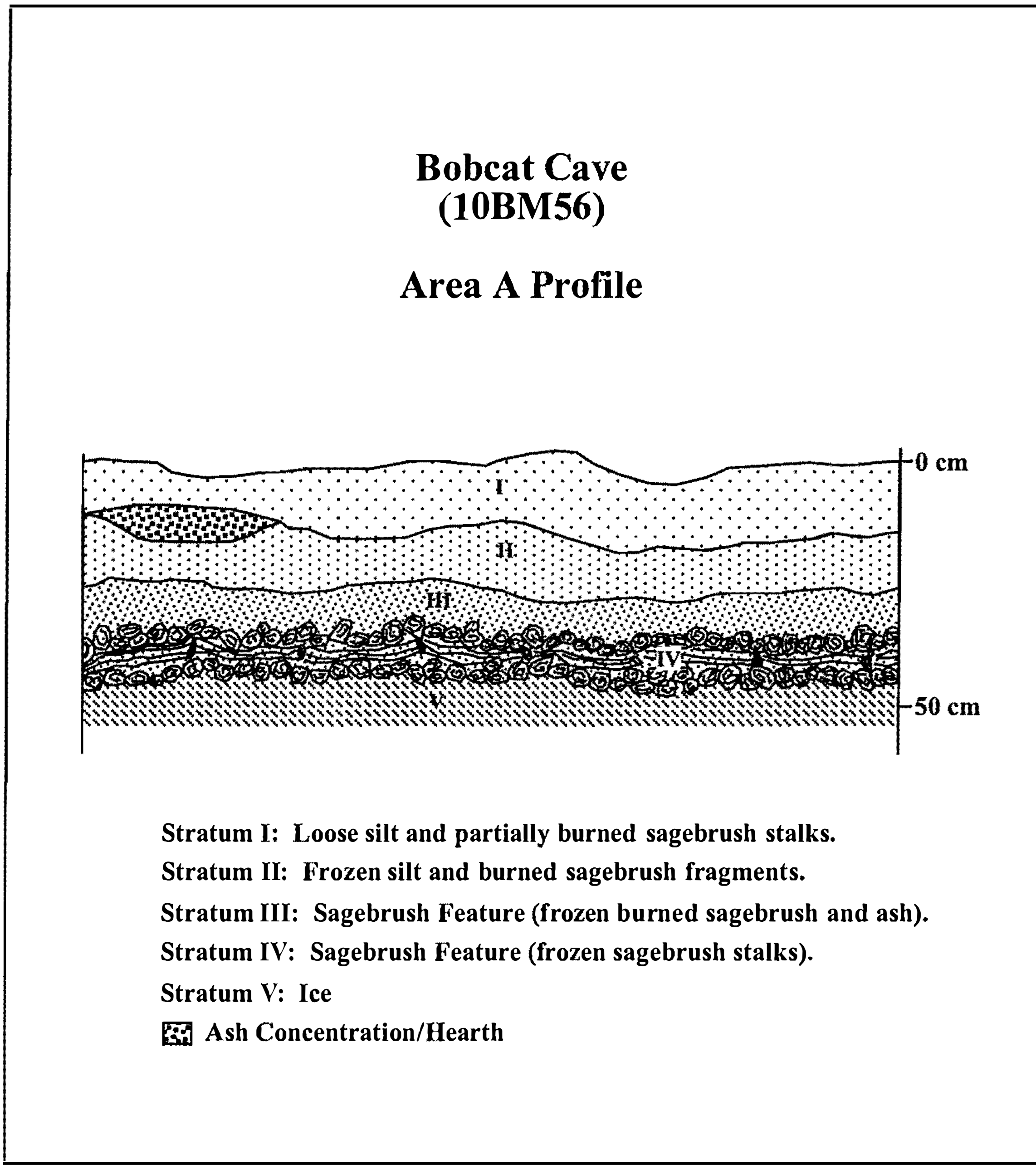


Figure 3. Schematic Profile of Area A sediments in Bobcat Cave.

sagebrush feature at a depth of 30 centimeters below ground surface. This feature, referred to as Stratum III and IV in Figure 3, consisted of three layers of sagebrush stalks laid at right angles to each other in a "cross-hatch" fashion then capped by a 5 centimeter layer of burned and unburned sagebrush bark and ash. This uniform arrangement of sagebrush stalks had also been placed directly above a layer of clear ice. Because this sagebrush feature was completely frozen, it was removed from only one grid unit to avoid damaging unidentified and undetected artifactual material. Figure 4 presents a plan view of the surface of Stratum III in Area A showing the arrangement of the sagebrush stalks directly above the ice. A total of 166 antler tines and 95 stone hammers (most of which are broken pestles), were recovered from the surface of the lower chamber of Bobcat Cave during 1987 and 1989. In addition, over 100 antler tine fragments and eight antler fragments were collected from the excavated deposits. Chipped stone artifacts recovered from the lower chamber test units include three lanceolate projectile points and a number of secondary and tertiary volcanic glass flakes that exhibit intentional pressure "retouching" or usewear along one or more margins (see Henrikson 1996). Two projectile points and two expedient tools from the 1989 test excavations at Bobcat Cave were submitted to Margaret Newman at the University of Calgary for immunological protein residue analysis. No protein residues were identified on three of the artifacts. However, Field Specimen 414-1, a lanceolate projectile point, recovered from the sagebrush feature reacted positively to bovine antiserum. According to Newman (1993, 1994), the blood residue could only have originated

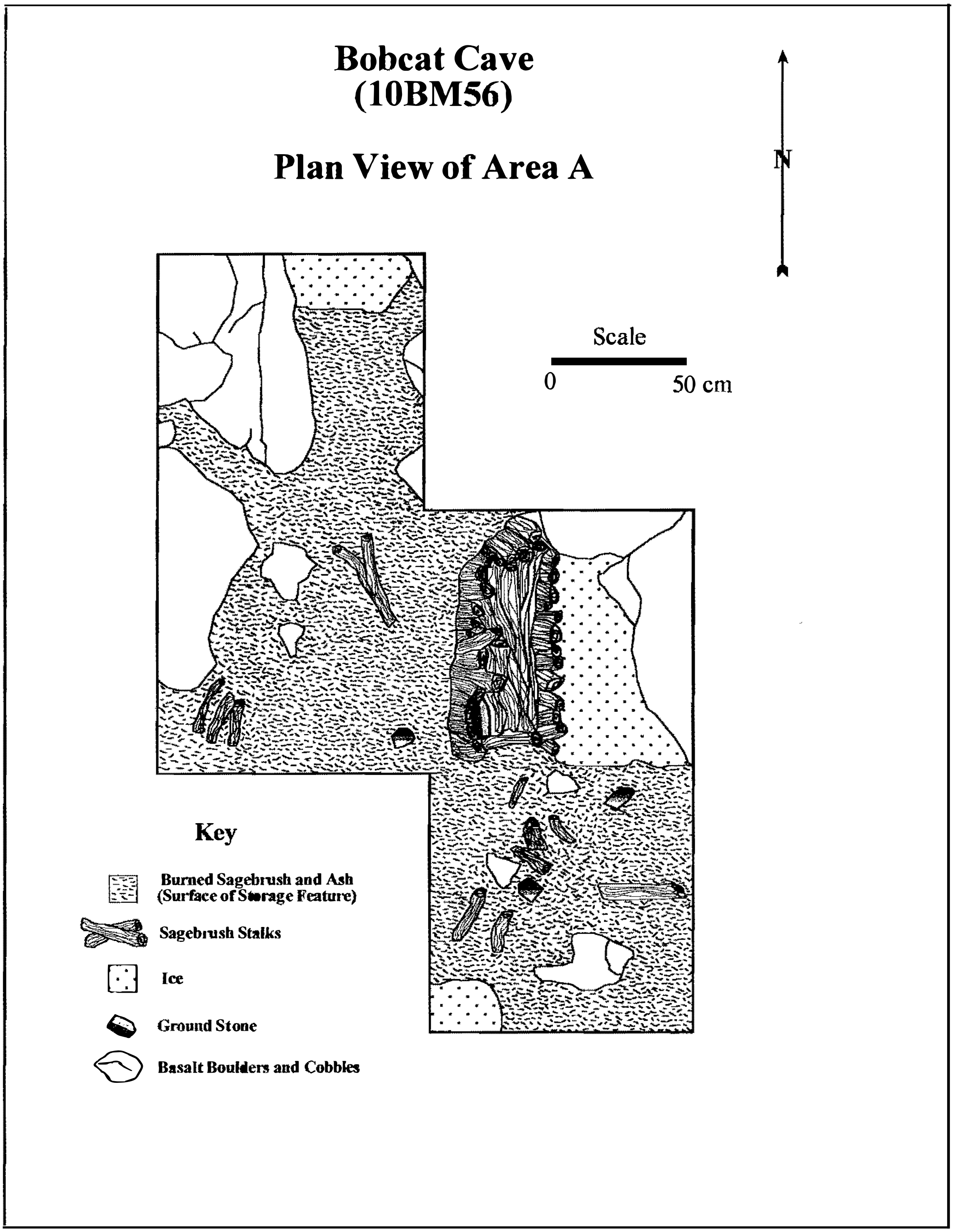


Figure 4. Plan view of the surface of Stratum III in Area A showing the arrangement of sagebrush stalks.

from bison, muskox, or cow. The artifacts and ecofacts recovered from Area A are presented in Table 1 below.

Table 1. Artifacts and Ecofacts recovered from Area A

Materials	Stratum I	Hearth	Stratum II	Stratum III	Total
Stone Hammers	3	-	-	2	5
Antler Fragments	73	-	6	8	87
Antler Tips	7	-	-	5	12
Points/Knives	1	-	-	1	2
Expedient Tools	1	-	-	3	4
Waste Flakes	7	-	2	1	10
Lg. Mammal Bone	35	11	1	57	104
Rodent Bone	14	-	14	4	32
Total	141	11	23	81	256

Faunal Assemblage

A total of 220 well preserved bone fragments were recovered from the lower chamber test units of Bobcat Cave. Of these, 39 are rodent remains that exhibit no evidence of butchering marks, charring, or breakage indicative of human modification or consumption and appear to be of natural origin. Of the remaining specimens, 191 range from 2.0 to 30.0 centimeters long and appear from their size and cortical thickness to be artiodactyl or large mammal long bone fragments. The largest quantity of long bone fragments was collected from the sagebrush feature in Area A, of which only a small fraction was excavated – indicating that a much higher proportion of such remains is located within the feature than in strata above. A total of 29 diagnostic faunal remains were recovered from the test units within the lower chamber of the cave and are listed in Table 2. While most have been identified as *Bison bison*, some could only be designated as large artiodactyl.

Table 2. Identifiable Bison and Large Artiodactyl Elements from Bobcat Cave

Element	Total	Fragment	Complete	Proximal	Distal	Left	Right
Rib	9	9	-	-	-	-	-
Calcaneus	1	-	1	-	-	-	-
Horn Core	1	-	1	-	-	-	-
Humerus	1	1	-	-	1	-	1
Innominate	1	1	-	1	-	1	-
Metapodial	2	2	-	1	1	-	-
Radius	5	5	-	3	2	3	2
Tibia	5	5	-	-	5	2	3
Ulna	2	2	-	2	-	2	-
Ungual	1	1	-	1	-	-	-
Vertebrae	1	1	-	-	-	-	-
Totals	29	27	2	8	9	8	6

Radiocarbon Dates

Two charcoal samples were collected from concentrations of burned sagebrush in the lower levels of Area A (see Figure 2). The radiocarbon dates produced from these samples are presented in Table 3.

Table 3. Radiocarbon Dates from Bobcat Cave (10BM56)

Lab No.	Depth	Stratum	C-14 Age	Calibrated Age (BP) at 2 Sigma
Beta-23981	10 cm	I	4360±70	5074 4826
Beta-23982	35 cm	IV	4110±70	4827 – 4502

Although these dates may suggest a single brief storage episode, a student's t-test indicates that the dates are statistically different at the 95% confidence interval. An older date recovered from the upper deposits may be indicative of the removal of a previous storage feature and its contents to make room for new sagebrush stalks.

Scaredy Cat Cave

Scaredy Cat Cave (Figure 5) is located in a large kipuka surrounded by Holocene lava flows. The terrain immediately surrounding the cave is composed of open sagebrush steppe. 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. 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. As in Scaredy Cat Cave, the central chamber is 34 degrees Fahrenheit while both the entrance and rear chambers are between 50-60 degrees Fahrenheit during the summer months.

The central chamber of Scaredy Cat Cave also contained a scatter of surface artifacts when discovered in 1996 (see Figure 6). These included 29 stone hammer fragments, 16 antler tines, 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

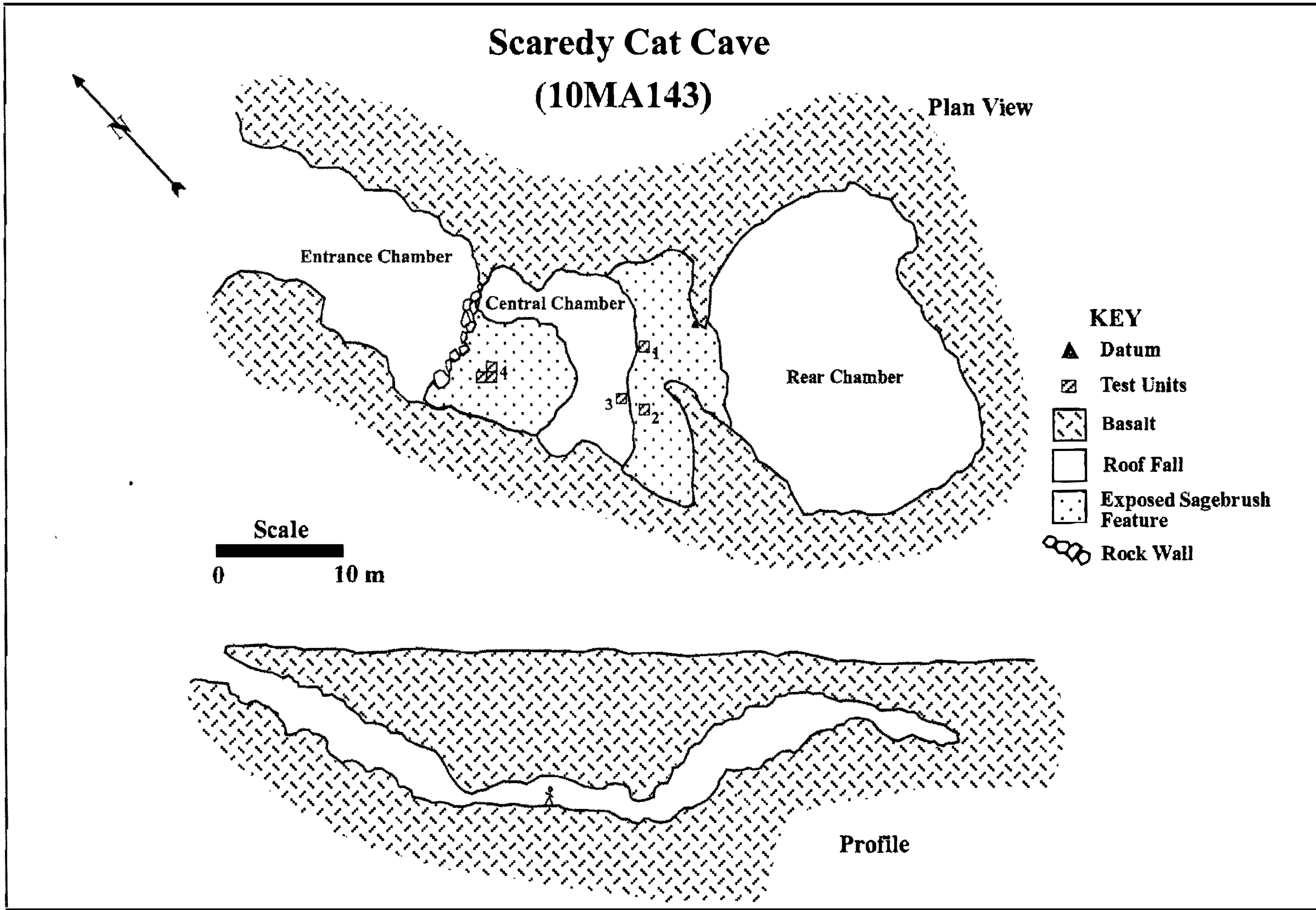


Figure 5. Plan view and profile of Scaredy Cat Cave (10MA143) showing location of test excavations.

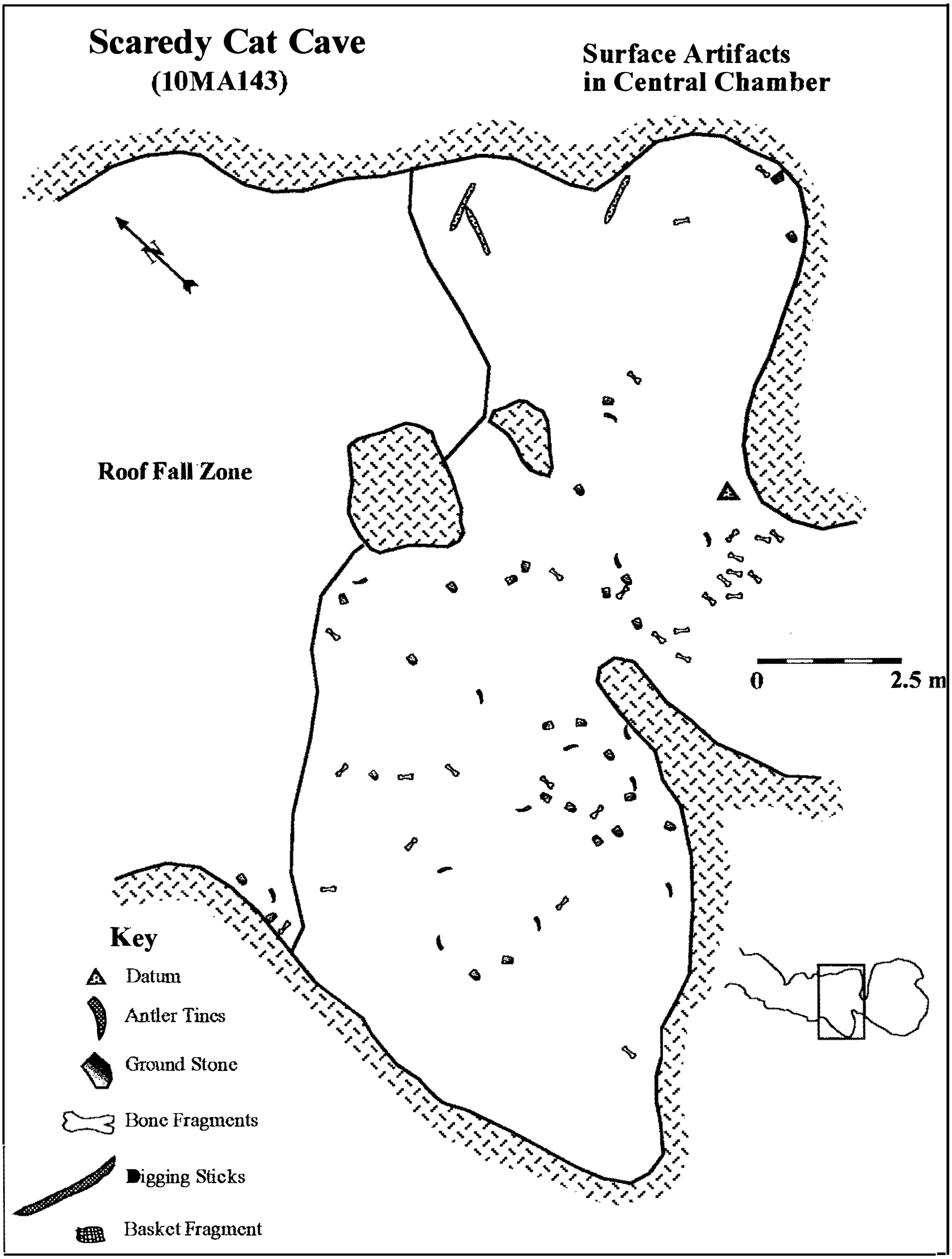


Figure 6. Distribution of surface artifacts in the central chamber of Scaredy Cat Cave.

the cultural occupation of the cave. The surface fragments of other large mammals may be the result of both cultural and carnivore activity.

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). 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 7). Although sagebrush stalks, bone fragments, antler and ground stone fragments were recovered from all of the test units, Test Unit 4 exhibited the deepest and most intact accumulation of cultural deposits (see Figure 8). 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 4 below.

Table 4. 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

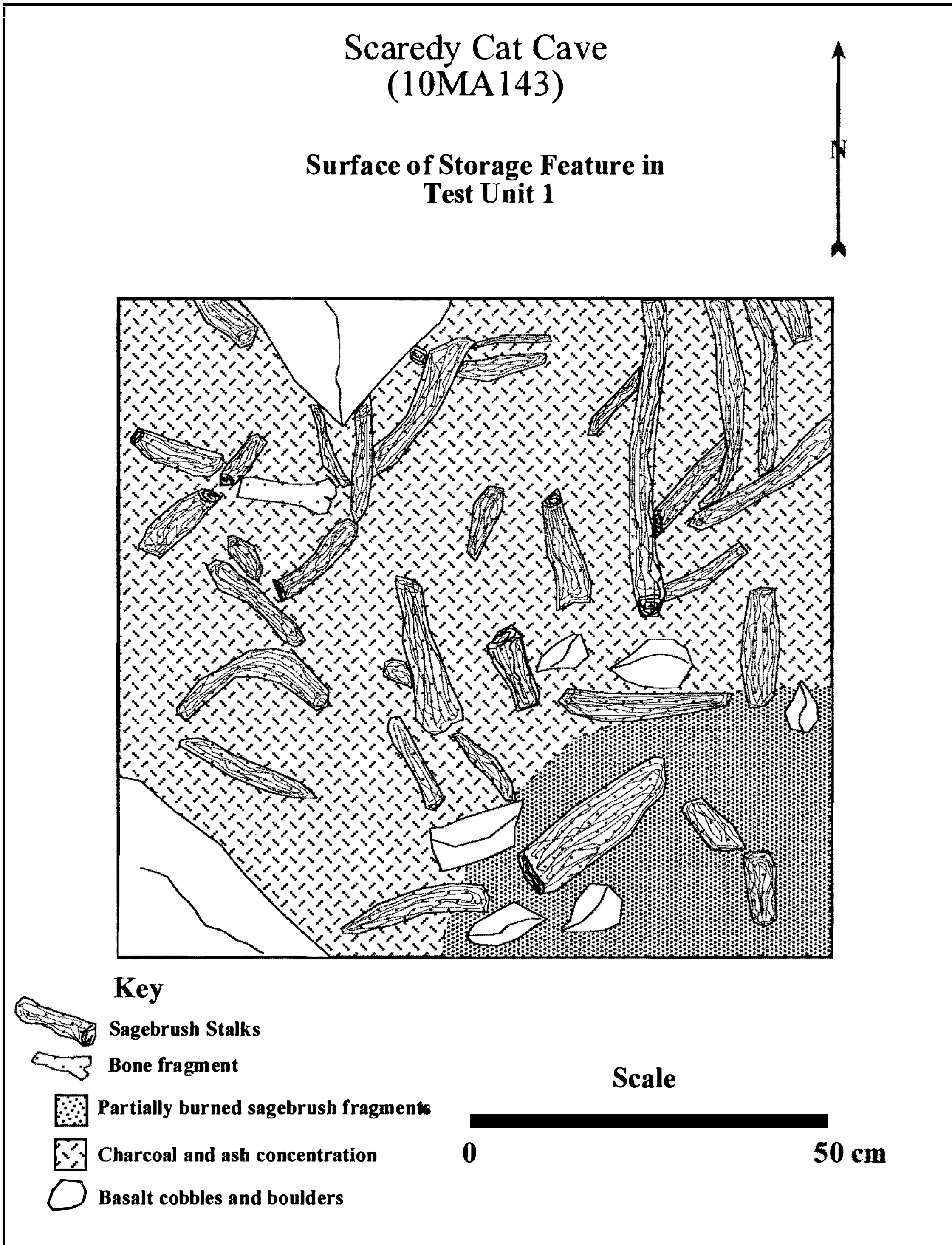
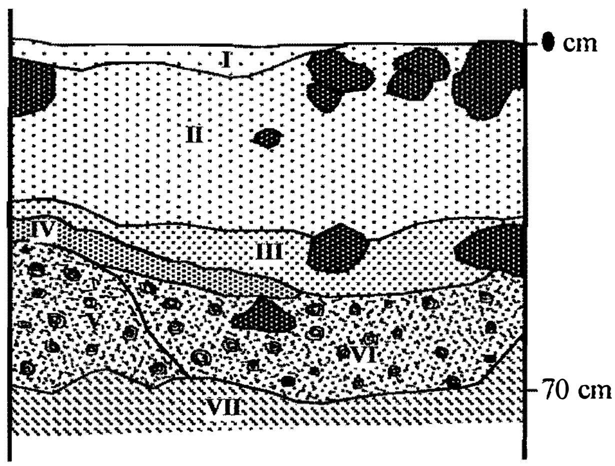


Figure 7. Exposed surface of storage feature showing sagebrush stalks, sagebrush fragments and charcoal concentration in Test Unit 1.

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 8. Profile of Test Unit 4 in Scaredy Cat Cave.

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. 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. 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 6).

Table 6. 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.

Tomcat Cave

Tomcat Cave (Figure 9) is located in open sagebrush steppe to the north of Black Ridge Crater. The cave is roughly 70 meters in length and 4 to 10 meters wide. The ceiling ranges from 2 to 7 meters in height. Tomcat Cave has the largest entrance chamber, which reaches nearly 6 meters high and slopes steeply downward

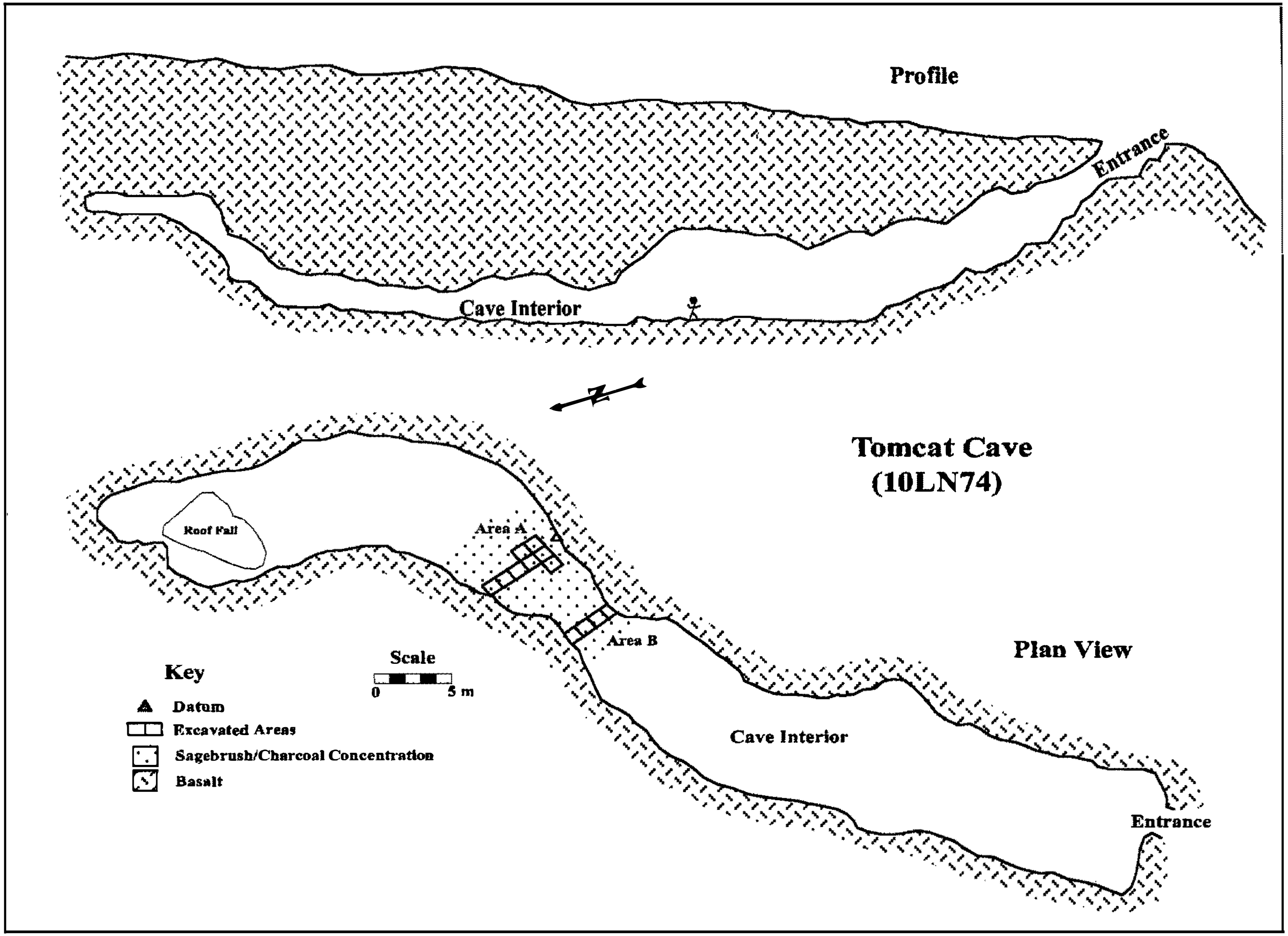
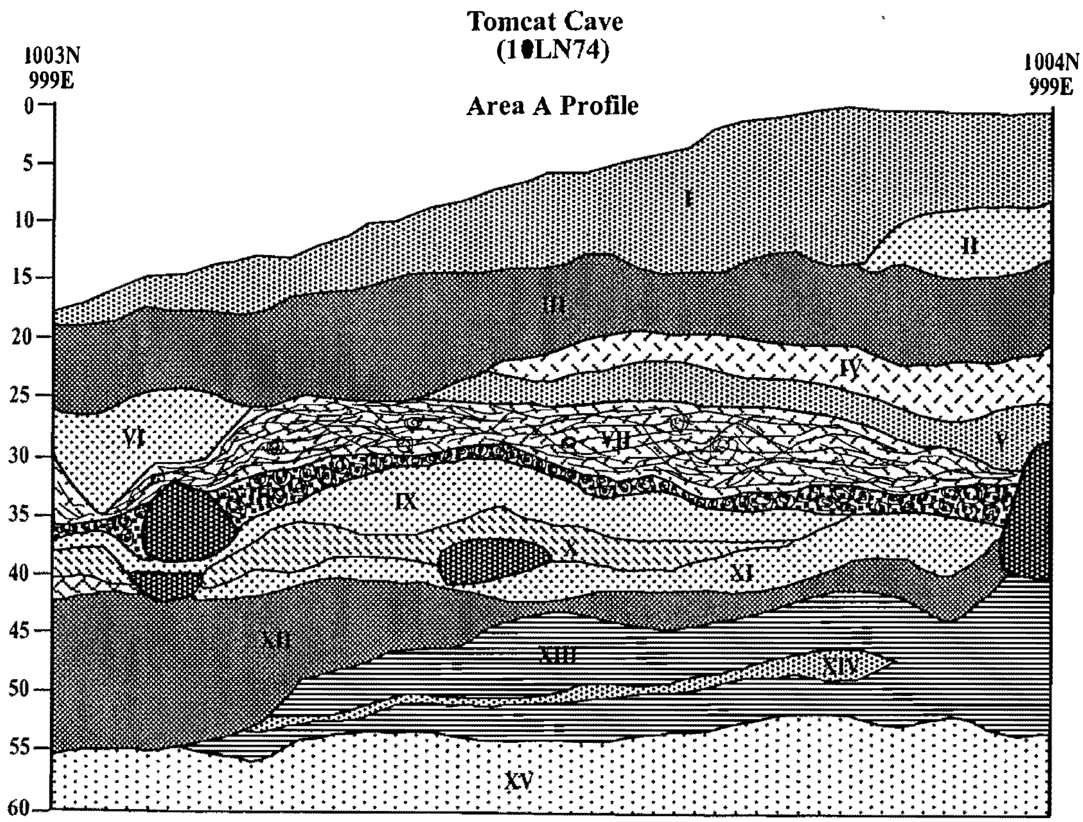


Figure 9. Plan view and profile of Tomcat Cave (10LN74) showing location of test excavations.

across a boulder strewn floor. However, at its lowest elevation, the roof drops and the walls close in significantly, forming a single, narrow tube that abruptly ends in a roof collapse. The entrance chamber, near the mouth, is roughly 50 degrees during the summer months but the temperature noticeably drops at the base of the slope. The rear of the cave is slightly higher in elevation and also noticeably warmer.

Approximately six cubic meters of sediments were excavated in the central portion of the cave during the summer of 2000, where sagebrush and charcoal were concentrated on the surface of the floor (see Figure 9). The stratigraphy in Area A revealed narrow bands of charcoal, ash and decomposing sagebrush (Figure 10). Strata VII and VIII represent several layers of sagebrush stalks laid in a fashion similar to that found in Bobcat Cave. The stalks that comprise Stratum VII run parallel with the sidewall of the test unit, while the stalks in Stratum VIII protrude from the sidewall. Although this feature is apparently decomposing from the high moisture content in the cave, the right-angled arrangement of individual sagebrush stalks is still apparent. Sterile sands lie below the cultural deposits at a depth of roughly 50 centimeters and extend to almost three meters below the current floor.

A total of 46 antler tines and fragments (see Figure 11), 19 stone hammers, 7 projectile points (see Figure 12), 2 biface fragments, 42 waste flakes and 142 faunal remains were recovered from the Area A and Area B excavations. Because of the challenge associated with excavating extremely thin stratigraphic layers individually (especially with less-than-optimum lighting), all units were excavated in five-



Stratum I:	Dark brown silt, sagebrush charcoal (80% organic).
Stratum II:	Dark brown silt and tan sand with burned and unburned sagebrush.
Stratum III:	Dark brown silt and sagebrush charcoal (70% organic).
Stratum IV:	Sagebrush charcoal.
Stratum V:	Dark brown silt and sagebrush charcoal (95% organic).
Stratum VI:	Light brown silty clay.
Stratum VII:	Decomposing unburned sagebrush stalks, parallel with side wall.
Stratum VIII:	Decomposing unburned sagebrush stalks, protruding from side wall.
Stratum IX:	Light brown silty clay.
Stratum X:	Decomposing unburned sagebrush and light brown silt.
Stratum XI:	Light brown silty clay.
Stratum XII:	Gray sandy silt with charcoal (20% organic).
Stratum XIII:	Sagebrush charcoal.
Stratum XIV:	Light brown silty clay with charcoal and ash (50% organic).
Stratum XV:	Tan sand.

Figure 10. Profile of Test Unit 4 in Tomcat Cave.

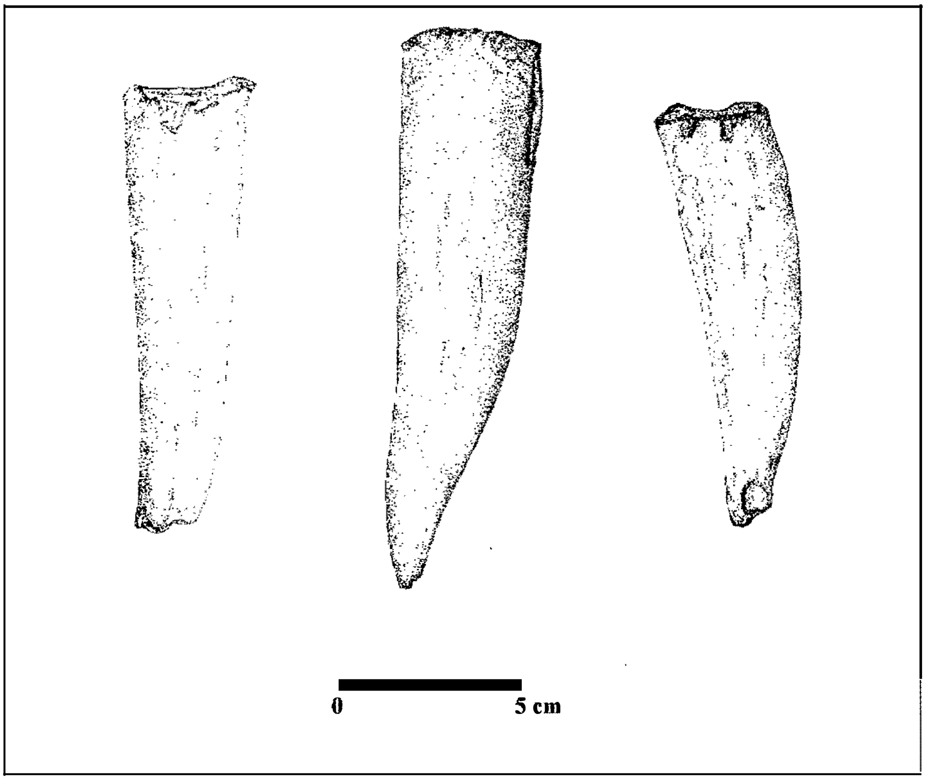


Figure 11. Elk antler tines recovered from Tomcat Cave (10LN74).

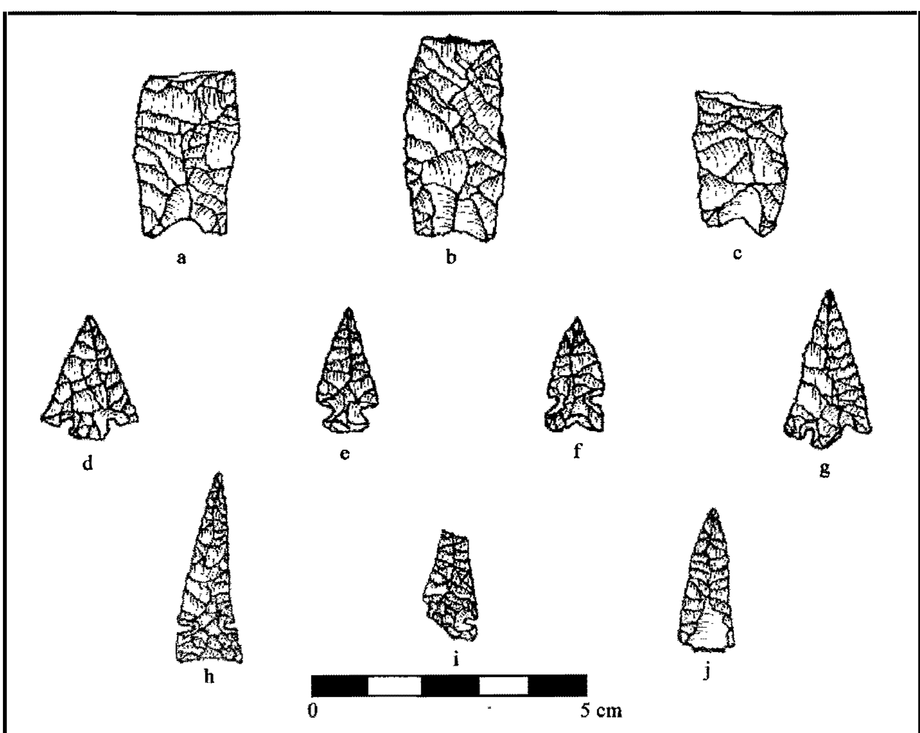


Figure 12. Projectile points recovered from Tomcat Cave (10LN74).

centimeter arbitrary levels. Tables 7 and 8 present the artifacts and ecofacts recovered from each area.

Table 7. Artifacts and Ecofacts recovered from Area A in Tomcat Cave

Materials	0-5 cm	5-10	10-15	15-20	20-25	25-30	30-35	35-40	Total
Hammer stones	2	2	1	2	1	2	1	2	13
Antler Tines	1	-	1	3	1	1	1	1	9
Antler Fragments	-	-	-	9	4	3	10	1	27
Antler Tips	3	-	1	-	-	-	1	-	5
Bone Tools	-	2	-	1	-	-	-	-	3
Points/Knives	1	-	1	-	1	-	-	1	4
Expedient Tools	-	-	-	-	1	-	-	-	1
Waste Flakes	6	1	3	1	5	4	3	2	25
Lg. Mammal Bone	10	5	5	5	11	8	21	10	75
Rodent Bone	4	4	-	-	3	1	1	-	13
Total	27	14	12	21	27	19	38	17	175

Table 8. Artifacts and Ecofacts recovered from Area B in Tomcat Cave

Materials	0-5 cm	5-10	10-15	15-20	20-25	25-30	30-35	35-40	Total
Hammer Stones	1	2	1	-	-	-	1	1	6
Antler Tines	-	-	-	-	1	-	-	-	1
Antler Fragments	-	-	-	-	1	-	-	-	1
Antler Tips	-	2	-	1	-	-	-	-	3
Bone Tools	-	-	-	-	1	-	-	-	1
Points/Knives	1	1	1	-	1	-	-	-	4
Expedient Tools	1	1	-	-	-	-	-	-	2
Waste Flakes	1	2	5	4	1	1	-	-	14
Lg. Mammal Bone	6	4	5	10	18	5	-	1	49
Rodent Bone	1	2	-	-	1	-	-	1	5
Total	11	14	12	15	24	6	1	3	86

As indicated in Table 7, mammal bone was concentrated between 20 and 35 centimeters below the ground surface, a depth corresponding with Strata VII and VIII. Stone hammer fragments, antler tines and waste flakes were located throughout the deposits, however, antler splinters and fragments were also concentrated in the lower strata. Recent analyses of three expedient tools from

Tomcat Cave have produced positive reactions to deer and dog antiserum (Newman 2001).

The stratigraphy of Area B was homogeneous and consisted of narrow bands of charcoal and ash combined with small fragments of partially burned sagebrush. Although intact sagebrush stalks could not be discerned in the profile, the cultural remains recovered from Area B suggest that similar activities were occurring in this portion of the cave. As indicated in Table 8, cultural debris, especially large mammal bone, was concentrated in the 15-25 centimeter levels.

Faunal Assemblage

Of 142 bones and bone fragments recovered from the excavations, 92 fragments were classified as either *B. bison*, artiodactyl or large mammal. Faunal remains recovered from a buried context exhibited no evidence of carnivore or rodent gnawing. The remaining items include an *Ursus* sp. scapula tool, four elements identified as *Marmota flaviventris* (yellow-bellied marmot) and 44 unidentified rodent remains. As in Bobcat and Scaredy Cat caves, the rodent remains do not exhibit evidence of cultural modification, indicating that they were likely deposited through natural processes. Table 9 presents the identifiable bison and large mammal remains.

Table 9. Identifiable Bison and Large Artiodactyl Elements from Tomcat Cave

Element	Total	Fragment	Proximal	Distal	Left	Right
Rib	9	9	-	-	-	-
Scapula	5	5	3	2	-	3
Humerus	2	2	1	1	1	1
Radius	3	3	2	1	2	1
Tibia	2	2	1	1	1	1
Ulna	2	2	2	-	2	-
Mandible	2	2	--	2	--	2
Totals	25	25	9	7	6	8

Radiocarbon Dates

Seven radiocarbon samples have been processed for Tomcat Cave (Table 10), including a date from the 1997 test probe. The samples from Area A were collected from individual bands of charcoal or sagebrush fragments exposed in the stratigraphic profile. Because individual strata in Area B were extremely difficult to discern, charcoal samples were collected from each five-centimeter level. Notably, the Tomcat Cave dates are significantly younger than the radiocarbon dates recovered from Scaredy Cat and Bobcat Cave.

Table 10. Radiocarbon Dates from Tomcat Cave

Location	C-14 Age	Sample#/Type	δ 13C	Calib. Age (BP)
Area A, Stratum I	1170±60 BP	Beta-48734/Charcoal	-25.2	1187 – 957
Area A, Stratum IV	1240±60 BP	Beta-53244/Wood	-25.5	1287 – 1053
1997 Test, 40 cm	2110±60 BP	Beta-15476/Charcoal	-25.0	2183 – 1946
Area A, Stratum XIII	2350±60 BP	Beta-48735/Charcoal	-25.5	2508 – 2300
Area B, 10-15 cm	2400±60 BP	Beta-53245/Charcoal	-24.1	2548 – 2336
Area B, 25-30 cm	2240±60 BP	Beta-53246/Charcoal	-23.7	2351 – 2115
Area B, 45-50 cm	2120±60 BP	Beta-153247/Charcoal	-24.8	2183 – 1966

A student's t-test of the dates from Area B suggests that the 2400 BP date from the 10-15 cm level is statistically different from the 2120 BP date from the 45-50 cm level. The inversion of these two dates suggests some degree of disturbance and, as in Bobcat Cave, may be the reuse of the debris from an older storage feature. The dates from Area A indicate at least two distinct storage episodes, the last occurring roughly 1150 to 1250 years ago. The 2350 BP date from Area A is statistically similar (at the 95% confidence interval) to the three dates from Area B and may be concurrent.

Pollen Analyses

Sediment samples collected during the test excavations at Scaredy Cat Cave were submitted to Dr. Peter Wigand at Desert Research Institute for a macrofossil and pollen analysis. These included a series of samples from Test Units 1 and 4 and one sample from ten centimeters below the present ground surface immediately outside the cave. This sample would represent an exterior control sample in which to compare the interior samples. The presence of arboreal pollen such as pine, juniper and alder recovered from both interior and exterior samples are likely due to the close proximity of the cave to the Pioneer Mountains, which are less than twenty miles to the north. The range of pollen from the cave is typical of a sagebrush steppe environment. The presence of *Poaceae* in all the samples indicates that grasses were consistently available in the surrounding environment. However, a few of the interior samples also produced pollen more associated with riparian environments. These include *Cyperaceae* (sedges), *Typha angustifolia* (cattail) and *Polygonum* sp. (water smart weed). Cattail pollen was recovered from deposits dating to 6680 radiocarbon years B.P. Water smart weed pollen was recovered from the interior surface sediments. Because both cattail and water smart weed require perennial water sources, it is possible that these were artificially introduced to the site, perhaps by individuals who had made previous stops along riparian areas. Sedges, which appear in three samples dating after 6000 radiocarbon years B.P., are currently present in ephemeral ponds in the immediate area of the cave.

Wigand (1997) found that the extremely high ratio of *Artemisia* (sagebrush) pollen in one sample suggested that the sagebrush was processed and placed in the cave during its blooming season in the fall. If these sagebrush features were constructed during the fall, it is likely that meat was placed in storage at this time of the year as well.

A total of 8 sediment samples from Tomcat Cave were analyzed by Linda Scott Cummings of the PaleoResearch Institute. These included three samples from depths of 10-15 centimeters, 25-30 centimeters and 35-40 centimeters from several units inside Tomcat Cave and two control samples (from 25-30 centimeters and 35-40 centimeters below ground surface) in the swale immediately outside the mouth of the cave. Her results indicate that, over the past 2500 years, the sagebrush steppe environment surrounding Tomcat Cave has been relatively stable. She noted small quantities of pine and juniper pollen in all of the samples as well as alder pollen. As with Scaredy Cat Cave, pine and juniper are currently located about 50 miles to the south in the Albion Mountains. Alder was likely present along the Little Wood River, which is located about eight miles west of the cave. Fireweed (*Epilobium)*, a native forb that usually appears after range fires, is present in both sediment samples from Grid Unit 1005 N 993E, indicating that either lightening or humans generated fires in the immediate area during the last 2500 years. The deposits also contained a variety of grasses *(Poaceae)*, indicating "at least moderate quantities .... in the local vegetation" (Cummings 2002:3).

The most interesting finding is the extensive amount of *Artemisia* pollen noted in all the sediment samples from Tomcat Cave. Sagebrush made up 75 to 80% of the pollen present in the cave, which are notably higher percentages than even those found in Scaredy Cat Cave. However, the exterior control samples produced comparable percentages of sagebrush pollen. These results do not provide confirmation that the sagebrush used in the storage features was necessarily carried into the cave during the fall.

Synthesis of Radiocarbon Dates

Figure 13 presents the distribution of radiocarbon dates from four cold storage caves in Idaho. As discussed above, the excavations at Scaredy Cat Cave revealed at least six separate storage episodes in different parts of the central chamber. At least two distinct storage events are represented in Bobcat Cave, and two in Tomcat Cave. The spread of radiocarbon dates indicates that cold storage

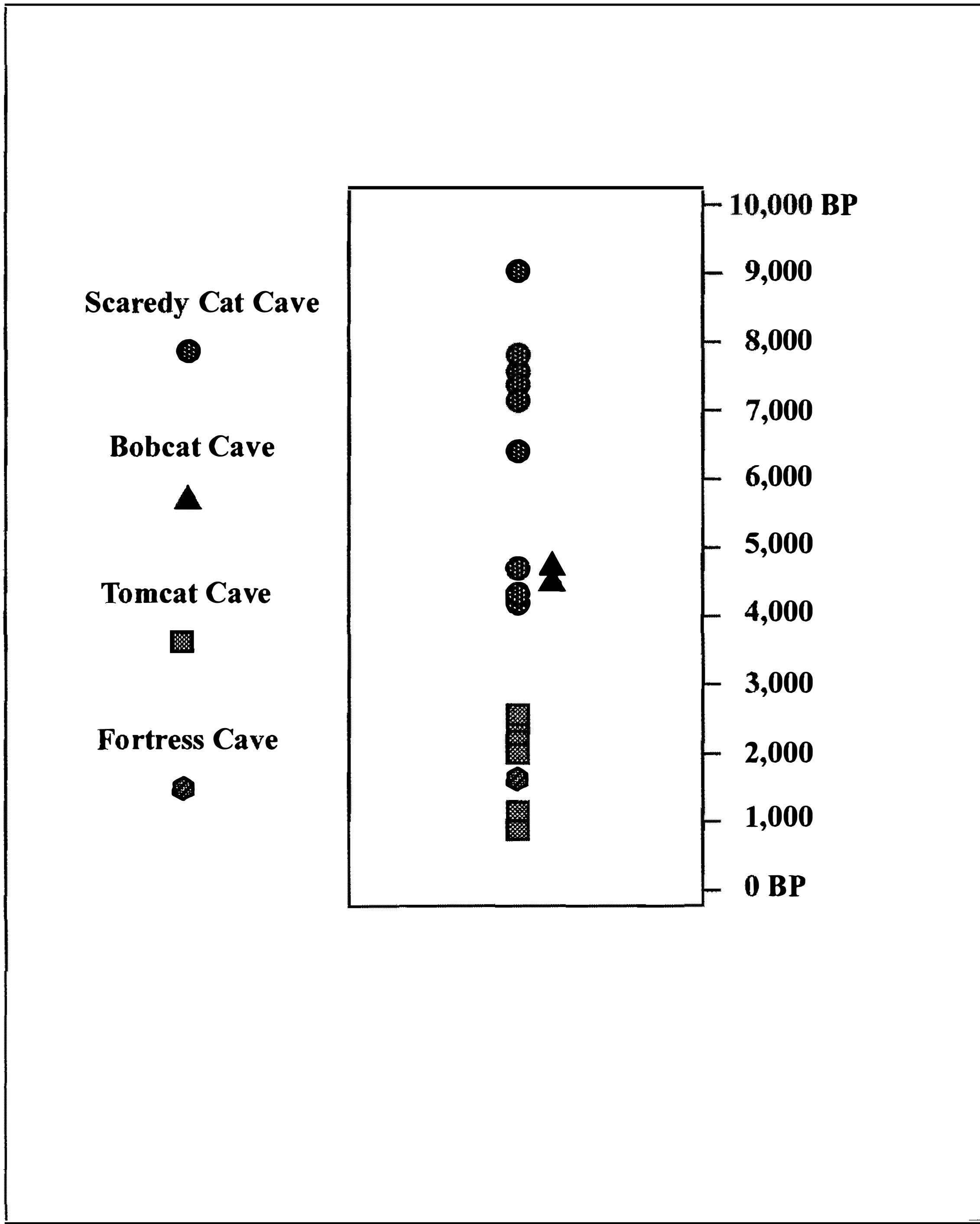


Figure 13. Distribution of calibrated radiocarbon dates from Idaho's cold storage caves (see Tables 3, 6 and 10).

caches were included as a component of the seasonal round on the eastern Snake River Plain for the last 8000 to 9000 years.

An AMS date of 1430 ± 40 radiocarbon years BP (Beta–158258) on an antler tine recovered from the Fortress Cave is also included. This date has been calibrated to between 1285 and 1394 calendar years BP. Research has not been conducted at the four other known cold storage caves, but they remain available for future investigations of the cold storage phenomenon.

Summary: Evaluating the Evidence for Cold Storage

Data recovered from these caves provides a sketch of the activities occurring at these sites. Prepared sagebrush stalks were carried down from above and placed in linear arrangements in the lowest point of the caves, where temperatures would allow meat to freeze. Various body parts of bison (containing bone and perhaps just meat) were likely placed on successive layers of sagebrush stalks. Use of the soft plant material was probably intended to ease the process of extraction in the future. Hand stone and pestle fragments provided the force behind the antler tine ice picks required to later remove the frozen meat from the sagebrush matrix. Broken tips of antlers indicate occasional breakage during this process (Figure 14). (Experiments conducted during the research confirmed that antler tines make highly resilient ice picks). Green fractured long bone also indicates that some processing of body parts occurred either prior to placing the meat and bone onto the sagebrush storage "beds" or immediately following its removal. The usewear visible on many of the volcanic

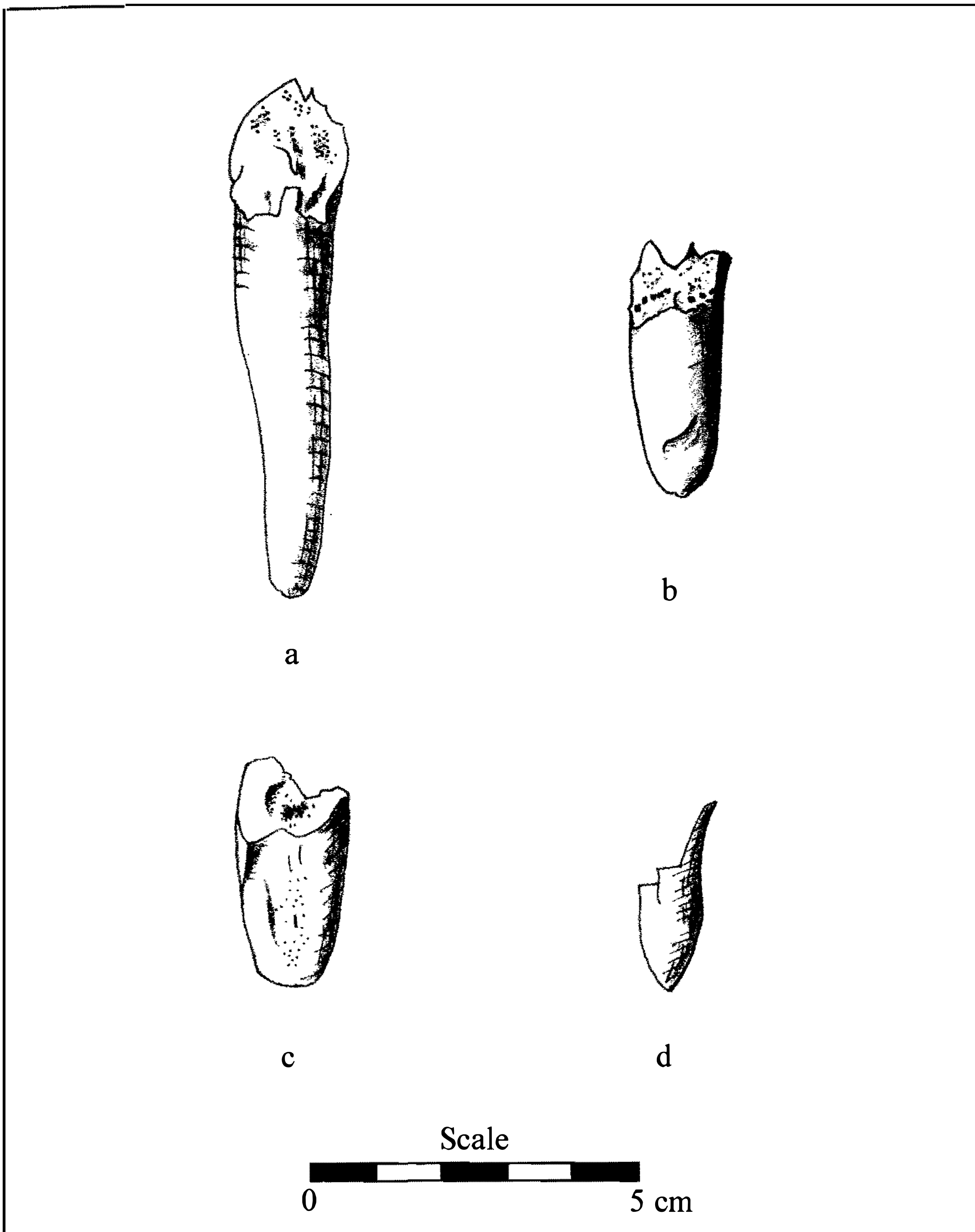


Figure 14. Antler tips recovered from the test excavations at Scaredy Cat Cave (10MA143): a) 186-1; b) 185-2; c) 167-2; d) 186-2.

glass flakes in the assemblage indicates that they probably served as expedient cutting implements that were used briefly and then discarded.

A storage feature is clearly still intact in Bobcat Cave. Because so little of this feature was removed, it may still contain intact remains of bison. A similar arrangement of sagebrush was also apparent in Area A in Tomcat Cave. However, the more jumbled appearance of the sagebrush stalks in Scaredy Cat Cave's Test Unit 4 may indicate a sequential series of storage features that have been disturbed, perhaps through the process of meat removal.

Although prehistoric storage caches have been notoriously difficult to recognize and many storage features have been found emptied of their contents (Friesen 2001, Holly 1998), some previously documented storage features show similarities to features in the caves reported here. Le Blanc's (1984) research at the late prehistoric Rat Indian Creek Site in the Northern Yukon uncovered several elaborate "cache" pits filled with shattered bone fragments and articular ends of caribou elements. One pit was lined with small twigs and willow branches topped by a layer of bark. The other was lined on the bottom with a parallel row of branches and likewise topped with what appeared to be aspen bark. Several rock lined cache pits were discovered in caves in the Coso Range of California, containing alternate layers of bunch grasses and Joshua Tree bark (Wilke and McDonald 1989); however, the contents had been removed previously and the pits abandoned. The Peel River Kutchin of the Northern Yukon Territory (Osgood 1936) made excavated pits lined with sticks and twigs. Fish were placed in the pit during the fall months and covered with spruce bark and "debris". The fish conveniently remained frozen throughout the winter. The cold storage features in Idaho's ice caves appear to serve a similar function, although bison appear to be the primary animals stored.

Testing Above Ground near Scaredy Cat Cave –2000/2001

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. Biface fragments, scrapers, drills, expedient tools, Intermountain Ware ceramics and numerous projectile points have also been recovered from the surface (Figure 15). Projectile points spanning the last 7500 years (including Northern Side-notched, Stemmed Indented-Base, Elko Corner-notched, Rosespring 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.

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 16). This feature represents a collapsed portion of a lava tube system

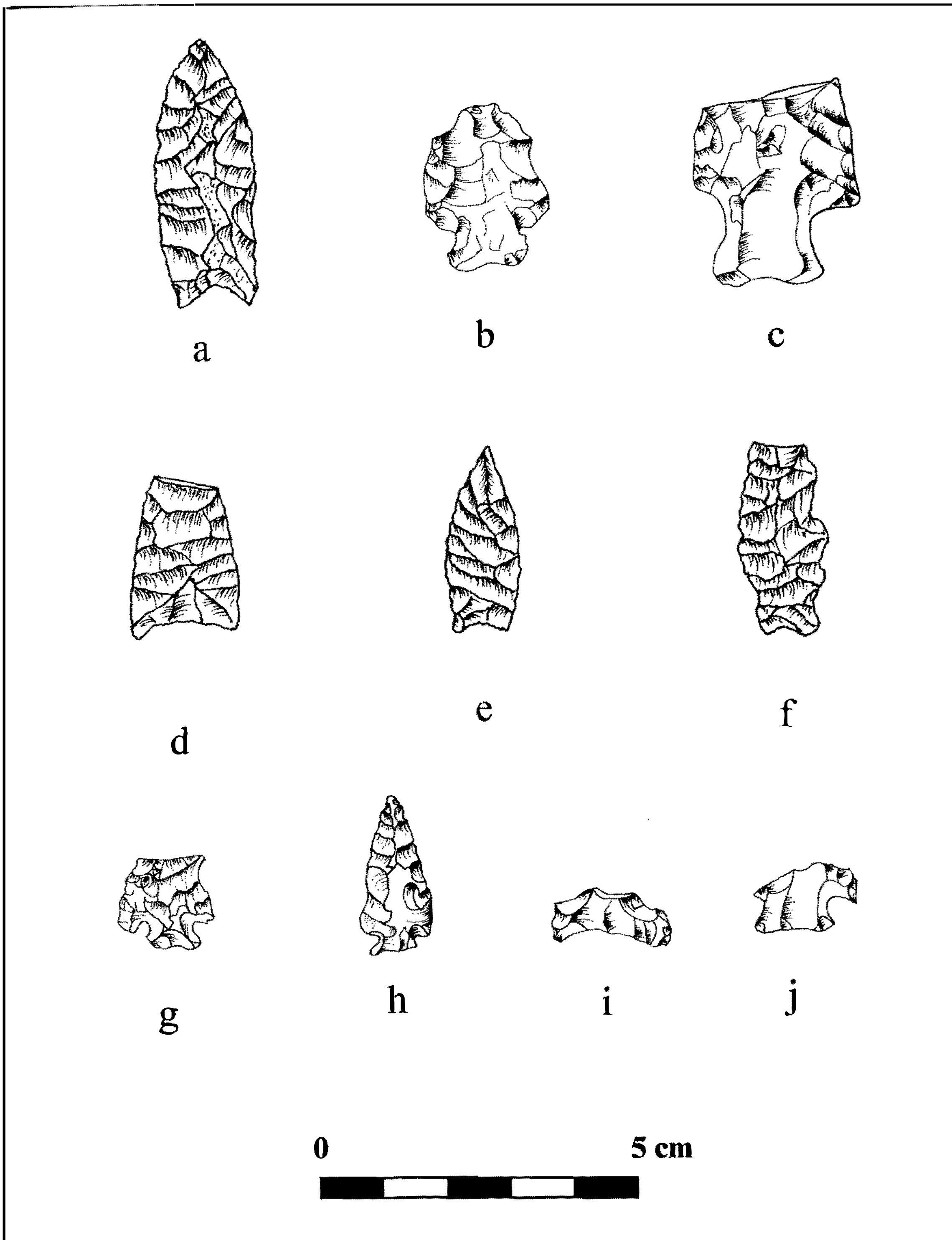


Figure 15. Surface projectile points from Scaredy Cat Cave (10MA143) exterior: a) 205-1; b) 215-1; c) 205-1; d) 208-1; e) 542-1; f) 218-1; g) 213-1; h) 217-1; i) 214-1; j) 210-1.

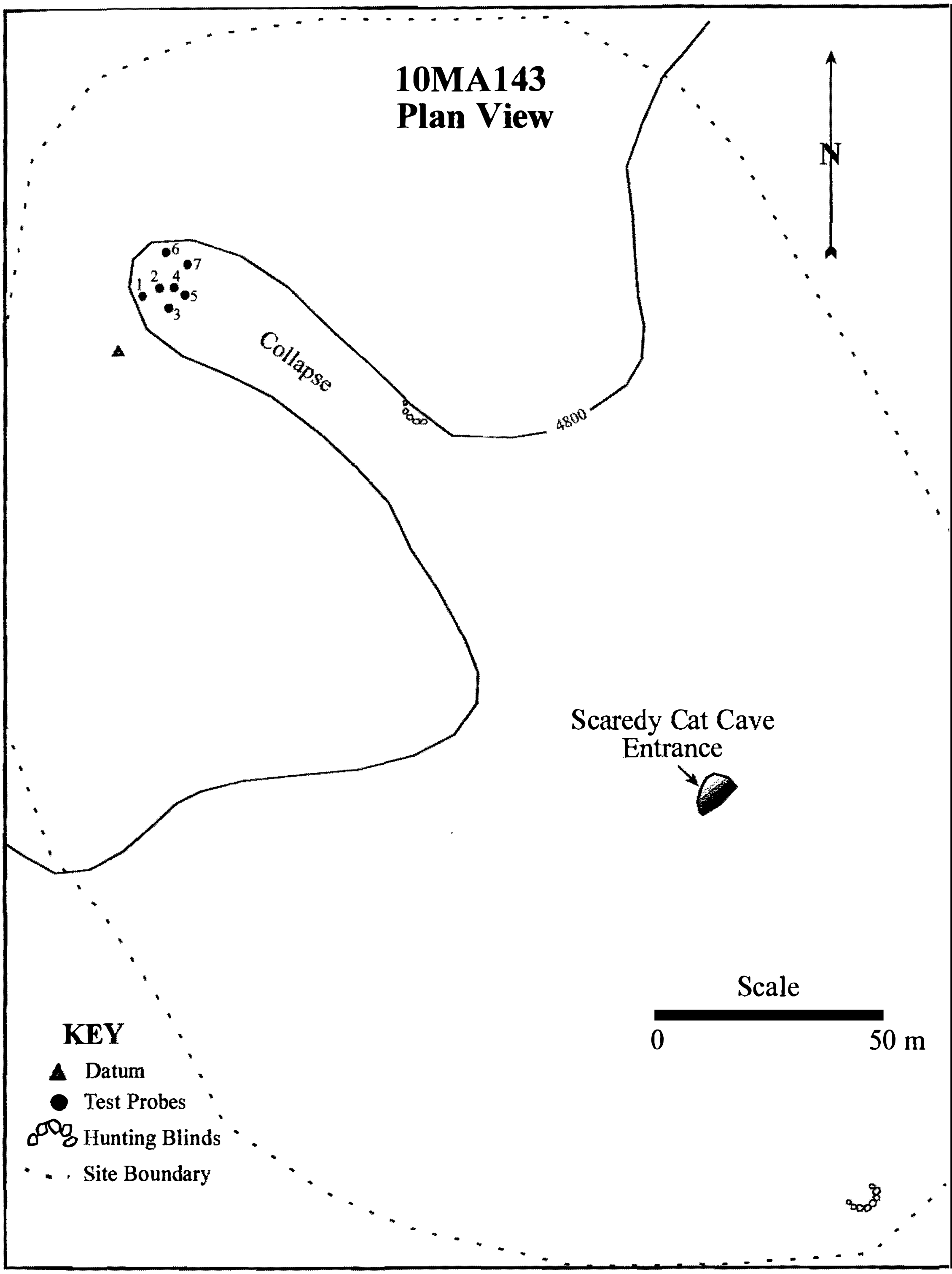


Figure 16. Plan view of Scaredy Cat Cave (10MA143) showing collapsed lava tube and location of test units near the mouth.

that includes the cave and several others located to the southeast and northwest. Over 100 meters long, the 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. 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 10-centimeter levels. If possible, the probes were excavated to a depth of 50 to 60 centimeters. Table 11 summarizes the artifacts and ecofacts recovered from these probes.

Table 11. Artifacts and Ecofacts from 2000 Surface Test 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 15) was recovered from the 30-40 centimeter 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 30-40 centimeter level of Probe 2. Test Probes 3 and 6 were sterile.

In 2001, four test units were placed in selected locations within the 10MA143 depression adjacent to Scaredy Cat Cave (see Figure 17) 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 10 centimeter levels.

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 (see Figure 18). The deposits also contained angular basalt cobbles and boulders, which eventually terminated the excavation.

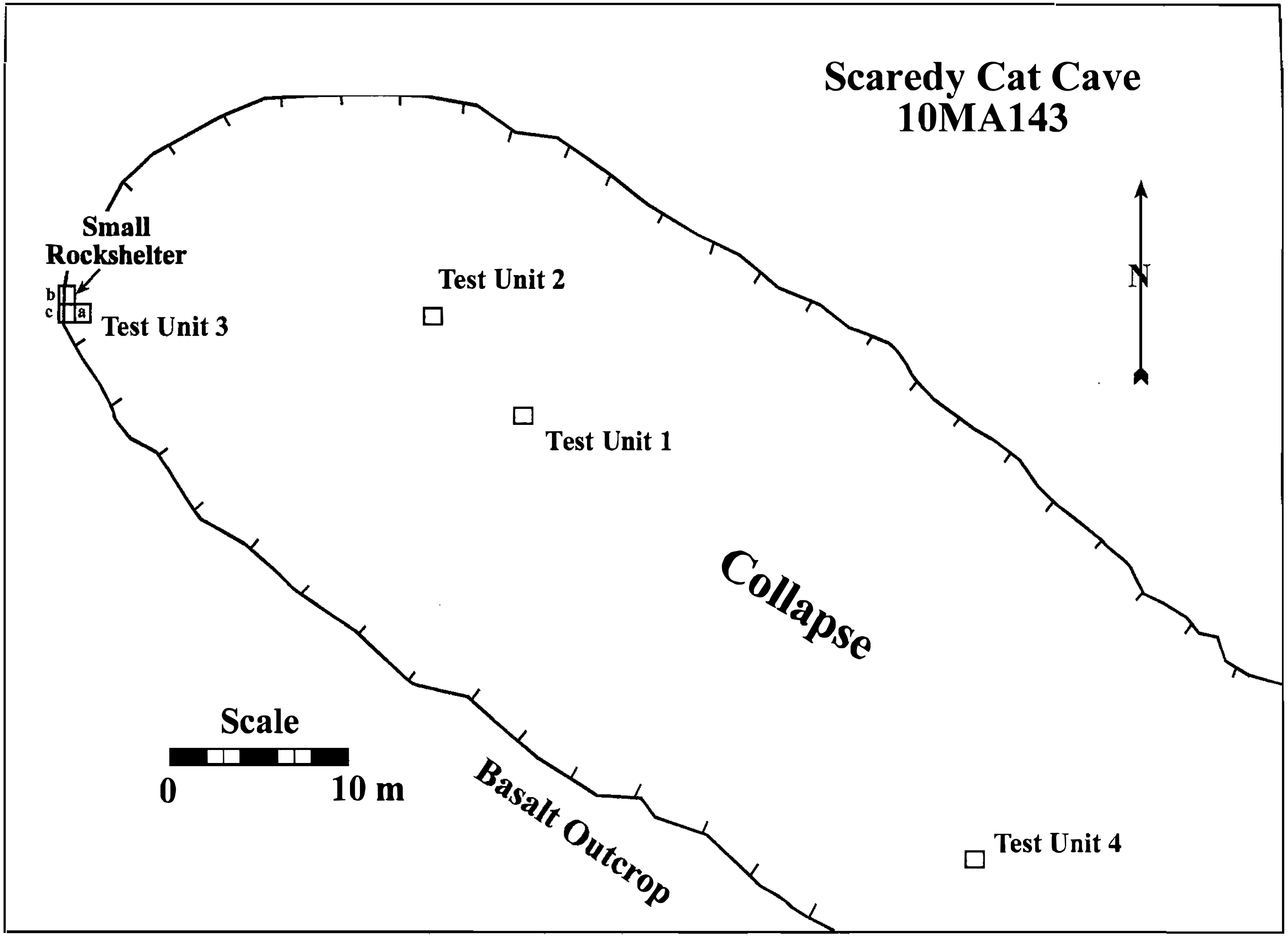


Figure 17. Plan view of 2001 test excavations in the depression near Scaredy Cat Cave.

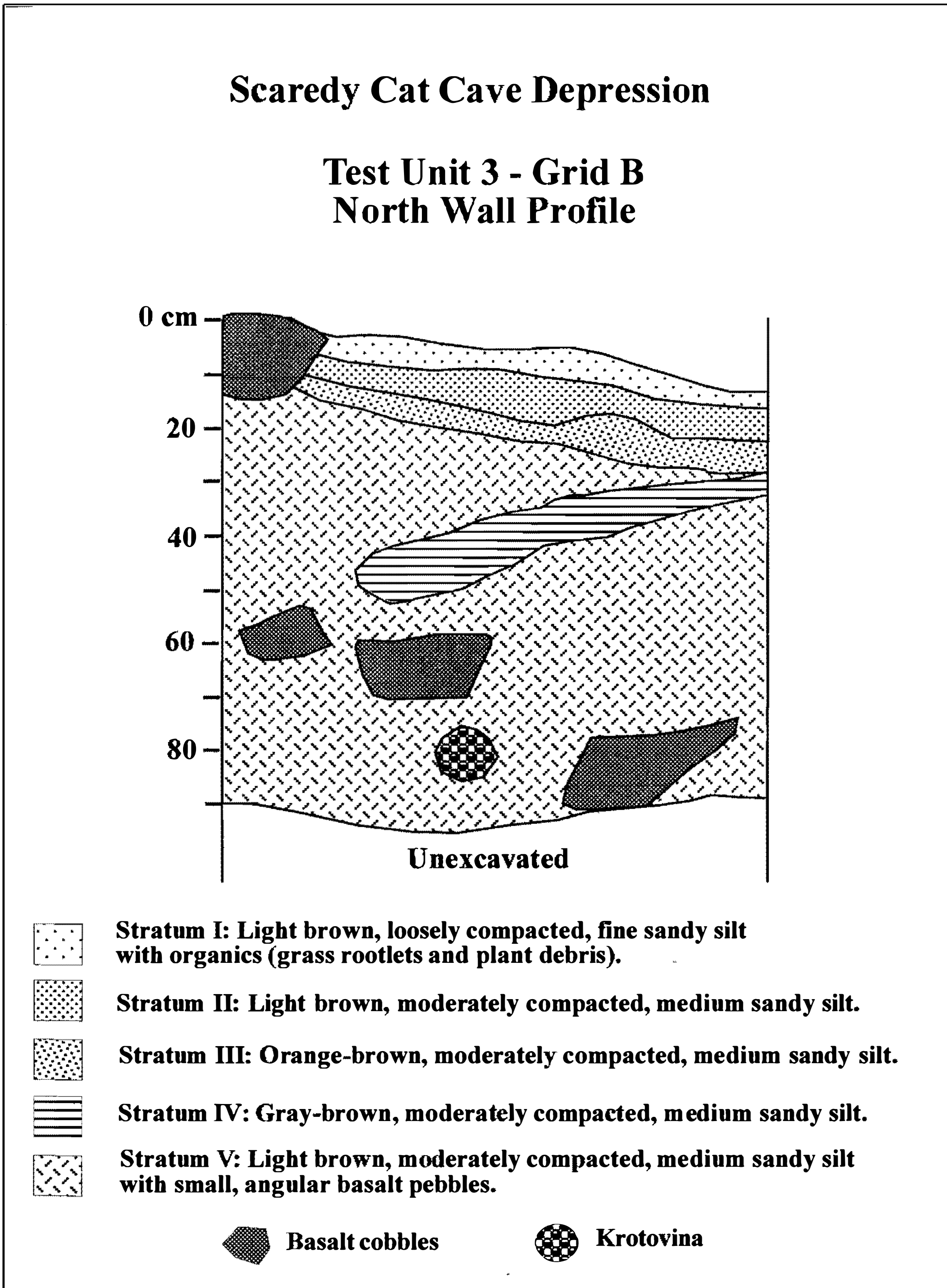


Figure 18. Profile of Test Unit 3 in depression near Scaredy Cat Cave.

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 "hearths" 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 Tests 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 40-50 centimeter level of Test Unit 1 and a silicate perforator from the 20-30 centimeter 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 Rosespring point from the 10-20 centimeter level of Grid C, one Eastgate point from the 20-30 centimeter level of Grid C (Figure 19), and one McKean lanceolate point from the 60-70 centimeter level of Grid C (Figure 15). 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 12

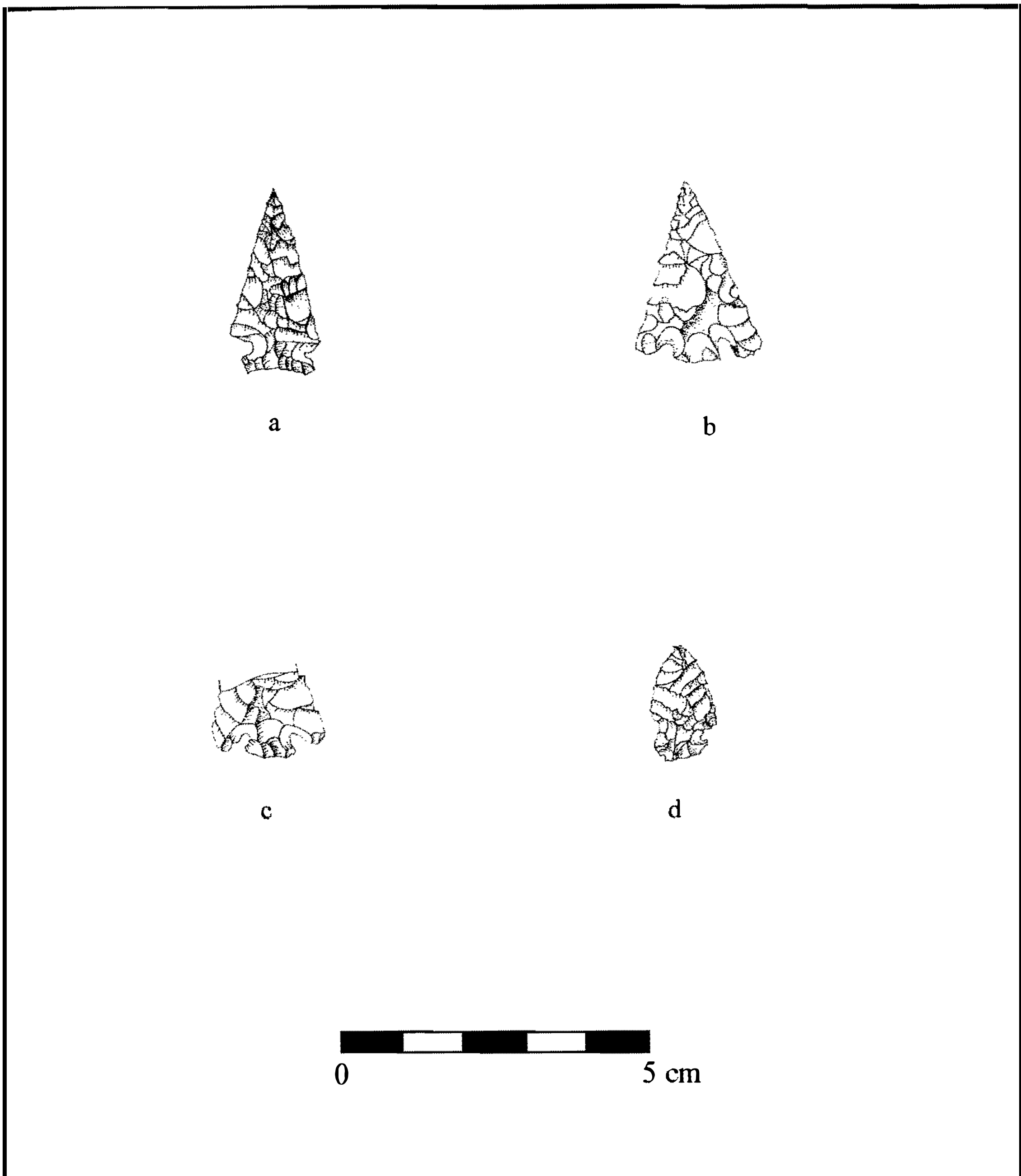


Figure 19. Projectile points recovered from Test Unit 3 at Scaredy Cat Cave (10MA143): a) 537-1; b)536-1; c) 514-1; d) 535-1.

through 14 below. All tools are volcanic glass with the exception of three silicate bifaces, one from Grid B and two from Grid C.

Table 12. 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 13. 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 14. 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

A total of 1094 waste flakes were recovered from the test units in 2001 (Table 15). 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 10-20 centimeter level of Test Unit 4 and four small body sherds (less than a centimeter in size) from the 10-20 centimeter level of Test Unit 1.

Table 15. 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 16), 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 10-20 centimeter 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 16. 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 60-70 centimeter 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 80-90 centimeter 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.

Above Ground Excavations near the Mouth of Tomcat Cave (10LN74)

The archaeological remains surrounding the mouth of Tomcat Cave consist of a large, dense scatter of waste flakes, biface fragments, utilized flakes, point fragments, Intermountain Ware and fragments of ground stone. Unfortunately, the site has been heavily surface collected over the years and few diagnostic projectile points have been recovered in recent years. Despite the lack of many projectile points, the physical evidence strongly suggests that the site surrounding Tomcat Cave served as a base camp where tool making, animal/plant processing and cooking likely took place. To gain insights regarding correlations between the interior and exterior assemblages, a 1x2 meter test unit was placed in a depression just outside the cave entrance (Figure 20) before concluding the 2000 research at Tomcat Cave.

This depression is a collapsed portion of the lava tube system that created Tomcat Cave. The depression runs south of the cave mouth for roughly 100 meters and is about 50 meters wide. Table 17 presents the artifacts and ecofacts recovered from the above-ground test excavation.

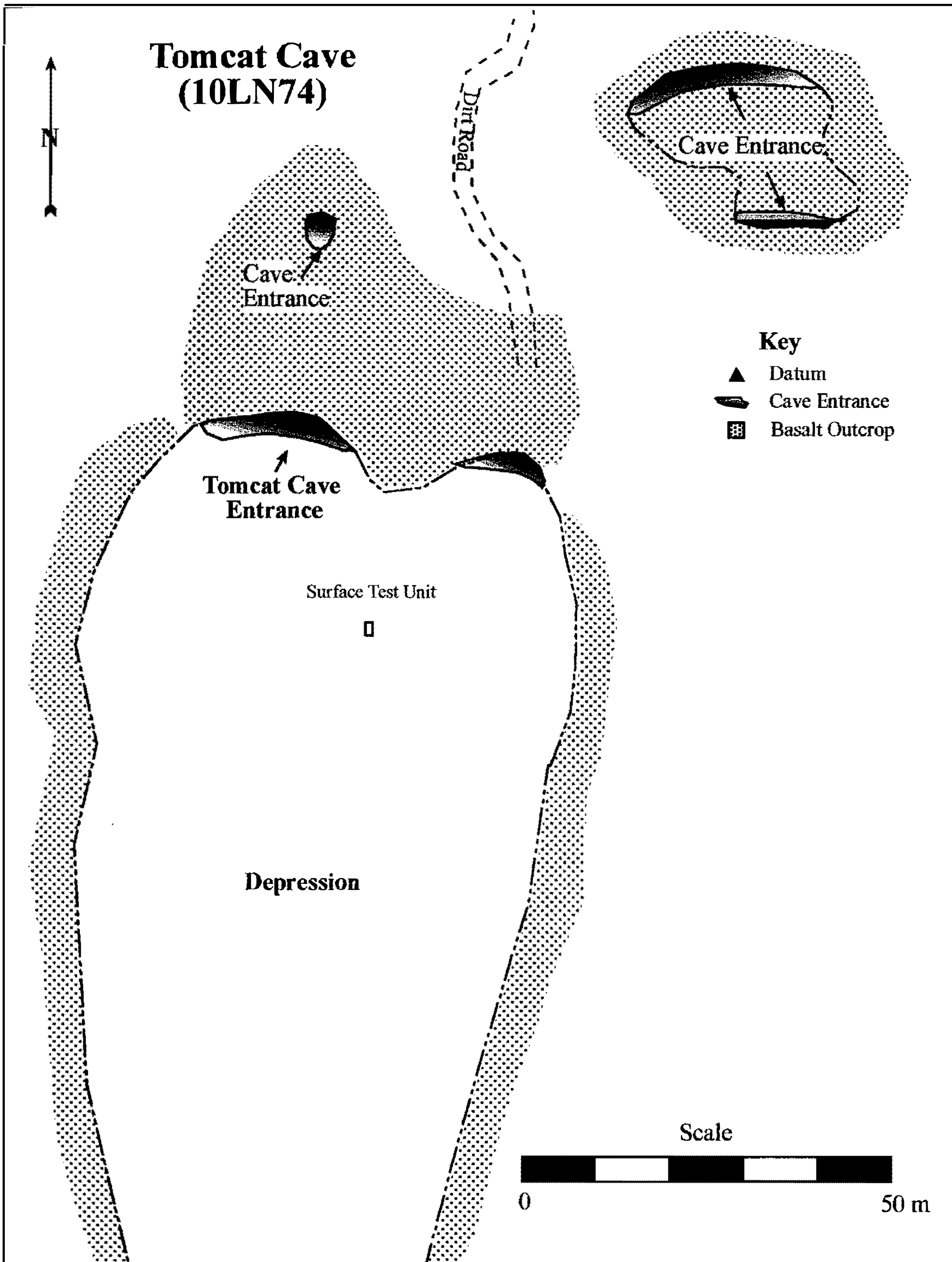


Figure 20. Plan map of Site 10LN74 showing the location of Tomcat Cave and the surface test unit.

Table 17. Artifacts and Ecofacts recovered from the Surface Test Unit at Tomcat Cave

Materials	0-5 cm	5-10	10-15	15-20	20-25	25-30	30-35	35-45	Total
Ceramics	11	54	29	6	-	-	-	-	100
Groundstone	-	-	-	-	1	-	-	-	1
Points/Knives	-	4	-	-	-	-	-	-	4
Expedient Tools	2	10	4	2	2	-	-	-	20
Waste Flakes	50	769	344	163	94	23	44	18	1505
Bone Frags.	2	231	77	32	3	-	1	1	347
Tooth Enamel	5	25	4	-	-	-	-	-	34
Total	70	1093	458	203	100	23	45	19	2011

A total of 100 Intermountain Ware sherds were recovered from the surface test excavation. Of these, three are rim sherds and two are basal fragments. Sherds recovered between 5 and 15 centimeters also exhibit blackened residue on the interior surface. One small fragment of a grinding slab recovered from the deeper deposits appears to be burned. Two Desert Side-notched points of volcanic glass (see Figure 12), one silicate point fragment and one volcanic glass point tip were recovered from the 5-10 centimeter level. Expedient tools were present throughout the deposits and include one basalt, seven silicate, and four volcanic glass biface fragments; four silicate and two volcanic glass edge-modified flakes; one silicate end scraper and one volcanic glass scraper fragment. The vast majority of the debitage recovered indicates retouching and resharpening activities. Faunal remains recovered from the above-ground test unit were extremely fragmentary. However, based on the thickness of their diaphyses, many fragments could be classified as large mammal. Over 30 fragments of artiodactyl tooth enamel were also recovered. Roughly 50% of the faunal assemblage was charred (either due to cultural activities or range fires).

The presence of Intermountain Ware ceramics and Desert Side-notched points from the exterior test unit indicates that the depression outside Tomcat Cave may have been occupied during a somewhat later period. The aeolian deposits within the depression lacked distinct stratigraphic horizons and became extremely compacted at a depth of 25 centimeters. The amount of cultural debris also decreased significantly at a depth of 45 centimeters. Future research will require additional excavations in the immediate vicinity of Tomcat Cave to determine if any deposits associated with the cold storage phase can be identified.

Excavations at Bison Heights (10LN636) – 2000/2001

During the summer of 2000, test probes were excavated at Bison Heights (10LN636), located roughly one mile southeast of Tomcat Cave. The site is situated on a flat basalt mesa that overlooks a linear depression bordered by basalt cliffs (Figure 21) and contains an elaborate series of rock alignments and hunting blinds (Figure 22). Over 700 fragments of large mammal bone were recovered from Shovel Probe 12, located in a sheltered, sandy area surrounded by basalt outcrops just south of the depression. Results of the shovel probe excavations prompted an expansion of the Bison Heights investigations in 2001. The site's proximity to Tomcat Cave served as a compelling reason to further examine the sheltered area to the south of the rock alignments.

The 2001 test units were placed in three arbitrary locations within this sandy zone (Figure 23). A total of 12 one by one meter units were excavated (two in Area A,

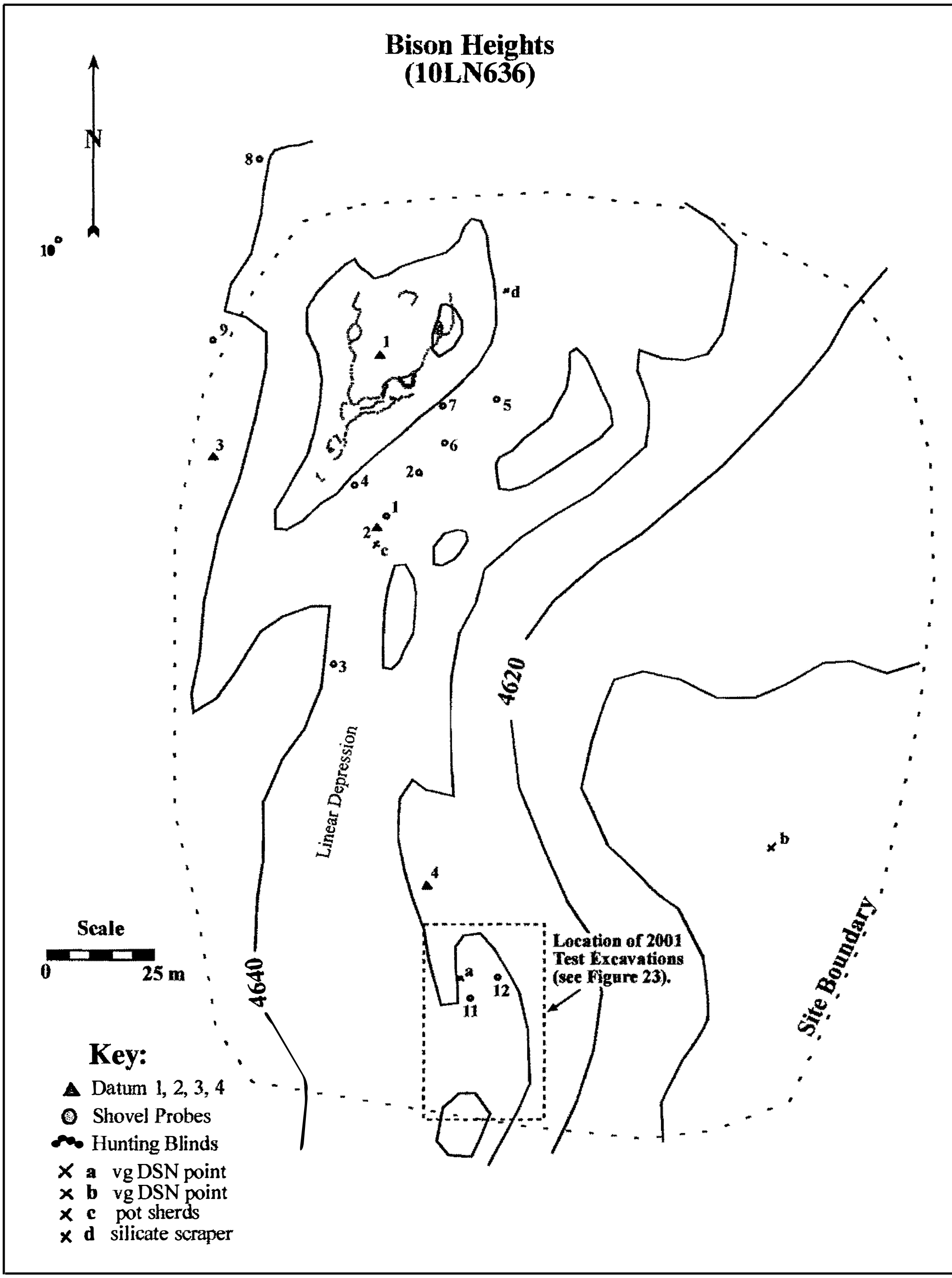


Figure 21. Plan view of Bison Heights (10LN636) showing the location of hunting blinds and test probes (modified from USGS quad).

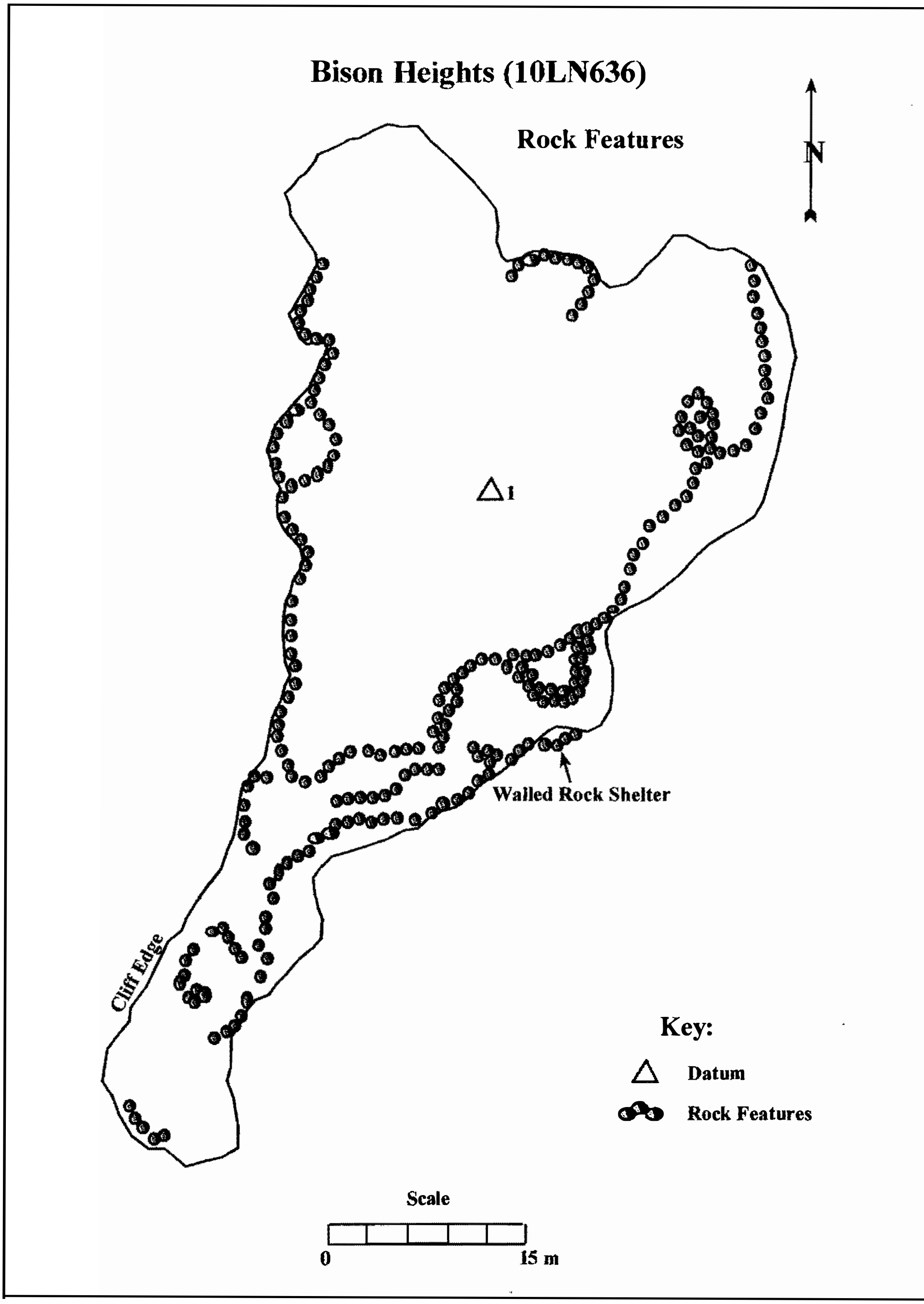


Figure 22. Plan view of rock features at Bison Heights (10LN636).

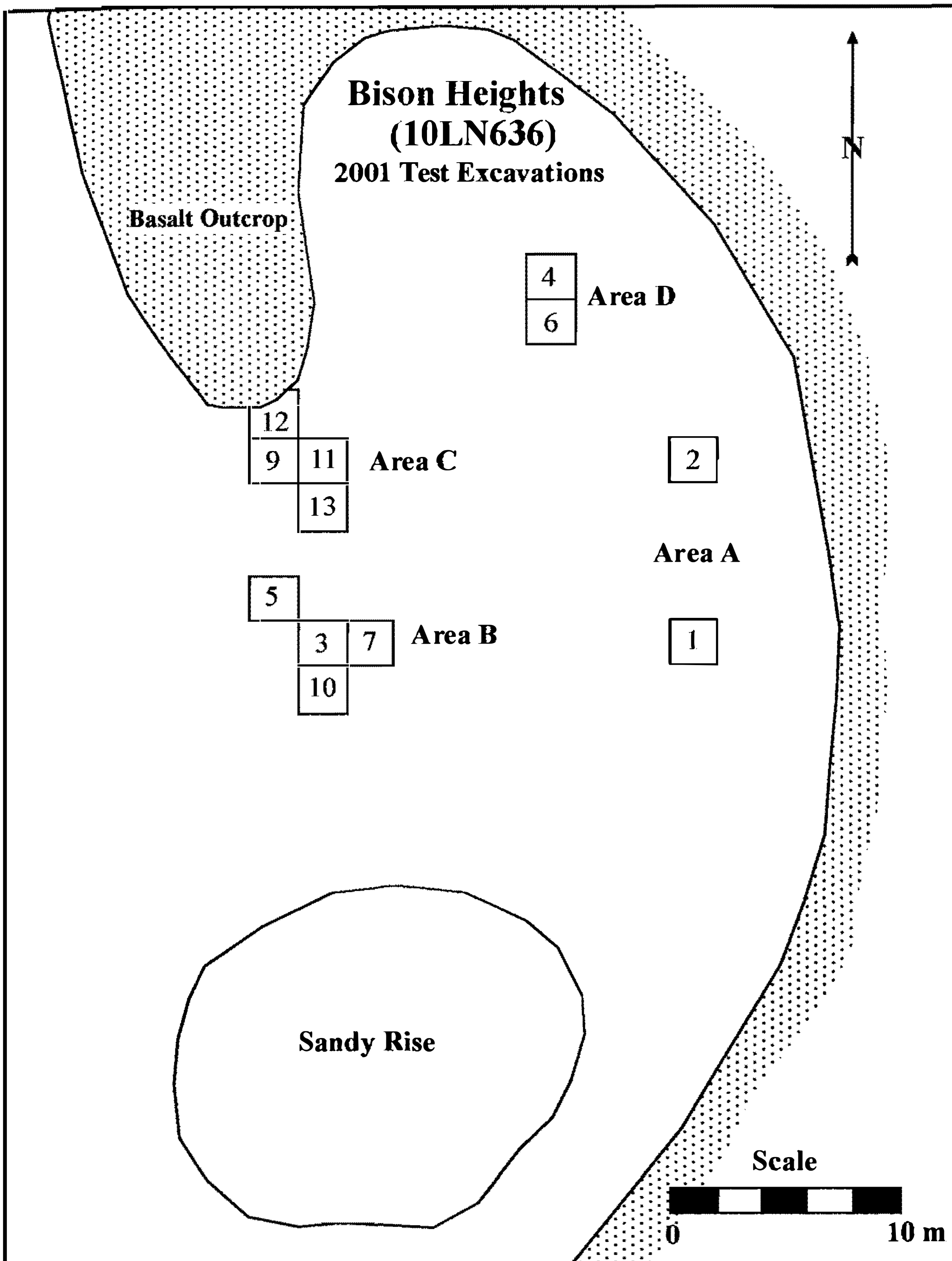


Figure 23. Location of 2001 test excavations at Bison Heights (10LN636).

four in Area B, four in Area C and two in Area D). In comparison with the other excavation areas, little cultural debris was recovered from Area A on the eastern side of the sandy zone. The sandy sediments in this area appear to be accumulating and cultural deposits are perhaps more deeply buried. The units in Area A were excavated to a depth of 40 centimeters in loamy sand with no indication of increased compaction.

Sediments in the area consisted of a fine, light brown sandy loam. No stratigraphy was discernable in the deposits, although increased compaction of the sediments was noted with depth. Figure 24 is a profile of Test Unit 7, showing the amount of basalt cobbles and small boulders encountered in Test Area B. In Test Units 1, 2, 4 and 6, relatively few basalt cobbles were encountered but the deposits were similar. The percentage of sand content in Test Units 1 and 2 was slightly higher.

Test units in Areas B, C, and D were excavated to a depth of 30 centimeters in most cases, unless rocks or compacted soil created excessive difficulties. Bioturbation appeared to be limited due to the density of basalt cobbles and boulders just below the ground surface. A large hearth feature was encountered in Area C and large quantities of charred faunal remains were removed from Area B. Flaked stone tools, debitage and a single Intermountain Ware sherd were also recovered.

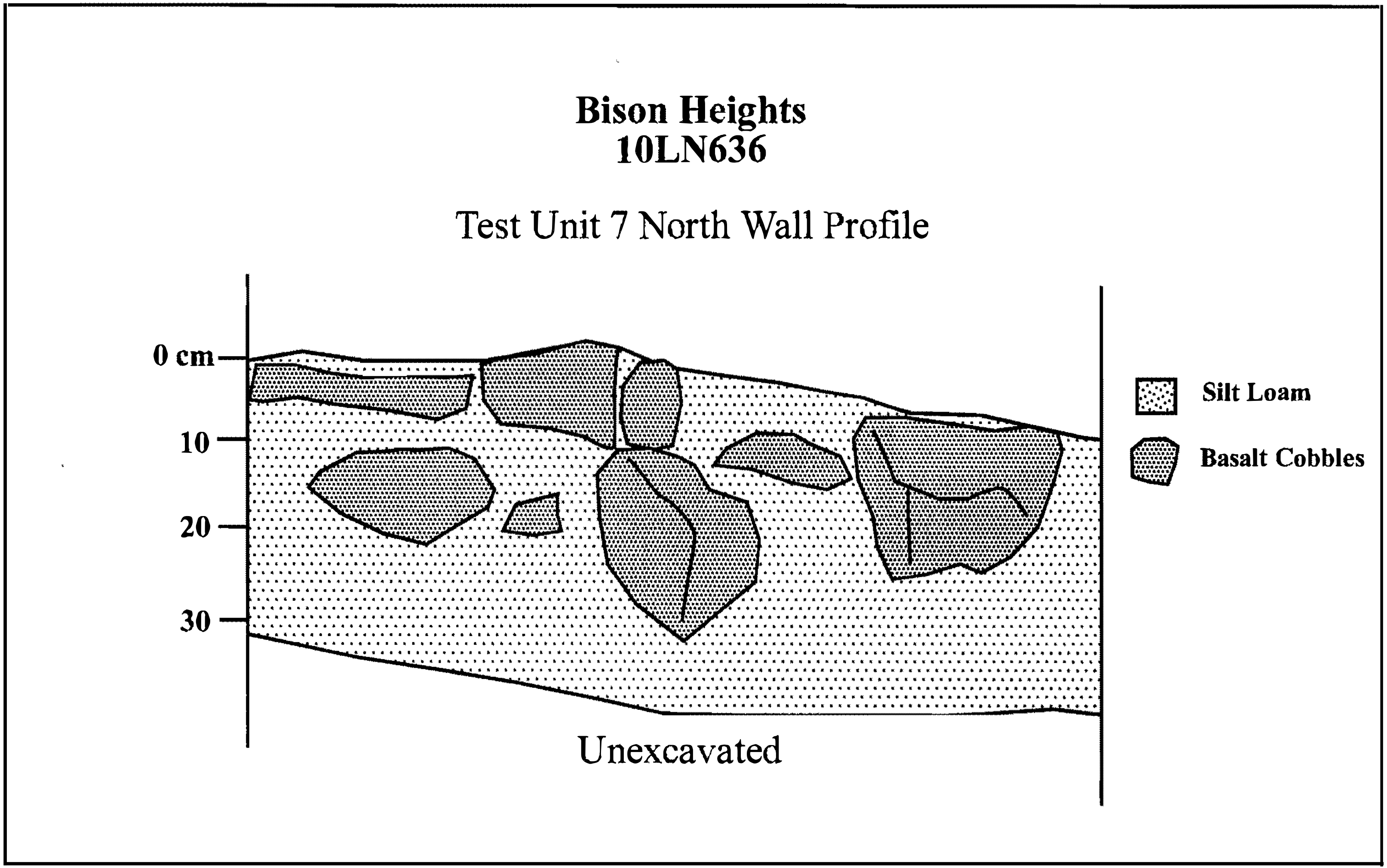


Figure 24. North wall profile of Test Unit 7 at Bison Heights (10LN636).

Summary of Artifacts and Debris

Stone tools recovered from the test excavations include four volcanic glass point fragments, two volcanic glass Desert Side-notched points (see Figure 25, b and d), one silicate knife or drill fragment and one volcanic glass core. All of the tools were recovered in the 0-10 centimeter level except for the Desert-Side-notched point found in a hearth in Area C.

A total of 568 waste flakes were recovered, of which 75% are volcanic glass, 25% are crypocrystalline silicate and less than 1% are basalt. Over 98% of the debitage is comprised of interior flakes and 1% are secondary flakes. No primary decortication flakes were recovered. As indicated in Table 18, the highest density of waste flakes (over 30%) were recovered from Test Unit 4, situated in the northern part of the sheltered area. Higher densities were also noted in units 11 and 13, adjacent to the hearth.

Table 18. Debitage Recovered from 2001 Excavations at Bison Heights

Level	U1	U2	U3	U4	U5	U6	U7	U9	U10	U11	U12	U13	Total
0-10	2	20	10	10	13	9	36	9	3	47	2	56	217
10-20	1	3	14	73	9	21	17	10		31	7	18	204
20-30	0	3	8	66	8	2	4	12			10		113
30-40	0	4	1	26			3						34
Total	3	30	33	175	30	32	60	31	3	78	19	74	568

Most of the debitage was recovered from the top twenty centimeters below ground surface. However, deposits deeper than thirty centimeters were not sampled in Units 10, 11 and 13. Rocks and compacted soil prevented additional excavation

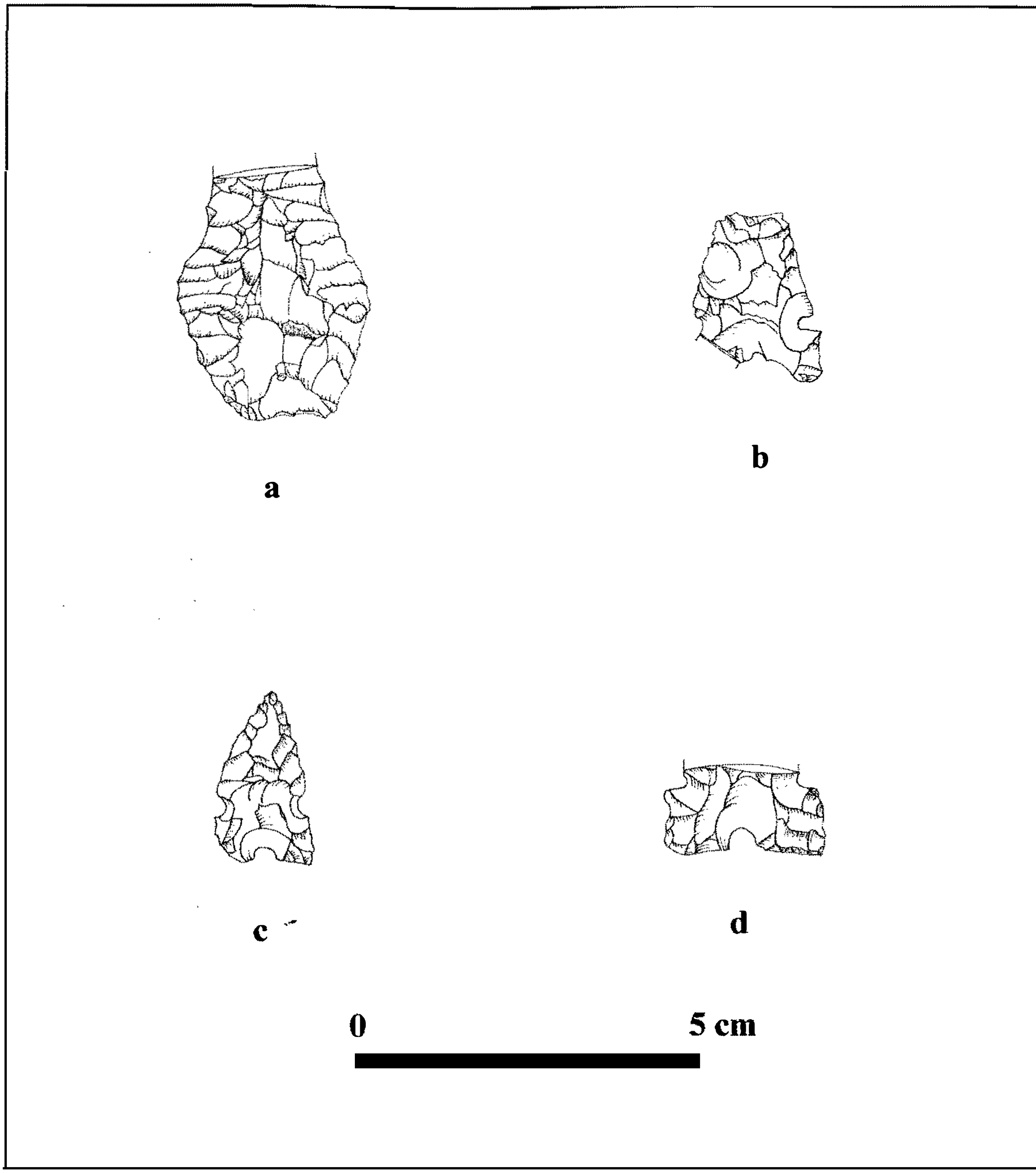


Figure 25. Projectile points and tools recovered from Bison Heights (10LN636): a) 116-1; b) 137-1; c) surface; d) 123-1.

in Area B. Units 11 and 13 were not excavated below 20 centimeters because of time constraints.

Faunal Assemblage

A total of 3893 bone fragments was recovered from the twelve 1 x 1 meter test units at Bison Heights. Of these, 2499 (64%) bone fragments were identified as large mammal. Although these remains were highly fragmented, the thickness of the diaphyses are suggestive of large artiodactyls in the size range of cow and bison. A total of 78 fragments of artiodactyl tooth enamel were also identified. Over 2000 large mammal fragments (roughly 80%) are burned or charred. A smaller percentage exhibited evidence of green fractures. This could be a byproduct of stone boiling or bone soup making. Roasting bone prior to bone soup manufacture produces fracture patterns that resemble dry rather than green fractures and fragments often exhibit exfoliation similar to that found at Bison Heights. Roughly 70% of the large mammal bone fragments were concentrated in Area B and strongly suggests a midden or discard area in the vicinity. Significantly fewer large mammal remains were recovered from Areas A, C and D.

Over 800 bone fragments identified as small mammal or rodent were recovered. Most of these were extremely small and very fragmented. While some appear to be long bone fragments in the size range of rabbits or marmots, many specimens have been identified as *Peromyscus* or *Microtus* sp. Roughly 70% of these unburned remains were recovered from Area C, near a basalt outcrop and small alcove that likely provides raptors and carnivores with shelter. Therefore, it is assumed that many of the small rodent remains were naturally deposited in the site. A total of 457 bone fragments were too small to be identified. Most of these remains may be fragments of exfoliated long bone.

Table 19. Numbers of Large Mammal Remains from Bison Heights (10LN636)

Test Unit	Burned	Unburned	Green	Dry	Total
A –1	17	50	16	51	67
A – 2	64	146	46	164	210
B – 3	501	196	408	289	697
B – 5	214	0	177	37	214
B – 7	738	0	52	686	738
B –10	69	6	17	58	75
C – 9	19	13	11	21	32
C – 11	26	1	1	26	27
C –12	16	4	0	20	20
C –13	78	0	31	47	78
D – 4	123	0	99	24	123
D – 6	218	0	129	89	218
Total	2083	416	987	1513	2499

Table 20. Numbers of Small Mammal Remains from Bison Heights (10LN636)

Test Unit	Burned	Unburned	Total
A – 1	0	0	0
A –2	0	0	0
B – 3	3	1	4
B –5	24	3	27
B –7	47	21	68
B –10	15	1	16
C – 9	17	15	32
C – 11	109	45	154
C –12	35	331	366
C –13	10	8	18
D – 4	28	4	32
D –6	32	59	91
Total	320	488	808

Features

A rock-lined hearth was exposed at a depth of 20-30 centimeters in Test Units 9 and 11 near the base of the basalt outcrop in Area C (see Figure 26). The hearth was roughly one meter in diameter and 10-15 centimeters thick as indicated by the distribution of stained and discolored soil and charcoal. The densest concentration of charcoal was situated directly above the blackened basalt slabs. Two large fragments of a schist grinding slab (Figure 27) were also incorporated into the cluster of rocks in the floor of the hearth. Relatively few faunal remains were recovered from the immediate vicinity of the hearth. Of these, 22 were charred long bone fragments from large mammals and 32 were identified as burned and unburned bone fragments from small mammals. The low density of faunal material recovered from the immediate vicinity of the hearth may indicate that bone was perhaps cooked and processed elsewhere or roasted in the hearth and removed before processing. The large number of charred bone fragments from Area B is suggestive of bone soup manufacturing. Fracturing bone into small fragments creates more surface area and maximizes the amount of fat extracted and decreases cooking time (Oliver 1993).

However, the limited amount of bone recovered from the hearth is puzzling unless pots were used in the boiling process. The bone refuse could then have been discarded away from the cooking area. While it is assumed that pot boiling would

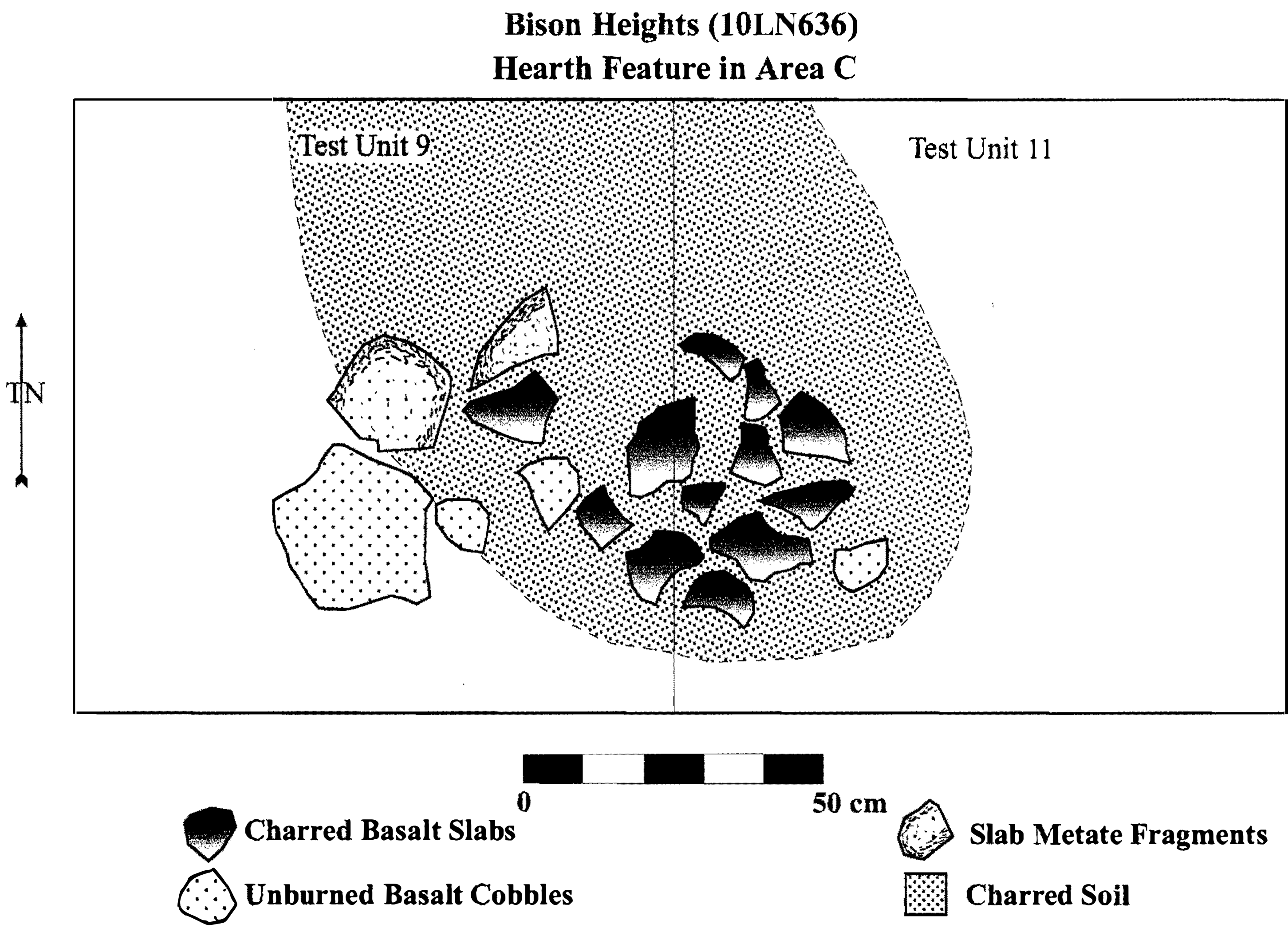


Figure 26. Hearth feature located in Test Units 9 and 11, Area C at Bison Heights.

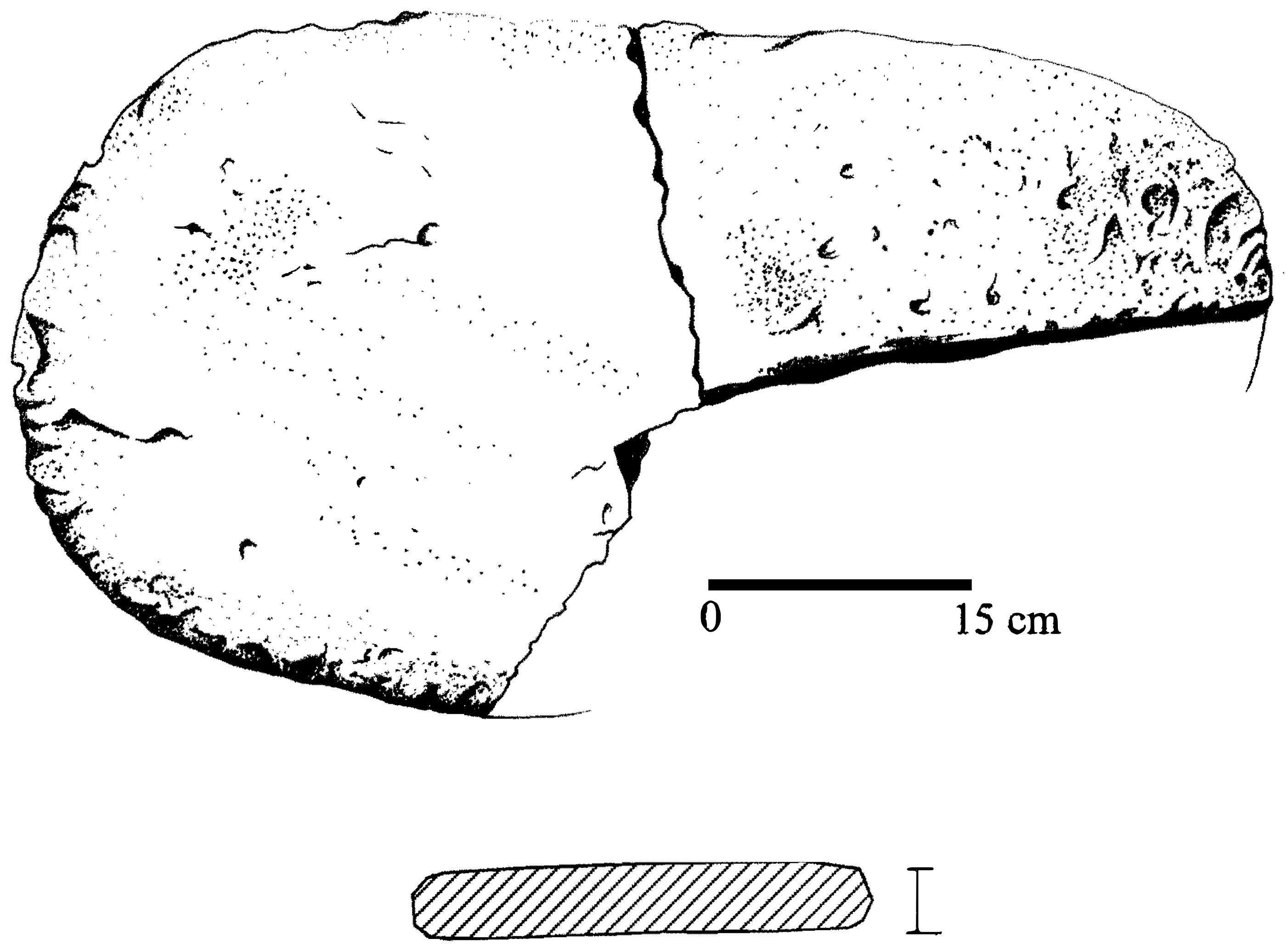


Figure 27. Grinding slab recovered from hearth at Bison Heights (10LN636).

result in a moderate amount of breakage, no ceramic fragments were recovered near the hearth. A single Intermountain Ware sherd was found in Area D. It is also possible that the hearth was used to generate heated stones for use in boiling pits. If so, these pits were not encountered during the 2001 excavations.

Two Desert Side Notched points were recovered from the units adjacent to the hearth (Figure 25). A charcoal sample from the hearth was dated to 240 ± 50 radiocarbon years B.P. (Beta-64591), with a calibrated age of 341 to 257 calendar years B.P. (at 2 sigma). One Intermountain Ware sherd was recovered from Area D.

Discussion

The number of faunal remains recovered from the test excavations at Bison Heights indicates that artiodactyls and perhaps small mammals were being processed and consumed at the site. Although little diagnostic bone was recovered, many of the long bone fragments were thick enough to fall within the bovid size range. The concentration of bone from Area B, in comparison with the other excavation areas, is indicative of a midden where bone refuse was discarded. The highly fragmented nature of the bone also suggests the manufacture of bone grease, an activity that may have occurred during late winter or early spring when animals were at their leanest. However, bone grease manufacture may have been profitable throughout the year.

The formal hearth exposed in Area C contained relatively little bone and, as discussed earlier, may not have been directly associated with activities that created the bone concentration in Area B. The radiocarbon date recovered from the hearth, the Desert Side-notched points and the Intermountain Ware ceramic sherd provide strong evidence for a Late Prehistoric occupation of the site, although a Rosespring point was recovered from the surface during 2000. The high percentage of interior flakes recovered from 10LN636 indicate that tool sharpening and refurbishing was one of the primary activities occurring at the site.

Excavations at Wilson Butte Cave in 2001

Although studies at Wilson Butte Cave were not planned for my research, Ruth Gruhn communicated to me in 2000 that she suspected there was a bison kill site in the immediate vicinity of the cave. This personal communication, in view of Gruhn's previous recovery of large quantities of bison remains from Wilson Butte Cave, prompted a field reconnaissance in the area surrounding the cave in the summer of 2001. Examination of landforms east of the cave led to the discovery of a narrow, linear depression bordered by the two prominent basalt ridges that comprise Wilson Butte. This depression, located roughly 300 meters east of the cave entrance (Figure 28), is bounded by rocky basalt outcrops much like the narrow depressions noted near Scaredy Cat and Tomcat Caves. The field examination also revealed a well-constructed hunting blind on the eastern rim of the draw (Figure 29) and a number of suspicious depressions in the basalt rubble that may have served as blinds, including one on a small basalt knob south of the depression (see Figure 28).

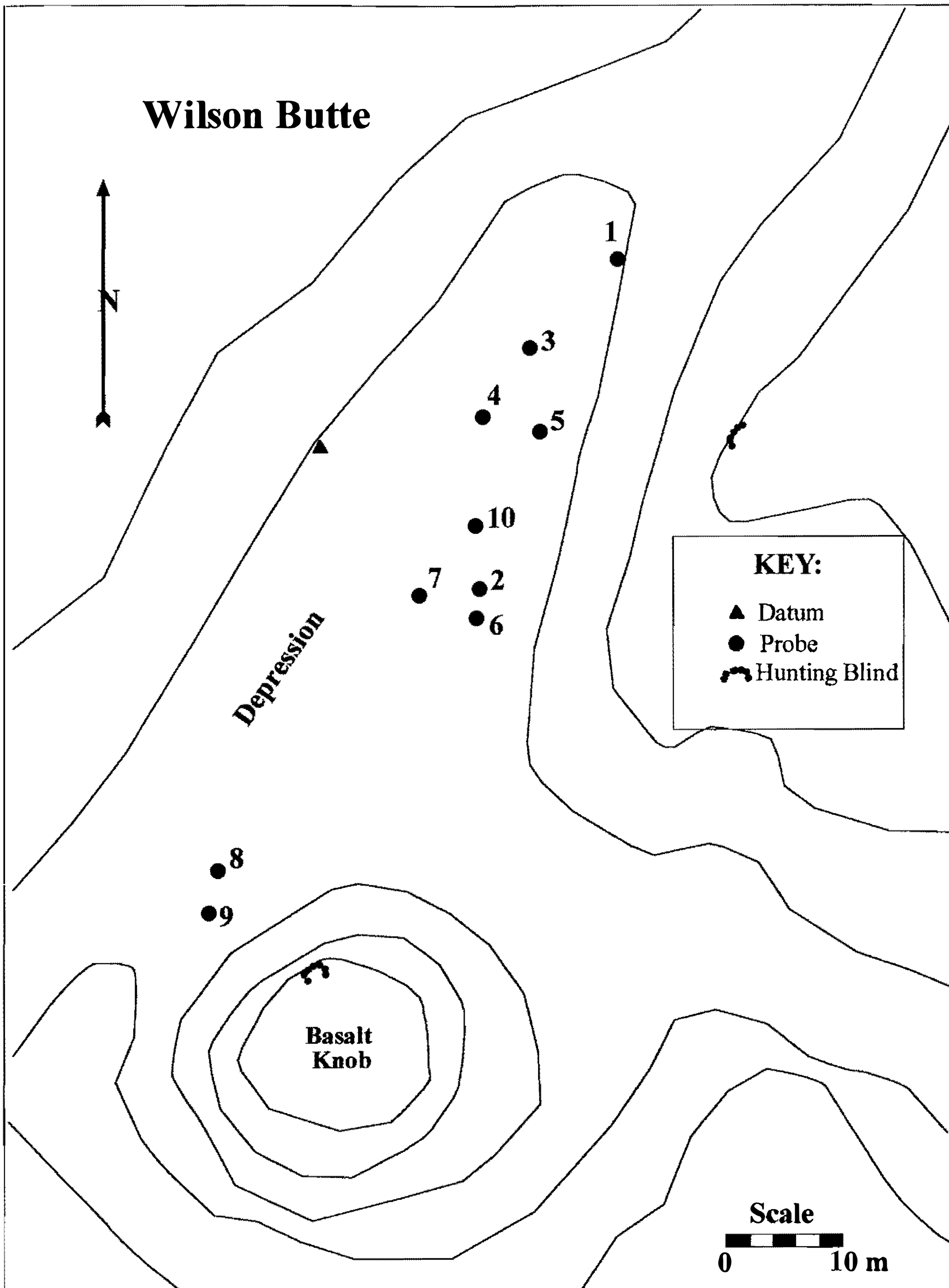


Figure 28. Location of 2001 test probes in narrow topographic feature east of Wilson Butte Cave.

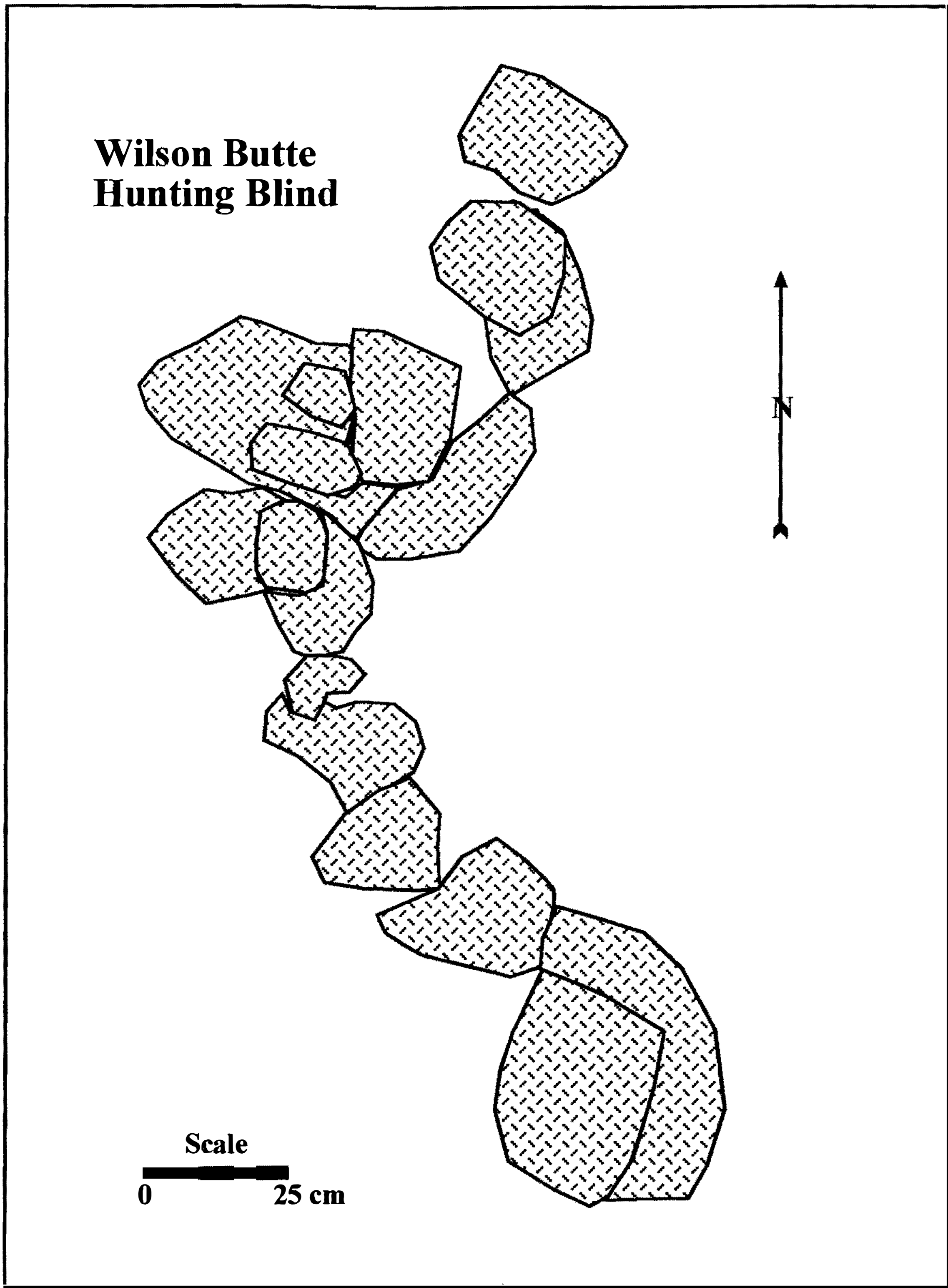


Figure 29. Hunting blind on east side of narrow topographic feature near Wilson Butte Cave.

A total of fifteen 50 by 50 centimeter shovel probes were placed in selected locations in the interior of the depression. Most shovel probes were excavated to a depth of 40-50 centimeters. Because the silt deposits were extremely compacted, Shovel Probes 1, 2 and 7 could not be excavated beyond 30 centimeters below surface.

A total of 72 waste flakes were recovered from the probes. All of the debitage was volcanic glass except for15 cryptocrystalline silicate flakes and one basalt flake. Only two secondary flakes were noted, the remaining are all interior flakes, indicating the final stages of tool manufacture and resharpening activities. The number of flakes recovered from each probe is presented in Table 21. No cultural material was recovered from Shovel Probe 6.

Table 21. Debitage recovered from Shovel Probes near Wilson Butte Cave

Level	SP1	SP2	SP3	SP4	SP5	SP7	SP9	SP10	Total
0-10	1	24	0	0	6	1	0	0	32
10-20	0	1	5	0	5	1	0	2	14
20-30	1	1	3	0	8	1	0	0	14
30-40	-	-	2	0	2	-	0	0	4
40-50	-	-	-	1	4	-	1	2	8
Total	2	26	10	1	25	3	1	4	72

Fifteen bone or tooth fragments were recovered from Shovel Probes 3, 4, 5, 7 and 9. The remaining probes produced no faunal material. Of the 15 elements, 5 appear to be artiodactyl tooth enamel. All of the fragments are less than a centimeter in maximum size and the other fragments lack any diagnostic features. Of these, 7 pieces are burned and three appear to have been fractured while "green".

My limited testing in the linear feature near Wilson Butte Cave produced little physical evidence to indicate its use as a bison kill site (other than the presence of hunting blinds and small amounts of bone and tooth fragments). However, as will be discussed in Chapter V, the cultural deposits at Wilson Butte Cave contained a large number of bison remains, indicating that these animals were being acquired in the surrounding area.

A Brief Note on Fortress Cave

As mentioned above, a single antler tine recovered from Fortress Cave produced an AMS date of 1430 ± 40 radiocarbon years B.P. (calibrated to 1394 –1285 calendar years B.P. at 2 sigma). While this date indicates a relatively young occupation for the site, it is important to note that the archaeological remains surrounding the cave mouth, as with the other cold storage caves, suggest that the location was used repeatedly as a base camp over thousands of years. The site is located on open sagebrush steppe near Wildhorse Butte. A total of 52 projectile points and point fragments was collected from the surface of the site in 1992. These include Northern Side-notched, Elko Corner-notched, Stemmed, Rose Spring and Desert Side-notched points, indicating that use of the site began as early as 7500 years ago and continued until very recently. A variety of bifaces, scrapers, expedient tools, ground stone implements and Intermountain Ware ceramics found at the site also attests to its use as a base camp. Although no linear depressions were located in the vicinity, a large circular rock feature roughly 15 meters in diameter rests on a low rise about 50 meters northeast of the cave mouth. The stone circle, which is partially collapsed, may have been over a meter high when constructed. Because this feature is much more massive than rock structures that fall within the parameters of what regional archaeologists would consider as hunting blinds, its purpose is currently being debated.

Discussion

One of my goals was to investigate the narrow draws and depressions in the immediate vicinity of Scaredy Cat Cave, Tomcat Cave and Wilson Butte Cave to determine whether these were connected to cold storage of bison meat. All of these topographic features contain what appear to be hunting blinds, which implies that they aided in dispatching large game. However, very little faunal material was recovered from the test excavations and shovel probes placed in these features. Although numerous waste flakes and tools are located in the immediate vicinity of the cave mouths, the waste flakes recovered from the depressions are limited to interior flakes indicating resharpening activities and tool refurbishing, which would perhaps coincide with the preparations necessary to dispatch game.

If these features served to funnel bison and other large game into an enclosed area where they could be dispatched, not much was left behind. This suggests the possibility that relatively limited numbers of animals were dispatched at these locations and processed elsewhere. Based on the physical evidence surrounding Scaredy Cat and Tomcat Caves, processing activities could have taken place closer to the cave mouth. Likewise, the possible evidence of bone soup manufacture at Bison Heights suggests that artiodactyl bone was valued for its fat content. This would lessen the likelihood that any part of a large animal carcass, including bone, would be left the kill site, as indicated by the ethnoarchaeological studies of Diane Gifford-Gonzalez (1993) and James Oliver (1993). These are discussed in the following section.

Inferences Regarding Cold Storage and Transport Decisions

Hunters in northern climates often dried meat during spring and summer months. Significant energy was expended in removing meat from bone because leaving meat attached to bone increases the rate of spoilage under warm conditions. However, cold storage eliminates the expense of boning meat to aid preservation (Binford 1978, Tatum 1980, Frison 1991), because frozen meat can be stored on bone without the threat of spoilage. Binford (1978), in his research among the Nunamiut, looked at temperature thresholds for the development of bacteria necessary to decomposition and found that between 10 and 0 degrees Celsius, essentially no bacteria growth was possible. With temperatures hovering around 2 degrees Celsius year around, the ice caves on the Snake River Plain would have eliminated the expense of drying and made bulk meat storage an economical enterprise.

Speth (1983) found that Binford's (1978) Modified General Utility Index (MGUI) for caribou and mountain sheep could be applied to bison remains from the Garnsey Site in New Mexico. Other aspects of Binford's (1978) research may also be useful in understanding bison storage on the eastern Snake River Plain. Binford proposed that, under cold storage conditions, high utility and moderate utility body parts of caribou and mountain sheep would likely be cached and decisions about what and how much was stored would be based on the "future food security" needs of the group. However, Lupo and Schmitt (1997) argued that bison, because of their large size, would have been a challenge to transport if there were a limited number of hunters involved and that it may have been necessary to transport only those body parts that were of the highest utility. Research among the Hadza (O'Connell et. al. 1988) also indicated that, for animals of significant size, the distance to a base camp or storage facility greatly influences how much bone is actually transported.

In contrast, based on her research with the Dassanetch in east Africa, Gifford-Gonzalez (1993) argued that there are benefits to transporting bone rather than leaving it behind. There is a significant difference in how bone is treated between mass kills and kills involving limited numbers of animals. If only a few large animals are killed during a single hunting event, transport costs of hauling both meat and bone from the kill site to the campsite may be negligible, especially if the marrow and fat content in bone from large animals is significant. Transport decisions are also based on what is planned for the various parts of an animal, referred to as "final processing goals" (Oliver 1993:201). In other words, depending on the options available for preparing and cooking large animals at the base camp, certain decisions will be made regarding which parts to transport and which to leave behind.

According to Oliver (1993), the Hadza separated animals into four size classes, with buffalo being the largest. The Hadza transported rib slabs and vertebrae back to camp despite low meat content because additional nutrients could be extracted through boiling. Oliver also observed that low utility parts provided useful "handles" for carrying portions back to base camp. The nutritional value of these items, extractable through roasting or boiling, balanced the minimal transport costs associated with carrying them to camp (Oliver 1993:210).

If Binford's arguments regarding transport decisions are valid, the faunal assemblage within the caves of the Snake River Plain should contain a preponderance of high utility items. According to Binford (1978) and Speth (1983), this would include the femur, tibia, sternum, ribs and pelvis. Brink (1997), based on in his analysis of the fat content of bison bone, would also include the humerus and proximal radius/ulna as high utility items.

Table 22 below presents the Minimum Number of Elements and Minimal Animal Units (as defined by Binford 1978) from each of the Idaho cold storage caves. High utility items, including ribs, humeri, radii, femora and tibiae make up 75% of the collection, although several mandibles, metapodials, a calcaneous, and an ungual were also recovered (see Figure 30).

Anatomical Distribution of *B. bison* and Large Mammal Elements from Bobcat, Scaredy Cat and Tomcat Caves

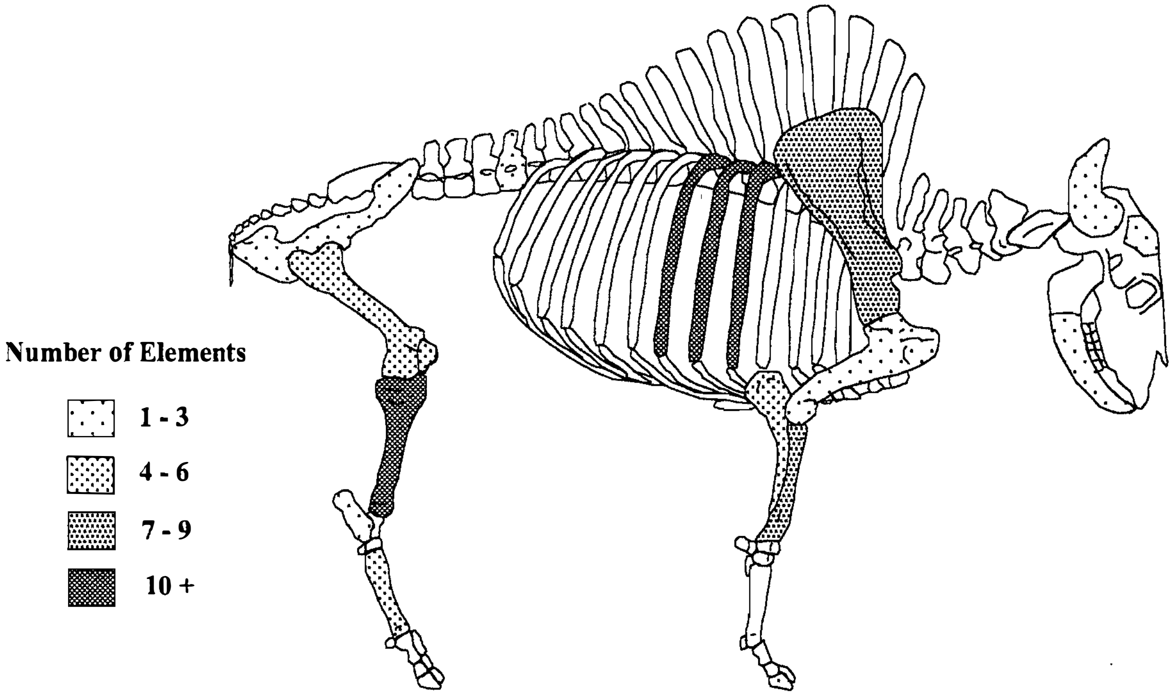


Figure 30. Frequency of B. bison and large mammal elements from the three caves.

Table 22. MNE and MAU of *Bison bison* from the Idaho Cold Storage Caves

Element	Bobcat MNE	Bobcat MAU	Scaredy Cat MNE	Scaredy Cat MAU	Tomcat MNE	Tomcat MAU	Total MNE
Horn Core	1	(0.5)	1	(0.5)	--	--	2
Cranial Fragment	--	--	1	(1)	--	--	1
Mandible	--	--	--	--	2	(1)	2
Vertebrae	1	(.04)	2	(.08)	--	--	3
Scapula	--	--	1	(0.5)	3	(1.5)	4
Ribs	(9)	(0.35)	(15)	(0.58)	(9)	(0.35)	(23)
Innominate	1	(0.5)	--	--	--	--	1
Humerus	1	(0.5)	--	--	2	(1)	3
Radius	3	(1.5)	1	(0.5)	2	(1)	5
Ulna	2	(1)	1	(0.5)	2	(1)	5
Femur	--	--	4	(2)	--	--	4
Tibia	3	(1.5)	3	(15)	2	(1)	8
Metapodial	1	(0.5)	1	(0.5)	--	--	2
Calcaneous	1	(0.5)	--	--	--	--	1
Ungual	1	(0.5)	--	--	--	--	1

Beyond the identifiable elements of Table 22, the bulk of the faunal remains from the caves (310 specimens) consist of green-fractured long bone and rib fragments that could only be identified as large artiodactyl or large mammal. These fragments indicate that processing activities, including marrow extraction, were also taking place in the caves. Further pulverization of bone could have occurred outside the cave for manufacturing bone grease (Vehik 1977). The extensive surface scatters outside all of the caves strongly suggest that they also served as camp sites where the processing and cooking of large game likely occurred. If the observations of Gifford-Gonzalez (1993) and Oliver (1993) can also be applied here, it is possible that very little bone was left at the kill site and the faunal material recovered from the interior cave excavations likely represent the "leftovers" from multiple storage episodes.

Bison Hunting on the Eastern Snake River Plain

Frison (1991) argued that Plains bison could not be communally hunted unless the herd was of significant size. For jumps to be effective a large number of animals is essential. If Frison is correct, hunting the less abundant bison of the eastern Snake River Plain may have required a different strategy than that common on the Great Plains. Small traps or surrounds that could be controlled by a limited number of hunters, or stalking techniques in broken terrain, may have been more effective. Successful acquisition may have required a natural "funnel" such as an arroyo or other narrow topographic feature that prevented animals' escape until they could be dispatched. In such a situation, it's most likely that only a few bison could have been procured during a single ambush. This argument is supported by bison kill/processing sites found on the eastern Snake River Plain over the last decade (Gough 1990, Henrikson 1993, Arkush 2002) as well as by an Shoshone-Bannock informant who recalled buffalo hunts from childhood (Butler 1971). According to the informant, four or five pedestrian hunters would drive bison into deep snow to dispatch them or ambush them "along a trail going near a steep grade" (Butler 1971:10). The preliminary investigations of the natural "funnels" at Scaredy Cat Cave and at Bison Heights suggest that kill sites may be situated at convenient locations near at least two of the cold storage caves (Henrikson 2000).

The seasonality of bison kills may also be a function of herding behavior (Speth 1983). The late summer rut appears to have been the most difficult time to attempt drives prior to the acquisition of the horse. Bulls converging with herds of cows and calves during this time are particularly "belligerent" and unpredictable, making pedestrian techniques very difficult and highly dangerous. The most favorable time to hunt bulls would be during spring when cows and calves are in even poorer condition (Speth 1983). Cow/calf herds could be more easily controlled without the presence of bulls during mid-summer, fall and winter (Tatum 1980). Fall is also an optimum time because cows and calves are at their maximum weight. Although the pollen analysis from Scaredy Cat suggests that some of the features may have been constructed during the fall, seasonality has yet to be determined at the other cold storage caves.

Conclusion

Based on the evidence presented above, bison were placed in cold storage in a number of lava tube caves on the eastern Snake River Plain. The bones from the excavated caves show that high utility body parts were stored more frequently than were body parts of lower utility. This observation suggests that bison were sometimes procured at a great enough distance from the caves that transporting low utility items was not worth the effort.

In regard to bison procurement, the narrow depressions at Scaredy Cat Cave, Wilson Butte and Bison Heights produced little or no bison remains or other cultural materials. This does not eliminate the possibility that they functioned as ambush locations. Probable hunting blinds are located at all three sites and the narrow topographic features would have provided greater hunting advantage over the surrounding landscape. Likewise, the scarcity of cultural debris in these depressions also indicates that they weren't used as encampments despite the fact that they would have provided shelter from the elements. The ethnoarchaeological studies of Gifford-Gonzalez (1993) and Oliver (1993) are pertinent here: it is likely that few animal parts would be left behind at a kill site where only a few animals were acquired. If bison herds on the eastern Snake River Plain consisted of relatively small herds in comparison to the Great Plains, it is likely that only a limited number of animals could be procured during a single hunting event. Investigating the role of bison and cold storage in aboriginal subsistence on the eastern Snake River Plain will be pursued in Chapter IV.

CHAPTER III

BEHAVIORAL ECOLOGY: A THEORETICAL APPROACH

In investigating the role of bison and cold storage in aboriginal subsistence on the eastern Snake River Plain, models from behavioral ecology offer productive insights. Behavioral ecology seeks to understand and explain behavior through the application of evolutionary theory within a specific ecological context. It focuses on how behavior is influenced by constraints affecting reproduction and the resources necessary to overcome these constraints. An underlying assumption of behavioral ecology is that humans make choices between behavioral options depending on the costs, benefits and constraints of local socio-ecological contexts. These "decisions" are viewed as the product of pan-human mental processes present because over evolutionary time scales they tended to produce behavior that increased the average relative reproductive success of their bearers. These adaptive behavioral responses to local socio-ecological conditions are the focus of behavioral ecology (Hill and Hurtado 1996).

Hominids have been faced with the challenges of hunting and gathering over a tremendously long period, so selection is expected to have honed decision-making processes related to foraging. In the realm of foraging decision making, behavioral ecologists make specific predictions about foraging behavior based on simple, non-intuitive assumptions derived from evolutionary and economic models (e.g., Hawkes et. al. 1982; Kaplan and Hill 1992). Anthropologists have borrowed these models previously developed by biologists and ecologists (e.g., MacArthur and Pianka 1966) and applied them to hunting and gathering societies. These Optimal Foraging models seem justified in using the "phenotypic gambit", the assumption that behavior should yield, on average, results which are locally adaptive within a given domain of activity. Hunter-gatherers continue to make foraging decisions. They have to make these decisions based on local knowledge of the environment, and are clearly aware of many relevant constraints on their behavior, as well as costs and benefits for alternate courses of action.

Three basic components common to foraging models include decisions, currencies and constraints (Kaplan and Hill 1992; Krebs and Davies 1991; Stephens and Krebs 1986). Decisions, such as whether to include a resource in the diet, are evaluated by their energy acquisition rate (i.e., net energy acquisition per unit of time expended or kcal/hr). Because the actual fitness effects of different foraging decisions is difficult or impossible to assess directly, this energy acquisition rate is often used as proxy currency for evaluating foraging decisions. It is not unreasonable to suspect that over time foraging efficiency will ultimately have effects on fitness. Constraints include other available options such as the seasonal and spatial distribution of food resources in the environment, technology, mobility, and knowledge (Kaplan and Hill 1992).

Multiple benefits can be derived from application of these models. They can specify often non-intuitive hypotheses or predictions using a few simple assumptions and parameters that can be tested with quantitative data. They specify how relevant tradeoffs are expected to influence decisions related to foraging, and thus provide the basis for qualitative understanding or explanations of behavior (Kaplan and Hill 1992). If these models fail to predict or correspond to the observed behavior, this serves as a strong indication that costs, benefits or constraints have not been adequately characterized (Kaplan and Hill 1992), or that factors other than economic optimality are at play. They thereby may stimulate a principled search for those other factors affecting the decisions being investigated (Sugiyama 1996).

Prey Choice and Diet Breadth Models

Simple models such as diet breadth and prey choice have been the most commonly used in anthropological contexts. The decision being modeled by the diet breadth model is whether or not a forager should pursue acquisition of a resource upon encountering it. According to the diet breadth model, foods are ranked according to their net caloric or energy values divided by handling time (which includes pursuit, dispatching and processing but not search time). These currencies, energy gain and time cost, are assumed to capture important components that affect human decisions. Simplifying assumptions made by this model are that: 1) each food species is encountered randomly in the environment (i.e., they are not clustered in particular locations that can be easily sought out; 2) handling time for each food species is calculated exclusively rather than combined with the search for other prey; and 3) resource abundance is not affected by foraging activities (Kaplan and Hill 1992).

Prey choice or optimal diet models propose that foragers will optimize their return rates (calories/handling time) if they "take those resources for which this ratio is equal to or higher than the average returns they get for foraging in general *and* if they ignore all potential resources for which this ratio is lower than their average returns" (Hawkes et al. 1982:388). Based on this assumption, when encountered, foods that do not meet these requirements will not be taken no matter how abundant they are. Conversely, foods that meet or exceed the average return rates will always be taken, no matter how rare they are. This non-intuitive prediction means that the highest ranked foods may only be rarely encountered and the bulk of the diet may therefore be made up predominately of lower ranked items included in the optimal set. "The ranking shows....which resources are more likely to enter or leave the diet and in what order. If the encounter rate with high-ranked resources fluctuates widely, the optimal diet will fluctuate, with the very highest ranked resources being the only ones that never go out" (Hawkes et al. 1982:388). In other words, as the frequency of encounter rates for higher ranked resources increases, lower ranked resources will be dropped from the diet.

Conversely, as the frequency of encounter rates for higher ranked resources decreases, lower ranked resources will be included in the diet.

For this study, variables for determining which resources will be included in the diet involve total foraging time (T) (this includes search time and handling time), total food energy or kilocalories acquired from foraging (E), the caloric value of resource *i* in kilograms (E_i) and the handling time required for resource *i* (H_i). These variables are expressed in the following equation (from Kelly 1995):

$$E/T = \frac{E\mu_i - E_i - Ts}{Ts + E\mu_i - H_i - Ts} = \frac{E\mu_i - E_i}{1 + E\mu_i - H_i}$$

As expressed in this equation, resource *i* will only be included in the diet if its return rates are equal to or greater than the overall return rate for foraging. While return rates can be affected by a number of constraints such as particular hunting methods and animal behavior, applications of optimization models indicate that in general, there is often a positive correlation between prey size and return rates (e.g., Hawkes et al. 1982). In other words, the larger the prey, the greater the return rates. This generalization may be particularly applicable in interior regions, where aggregated aquatic resources are not available or abundant.

Patch Choice Models

A key element of the diet breadth model is the assumption that resources are dispersed "homogeneously" throughout the environment and will be encountered as a simple function of their relative abundance. Therefore, search time is not factored into the calculation of return rates (i.e., rank) of individual species. However this situation does not apply across the varied environments of the Great Basin or Snake River Plain. The patch choice model may therefore provide more useful insights regarding resource use in this region. The patch choice model applies to environments where resources occur in patches across the landscape. The decision being modeled is which patches a forager should decide to include in a foraging round. Therefore, the patch choice model, instead of ranking the energy return rates for individual resources upon their encounter, rank the return rates for different resource patches. It differs from diet-breadth models because search time and travel time are "included in calculating a patch's overall return rate" (Kelly 1995: 91). The model predicts that in situations where different resources are distributed in various isolated locales across the landscape, foragers will select the patch or patches that generate the highest average energy return rate after travel, search and handling time are factored in (Hawkes et. al 1982). In this kind of heterogenous environment, the patch choice model can be employed to predict which resource patches will be included in the diet.

Three basic patterns (Figure 31) describe the possible changes in total energy returns during the exploitation of a patch. The returns either remain constant (i.e., foraging does not diminish the resource [Graph A]), remain constant until the last unit of a resource is harvested (Graph B), or diminish at a non-linear decelerating rate (i.e., return rates diminish because of longer search time or increasingly wary prey [Graph C]) (Kaplan & Hill 1992). Identifying which of these functions describes a resource patch is critical to understanding the forager's decision of whether to move to an alternate patch and when.

If the resources within a patch decrease at a non-linear decelerating rate, Charnov's *marginal value theorum* (1976) applies. This theorum predicts that foragers, "to maximize their net rate of resource harvest.....will move out of a resource patch when the rate of harvest in that patch falls below the average rate for the entire environment (the entire population of potential resource patches, with travel time included), rather than when the return rate in the current patch has fallen to zero" (Kelly 1995:91). The *marginal value theorum* is expressed graphically as "C" in Figure 31. While relocating to another patch may increase return rates, the energy to move must also be included in the equation. Therefore the decision of whether or not to move is based on the benefits of moving minus moving costs weighed against the advantages of staying.

Kelly (1990) applied a patch choice model using Charnov's marginal value theorem in his archaeological investigations of the Carson Sink in western Nevada.

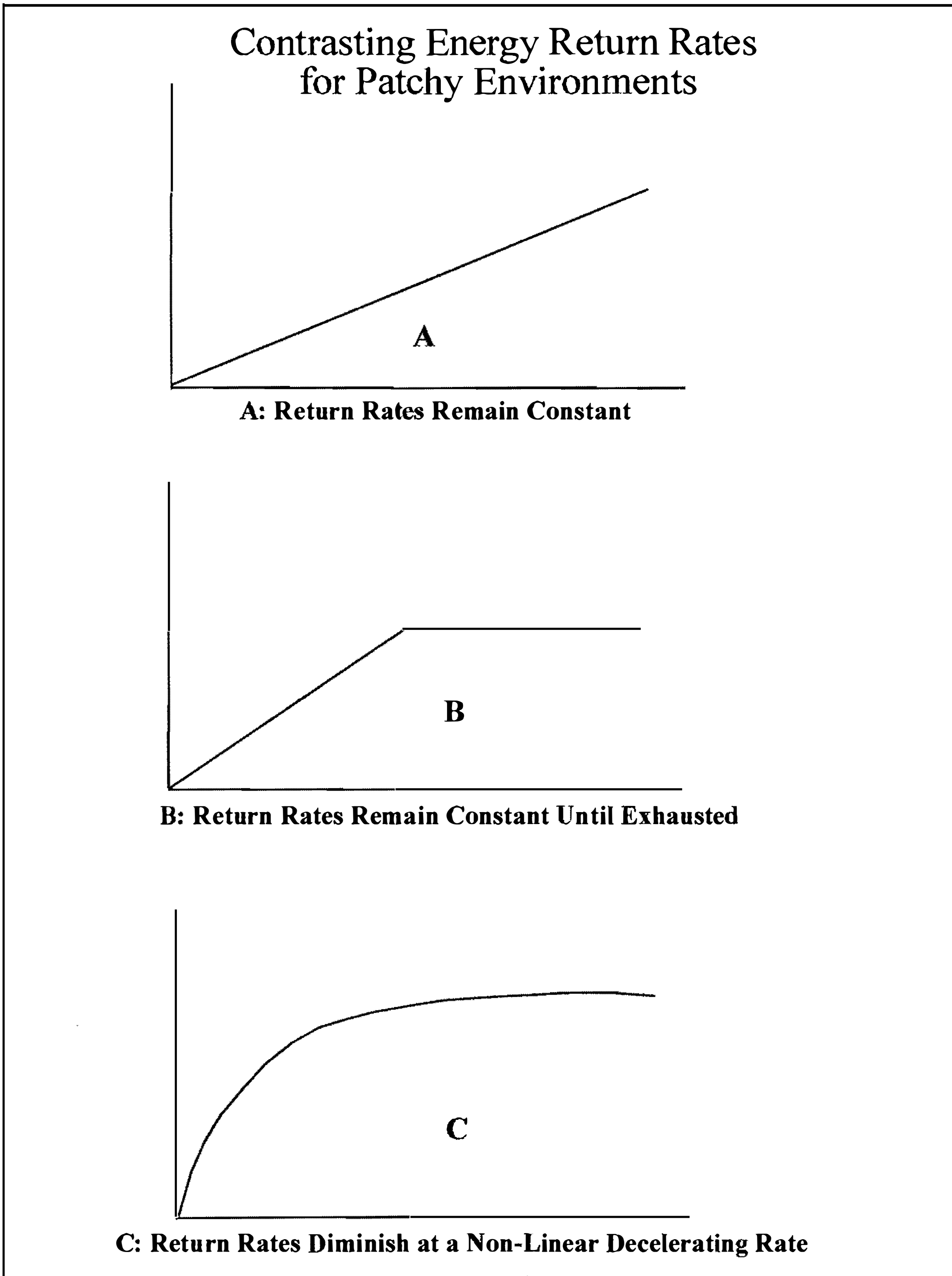


Figure 31. Contrasting energy returns for patchy environments.

He argued that the distance between the highly scattered marshes in the area determined how long groups would remain at one marsh before moving on. According to the model, if adjacent marshes were close by, the marginal value of moving to a new patch would be greater than if marshes were far apart. He predicted shorter stays when marshes are close and longer stays when marshes are farther apart. In the case of the Carson Sink marshes, oases were significant distances apart and aboriginal groups appear to have chosen to remain at marshes for long periods. However, a key factor that allowed for extended periods at a single marsh was the availability of storable foods such as bulrush seeds and fish, which could support people as foraging rates declined over time.

Anthropological tests of the patch-choice model are challenged by the fact that human foragers make deliberate decisions on when and where to move rather than coming across resource patches randomly. However, the model is still useful in assessing whether humans deliberately select the "highest-return-rate patches given their environmental knowledge" (Kelly 1995: 92). Tests of the marginal value theorum are also very difficult in anthropological applications because they require not only the calculation of the return rates for all potential resource patches but travel time as well. The theorum also assumes that travel time between patches is nonproductive, which is usually not the case. Nevertheless, these models make explicit predictions about foraging behavior based on a few simple assumptions, and have proven useful in understanding the foraging patterns of hunters from the

Amazon, Africa and the Arctic (Kaplan and Hill 1985, Hawkes et. al. 1982, Hawkes and O'Connell 1985, Smith 1991).

Patch choice and diet breadth models have been combined in fruitful ways. For example, in Simms' (1987) simple diet breadth model proposed for Great Basin foragers, he estimated the procurement costs associated with a wide range of hunting situations involving deer, big horn sheep and antelope. However he also recognized that search time, especially associated with big game, must be included in the application of the model. "When search time is the primary component in the cost/benefit equation with handling time playing a minor role, the abundance and density of the resource becomes an increasingly important factor in determining the overall cost of procurement" (Simms 1987:72). This amounts to counting each specific game animal as a different resource "patch". To calculate search time from the caloric returns of big game, Simms examined historic population densities of large game, their habits, and various modern and historic hunting techniques. However, even with search time included, Simms argued that the net return rate for large mammals is still "extremely high" in comparison with other resources, and in all but the most extreme situations, return rates appear to be relatively constant. "Thus, while large game may have been relatively rare in the diet, they were probably always sought and taken when possible" (Simms 1987:76). While it is difficult to evaluate this claim directly, we can predict that situations which decrease (through storage) the search, travel, pursuit or handling time, or increase the relative marginal value of bison "patches", would increase the relative desirability of this resource.

In a recent Great Basin application of the diet breadth model, Lupo and Schmitt (1997) examined the presence of bison in archaeological assemblages from Fremont sites in Northern Utah. Although they did not calculate return rates per handling time for bison, they argued that the live weight of adults would make them by far the largest terrestrial mammal in the region and therefore easily the highest ranked prey. Although bison may have not been continually available during the Fremont period, specific foraging and butchering strategies may have been adopted on a short term basis to harvest such large game when they were available. In other words, even though bison were sometimes rare and expensive to search for and process, they would always be taken.

In conjunction with the use of behavioral ecology models in my research, I utilize recent ethnoarchaeological studies of big game hunting. These studies indicate that simple models do not account for all of the decisions involved in transporting and processing game. While drying meat may greatly reduce transport costs, the labor costs of drying are high (Gifford-Gonzalez 1993:184). Based on her research with the Dassanetch in east Africa, Gifford-Gonzalez argued that there are benefits to transporting bone rather than leaving it behind. There is a significant difference in how bone is treated between mass kills and kills involving limited numbers of animals. If only a few large animals are killed during a single hunting event, transport costs of hauling both meat and bone from the kill site to the camp site may be negligible, especially when the marrow and fat content in bone from large animals is significant. Transport decisions are also based on what is planned for the various parts of an animal, referred to as "final processing goals" (Oliver 1993:201). In other words, depending on the options available for preparing and cooking large animals at the base camp, certain decisions will be made regarding which parts to transport and which to leave behind.

In the following chapter, I use the assumptions of behavioral ecology to examine cold storage practices and bison hunting on the eastern Snake River Plain. For my analysis, I selected a patch choice model that outlines net caloric return rates for resource patches in the region. Information regarding which resources were potentially used has been gathered from Shoshone-Bannock ethnographic data. In the case of bison, return rates have been generated with the assistance of historic Euroamerican journals from the early 1800s as well as contemporary knowledge about bison behavior. Inferences about the availability of resource patches prehistorically are drawn from existing biotic and paleoclimatic data from the region.

CHAPTER IV

BUILDING A MODEL OF SNAKE RIVER PLAIN SUBSISTENCE ECOLOGY

As discussed in Chapter III, because food resources on the eastern Snake River Plain are concentrated in a variety of relatively rich patches surrounded by less productive sagebrush steppe, the application of a patch choice model is most appropriate for understanding mobility patterns, while a prey choice model can be applied within individual patches to understand human subsistence choices within them.

Resource patches on the eastern Snake River Plain consist of linear patches along the few perennial water sources in the region, hundreds of ephemeral ponds, and the cold storage caves, which become "resource patches" when people return to retrieve stored meat. These caves, as has been shown in Chapter II, are also likely sites of bison hunting activity. In applying a patch choice model to evaluate how bison and ice caves fit into the subsistence strategy of aboriginal groups residing in the region, it is essential to identify a comprehensive sample of the potential resources available to the prehistoric inhabitants of the area and thus potentially incorporated into the diet. These can be generated by examining regional environmental data, ethnographic data, historic journals (in regard to bison), archaeological data and modern hunting data. The following sections develop quantitative data that will allow qualitative assessments of how resource patches on the eastern Snake River Plain were used in prehistoric subsistence rounds.

The Snake, Big Wood and Little Wood rivers are the only permanent water sources within the confines of the eastern Snake River Plain. However, many swales and basins serve as natural catchment areas for winter snowmelt and spring rains (Henrikson et al. 1998). During spring and early summer, these ephemeral water bodies are attractive oases. Prior to generating a resource model, it is essential to consider whether significant climatic events in the past would have significantly altered this sagebrush steppe environment. Regional paleoclimatic data can provide insights into the vegetation communities present during the Holocene and illuminate the degree to which climatic fluctuations may have altered the productivity or composition of available resource patches in the region.

Holocene Paleoclimate and Resource Patches on 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 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) located northeast of the cold storage caves produced continuous climatic records (Figure 32).

Pollen records from both Middle Butte Cave (5187 ft. asl.) and Rattlesnake Cave (5177 ft. asl.) 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. As moisture conditions gradually improved by about 5200 years ago, sagebrush and woodland-sagebrush communities came to characterize to 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).

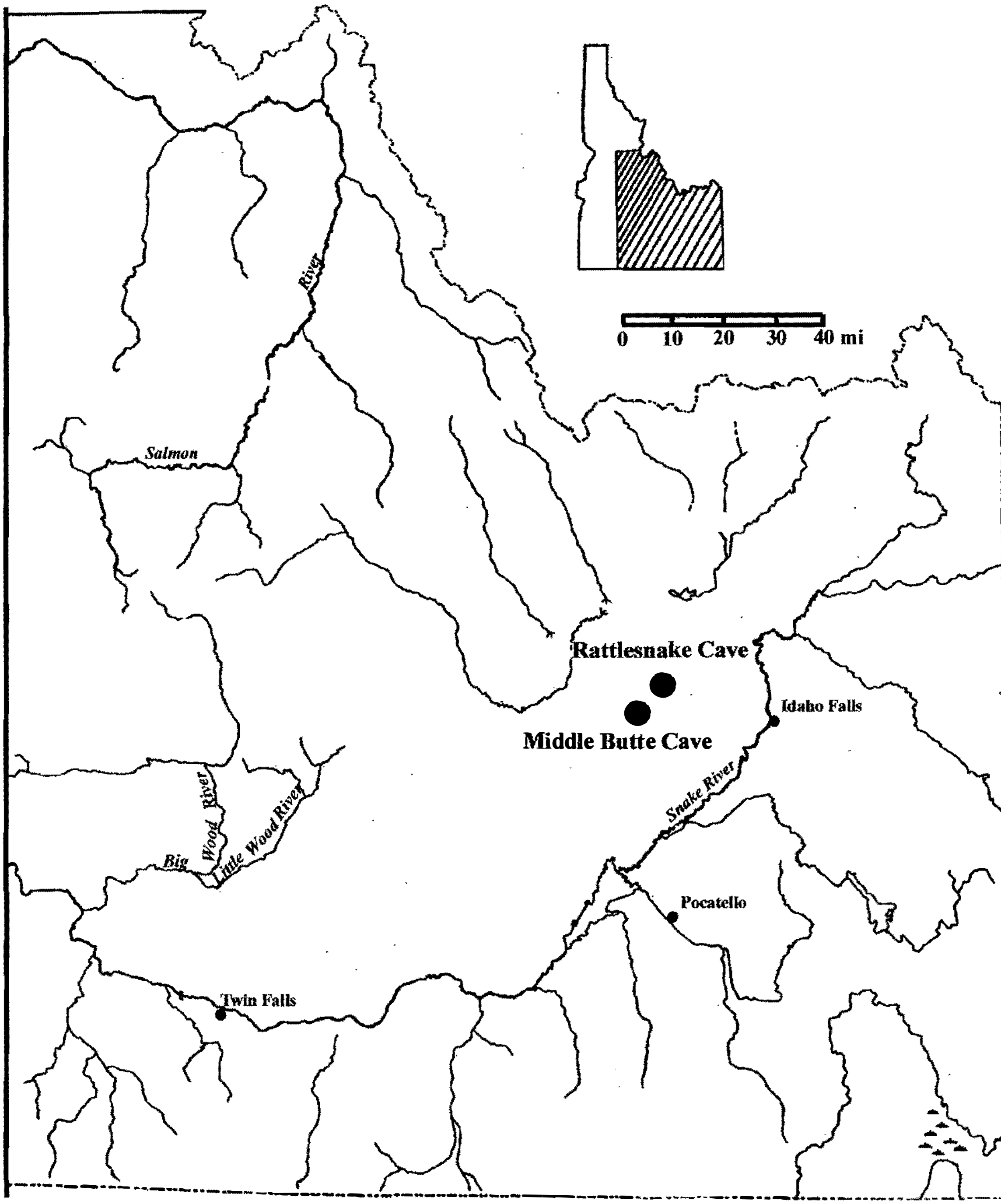


Figure 32. Location of Rattlesnake and Middle Butte Caves on the eastern Snake River Plain (modified from Butler 1978)

Likewise, pollen data from Tomcat Cave reveal 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 has been relatively stable for the last 2500 years (Cummings 2002).

Pollen data from Scaredy Cat Cave provide some interesting correlations with the paleoclimatic picture just presented. Pollen ratios from Test Unit 1 (dating between roughly 4700 and 4200 years ago) closely resemble those of the sagebrush community currently surrounding the site, although with 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.

Thus, 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.

Ethnographic Data on Food Resources

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 Shohsone-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?). Although this approach has exciting ramifications, for the study at hand I will focus only on plants and animals named as having "edible parts". These are listed in Tables 23 and 24.

Table 23. 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 24. Plants with Edible Parts (Turner et al. 1986)

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

The lists offer a good picture of the most important regionally available and ethnographically utilized food resources. As mentioned previously, 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 the cold storage caves.

Table 25 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 prehistoric Snake River Plain diet.

Table 25. 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 would vary according to season. Linear river patches, with their dependable moisture and good soils, would contain the widest variety of resources. In springtime, ephemeral ponds would provide fresh water and a population of freshwater crustaceans (fairy and tadpole shrimp) that would attract waterfowl. The water in turn would attract whatever large and small game species were common to the area. Cold storage caves would contain water at any season and whatever meat stores had been previously cached. 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.

As a basis for calculating search time, pursuit time and net return rates for animals encountered within resource patches on the Snake River Plain in the prehistoric past, my study can fortunately rely on Simms (1987), who generated caloric values and return rates for many plant and animal species common to both the Great Basin and the eastern Snake River Plain. As the ethnographic data of Lowie (1909), Steward (1938) and Murphy and Murphy (1960) show, the people of the Great Basin and Snake River Plain relied on the same plant and animal species to a very great degree. Generating bison return rates, however, is not as straightforward. Bison had disappeared from the Snake River Plain by 1840, reportedly due to over-hunting by white fur trappers (Townsend 1978). To generate the necessary quantitative data, information on net return rates for bison must be gleaned from fur trapper's journals. Because return rates for bison on the eastern Snake River Plain are so central to this study, I turn next to the task of generating those data, beginning with some basic ecological facts.

Calculating Return Rates for Bison

According to McDonald (1981), modern bison species currently occupying North America, both *Bison bison bison* (plains bison) and *Bison bison athabasacae* (woods bison), are thought to have evolved from different populations of *Bison antiquus* that occupied North American savannas at the end of the Pleistocene. These animals were spared extinction by the expansion of short-grass communities on the Plains (Guthrie 1980). *Bison bison* likely evolved on the Great Plains and radiated outward, depending on available habitat. "The short grasses were probably always bison's dietary mainstay. In many ways the short-grass communities with their resistance to heavy grazing and trampling may have co-evolved with the bison" (Guthrie 1980: 67). The short grasses that make up the Great Bison Belt (primarily *Bouteloua, Agropyron, Stipa,* and *Buchloe*) provided bison with a high protein to carbohydrate ratio even in their dry form, which extended their palatability well into winter (Tatum 1980).

Frison (1991) noted that, based on the analysis of archaeological specimens from the Plains, there appears to be a steady decrease in the size of bison through the Holocene that is most likely associated with climatic factors. He agreed with Gruhn's and Swanson's earlier suggestions that bison populations on the Snake River Plain were severely curtailed because of generally drier climatic conditions during the Middle Holocene. Bison of the Great Plains are thought to have been highly susceptible to both long-term and short-term periods of increased aridity because of their heavy reliance on short grasses, which are greatly affected by changes in seasonal precipitation and temperature (Hanson 1984, Bamforth 1987). By 5000 years ago, conditions on the Great Plains had improved sufficiently to allow bison populations to rebound. Archaeological records for the eastern Snake River Plain at Wilson Butte Cave, Owl Cave, and other sites reported in this research, show that bison were effectively present in Idaho throughout the Holocene, though the available data are insufficient to track their population curve with any conviction. However, Daubenmire (1985) argued that deep snow and insufficient grass west of Wyoming would not allow large populations of bison in the region.

As mentioned above, developing return rates for bison is difficult. While Simms (1987) used an experimental approach to generate caloric return rates for plants, he had to rely on modern hunting data for game animals. His return rates for antelope, deer and elk are used here, but since modern hunting data for bison are essentially non-existent, this study approaches the problem through the historical narratives of fur trappers who frequented the eastern Snake River Plain in the early 1800s.

Historic Journals and Bison Encounters

Journal entries of trappers exploiting the resources of the Snake River Plain during the early 1800s refer often to bison. In fact, bison appear to have been the preferred subsistence animal because their massive size provided large quantities of meat in a single package. Some earlier travelers, such as the parties of Wilson Price Hunt and Robert Stuart, often stayed close to the Snake River corridor without venturing out onto the sagebrush steppe. Stuart's party in particular relied heavily on fish rather than large game for food. However, fur traders who wanted to explore the tributaries of the Snake in search of beaver spent significantly more time in the region. For this paper, information was gathered from four primary sources. These include the journals of Peter Skene Ogden (who traversed the rivers and streams of the eastern Snake River Plain during 1825 and 1826 in search of beaver pelts), Captain Bonneville (who moved to and from the region between 1832 and 1835) and John Kirk Townsend and Osborne Russell (two of Nathaniel Wyeth's men who traversed the Snake River Plain between the years of 1834 and 1843).

Peter Skene Ogden, whose fur trapping party reached the eastern Snake River Plain in 1825, first entered Idaho from Montana. Coming into the Salmon River area in mid February, he noted "Buffalo by hundreds indeed as far as the eye can reach the plains appear to be covered with them." (Ogden 1950:21). By early April, Ogden reached the northern end of the Snake River Plain and headed south for the Snake River intending to trap beaver. However, because the snow was too deep and no grass was sprouting yet for horse feed, he decided to travel west to the Boise River. He did not return to the Snake River Plain until the following spring. No bison were sighted crossing the plain until early April when the party had reached Ferry Butte along the Fort Hall Bottoms. The party spent April and May between American Falls and Raft River.

Table 26 summarizes the journal notes of bison hunting recorded by Ogden. The entries are often vague and there are few precise references to the number of bison present or the number of hunters involved. Descriptive terms used in the text allude to the number of animals encountered or killed, though precise enumeration is rare. With one exception, all the entries are limited to the months of April, May and June.

Table 26. Ogden's Journal Entries noting Bison Encounters and Kills on the Eastern Snake River Plain

Date	Bison Encountered	# of Bison Killed
April 20, 1825	Numerous	5
May 1, 1825	Numerous	Unknown
May 13, 1825	Numerous	Unknown
June 16, 1825	Unknown	"Some"
June 18, 1825	Numerous	"Many"
October 9, 1825	Numerous	Unknown
April 3, 1826	Numerous	None
April 4, 1826	Numerous	"a few"
April 6, 1826	Numerous	Unknown
April 15, 1826	Numerous	15
April 20, 1826	Unknown	2
April 24, 1826	Unknown	2
April 25, 1826	Unknown	2
April 26, 1826	Numerous	"some"
April 27, 1826	Numerous	10
April 29, 1826	Numerous	12
May 9, 1826	Numerous	"some"

Captain Bonneville first reached Idaho in early fall of 1832, wintering in the vicinity of Salmon, Idaho. He noted that game was scarce and because of the lack of bison, his party was relying on fish, waterfowl and antelope (Irving 1986:81).

By late December, the group had traveled to the eastern Snake River Plain in the vicinity of the Big Lost River, noting plenty of snow but few game animals (Irving 1986:116). They reached the Fort Hall Bottoms in January, describing the area as lush, with Bannock lodges and bison present along the river banks where snow wasn't deep (Irving 1986:122-123).

In early June, near the Big Wood River, Bonneville's party staged a "grand buffalo hunt" in a plain that is "absolutely swarming with buffalo" (Irving 1986:137). This may be a reference to the eastern edge of Camas Prairie in the vicinity of the Timmerman Hills. From there, Bonneville headed into western Idaho and didn't return to Fort Hall until mid May of 1834. Although he noted that bison were plentiful along the Portneuf River, by late fall the herds had moved into the Bear River country and were no longer accessible because of deep snow. Table 27 presents Captain Bonneville's journal entries regarding bison encounters.

Table 27. Captain Bonneville's Encounters with Bison on the Eastern Snake River Plain

Date	# of Bison	# Killed
Oct. 10, 1832	Unknown	1
Oct. 12, 1832	Unknown	1
Dec. 28, 1832	Unknown	1
Jan. 5, 1833	Unknown	1
Feb. 28, 1833	Unknown	"supply"
June 5, 1833	Numerous	Unknown
May 15, 1834	Unknown	2
Oct. 26, 1834	Numerous	Unknown

Osborne Russell was a member of Nathaniel Wyeth's party who trapped in western Montana, northern Utah and southern Idaho between 1834 and 1843. His first journal entry in Idaho mentioned that the party had reached Fort Hall by July 18th, 1834. He noted that the "country is bounding with game" but no animals could be approached. He attributed it to skittishness as a result of too many people in the immediate area. Because of poor hunting luck in the area around Fort Hall, hunting expeditions were sent south along the Portneuf or north along the Blackfoot River in search of bison. Hunting groups also acquired dried bison meat through trade with Shoshone villages located on the Blackfoot River and with large groups of Bannocks who arrived at Fort Hall in the fall.

The following spring, Russell noted "thousands of buffaloes carelessly feeding" in a narrow valley south of Fort Hall (Russell 1921:18). Only bulls were dispatched during spring hunts because the cows were reportedly in extremely poor condition at that season. In the fall of 1835, Wyeth's party re-entered the northeastern edge of the Snake River Plain following a fur trapping expedition in Montana. Russell made note of large herds throughout the vicinity of Camas Creek and Mud Lake (Russell 1921:38) at that time, but during his last trek through southern Idaho in 1841, he sadly noted the complete lack of bison and no evidence that they had ever been there. What had happened to bring about this decline is not clear, but it may well have been due to the rapidly increasing presence of Euroamericans and rifles in the region.

Table 28. Journal Entries of Russell noting Bison Encounters on the Eastern Snake River Plain

Date	# of Bison	# of Bison Killed
Aug. 12, 1834	Numerous	None
Aug. 14, 1834	Numerous	4
April 27, 1835	Numerous	"some"
May 22, 1835	"thousands"	"many"
June 17, 1835	Unknown	2
Sept. 27, 1835	Numerous	"many"
Oct. 3, 1835	Numerous	None

John Kirk Townsend, also a member of Wyeth's party in 1834 and 1835, recorded bison encounters not mentioned by Osborne Russell. He also noted that game was hard to acquire near Fort Hall during the summer of 1834 and hunting parties were dispatched farther afield. His journal entries describe good fishing along the Portneuf River (Townsend 1978:99) and the density of cottonwoods and grasses in the Fort Hall area. During a summer hunt, the group dispatched cows rather than bulls. Townsend noted that cows are "best food in the world" and bulls were "at this season poor and rather unsavory" (Townsend 1978:106).

Table 29. Townsend's Journal Entries of Bison Encounters On the Eastern Snake River Plain

Date	# of Bison	# of Bison Killed
July 5, 1834	Unknown	2
July 8, 1834	Unknown	2
July 14, 1834	Unknown	1
July 16, 1834	Unknown	1
July 17, 1834	"few"	4
July 20, 1834	Unknown	"several"
July 21, 1834	Numerous	Unknown
July 25, 1834	Numerous	"many"
August 9, 1834	"Scarce"	1
August 10, 1834	"Scarce"	1
August 11, 1834	Unknown	2
August 12, 1834	Unknown	1

Based on the journal narratives, it is also evident that the region was well populated by the Shoshone, Bannock and Blackfeet. Shoshone individuals frequently traveled and hunted with the trapping parties or were often encountered by them while traveling. Trappers also visited villages, some of which were reasonably large, and reported that the inhabitants appeared to be in good health. While trapping near Raft River on March 21,1826, Peter Skene Ogden's party encountered "100 Indians" well stocked and ready for trading (Ogden 1950:144).

In mid-January of 1833, Captain Bonneville and his party arrived in the Fort Hall Bottoms to find a Bannock village of 120 lodges situated in an area "covered with groves of cotton-woods, thickets of willow, tracts of good lowland grass and abundance of green rushes" (Irving 1986:122). On October 1, 1834, Osbourne Russell and a small party of trappers visited a "Snake" village of 60 lodges on the Blackfoot River north of Fort Hall and procured as much bison meat as their horses could carry (Russell 1921:13). On October 20, 1834, Russell encountered "250 lodges" belonging to the Bannock near Fort Hall (Russell 1921:14). He saw "300 lodges" near Bear Lake in April of 1835 (Russell 1921:17) and "400 lodges of Snakes and Bannocks" near the Bear River on May 8, 1836 (Russell 1921:45). Judging from the journal entries, both people and bison were thriving on the eastern Snake River Plain in the 1820s and 1830s. As an aside, these entries are significant in documenting a flourishing ethnographic pattern of life, and in showing that the great mortalities that afflicted west coast and other populations, as a result of white man's diseases, apparently had not decimated the Shoshone and Bannock peoples residing the Snake River Country.

In calculating bison return rates, I used only the narratives of Odgen, Townsend and Russell because only these journals provided daily reports on activities for a period of months or years. While Townsend and Russell were both with Nathaniel Wyeth's party, events documented in their journal entries do not correspond with one another and it appears that, for much of the time, they were in different sub-groups of the original party. Therefore, both journals have been considered in my effort to calculate bison return rates.

Making the Calculations

To calculate bison return rates, values for a number of specific factors must be provided. While the historic journals can help suggest quantitative information regarding the success rates of hunters, other factors included in the equation must be generated by other means. These factors include the caloric value of bison meat, the amount of edible meat on a bison, the number of hours in a hunter day and the amount of time it takes to process a bison. The following paragraphs discuss each of these factors and explain how specific estimate values were generated.

The caloric value of bison meat was obtained from an analysis of the nutritional composition of lean bison cuts, including ribeye and sirloin (Marchello et al. 1998). Standard nutritional analyses are performed on all foods to fulfill requirements set by the United States Department of Agriculture. These analyses extract and measure the amount of protein, moisture, fat, ash, cholesterol and energy contained in 100 grams of a specific food. The caloric value of a 100 grams of bison meat ranged from 136 calories to 145 calories, depending on the specific cut (Marchello et. al., 1998). To convert calories to kilocalories, these figures are multiplied by 10 (i.e., caloric value of 1000 grams rather than 100 grams). For the purposes of this study, the higher figure of 1450 is used because it is clear from ethnographic observation that aboriginal people would not have excluded the fattier cuts and indeed appreciated their food value.

In a study among the Ache foragers of Paraguay, 4086 total hunting hours (including processing, search and pursuit time) were observed over 674 man-days (Hawkes et. al., 1982), resulting in a rough average daily hunting time of 6 hours. Based on Simms' personal experience and information generated from modern hunters in Utah, he concluded that five hours was representative of a single "hunter day". Sugiyama, in his research with the Yora of Peru and Shiwar of Ecuador (1996), generated similar figures. The more conservative figure of 5 hours will be used here.

I use Simms' estimate that roughly 60% of an animal's total weight would be considered edible in the prehistoric diet. These weights were originally generated by White (1953), who considered that only 50% of an animal's flesh was edible. Simms' rationale for the increase stems from his argument that modern butchering techniques discard flesh that prehistoric groups would have considered edible.

This rationale is well founded. Calculations based on ethnographically measured edible proportions of game in studies of the Ache of Paraguay and the Piro of Peru yield an estimate of 65% of body weight (Kaplan and Hill 1985). According to White (1953), the average live weight for a male bison is 1800 pounds and the average live weight for a female bison is 800 pounds. For my study, these figures are averaged and the edible weight calculated using Simms' estimate of 60% of total weight. This calculation generated an average edible bison weight of 354 kilograms.

Processing includes the amount of time it takes to "gut, skin, and butcher the animal into sizable portions"(Simms 1987:46). Simms provided no estimate for bison, but a modern hunter can easily gut, skin and cut up a 300 kilogram bull elk in an hour, even while taking great pains to keep the meat clean (Dennis L. Jenkins, personal communication). I have estimated the processing time for a bison carcass at four hours and consider this to be a generous figure.

This information must now be related to quantitative data on the pursuit time involved in bison hunting from the journals of Odgen, Russell and Townsend. The information needed includes the total number of animals taken and the total number of man-hours required to take them. The pursuit time can then be expressed in kilograms of meat obtained per hour of effort expended.

The number of hunter days was derived from journal entries that commented on hunting (see Appendix A). Because the number of hunters involved in particular bison procurement activities was often not given, the number of hunters used in my calculations is based on those entries where the number is specified.

Townsend's journal entries were the most informative regarding the actual number of hunters involved in each attempt to acquire bison. The number of hunters ranges in specific cases from one to six; I averaged these and used three hunters in the formula. Ogden's journal mentions 5 hunters involved in a bison hunt in the Lemhi Valley on February 12, 1825. Because this is the only entry in which the actual number of hunters is listed, I used it in calculating Ogden's success rate. Russell's journal contains three entries in which four hunters were involved. Because no other Russell entries provide a specific number, I used this in the calculations.

As previously noted, the journal entries were often vague regarding the number of animals killed. As noted in Tables 27, 28 and 29, the terms "many" or "large numbers" were commonly used. Where these entries were noted, the number of bison killed was assigned a numerical value of "20". When "some" bison were procured, the number "10" was assigned. These may be conservative estimates judging from the sheer size of many of the fur trapping parties. For example, Ogden's party consisted of at least 58 individuals equipped with 61 guns and 268 horses when they departed the Flat Head Post in December of 1824 (Russell 1950:3). Alexander Ross had left for the "Snake River Country" a year earlier, taking a trapping party of 54 men with 62 guns and 231 horses (Ogden 1950:xxxvii) and Nathaniel Wyeth's party consisted of 58 men (Russell 1921:7).

In addition to the trappers, these groups also included families (women and children) of certain trappers, although their actual numbers are not specified. Because journal entries noted that some trappers brought wives and children while others were "single", I have estimated the total group size at 75. Feeding a group of 75 individuals for a month (at 2500 calories a day per person) requires roughly 5,625,000 calories. Because bison was preferred over all other foods, it is assumed that bison meat made up the bulk of the fur trappers' diet. This caloric figure represents the equivalent of 10 bison per month, assuming that 60% of each animal was used. However, it is clear that fur trappers often wasted significant portions of their kills (Townsend 1978:104, 128) or lost certain kills to wolves (Ogden 1950:160). Some journal entries make special note of when "nothing was wasted" due to the overall shortage of bison meat in camp (Townsend 1978:128). If only half of the edible portion of a bison was consistently consumed, it would have required nearly 20 bison to feed a party of 75 for a month. As shown in Appendix A, the frequency of kills involving "10" or "20" animals is low and they were often spaced several months apart. As rough as these estimates are, they do provide reasonable "ballpark" figures to work with.

The caloric costs of the total hours estimated for Ogden, Russell and Townsend in both the pursuit and processing of bison must be expressed in kilograms per hour to derive return rates. Table 30 presents the specific numbers needed to make these calculations.

Table 30. Total Man-Hours and Bison Killed Estimated from Trapper Journals

Journal	Hunters	Total Man-Hours	# Killed	Processing Hours
Ogden	5	1120	205	820
Russell	4	224	55	220
Townsend	3	240	16	64

This calculation requires that the total number of hunter hours be added to the total number of processing hours. (To determine the total number of processing hours, the number of bison acquired was multiplied by four, the number of hours required to process a single bison). Pursuit and processing hours were then divided by the number of bison taken, multiplied by the number of kilograms of edible meat per bison. The character "H_i" represents pursuit and processing time per kilogram, as in the following equation:

$$\frac{\text{Total Hunter Hours} + \text{Processing Hours}}{\text{N x 354 kg}} = H_i$$

Once pursuit and processing time per kilogram (H_i) has been calculated, the Total Handling Time (THT) must be derived. To do this, H_i be multiplied by the kilograms of meat available per bison. For use in the equation, the 354 kilograms of meat available per bison will be expressed as "μ_i" and the caloric value of bison meat (1450 kilocalories per kilogram) established by Marchello (et al. 1998) will be represented as "E_i". The following equation will then produce the net return rate for each journal account:

$$\frac{\Sigma(\mu_i \times E_i)}{\Sigma(\mu_i \times H_i)} = \text{Net Return Rate}$$

Table 31 presents the estimated return rates for bison hunting based on the numbers generated from the narratives of Ogden, Russell and Townsend.

Table 31. Net Return Rates for Bison

Narrative	μ_i	E_I	H_i	$\mu_i \times H_I$	Return Rate
Ogden	354 kg	1450	.0268	9.487	54,105 kcal/hr
Townsend	354 kg	1450	.0326	11.54	44,480 kcal/hr
Russell	354 kg	1450	.0228	8.07	63,606 kcal/hr

Because of the crudity of the data and for the sake of simplicity in calculation, the net return rate for bison will be averaged for the three narratives. The round figure of 54,000 kilocalories per hour, which closely matches Ogden's median return rate, will be used as the return rate for bison. However, Simms argued that aboriginal hunters using bows and arrows likely experienced a lower success rate than modern hunters and reduced the return rate for deer and antelope by 40 percent (1987). If the return rate of 54,000 kcal/hr is comparably adjusted to 32,400 kcal/hr to make up for the potential differences in hunting success between aboriginal hunters and fur trappers with horses and rifles, the resulting return rate is roughly 50% higher than deer and antelope. In the following paragraphs, this figure will be used in calculating the optimal diet curve for the eastern Snake River Plain.

Calculating Return Rates for other Animal Resources

As noted previously, useful information has been generated and applied by Simms (1987) in calculating return rates for certain animal species in the Great Basin. Although there may be some variation between regions, many of these species were also available to the aboriginal inhabitants of the eastern Snake River Plain, as identified by Turner's (et al. 1986) list of animals with edible parts from Shoshone-Bannock ethnographic data. Table 32 below summarizes the kilograms of usable meat obtainable from individual game animals that were available in southern Idaho.

Table 32. Usable Meat Weights from Game Animals Commonly Available in Southern Idaho (modified from White 1953)

Animal	Kilograms
Bison E	364
Bison Γ	818
Moose	218
Elk	190
Mule Deer	54
Antelope	50
Beaver	15
Porcupine	4.0
Rockchuck	3.27
Jackrabbit	1.6
Cottontail Rabbit	0.95
Muskrat	0.81
Ground Squirrel	0.68
Pocket Gopher	0.27
Canada Goose	2.18
Sage Grouse Γ	1.5
Mallard	0.68

Calculating Return Rates for Plant Resources

As with animal resources, a list of plant resources potentially used in southern Idaho has been generated from Shoshone-Bannock ethnographic data (Turner et al. 1986). Through experimentation, Simms (1987) was able to generate return rates for some of these species of plants, and his return rates for potential plant resources are applied here. Table 33 includes only those plants investigated by Simms that would have been available on the sagebrush steppes of southern Idaho.

Table 33. Return Rates for Plant Foods Commonly Available in Southern Idaho (from Simms 1987)

Species	Food Type	Calories/Hr
Helianthus annus (sunflower)	seeds	467-504
Elymus cinereus (GBWR)	seeds	266-473
Oryzopsis hymenoides (IRG)	seeds	301-392
Carex (sedge)	seeds	202
Sitanion hystrix (squirrel tail)	seeds	91

Calculating Return Rates for Resource Patches

Because I use a patch choice model to examine mobility patterns and foraging across the environment of the eastern Snake River Plain, it is necessary to consider which resources available within patches, depending on their return rates, would predictably be included in the aboriginal diet. As presented in Chapter III, diet breadth models predict that foragers will maximize their return rates if they take only those resources that generate net returns that are equal to or higher than the average returns produced by overall foraging and will ignore resources that fall below their average returns (Hawkes et al. 1982, Kelly 1995).

Foods that fall below their average returns will not be taken no matter how abundant they are. Conversely, foods that meet or exceed the average return rates will always be taken, no matter how rare they are. As the frequency of encounter rates for higher ranked resources increases, lower ranked resources will be dropped from the diet. Conversely, as the frequency of encounter rates for higher ranked resources decreases, lower ranked resources will be included in the diet.

Table 34 presents my reconstruction of the net return rates and overall ranking of common resources potentially available to the aboriginal inhabitants of the eastern Snake River Plain.

Table 34. Return Rates for common eastern Snake River Plain Food Resources (modified from Simms 1987)

Resource	Kg	Kcal/kg	Hr/kg	Kcal/hr	Kg x hr/kg	Rank
Bison	354	1450	.04	32,400	10	1
Deer	45	1258	.06	20,966	3	2
Antelope	25	1258	.06	20,966	1.5	2
Jackrabbit	1.4	1078	.07	15,400	.49	4
Marmot	3.6	1078	.07	14,400	1.26	5
Cottontail	.80	1078	.12	9,000	.84	6
Waterfowl	.90	848	.40	2200	1.2	7
Sagegrouse	.90	848	.40	2120	2.8	8
Trout	.50	975	.40	2119	.23	9
Gopher	.03	1078	.70	1540	.021	10
Squirrel	.45	1078	.74	1470	.33	11
Sunflower		3650	7.2	485	2.15	12
Wild Rye		2800	5.9	370	2.65	13
Rice Grass		2740	6.9	350	2.2	14
Shrimp		26	1	252	1	15
Sedge		2590	12.8	202	1.75	16
Squirreltail		2700	31.0	91	.32	17

Calculating the Optimal Diet Curve

To evaluate the net return rates of different kinds of resource patches, it is important to ascertain an optimal diet curve that predicts which resources were included in the diet. To do this, Holling's disc equation is applied (Charnov and Orians 1973). As Simms (1987:80) noted, these estimates have been demonstrated to be "more theoretically robust than initially thought" and have been shown to work in both homogeneous and patchy environments. The equation is expressed as:

$$\frac{\Sigma\,(\mu_i \times H_i) \times E_i}{1 + \Sigma\,([\mu_i \times E_i] \times H_i)} + \frac{\Sigma\,(\mu_i \times H_i) \times E_i}{\Sigma\,([\mu_i \times E_i] \times H_i)} + \frac{\text{etc.}}{\text{etc.}} = \text{Return Rate}$$

Holling's disc equation calculates the cumulative handling costs and overall return rate as more resources are added to the diet, beginning with the highest ranked resource. The calculation of values for individual resource types in Table 34 thus yields an "optimal diet curve". Figure 33 shows the optimal diet curve for the eastern Snake River Plain and includes both return rates for bison. The upper curve represents foods in the order in which they are ranked in the diet. The lower curve represents the cumulative handling time involved as each food item is included in the diet. The point at which the two curves intersect marks the point at which the

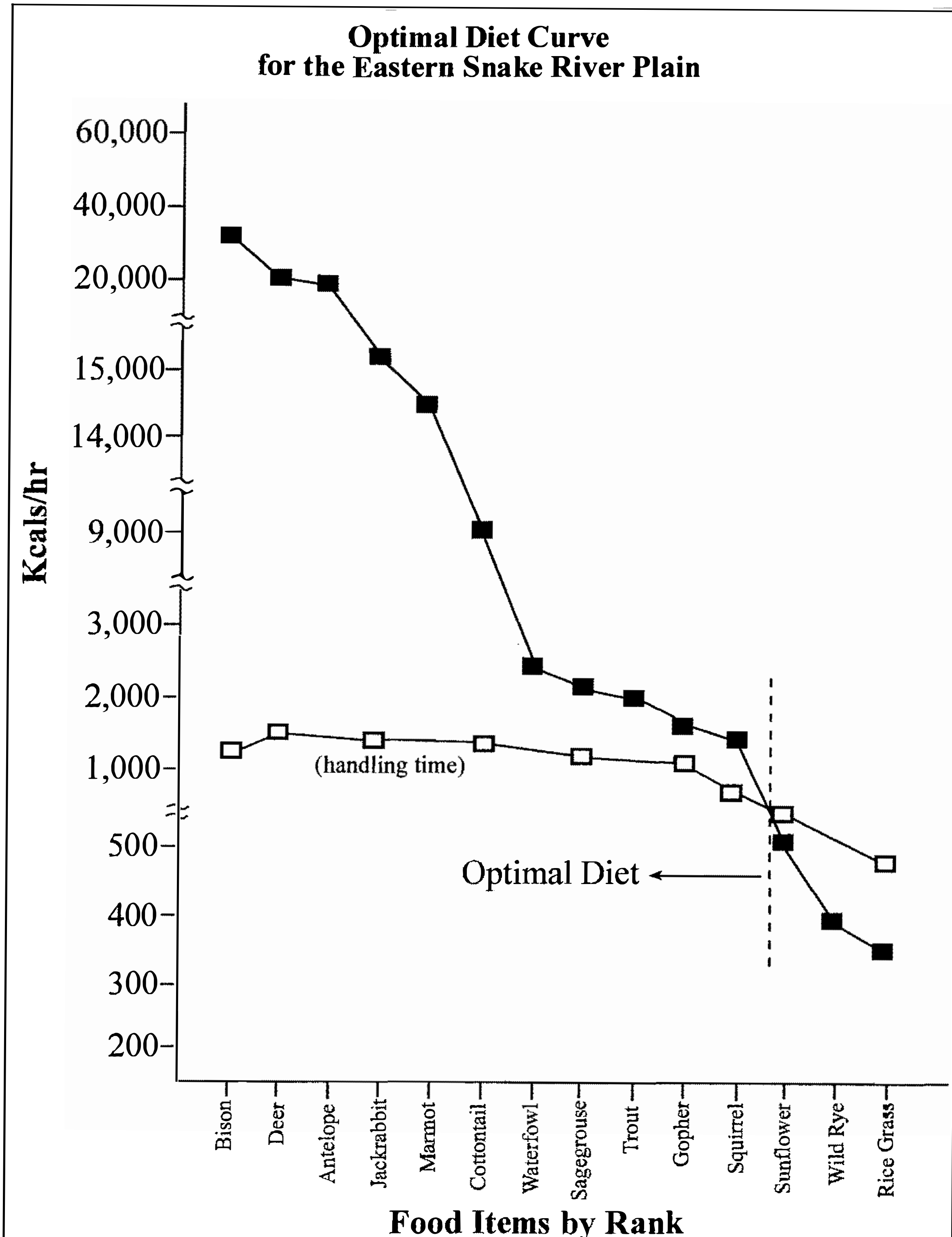


Figure 33. Optimal diet curve for the eastern Snake River Plain.

overall return rate declines. Foods to the left of this juncture are predicted to be included in the diet, and foods to the right are predicted to be excluded.

Based on the calculations, foods whose harvesting would generate fewer than 500 kilocalories per hour are not expected to be included in the aboriginal diet for the eastern Snake River Plain if higher ranked resources are available, because to do so would decrease the overall return rate. While this curve essentially excludes many plant foods, it is interesting to note that, although bison have a high net return rate, the optimal diet should still include many small mammals and rodents, and potentially sunflowers.

It is also important to note that women's subsistence strategies are not delineated in this optimal diet curve. Likewise, vegetal foods fulfill critical nutritional needs that animal foods do not, and would be expected to remain in the diet to some degree for reasons not related to their caloric yield. This does not negate the value of calculating diet breadth for the eastern Snake River Plain, however, since the productivity of individual resource patches remains fundamental in attracting people to them.

In the following paragraphs, return rates for the resources of linear river patches, ephemeral pond patches and cave patches are discussed and certain inferences made regarding factors that may have influenced people's use of these patches. This discussion is necessarily qualitative rather than quantitative at this stage of research, because the determination of actual rates from a field sample of such patches would be a monumental undertaking far beyond the resources of this project.

Return Rates for Linear River Patches

River corridors are essentially long, narrow resource patches surrounded by less productive environments. On the Eastern Snake River Plain, riverine patches consist of the Snake, the Big Wood and Little Wood Rivers (see Figure 1), which combined, create almost 400 kilometers of rich, linear river patch. Smaller perennial water sources such as creeks and streams are virtually non-existent in the flat, open plain. However, the Camas Prairie, located northwest of the Snake River Plain contained numerous springs that fed two perennial streams, Silver Creek and Camas Creek. The area was likely rich in riparian resources as well as camas.

Available resources in a well-watered riverine linear patch would include a variety of large and small game, fish, waterfowl, and plant foods. These patches are often lower in elevation than their surroundings, with denser vegetation, providing raw materials and greater protection from the elements. Such patches would also tend to have the longest seasons of availability, because of the presence of perennial water, and to have the highest degree of predictability because their water is derived from very extensive areas that extend well outside the immediate region. Essentially all of the resources identified in Table 35 would have been available in the linear river patches.

Table 35. Return Rates for Resources found within Linear River Patches

Resource	Kg	Kcal/kg	Hr/kg	Kcal/hr	Kg x hr/kg	Rank
Bison	354	1450	.04	32,400	10	1
Deer	45	1258	.06	20,966	3	2
Antelope	25	1258	.06	20,966	1.5	2
Jackrabbit	1.4	1078	.07	15,400	.49	4
Marmot	3.6	1078	.07	14,400	1.26	5
Cottontail	.80	1078	.12	9,000	.84	6
Waterfowl	.90	848	.40	2200	1.2	7
Sagegrouse	.90	848	.40	2120	2.8	8
Trout	.50	975	.40	2119	.23	9
Gopher	.03	1078	.70	1540	.021	10
Squirrel	.45	1078	.74	1470	.33	11
Sunflower		3650	7.2	485	2.15	12
Wild Rye		2800	5.9	370	2.65	13
Rice Grass		2740	6.9	350	2.2	14
Sedge		2590	12.8	202	1.75	16
Squirreltail		2700	31.0	91	.32	17

These considerations make it clear that linear riverine patches hold the highest rank for overall and sustained productivity potential within the study area.

Return Rates for Ephemeral Pond Patches

When winter precipitation was adequate, ephemeral ponds on the Snake River Plain would have provided small, but rich resource patches the following spring and early summer. Under the current climatic regime, these ponds attract large numbers of migratory waterfowl and a wide variety of large and small game. It is also likely that the abundant freshwater invertebrates they support were included in the human diet (Henrikson et al. 1998), though return rates for this potentially usable resource are not available at this time.

As shown in Table 36, effectively the same resource species are found around ephemeral ponds as are found around linear riverine patches, but the quantity of resources available in each kind of patch surely varies. There are over 1200 ephemeral ponds scattered across the eastern Snake River Plain ranging from about 500 meters to over 90,000 square meters in size. While these numbers are impressive, the seasons of resource availability around such ponds tend to be much shorter than for perennial streams, and they are also more susceptable to annual fluctuations in local precipitation. Thus, the productivity of the ephemeral pond patches clearly ranks second in both quantity and dependability to that of riverine patches.

Considering the brief 3-4 month period of availability for ephemeral pond resources, the overall productivity of the ephemeral pond patch is probably less than half that of the riverine resource patch, where the productive season was at least 7-8 months long.

Table 36. Return Rates for Resources found in Ephemeral Pond Patches

Resource	Kg	Kcal/kg	Hr/kg	Kcal/hr	Kg x hr/kg	Rank
Bison	354	1450	.04	32,400	10	1
Deer	45	1258	.06	20,966	3	2
Antelope	25	1258	.06	20,966	1.5	2
Jackrabbit	1.4	1078	.07	15,400	.49	4
Marmot	3.6	1078	.07	14,400	1.26	5
Cottontail	.80	1078	.12	9,000	.84	6
Waterfowl	.90	848	.40	2200	1.2	7
Sagegrouse	.90	848	.40	2120	2.8	8
Gopher	.03	1078	.70	1540	.021	10
Squirrel	.45	1078	.74	1470	.33	11
Sunflower		3650	7.2	485	2.15	12
Wild Rye		2800	5.9	370	2.65	13
Rice Grass		2740	6.9	350	2.2	14
Sedge		2590	12.8	202	1.75	16
Squirreltail		2700	31.0	91	.32	17

Return Rates for Cold Storage Cave Patches

Cold storage caves may be viewed as rich resource patches on the otherwise low-productivity sagebrush steppe. The caves could have provided critical meat reserves and a critical source of water (in the form of ice) during the late fall, winter and early spring when other resource patches were no longer productive. Table 37 presents the potentially available resources at a cold storage cave on the Snake River Plain, where archaeological evidence known so far attests only the presence of bison.

Table 37. Return Rates for Resources at Cold Storage Caves

Resource	Kg	Kcal/kg	Hr/kg	Kcal/hr	Kg x hr/kg	Rank
Bison	354	1450	.04	32,400	10	1

Stored bison meat could well have been critical during the most difficult and resource-poor season of the year. Expectably, the storage caves would have been subject to high consumption rates over the critical cold season, but during the summer and fall caves could not be reckoned as productive patches. These would be seasons of restocking, rather than periods when their resources were actually drawn on. Based on these considerations, it is appropriate to rank the storage cave patches third in productivity following riverine and ephemeral pond patches.

Summary and Conclusion: a Predictive Model of Site Location on the Eastern Snake River Plain

Patch choice models predict that in situations where different resources are distributed in various isolated locales across the landscape, foragers will select the patch or patches that generate the highest average energy return rate after travel, search and handling time are considered. The following paragraphs review some of the predictable tradeoffs and decisions associated with available resource patches on the eastern Snake River Plain.

As shown above, the estimated net return rates for bison exceed return rates for all other resources, including deer and antelope. However, it is notable that even with bison included in the aboriginal diet, the overall diet breadth for aboriginal peoples occupying the Snake River Plain is predicted to be broad, as demonstrated in Figure 33.

While quantitative comparisons between the overall return rates of each type of resource patch can not be extended beyond the level of rank-ordering at this time, such a ranking does facilitate a qualitative evaluation of the productivity of linear river patches versus pond and cave patches.

Although the types of resources available at rivers and ephemeral ponds are not significantly different, river corridors are perennial water sources that would have provided a variety of large and small game, waterfowl, fish and plant foods for many months. Linear river corridors are also located in lower elevations and provide more protection from the elements. Ephemeral pond patches, because of their limited size in comparison with linear river patches, would contain fewer resources overall. The productivity of these resource patches is limited to the spring and early summer and people at pond patches would also experience a rapidly decelerating return rate, with resources being depleted in a matter of weeks rather than months.

The sagebrush steppe that surrounds pond and cave patches would have provided bunchgrasses for bison and antelope, and could have provided grass seeds for human foragers as well. The primary attraction of the cold caves was stored bison meat and during dry season visits, ice water. Pollen evidence from Scaredy Cat Cave indicates that some of the storage features were probably constructed during the fall, in turn suggesting that bison were acquired and stored at this time. According to the fur trappers' journals, fat and docile herds of female and immature bison were at their best during this season. Stored meat would have been most critical to the regional population during the winter and early spring when linear river corridor patches and ephemeral pond patches had been depleted.

The relatively easy distances between the cold storage caves and the linear river corridor patches suggests that the caves could have been stocked by hunters on forays from residential bases or base camps in the river corridors. Similarly, later visits to retrieve stored foods would not have been onerous. According to Kelly (1990), foragers moving between resource patches can travel roughly 25 kilometers in a day. Scaredy Cat Cave, which is about 60 kilometers from the Fort Hall Bottoms, would require a six day round trip, but a round trip to the much closer Alpha, Wolffang and Bearpaw caves could easily be done in two days (Figure 1).

Based on all the above considerations, the model developed for this study predicts that riverine resource patches, being the most productive for the longest duration, would be the most desirable locations for seasonal sedentism. On the eastern Snake River Plain, riverine resource patches would most likely be occupied during the winter when the sagebrush steppe is quite inhospitable and ephemeral pond patches are unproductive. Ephemeral pond patches would most expectably exhibit short-term use during the spring when water is most reliably available. Archaeological remains surrounding the ice caves should also indicate seasonal short-term base camps, used while hunters were in the area killing bison and caching their meat. The results of the pollen analyses indicate that at least some of the storage features were constructed during the fall and it is logical that bison meat was cached at the same time.

In summary, there is a hierarchy of predictions contained in the model that can be expressed as follows: 1) linear river corridors are most attractive to all kinds of sites and the only places where residential sites are to be expected; 2) ephemeral ponds and cold storage caves can only be expected to attract short-term base camps; and 3) open sagebrush steppe can only be expected to attract extremely transitory sites. To test the viability of this deductive model, its predictions will be evaluated against extensive archaeological survey data from the eastern Snake River Plain in Chapter VI.

CHAPTER V

OVERVIEW OF REGIONAL PREHISTORY

A patch choice model developed for the eastern Snake River Plain produced the expectation that linear resource patches such as the Snake River and some of its major tributaries would be the location of winter residences while ephemeral pond patches would be attractive base camp locations only during spring months and early summer months when precipitation was adequate. Ice caves would have provided critical bison meat reserves in the late winter and early spring when game was starved and scarce, and as indicated by the pollen data from Scaredy Cat and Tomcat caves, meat would have been cached at the caves during the fall.

To frame the relevance of this model to our understanding of aboriginal lifeways on the Snake River Plain, it is necessary to first present an overview of the regional prehistory, and some notes on the ethnological inter-relationship of native life in the region during the 19th Century. As discussed in Chapter I, Steward (1938) maintained that bison would not have been a significant resource to aboriginal peoples in southern Idaho until they acquired the horse shortly before the 19th Century. Prior to that time, he believed the natives did not have sufficient technology to procure these large mammals. I begin a reassessment of Steward's contentions with a review of important archaeological locales in the region, paying special attention to sites containing bison remains.

Projectile Point Chronology

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), and Ringe (1993). This chronology will be employed in the following chapter to structure the analysis of archaeological data from the Snake River Plain, in a test of the model presented in Chapter IV. Here it provides an outline of the cultural history of the region. For simplicity, the dates presented in this chapter are expressed in radiocarbon years before present.

The Early Prehistoric Period 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 34). The Early Prehistoric I Subperiod is generally characterized by large fluted spear points. 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±150 ry B.P., 12,250±200 ry B.P. and 10,920± ry B.P. (Butler 1978, Miller and Dort 1978).

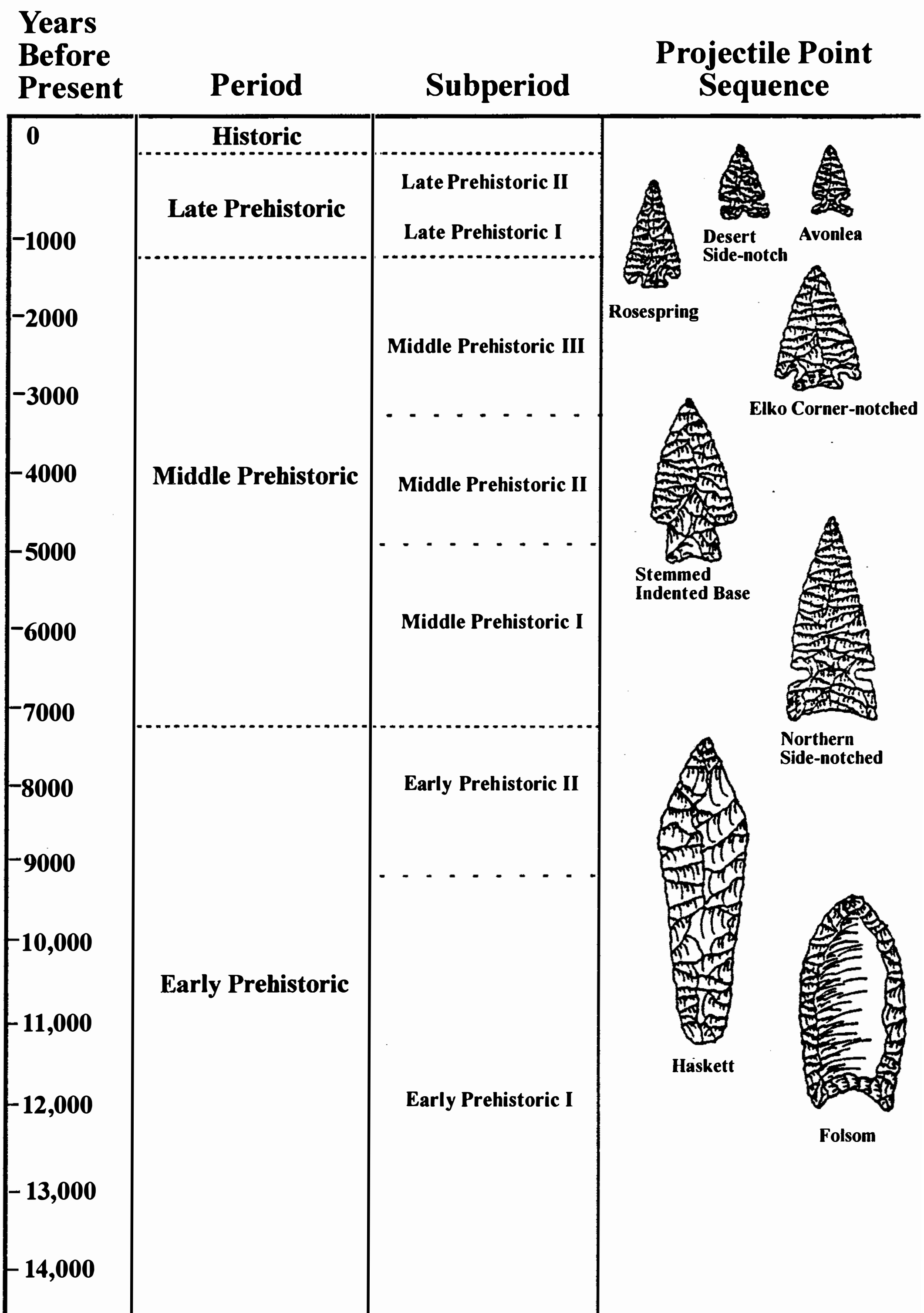


Figure 34. Projectile point chronology for the Eastern Snake River Plain (modified from Reed et al. 1986).

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 during the Early Prehistoric II Subperiod (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 a warming and drying that followed upon the end of the Pleistocene. The beginning of the Middle Prehistoric Period is delineated by the appearance of smaller stemmed and notched dart points, which were used in the harvesting of bison, deer, antelope, big horn sheep and smaller animals as part of a broad-spectrum subsistence base.

The Middle Prehistoric Period is divided into three subperiods, of which the first is the least understood phase in regional prehistory. Few remains have been found in datable contexts associated with this subperiod. Bitterroot or Northern Side-notched dart points (and, to a lesser extent, smaller stemmed points) characterize the beginning of the Middle Prehistoric I Subperiod (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). Stemmed indented-base points and lanceolate points of the McKean and Humboldt traditions emerged during the Middle Prehistoric II Subperiod (ca. 5000-3500 years ago). The Middle Prehistoric III Subperiod (ca. 3500-1500 years ago) is dominated by the Elko Corner-notched dart point; but some controversy surrounds the dates associated with this point type (Flenniken and Wilke 1989).

The early phase of the Late Prehistoric Period (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 Prehistoric, but it is definitely associated with Desert Side-notched points, which dominate the Late Prehistoric II Subperiod 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 (see Figure 35) 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.

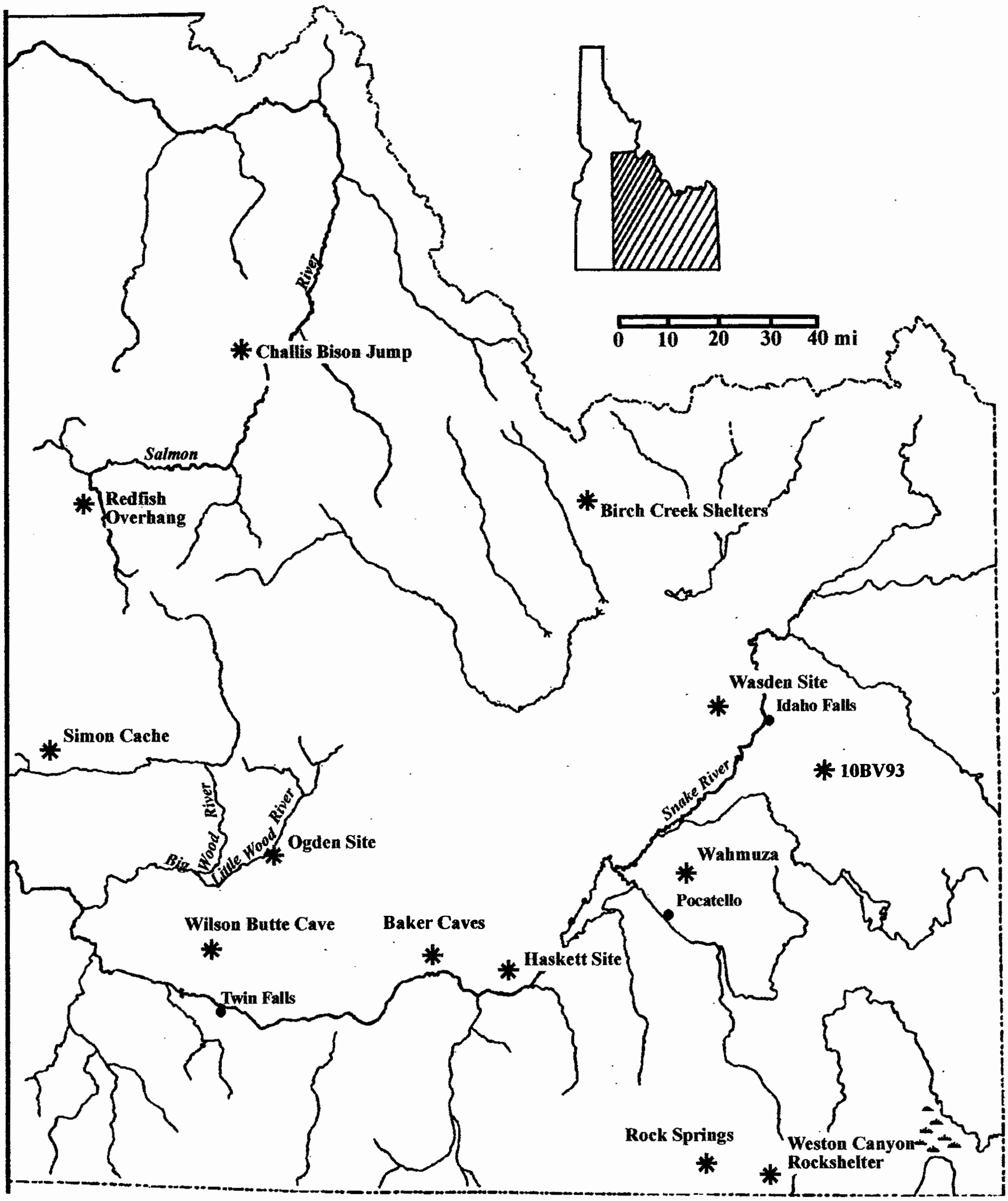


Figure 35. Excavated sites in southeastern Idaho (modified from Butler 1978).

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 from14,500 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), although Haynes (1971) has expressed doubt about the reported dating.

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 ± 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 (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 ± 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 includes a small bison kill site discovered in 1987 during archaeological surveys for a powerline 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).

Although discussed in Chapter II, the cold storage caves must again be mentioned in this section. While radiocarbon dates are not available for Alpha, Wolffang and Bearpaw caves, the bison remains from Bobcat Cave have associated radiocarbon dates of 4360 ± 70 ry BP and 4110 ± 70 ry BP collected from a frozen sagebrush feature in the lower chamber. Ten radiocarbon dates from Scaredy Cat Cave indicate that the site was repeatedly used between 8190 ± ry 100 BP and 3810 ± 70 ry BP. Radiocarbon dates from Tomcat Cave range from 2400 ± 60 ry BP to 1170 ± 60 ry BP and an antler tine from Fortress Cave produced a date of 1430 ± 40 ry BP. While cold storage of bison meat at Bobcat and Scaredy Cat Caves is well represented during the Middle Holocene, in Tomcat and the Fortress Caves these activities appear to have occurred during the Late Holocene -- although the possibility of earlier cold storage events can not be eliminated at this point.

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 southcentral 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 intrepretation 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, Idaho, 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 a minimum number of only 17 adult bison. Although seasonality could not be assigned to all of the bone beds in the site, several appear to be related to early spring kills (based on the amount of fetal remains). However, the most extensive bone bed (Bone Bed 3) contains both mature bulls and cows, suggesting a early fall kill when bison herds were at their peak.

Archaeological Sites with Bison in Adjacent Regions

Bison have also been noted in archaeological assemblages north of the Snake River Plain. Chatters' (1982) dissertation research in the Pahsimeroi Valley of central Idaho indicated that by 2500 years ago, the faunal assemblages of archaeological sites in the valley were comprised of mountain sheep, bison and antelope. In fact, bison appears to have been continuously harvested in similar quantities to other ungulates well into prehistoric times.

Evidence for prehistoric bison exploitation is also present in Northern Utah. Although pronghorn is the most abundant artiodactyl represented in the Hogup Cave assemblage, a total of 22 individual bison appear to be evenly distributed throughout the occupation of the site, except for the earliest layers, in which bison is absent (Aikens 1970). According to Lupo and Schmitt (1997), the presence of bison in archaeological assemblages in the northeastern Great Basin is highly significant. Their examination of previously excavated sites along the shores of the Great Salt Lake (Aikens 1966, 1967) indicates that during the Fremont Period, greater representation of bison bone in archaeological assemblages may equate to the expansion of grasslands because of increased summer moisture (resulting in more available bison).

This hypothesis is supported by the ratios of grass pollen during this same time period at Hogup Cave. By AD 1300, bison remains no longer appear in assemblages from Northern Utah and Lupo and Schmitt attributed this to a retreat in grassland habitats with the onset of a dryer period. While these issues have only been briefly discussed in the archaeological literature from the Great Basin, Harper (1967) noted that bison occur in sites in the northern part of the region where grasslands were present but were likely restricted to these areas because of climatic factors. Farther afield, Grayson (1982) noted bison remains in caves from central and southeastern Nevada, arguing that while bison may not have been abundant, they were present in small, widespread local populations. At Dirty Shame Rockshelter in extreme Southeast Oregon, bison bones were present in levels dated between 8000 ry B.P. and late prehistoric times (Aikens, Cole and Stuckenrath 1977; Grayson 1977).

Temporal Distribution of Bison Sites

The temporal distribution of bison assemblages from the eastern Snake River Plain indicates that bison have been procured at a variety of locales within the region for the last 8000 years (Figure 36). This information, combined with the paleoclimatic data generated from Middle Butte and Rattlesnake Caves (Davis and Bright 1983) presented in Chapter IV, shows that bison were a resource consistently available to and used by the prehistoric inhabitants of the region. Steward's contention that bison were either too scarce or too difficult to obtain by pedestrian hunters on the eastern Snake River Plain does not appear to be well-founded based on the evidence presented above. Although large, "plains-style" bison jump sites have not been found in Idaho, it is apparent that bison were not only being acquired but often make up a significant percentage of the faunal assemblage at a number of sites. Most prominently, these include Wilson Butte Cave (Gruhn 1961), the Birch Creek Rockshelters (Swanson 1972), the Wasden Site (Butler 1968), Baker Cave III (Plew et. al., 1987) and the cold storage caves reported here. However, sites such as Wahmuza and Weston Canyon Rockshelter indicate that other resources also played a critical role in aboriginal subsistence on the eastern Snake River Plain. Wahmuza, which appears to be residential base in the Fort Hall Bottoms, contained a wide range of riparian resources (Turner et al. 1986), while big horn sheep were the prey of choice at Weston Canyon Rockshelter (Miller 1972). Aviator's Cave, a lava tube located on the Idaho National Engineering and Environmental Laboratory, contained plant foods and waterfowl from winter and early spring occupations during the Late Holocene (Lohse and Sammons 1994).

Figure 36. Temporal distribution of bison assemblages on the eastern Snake River Plain

Owl Cave	*****
Scaredy Cat Cave	*************************
Wilson Butte Cave	**********************************
Bobcat Cave	***
10BV93	**
Birch Creek Rockshelters	******************
Tomcat Cave	**
Wahmuza	*********
Baker Cave III	****
Years BP	10,000 9,000 8,000 7,000 6,000 5,000 4,000 3,000 2,000 1,000 0

Notes on the 19th Century Shoshone-Bannock Seasonal Round

Archaeological data from southern Idaho clearly demonstrate the longevity of bison use in the region. It is also critical, however, to examine the role of bison and other resources in the 19th Century seasonal round of the Shoshone-Bannock who made their home in the region.

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 (Meatte 1990). Following the spring salmon runs, s.mall 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. The timing of the Shoshone return to the Snake River usually coincided with the fall salmon runs (Steward 1938).

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 would disperse every spring in various directions. 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. 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 hunt, groups returned to the Fort Hall Bottoms for winter. However, if bad weather hit before some groups could return, they were forced to spend the winter on the eastern side of the divide.

Each succeeding spring, the groups would disperse from the Fort Hall Bottoms, but in different directions from the previous year. Steward (1938) noted that no individual group would travel in the same direction two years in a row, but there would be at least one individual included in each group who was knowledgeable of the terrain and resources of each particular 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 by 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 great falls. Although eastern groups would have to travel the lengthy distance on foot to Salmon Falls for salmon or journey far across the desolate plains to the Camas Prairie, these were the only reliable resources available to them, as he saw it.

Notes on Regional Volcanism and its Possible Impact on Prehistoric Subsistence Rounds

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.

Late Pleistocene and Holocene Lava Flows

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 37). 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 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 between 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.

Distribution of Late Pleistocene and Holocene Lava Flows on the Eastern Snake River Plain

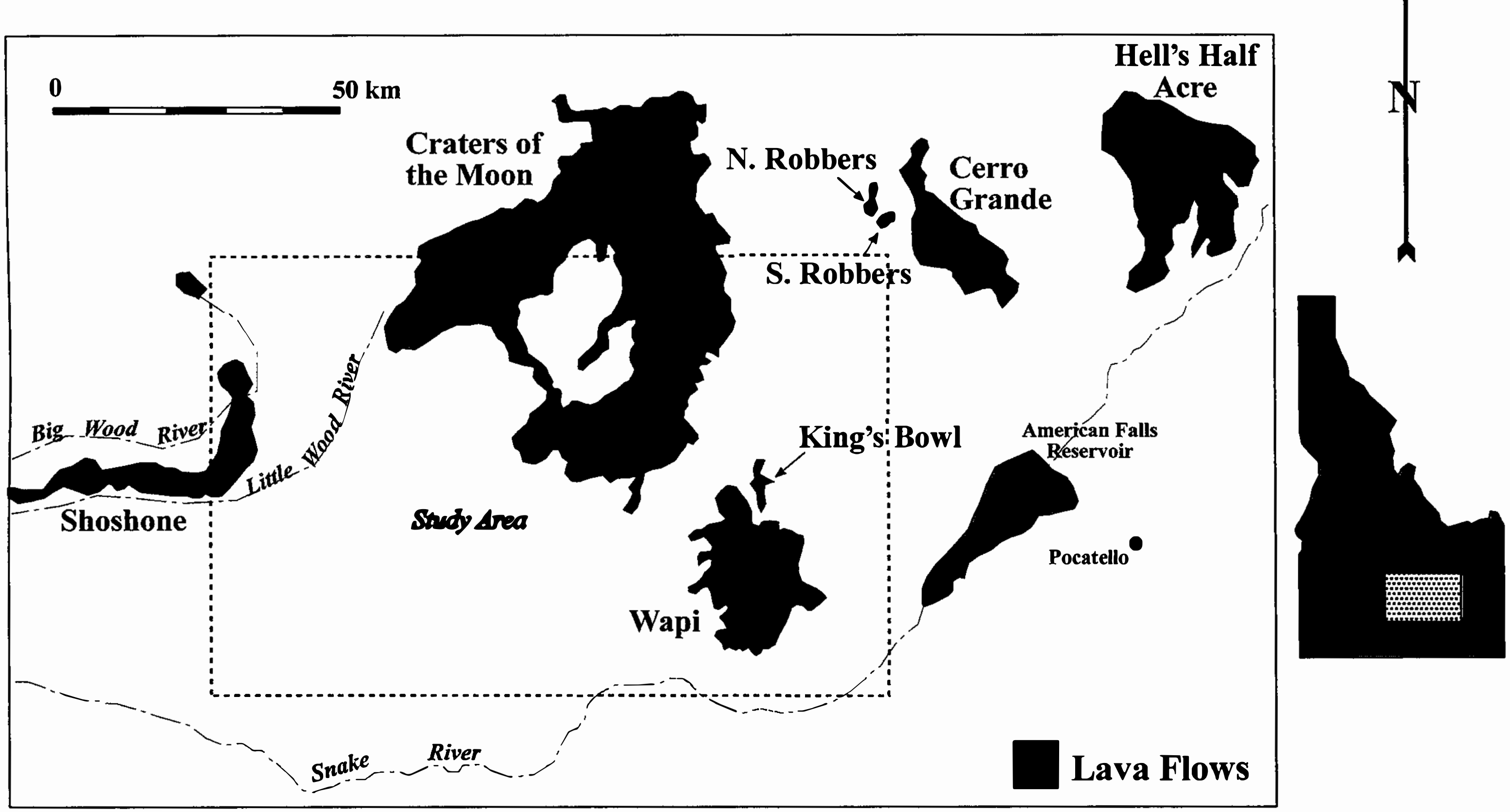


Figure 37. Location of Late Pleistocene and Holocene lava flows on the eastern Snake River Plain (modified from Kuntz et al. 1992).

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 38). 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.

The use of Scaredy Cat Cave, which is surrounded by the Craters of the Moon lava field, appears to have been directly influenced by individual eruption events. Kuntz (et al. 1986) has dated two eruptive events that correspond with the onset of cold storage at the cave and then with the abandonment of cold storage at the locale. Eruptive Period E (see Figure 38), which includes the Grassy Cone, Laidlaw Lake and Lava Point flows, has been dated to between 7,840 ± 140 and 6,670 ± 100 ry B.P. The oldest cold storage feature at Scaredy Cat Cave has been dated to 6930 ± 60 ry B.P. Likewise, Eruptive Period B and its associated flows range in age between 4510 ± 100 and 2660 ± 60 ry B.P. The largest of the Period B flows is the Minidoka, situated about 4 kilometers east of Scaredy Cat Cave. This massive flow is roughly 40 kilometers long and 5 to 10 kilometers wide, extending from the Craters of the Moon Monument to the Wapi lava field to the south. It is thought to have occurred around 3600 ry B.P (Kuntz et. al 1986). Harmonic tremors associated with the first stages of this flow may have been responsible for the massive roof fall

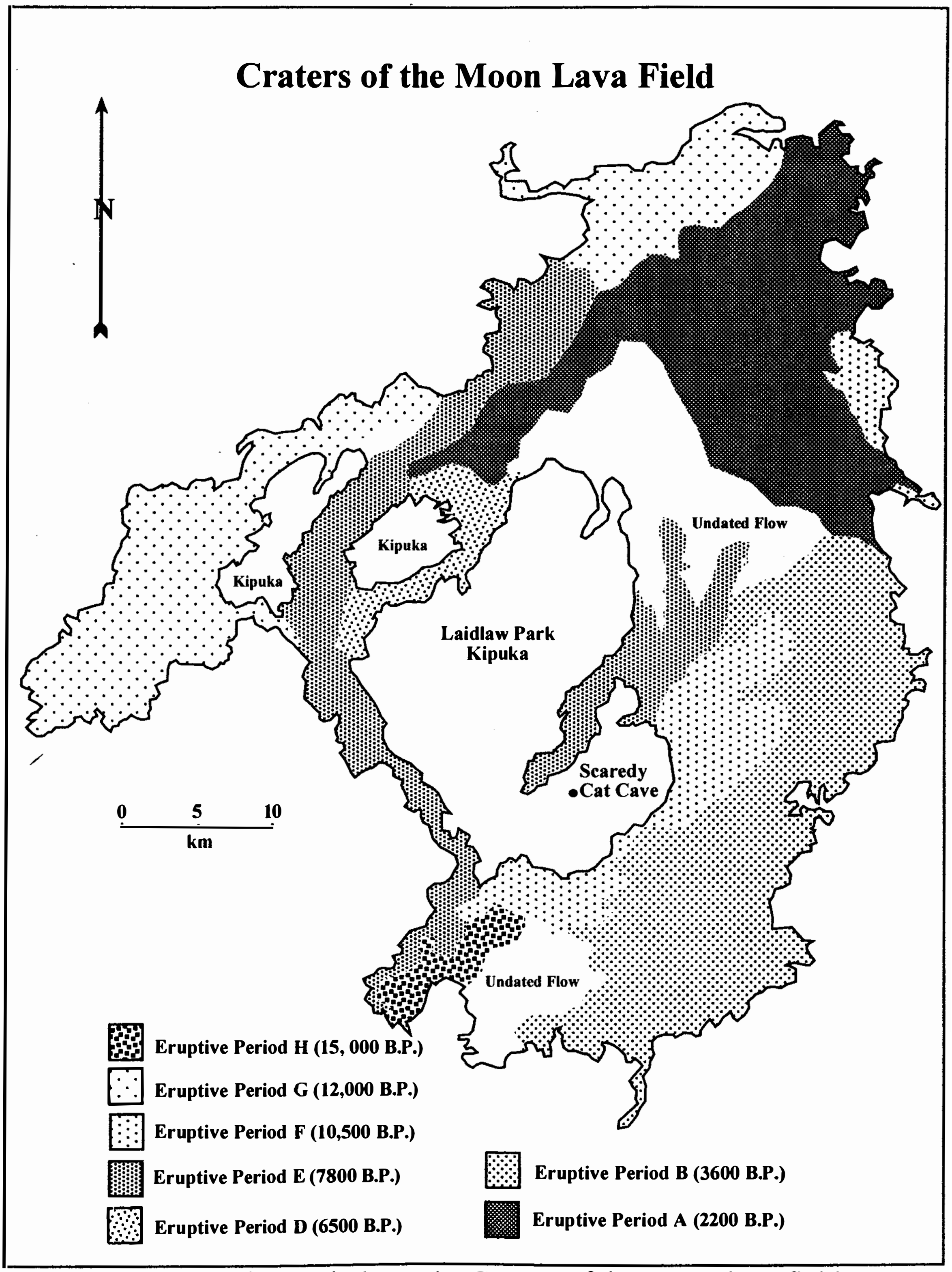


Figure 38. Eruptive periods on the Craters of the Moon lava field (modified from Kuntz et al. 1992).

episode that occurred in the central chamber of Scaredy Cat Cave, with the last cold storage episode occurring at 3800 ry B.P.

Although the roof fall episode seems unlikely to have altered the temperature in the central chamber of Scaredy Cat Cave, the heat from a nearby mass (see Figure 36) of flowing lava the size of the Minidoka flow may have created unsuitable temperatures in the vicinity for a period of months or years. 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.

Conclusions

Excavated archaeological sites in southern Idaho indicate that bison have been procured in the region for the last 8000 years. This evidence is in strong contrast to Steward's contention that bison were either too scarce or too difficult to obtain by pedestrian hunters. However, while bison make up a large percentage of the faunal remains from many sites, some localities such as Wahmuza, Weston Canyon Rockshelter and Aviator's Cave suggest that other resources were important in aboriginal subsistence on the eastern Snake River Plain. It should also be noted that sites such as the Birch Creek Shelters and Wilson Butte Cave were excavated over thirty years ago without the benefit of modern sampling methods (i.e., smaller screen mesh size) and analytical techniques that could have provided more detailed and perhaps more accurate information on subsistence activities. Likewise, recent excavations at the Rock Springs Site suggest that, even with the help of a natural "funnel", only a limited number of bison could be dispatched during a single hunting event. This evidence provides support for the prediction that, along with bison, a wide range of other foods would have to be included in the optimal diet of the eastern Snake River Plain.

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. Alternating directions every spring and going in search of a wide variety of resources, including bison, likely aided survival.

If a subsistence round like that of the Shoshone-Bannock actually has great antiquity in the region, lava flows that have erupted during the last 10,000 years likely had a impact on the seasonal movements of people. Active eruptions may have prevented access to important resource patches for a period of months or years and crossing the Snake River Plain to reach the Camas Prairie during the spring or summer may have been extremely difficult or impossible at times. Although it is difficult at this point to truly measure the influence of Holocene lava flows on the seasonal round, these dramatic events must be considered in the prehistory of the eastern Snake River Plain. The following chapter further examines the archaeological record of the region as generated by recent intensive inventories and compares these data with the predictive model presented in Chapter IV.

CHAPTER VI

GEOGRAPHIC INFORMATION SYSTEMS ANALYSIS OF ARCHAEOLOGICAL SITES ON THE EASTERN SNAKE RIVER PLAIN

Much of archaeological data is spatial in nature and archaeologists have, for decades, searched for patterns that may appear in the myriad of variables that influence where humans choose to live. Environmental factors play a strong role in such patterns, and these patterns can be quantified and explained (Wheatley and Gillings 2002). The development of Geographic Information Systems (GIS), with their ability to rapidly analyze large quantities of spatial data, has provided archaeologists with an extremely valuable tool that can integrate archaeological data with geologic, topographic, hydrographic and other data sources within hours rather than months or years (Wheatley and Gillings 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). Based on the theoretical framework of behavioral ecology, I presented a deductive model was presented in Chapter III of this dissertation. This "predictive" model will be tested and evaluated against the inductive results generated in this Chapter. My analysis inevitably incorporates an inductive approach because empirical observations are always essential if fact is to be related to theory. This 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.

Through the examination of GIS data, the predictions of the deductive model can be tested for viability against archaeological data from the eastern Snake River Plain. As stated in Chapter II, behavioral ecology makes specific predictions about foraging behavior based on simple, non-intuitive assumptions derived from economic models. Patch choice models predict that in situations where resources are distributed in various isolated locales across the landscape, foragers will select the patch or patches that generate the highest average energy return rate after travel, search and handling time are considered.

The Snake River Plain harbors three kinds of relatively rich resource patches surrounded by less productive sagebrush steppe. These include linear patches along the few perennial water sources in the region, hundreds of ephemeral ponds, and the cold storage caves. As stated in Chapter IV, the types of resources available at rivers and ephemeral ponds are not significantly different. However, perennial rivers such as the Snake, Big Wood and Little Wood rivers would have provided game, waterfowl, fish and plant foods for many months while ephemeral pond patches, because of their limited size, would contain fewer resources overall and their productivity would be limited to the spring and early summer. Bison meat would be the strongest attraction of cold cave patches, especially during the winter and early spring when linear river corridor patches had been depleted and ephemeral pond patches had not reached full productivity. The storage features appear to have been constructed in the fall and evidence suggests that bison were also acquired and stored at this time.

Based on these considerations, the model developed for this study predicts that riverine resource patches, being the most productive for the longest duration, would be the most reasonable locations for seasonal sedentism. On the eastern Snake River Plain, riverine resource patches could provide critical resources even during the winter when the sagebrush steppe is quite inhospitable and ephemeral pond patches are unproductive. Ephemeral pond patches could only be expected to exhibit short-term use during the spring when water is most reliably available. Archaeological remains surrounding the ice caves should also indicate seasonal short-term base camps, used while people came to retrieve stored meat or when hunters were in the area killing bison and caching their meat.

Based on these considerations, the model predicts that seasonally sedentary winter residential bases most likely occurred only within river resource patches.

However, riverine resource patches would also be attractive during other times of the year and expectably would exhibit shorter-term occupations as well. Ephemeral ponds (which were relatively rich, but only briefly productive as resource patches) would expectably contain only sites of short duration such as base camps or field camps. Ephemeral pond patches could be repeatedly occupied during the spring and early summer when water is most reliably available but, because of their limited overall resource base, are not expected to contain evidence of seasonal sedentism. The archaeological remains surrounding the ice caves should also indicate seasonal short-term base camps. Their season of use would likely be during the spring when people were coming to retrieve stored meat and during fall, when bison were being killed and cached. In turn, the open sagebrush steppe is not expected to contain evidence of sedentism or seasonal base camps. Because of its lack of concentrated resources, the model predicts that the steppe would contain locations that were occupied only transiently, as at kill sites, game lookouts or "over-night" stops.

Methods

To test the settlement model presented above, I analyzed archaeological data from six counties on the eastern Snake River Plain that are stored in the Bureau of Land Management's GIS database. Lincoln, Minidoka, Blaine, Power, Bingham, and Butte counties incorporate a significant portion of the eastern Snake River Plain, including the region of the cold storage caves and the Craters of the Moon Lava flow (see Figure 39).

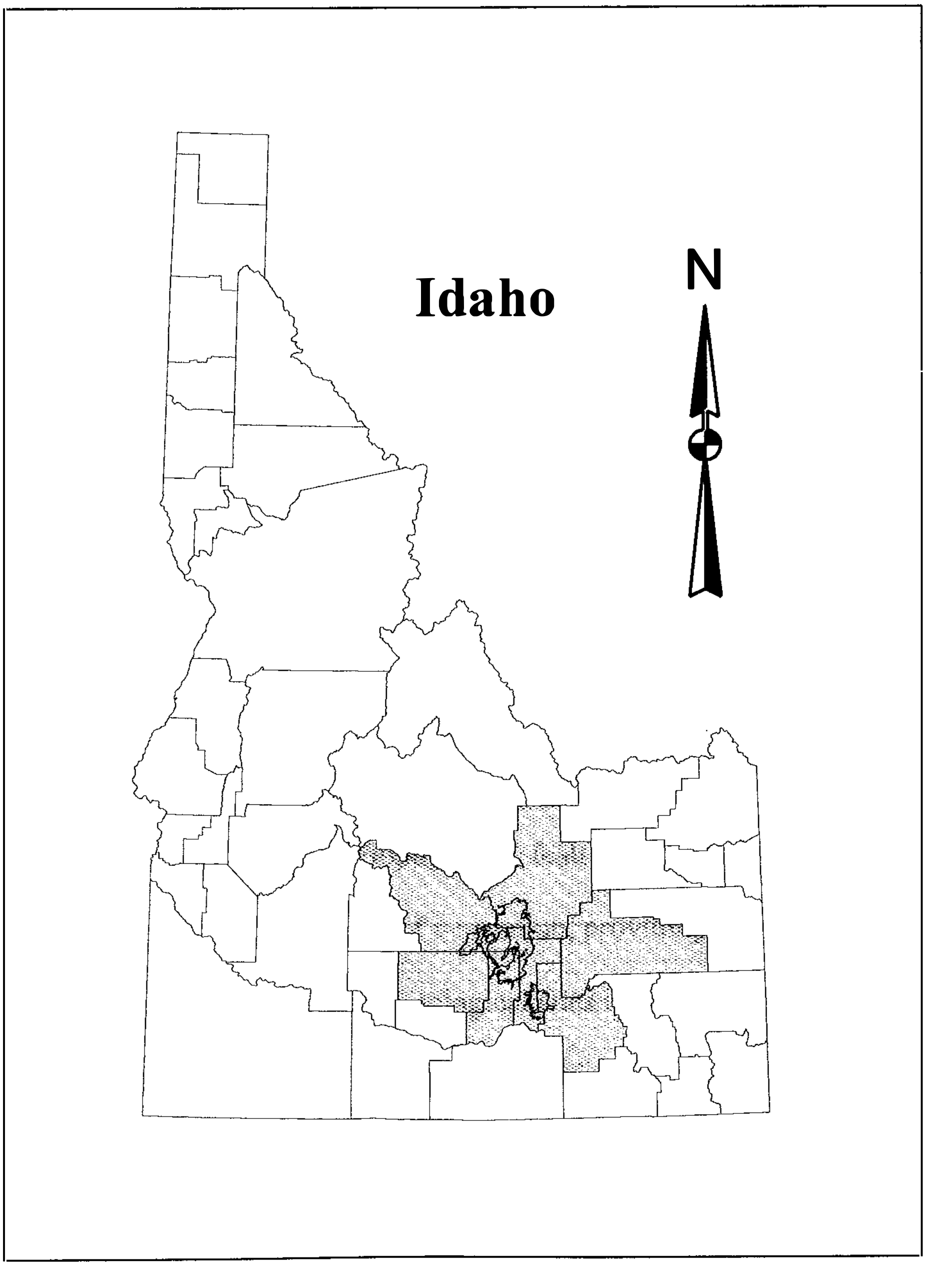


Figure 39. Location of study counties (shown in green) in southern Idaho.

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 precede 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.

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. Many surveys have exceeded 20,000 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.

In addition to sharing archaeological data, the BLM also provided hydrographic data for both perennial and ephemeral water sources in the region and the late Pleistocene and Holocene lava flows that comprise the Craters of the Moon and

Wapi lava fields. Other data such as Digital Raster Graphics (DRGs) for USGS 7.5 minute quadrangles were downloaded from Idaho GIS web sites.

The study area includes a currently known total of 1649 prehistoric sites and 1458 prehistoric isolated finds (Figure 40). The BLM has established standard policies for recording archaeological sites during fire rehabilitation surveys. "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 my study.

The site data here are provided by the Archaeological Survey of Idaho, which regularly enters all documented archaeological sites and isolated finds by county into an Access database. The information in this database was downloaded into ARC/INFO and manipulated through ARC View. It was necessary to remove all historic sites from the original shape file and separate the remaining 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. I assigned the following categories to aboriginal sites based on the physical descriptions provided in the attribute field: residential base, short-term base camp,

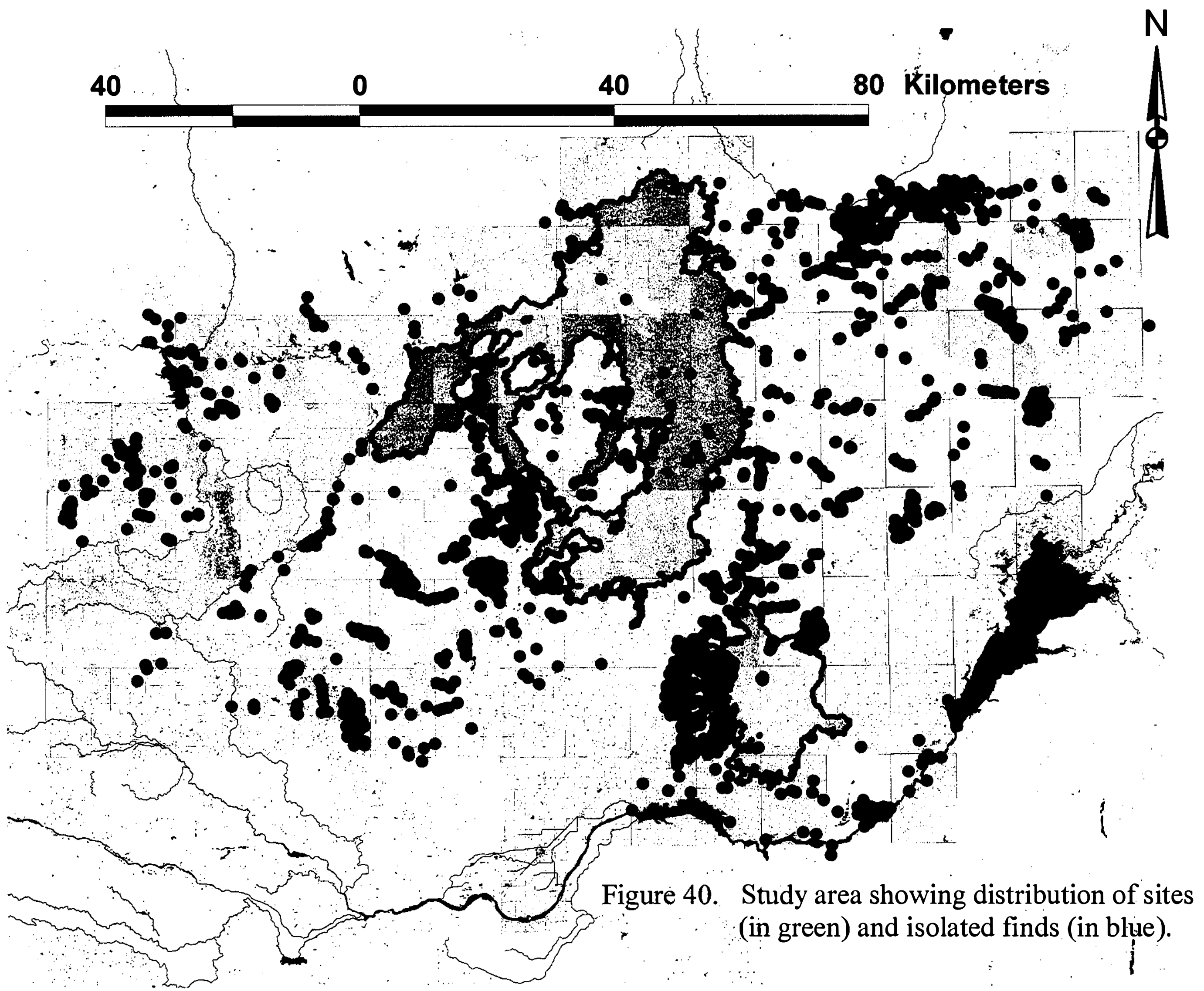


Figure 40. Study area showing distribution of sites (in green) and isolated finds (in blue).

cold storage cave/base camp, field camp, hunting blind and isolated find. The specific attributes I 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, groundstone, 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 two sites within the study area fit the criteria for a residential base. According to the predictions of my model, residential base sites occur only along linear river corridors.

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 41 sites in the study area fit this description, including the seven cold storage caves. According to the model, ephemeral ponds and cold storage caves are predicted to exhibit evidence of "short-term base camps", but these site types may also occur along river corridors.

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 1281 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 (see Figure 40).

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 36 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 1458 documented isolated finds in the study area (see Figure 40).

Each of the site types, based on the description of artifacts provided in the database's attribute field, was assigned a code in Arc View. The site types are presented in Table 38 along with the number of sites of each category recorded in the study area.

Because the attribute field for sites recorded many years ago was often left blank due to the poor quality of the original recordation, these sites were assigned the designation of "unknown" and are not included in the analysis. There were 283 such sites recorded in the database for the area.

Table 38. Codes and Numbers of Site Types recorded in the Study Area

Code	Site Type	Number in Study Area
1	Residential Base	1
2	Base Camp	41
3	Field Camp	1281
4	Isolated Find	1458
5	Unknown	283
6	Hunting Blind	36
7	Storage Cave/Base Camp	7

Projectile Point Chronology and Temporal Distribution of Sites in the Study Area

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 15% of the sites and 13% of the isolated finds. Although this is a small percentage, the number of specimens is large enough to be useful, and GIS analysis can still produce results that can be considered against the model.

The ability to assign a period of occupation to many localities within the study area 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 are presented in Figure 34.

There are 356 sites in the study area that contain diagnostic projectile points, allowing for an assignment of a period or periods of occupation. Only two sites contain Early Holocene projectile points, while 81 sites contain points from the Middle Holocene and 275 contain Late Holocene projectile points. Because Desert Side-notched and Cottonwood Triangular points and Intermountain Ware ceramics are well established as contemporaneous, they were assigned the same code. Table

39 presents the codes and periods assigned to the various projectile points or combinations of points recovered from archaeological sites within the study area.

Table 39. 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)
2	Middle Holocene	McKean Lanceolate (MK)
3	Late Holocene	Elko Corner-notched (ECN)
4	Late Holocene	Rosegate (RG)
4	Late Holocene	Avonlea (AV)
5	Late Holocene	Desert Side-notched (DSN)
5	Late Holocene	Ceramics
5	Late Holocene	Cottonwood Triang. (CT)
6	Middle Holocene	NSN, SIB
7	Middle, Late Holocene	NSN, SIB, ECN
8	Middle, Late Holocene	NSN, SIB, ECN, RG
9	Middle, Late Holocene	NSN, SIB, MK, RG, DSN
10	Middle, Late Holocene	NSN, ECN
11	Middle, Late Holocene	NSN, RG
12	Middle, Late Holocene	NSN, DSN
13	Middle, Late Holocene	SIB, MK, ECN
14	Middle, Late Holocene	SIB, MK, RG
15	Middle, Late Holocene	SIB, MK, DSN
16	Late Holocene	ECN, RG
17	Late Holocene	ECN, DSN
18	Late Holocene	RG, DSN
20	Early Holocene	Haskett
21	Late Pleistocene	Clovis
22	Late Holocene	ECN, RG, DSN
23	Middle, Late Holocene	SIB, MK, ECN, RG, DSN
24	Middle, Late Holocene	SIB, ECN, DSN
25	Middle, Late Holocene	NSN, SIB, ECN, DSN
26	Middle, Late Holocene	SIB, RG, DSN
27	Early, Late Holocene	Haskett, RG
28	Early, Late Holocene	Haskett, ECN
29	Middle, Late Holocene	NSN, ECN, DSN
30	Late Pleistocene, Late Holocene	Clovis, ECN

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). Based on the deductive model proposed in Chapter IV, however, the key variables relevant to my study are simply water and vegetation. 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 and cold storage caves. 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. Elevation and slope were not considered as significant variables because of the over-all low topographic relief on the Snake River Plain.

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 distance from water. There are two key sources of water on the Snake River Plain: the Snake, Big Wood and Little Wood linear river corridors, and ephemeral ponds. Assessing the relationship of sites to linear river corridors is straightforward, but assessing site relationships to ephemeral ponds is more complex.

There are over 1200 ephemeral ponds scattered across the eastern Snake River Plain that vary from less than 100 square meters to over 900,000 square meters in area (Figure 41). These features form when winter snow melt and spring rains collected in areas of lower topographic relief than the surrounding terrain. Some interesting observations indicate that only one or two sites are located around the perimeter of a pond, no matter how large it may be. 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 these sites in harvesting activities. The zone of ephemeral ponds provides nearby water but only for a very limited season.

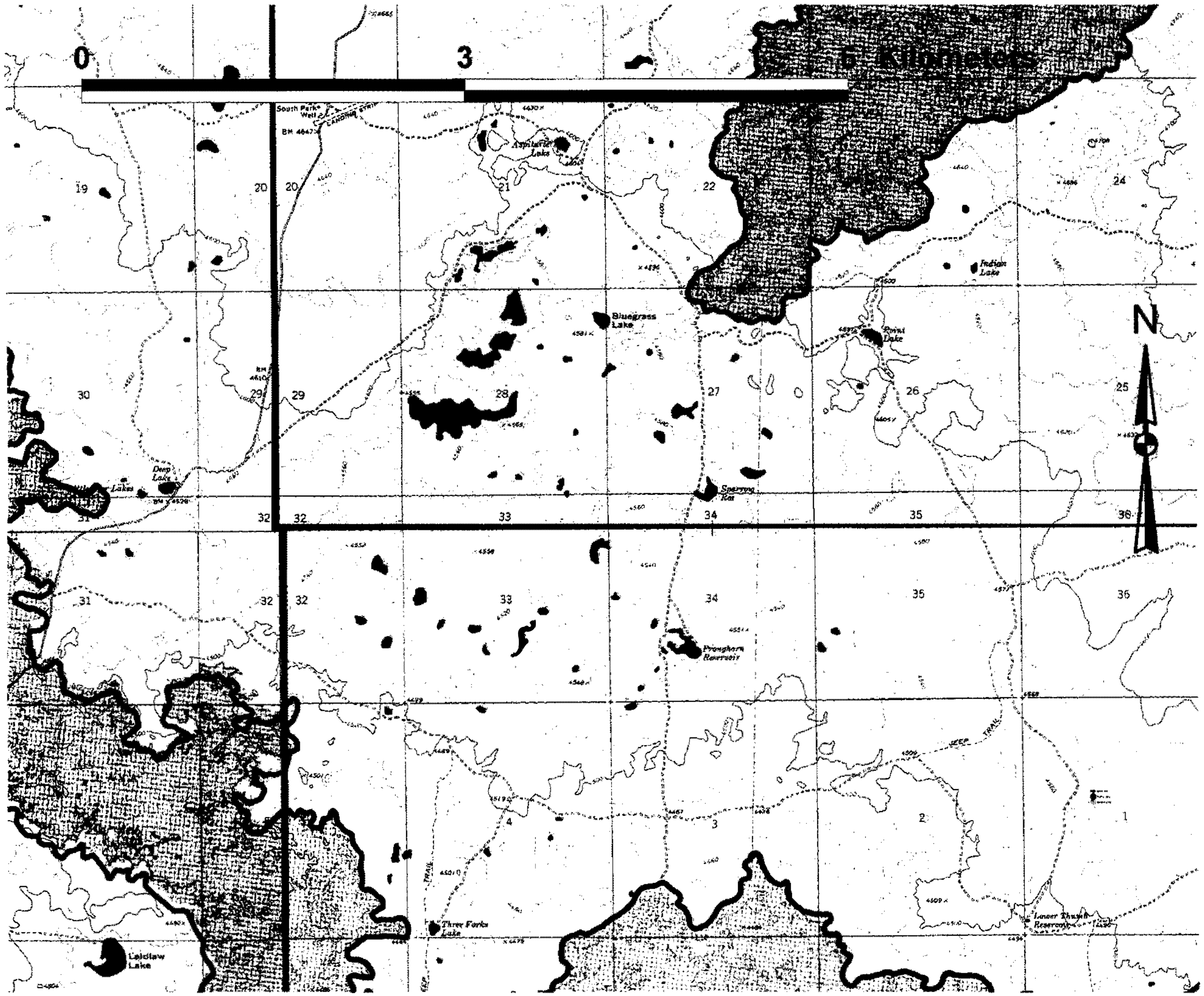


Figure 41. Close up view of ponds near Craters of the Moon showing variation in pond size.

Residential Bases in the Study Area

I predicted that residential bases will be restricted to river corridors. Unfortunately, very little archaeological inventory has occurred along the three river corridors within the study area. Most of the land adjacent to the Snake River is privately owned, except for small segments near American Falls Reservoir managed by the Bureau of Reclamation. Likewise, only small sections of the Big Wood and Little Wood rivers are publicly managed. Archaeological inventories have been conducted within roughly 20% of these sections. Wahmuza, located along the Snake River in the Fort Hall Bottoms, is the only residential base documented along a river corridor in the study area. There are 11 other sites located on the Snake and Big Lost rivers that have been included in the base camp category, but their survey descriptions afford some clues that they may actually be the remains of residential bases. These sites contain elements that are not present at other base camps in the study area, including higher densities of artifacts, formal hearths and charcoal stained soil. This is a problem that needs further investigation in the future through test excavations. Logically, a region the size of the study area would be expected to include more than one residential base.

Most interestingly, the only other site in the current sample that meets the criteria of a residential base occurs in an unexpected location far from a river corridor. 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, as will be discussed in the final chapter.

Base Camps in the Study Area

According to my predictions, ephemeral ponds or cold storage caves are highly expectable base camp locations. A total of 41 sites in the study area meet the criteria of a base camp (Figure 42). Because of this manageable number, the proximity of each base camp to pond, cold storage caves, river corridors and other topographic features could easily be examined. Table 40 presents the results of this examination.

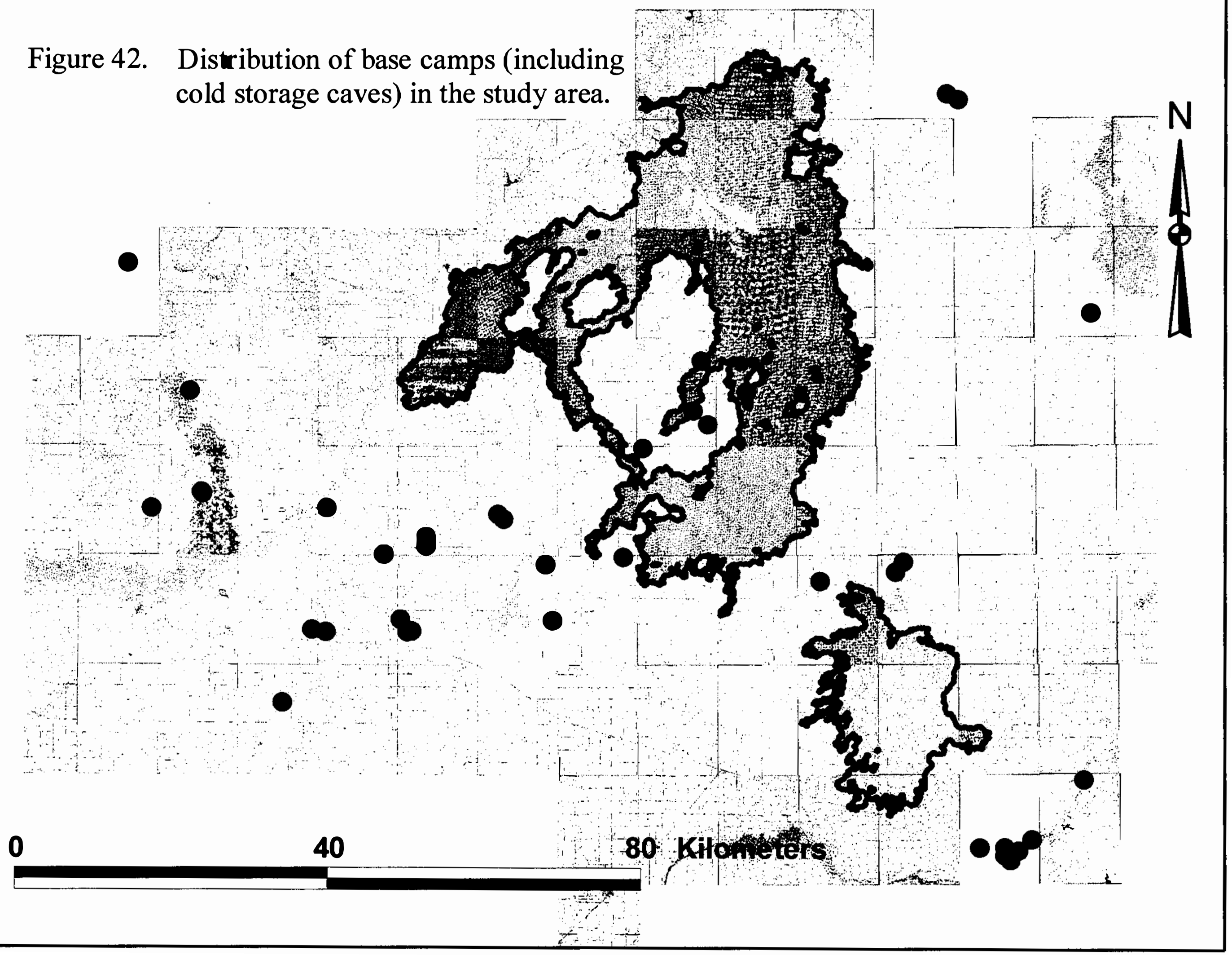


Figure 42. Distribution of base camps (including cold storage caves) in the study area.

Table 40. Location of Base Camps within the Study Area

Site	Name/Type	Location	Proj. Points	Period
10BM56	Bobcat Cave	Cave	MK, ECN, RG, DSN	Mid-Late Holocene
10BN356	Open Base Camp	Camas Creek	Unk	
10BN389	Open Base Camp	Lava Edge	SIB, RG, DSN	Mid-Late Holocene
10BN967	Open Base Camp	Pond	Unk	
10BN1097	Open Base Camp	Pond	DSN	Late Holocene
10BT2013	Open Base Camp	Big Lost River	Unk	
10BT2038	Open Base Camp	Big Lost River	Unk	
10LN67	Open Base Camp	Big Wood River	Unk	
10LN74	Tomcat Cave	Cave	MK, RG, DSN	Mid-Late Holocene
10LN94	Open Base Camp	Little Wood River	ECN	Late Holocene
10LN96	Open Base Camp	Big Wood River	Unk	
10LN111	Open Base Camp	Big Wood River	Unk	
10LN142	Open Base Camp	Pond	DSN	Late Holocene
10LN267	Fortress Cave	Cave	NSN,SIB,ECN,RG,DSN	Mid-Late Holocene
10LN280	Open Base Camp	Big Wood River	Unk	
10LN302	Open Base Camp	Little Wood River	Unk	
10LN380	Open Base Camp	Depression	Unk	
10LN399	Open Base Camp	Pond	SIB, MK, ECN	Mid-Late Holocene
10LN421	Open Base Camp	Pond	Unk	
10LN424	Open Base Camp	Pond	RG	Late Holocene
10LN490	Open Base Camp	Pond	Unk	
10LN623	Open Base Camp	Pond	Unk	
10LN631	Open Base Camp	Pond	Unk	
10LN636	Bison Heights	Crater	DSN	Late Holocene
10MA101	Open Base Camp	Pond	Unk	
10MA114	Open Base Camp	Pond	SIB, ECN, DSN	Mid-Late Holocene
10MA143	Scaredy Cat Cave	Cave	NSN, SIB,ECN,RG,DSN	Mid-Late Holocene
10MA163	Open Base Camp	Lava Edge	DSN	Late Holocene
10MA168	Open Base Camp	Lava Edge	ECN,RG,DSN	Mid-Late Holocene
10PR188	Wolf Fang Cave	Cave	Unk	
10PR265	Open Base Camp	Snake River	Unk	
10PR319	Bear Paw Cave	Cave	Unk	
10PR332	Open Base Camp	Snake River	ECN,DSN	Late Holocene
10PR408	Open Base Camp	Snake River	DSN	Late Holocene
10PR465	Open Base Camp	Snake River	Unk	
10PR469	Open Base Camp	Snake River	Unk	
10PR472	Open Base Camp	Snake River	Unk	
10PR476	Open Base Camp	Snake River	Unk	
10PR489	Open Base Camp	Snake River	Unk	
10PR501	Open Base Camp	Snake River	Unk	
10PR641	Alpha Cave	Cave	RG	Late Holocene

There are base camps directly associated with all seven of the cold storage caves. Because of the availability of ice at these sites, their distance to water was recorded as 0 meters. An additional 11 base camps are also located 0 meters from ponds (in all cases, they are positioned right at the water's edge). The base camp at

Bison Heights (10LN636), described in Chapter II, is not located near an ephemeral pond but its close proximity to Tomcat Cave, and its distinctive topographic features, may have made the location suitable as a base camp.

Base Camp 10LN380 is situated on the edge of a small depression. Although the current GIS hydrographic layer does not show the location to be an ephemeral water source, the likelihood that it held water in the past is high. Finally, three camps are positioned directly adjacent to the Craters of the Moon lava field rather than near ephemeral ponds. Three of these sites are on the banks of the Big Lost River near Arco, Idaho. Six more are situated along the Big Wood and Little Wood Rivers and nine are located in sandy areas on the north side of the Snake River near American Falls, Idaho. As noted above, the sites located on the Snake and Big Lost rivers have been assigned as base camps from the information provided in the survey database, but I suspect that some of these 11 sites may be the remains of residential bases rather than temporary base camps. Although none of the suspected localities have been tested, the formal hearths, charcoal stained soil and density of cultural debris noted on the site forms are not recorded for other sites in the study area identified as base camps. These elements may be an indication that house floors are also present.

Although the distribution of base camps appears intuitively to be very non-random, this was further assessed by comparing the base camp locations with an equal number of randomly selected points. In this analysis, 41 random Universal Tranverse Mercator (UTM) points were generated using a random number table.

To ensure that the random points selected fell within the study area, the first two digits in both the northing and easting coordinates were retained. 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 random points and base camps in relation to water is presented in Figure 43. Because cold storage caves contain water in the form of ice, their distance to water was assigned as zero meters. To measure the significance of what appears to be a nonrandom distribution in the location of base camps, 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 the base camp locations and the distribution of random UTM points. The greater the difference between these proportions, the less likely that the null hypothesis is true. Table 41 compares the cumulative proportions of the base camp locations and the random sample of UTM points.

Table 41. Comparison of Base Camps and Random UTM points in the Study Area in Relation to Distance to Water

Distance to Water	Base Camp Locations (N=41)		Random Points (N=41)		Difference
	Raw	Cum. %	Raw	Cum. %	
0-250 meters	36	0.878	5	0.121	**0.757**
0-500 meters	36	0.00	11	0.268	0.268
0-750 meters	38	0.048	19	0.463	0.415
0-1000 meters	40	0.048	21	0.512	0.464
1000 + meters	41	0.024	20	0.487	0.463

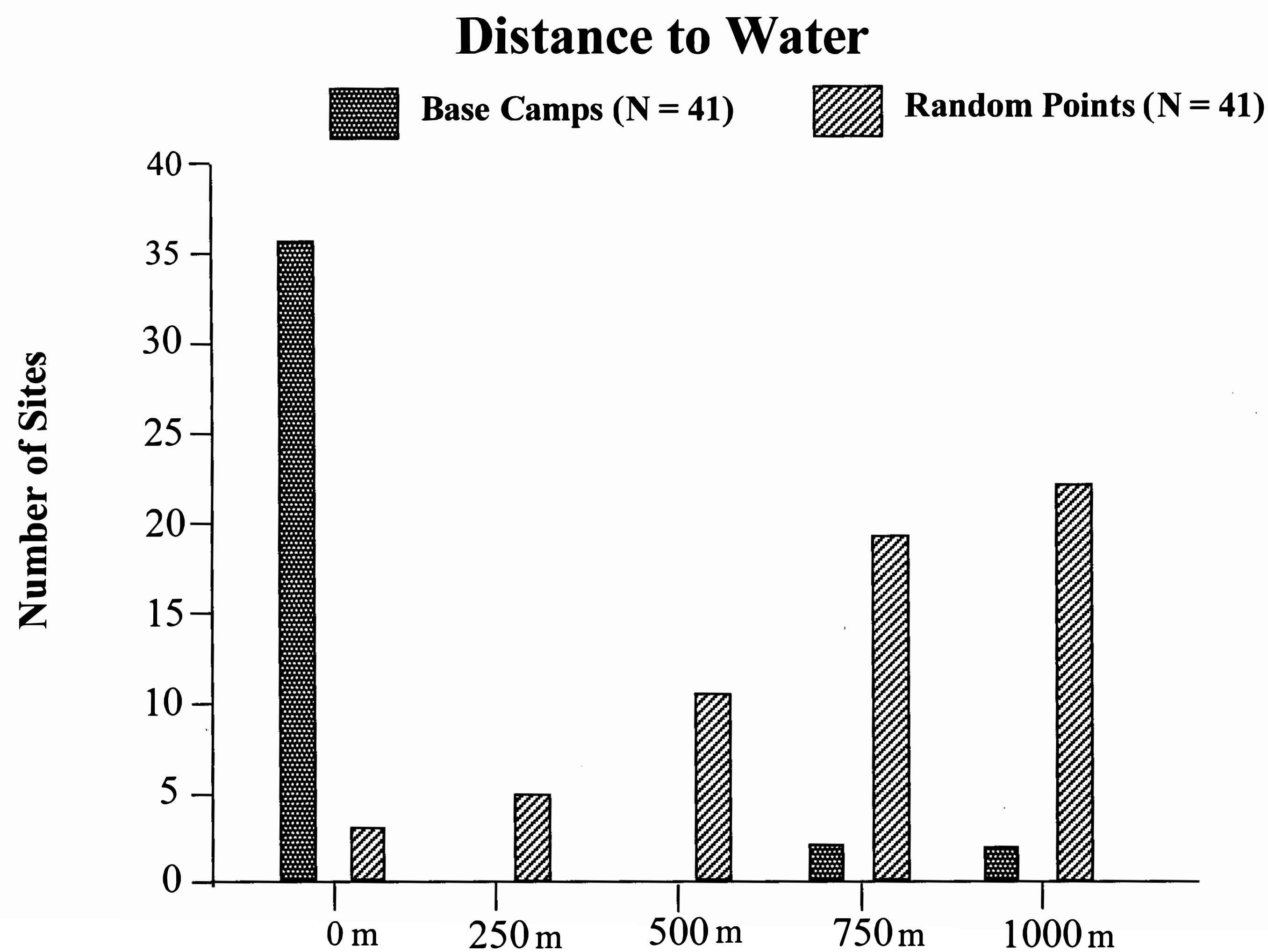


Figure 43. Cumulative graph showing the location of base camps and random UTM points in relation to permanent and perennial water sources. The base camps are non-randomly distributed, virtually all being located right at water sources.

The largest deviation between the two samples is seen in the number of base camps and random UTM points that are between 0 and 250 meters from water. This figure (0.757%), referred to as the "D Statistic" in the Kolmogorov-Smirnov test, represents the "observed" difference between the cumulative proportions of base camps and random points that are located within 250 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:

$$1.63 \quad \frac{n1 + n2}{n1n2} \quad \text{or} \quad 1.63 \quad \frac{41 + 41}{41 \times 41}$$

These calculations resulted in 0.220 as the critical value of "D". Because the observed value of "D" (0.757) is well above the critical value of "D", the null hypothesis is rejected. The difference between the locations of base camps and random points that are within 250 meters of water is statistically significant at the 99% confidence level, or in other words, the distribution of base camps is emphatically not random (see Figure 43), but strongly biased toward water. It should be noted that water sources used in this 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.

Of the 41 base camps in the study area, 17 contain diagnostic artifacts and can be assigned to specific periods (see Table 42). Projectile points found at nine base camps (including four of the cold storage caves) indicate multiple occupations that span the Middle and Late Holocene. Intermountain Ware ceramics and Desert Side-notched points were recovered from eight base camps, indicating use of these sites until very recently. Sites 10BN389, 10MA163 and 10MA168, located along the edge of the Craters of the Moon flow and Bison Heights (10LN636), near Tomcat Cave, exhibit only late Holocene occupations.

Table 42. Periods of Occupation of Base Camps within the Study Area

Site	Name/Type	Location	Period
10BM56	Bobcat Cave	Cave	Middle, Late Holocene
10BN389	Open Base Camp	Lava Edge	Middle, Late Holocene
10BN1097	Open Base Camp	Pond	Late Holocene
10LN74	Tomcat Cave	Cave	Middle, Late Holocene
10LN94	Open Base Camp	Little Wood River	Late Holocene
10LN142	Open Base Camp	Pond	Late Holocene
10LN267	Fortress Cave	Cave	Middle, Late Holocene
10LN399	Open Base Camp	Pond	Middle, Late Holocene
10LN424	Open Base Camp	Pond	Late Holocene
10LN636	Bison Heights	Crater	Late Holocene
10MA114	Open Base Camp	Pond	Middle, Late Holocene
10MA143	Scaredy Cat Cave	Cave	Middle, Late Holocene
10MA163	Open Base Camp	Lava Edge	Late Holocene
10MA168	Open Base Camp	Lava Edge	Late Holocene
10PR332	Open Base Camp	Snake River	Late Holocene
10PR408	Open Base Camp	Snake River	Late Holocene
10PR641	Alpha Cave	Cave	Late Holocene

Although recent lava flows were not included as a variable in the patch choice model presented in Chapter IV, their potential influence on site distribution will be evaluated in the following paragraphs.

Field Camps in the Study Area

Although the patch choice model presented in Chapter IV does not provide specific predictions regarding the distribution of field camps, these sites are by definition associated with hunting activities. Therefore, their location could be influenced by topography and other variables, especially if they are related to the procurement of big game. In such cases, their position on the landscape is predicted to be associated with landforms that would facilitate hunting drives or ambushes. Similarly, their location could be influenced by the presence of water. In investigating these issues, I begin by performing a similar exercise with the 1281 field camps in the study area (Figure 44) as was done with base camps to evaluate their association with water. To do this, 1281 random UTM points were generated within the study area, examined in relation to water, and compared with the actual distribution of field camps (Table 43).

Table 43. Comparison of Field Camps and Random UTM points in the Study Area in Relation to Distance to Water

Distance to Water	Field Camps (N=1281)		Random Points (N=1281)		Difference
	Raw	Cum. %	Raw	Cum. %	
0-250 meters	239	0.186	111	0.086	0.100
0-500 meters	363	0.283	209	0.163	0.120
0-750 meters	471	0.367	315	0.245	**0.122**
0-1000 meters	561	0.437	425	0.331	0.106
1000 + meters	720	0.562	856	0.668	0.106

In Table 43, the largest deviation between the two samples rests in the number of field camps and random UTM points that are within 750 meters of water. Again, this figure (0.122%) represents the "observed" difference between the cumulative

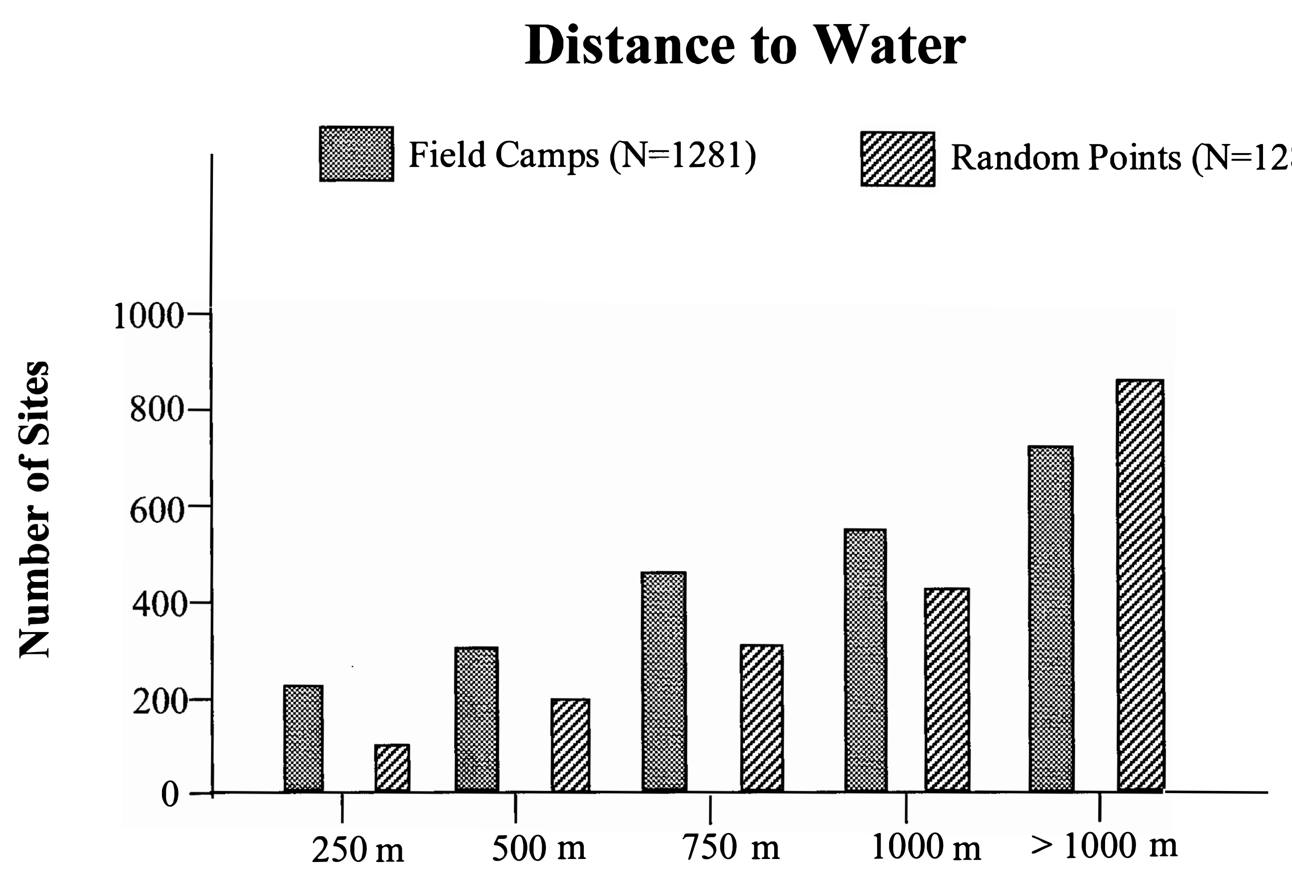


Figure 44. Cumulative graph showing the location of field camps and random points in relation to permanent and perennial water sources on the eastern Snake River Plain.

proportions of field camps and random points that are located within 750 meters of water. Testing the observed value of "D" against the critical value of "D" (at the 99% confidence interval, or $\alpha = 0.01$) is generated according to the following formula:

$$1.63 \quad \frac{n1 + n2}{n1n2} \quad \text{or} \quad 1.63 \quad \frac{1281 + 1281}{1281 \times 1281}$$

These calculations resulted in .00156 as the critical value of "D". Because the observed value of "D" (0.122) is well above the critical value of "D", the null hypothesis is rejected. In other words, the difference between the number of field camps and random points within 750 meters of water is statistically significant at the 99% confidence level. This suggests that, although field camps are not always located in the immediate vicinity of ephemeral ponds or river corridors, distance to water does seem to strongly influence their location (Figure 44). The causal factor might be a reduction in hunting success as distance from water increases or perhaps limitations associated with transporting water to field camps.

There are 3 base camps (including Scaredy Cat Cave, Fortress Cave, and Bison Heights) and 33 field camps scattered throughout the study area that contain rock features interpreted as hunting blinds. If success in obtaining bison and other large game animals required narrow draws or "funneling" features on the landscape, I predicted that hunting blinds would 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 land forms 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).

Analysis of the Temporal Distribution of Archaeological Sites in the Study Area

If resource patches on the eastern Snake River Plain have not been dramatically affected by changes in climatic conditions over the last 8000 years, and if the distribution of sites is largely controlled by environmental variables, the comparative distributions of Middle Holocene and Late Holocene sites should exhibit little variation as well. In other words, the predicted locations of residential bases, base camps and field camps would remain constant during much of the Holocene.

In order to test this hypothesis, the sites assigned to each period were examined in relation to their distance to water in a similar fashion to exercises presented above (Table 44). As previously stated, there are 356 sites in the study area that contain diagnostic projectile points. While the Early Holocene is represented by only two sites, there are 81 sites containing Middle Holocene projectile points and 275 sites containing Late Holocene projectile points. Because there are more Late Holocene sites than Middle Holocene sites, the raw numbers were converted to proportions to compare the distribution of sites in Figure 45.

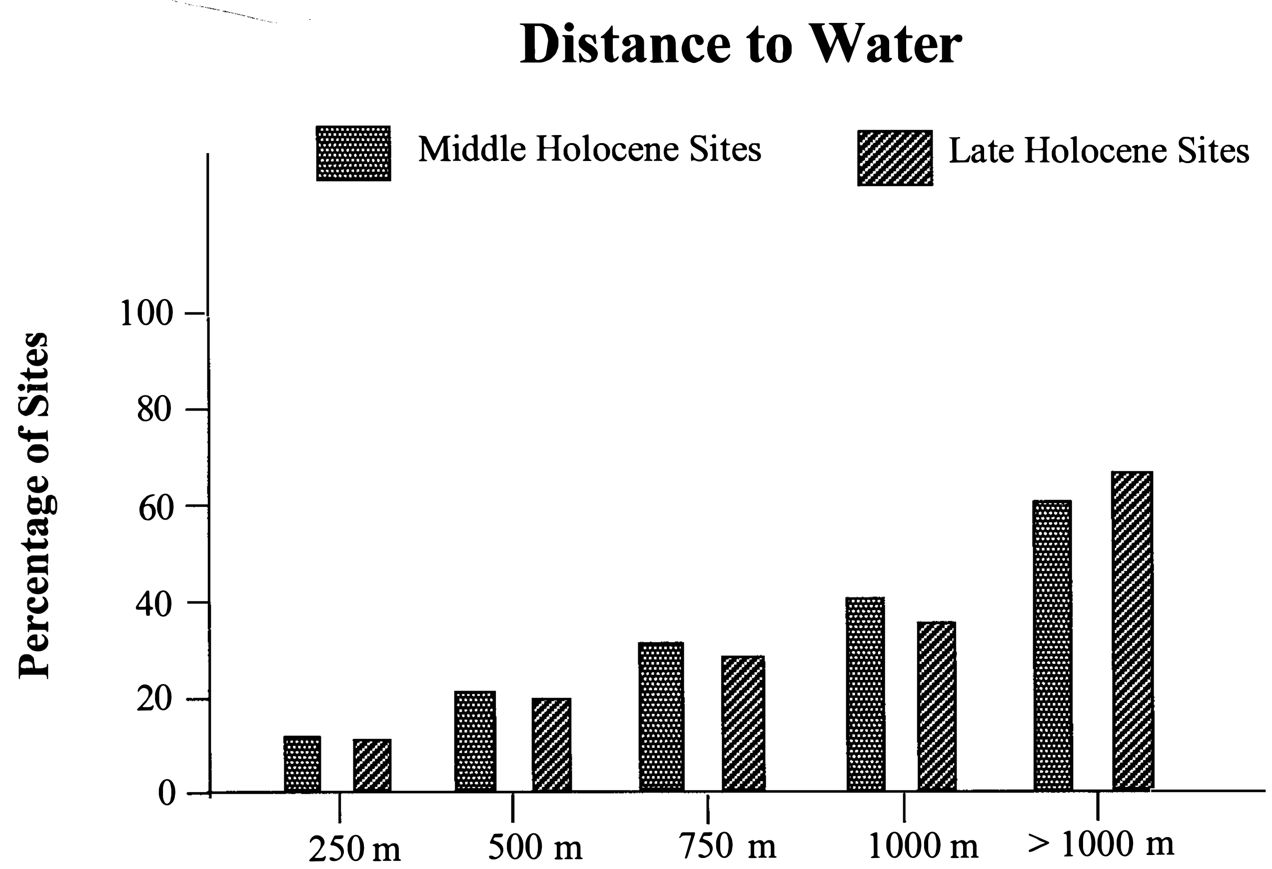


Figure 45. Cumulative graph showing the location of Middle Holocene and Late Holocene sites in relation to permanent and perennial water sources on the eastern Snake River Plain.The graph shows that the relationship between water sources and site locations remained remarkably stable between Middle and Late Holocene times.

Table 44. Cumulative Distribution of Middle and Late Holocene Sites in Relation to Water

Middle Holocene		Late Holocene	
No. of Sites	Distance to Water	No. of Sites	Distance to Water
10 (12%)	< 250 m	28 (10%)	< 250 m
18 (22%)	< 500 m	56 (20%)	< 500 m
27 (33%)	< 750 m	75 (27%)	< 750 m
33 (40%)	< 1000 m	98 (36%)	< 1000 m
48 (59%)	> 1000 m	177 (64%)	> 1000 m

The proportions of Middle Holocene and Late Holocene sites in relation to water are nearly identical. This indicates that spring-time ponds and caves, as well as river corridors, provided reasonably reliable resource patches throughout the Middle and Late Holocene. The results of this examination suggest that subsistence patterns, as related to the overall availability of water on the eastern Snake River Plain, have not changed significantly over the last 8000 years. Furthermore, as pointed out earlier, the same findings indicate that the distribution of water sources relied on by the human population over this time does not vary significantly from the distribution of modern water sources.

Lava Flows

As discussed in Chapter V, the Minidoka flow may have curtailed cold storage activities at Scaredy Cat Cave. This information, combined with the presence of a Late Prehistoric residential base and base camps at the Craters of the Moon lava edge, shows that Holocene lava flows need to be considered in any complete investigation of aboriginal settlement and subsistence patterns on the eastern Snake

River Plain. However, because so little of the lava flow margin has been inventoried at this point, it is not currently possible to conduct a meaningful quantitative evaluation of the potential influence that recent lava flows may have had on aboriginal settlement patterns.

Discussion and Conclusion

The goal of this chapter was to test the predictions of the patch choice model proposed in Chapter IV against archaeological data from the eastern Snake River Plain. The model predicted that residential bases likely occurred only within river resource patches while ephemeral ponds and ice caves would contain sites indicative of seasonal base camps. Open sagebrush steppe is expected to attract only field camps.

Besides Wahmuza in the Fort Hall Bottoms, only one other residential base has been confidently identified in the study area. The location of the Lost Lava Rings Site was not predicted by the model, suggesting not only that lava flows need to be considered in studying prehistoric residence patterns, but that factors other than purely economic decisions may also influence site distribution on the eastern Snake River Plain or anywhere, indeed. The Lost Lava Rings Site, situated in a naturally fortified position within the very rugged and rather inhospitable Craters of the Moon flow, may plausibly be understood as a strategic defense location occupied during the Late Prehistoric period of Euroamerican incursion and major intercommunity stress.

It is also suspected that some sites currently identified as base camps on the Snake and Big Lost rivers may be the remains of residential bases. While these sites will have to be investigated further in order to make or rule out this determination, their presence along river corridors is in either case concordant with the model's predictions.

The analysis of base camp distribution also provides strong support for the model's predictions. Of the 41 base camps within the study area, 37 are directly associated with either ephemeral ponds, ice caves or linear river corridors. Of the four remaining base camps, one is situated at the edge of a depression that may have held water in the past and three are located against the edge of the Craters of the Moon flow, again indicating an attraction for lava edges not considered by the model.

In fact, a preference for locating base camps and field camps near lava edges has been noted in prior research on the Idaho National Engineering and Environmental Laboratory, located northeast of the study area. Ringe (1992) found higher frequencies of sites near the edge of the Cerro Grande flow (see Figure 36) than elsewhere, and argued that the prominent ridgelines that characterize these edges could have formed their own microenvironments by catching drifting snow during the winter. Melting snow would then provide greater moisture for plant growth in the spring and attract animals (and hence people) to these "resource patches". A similar situation may have occurred within the study area, with aboriginal peoples making use of Holocene lava flow "resource patches". This scenario may provide an explanation for the presence of seasonal base camps along recent lava margins.

Of the 41 base camps, 17 produced temporally diagnostic projectile points. Of these 17, eight sites indicate both Middle and Late Holocene occupations and nine indicate Late Holocene occupations only. Projectile points spanning the Middle and Late Holocene periods were recovered from four of the cold storage caves and it is suspected that a more thorough investigation of the exterior ground surface surrounding Wolf Fang and Bear Paw caves will indicate lengthy occupations there as well.

In examining the distribution of all sites containing diagnostic artifacts in the study area, it appears that no significant differences exist between the location of sites during the Middle and Late Holocene periods. This outcome indicates that past climatic events though quite marked in terms of environmental indicators, did not affect the relative distribution of riverine, ephemeral pond and cave resource patches over the last 8000 years in a way sufficient to have altered overall human resource use patterns in the area. These results also suggest that subsistence patterns involving the use of cold storage caves, ephemeral ponds and linear river corridors on the eastern Snake River Plain have not changed significantly over same period.

CHAPTER VII

SUMMARY AND CONCLUSIONS

My investigations at several cold lava tube caves on the Snake River Plain of southern Idaho have generated productive inquiries related to storage practices among hunter-gatherers and the role of stored bison meat in aboriginal subsistence on the eastern Snake River Plain. The unique archaeological assemblages from these caves consist of dozens of elk antler "ice picks", ground stone "hammers", bison bone and arranged masses of sagebrush stalks as evidence that bison meat had been repeatedly cached and removed there over thousands of years.

The consistent use of these bison freezers over the last 8000 years suggests that they were an integral part of the prehistoric native peoples' seasonal round. However, the availability of year-around meat lockers did not "trigger" a notable degree of sedentism in the native lifeway. Although an extensive literature suggests that storage features at archaeological sites are usually associated with some form of sedentism, the archaeological sites at and around the cold storage caves of the Snake River Plain are clearly the remains of temporary base camps rather than residential bases. The application of models from behavioral ecology provide a powerful explanation for why this is the case.

A patch choice model was applied to the environment of the eastern Snake River Plain, with its biotically rich rivers and ephemeral ponds surrounded by much less productive sagebrush steppe. If the caves are viewed as isolated resource patches on the eastern Snake River Plain, their productivity must be evaluated against the productivity of other patches such as ephemeral ponds and linear river corridors on a season to season and year to year basis. Although cold storage caves would have a lesser marginal value decline than ephemeral pond patches in their immediate area, once stored bison meat was exhausted the return rates of cave patches would drop below that of the surrounding environment. From this perspective, it can be seen that the ability to store bison meat in caves, even indefinitely, would not necessarily be expected to make foragers decide to take up long term residence at or near the storage sites.

Bison represent the only identifiable faunal remains recovered from the cold storage caves; a number of other archaeological sites from the eastern Snake River Plain, including Wilson Butte Cave, Owl Cave, the Birch Creek Rockshelters, Baker Cave and the Rock Springs Site, also attest to the successful acquisition of bison by native hunters throughout prehistory. This evidence refutes Steward's (1938) contention that bison were not an important food resource for the ethnographically known Shoshone-Bannock of southern Idaho until they acquired the horse and could travel across the continental divide to access the large herds of plains bison present in Wyoming and Montana. However, the presence of bison in archaeological sites on the eastern Snake River Plain is not sufficient to assess their relative importance in the prehistoric diet.

To generate key data, ethnographic information was gathered to define the character and breadth of the 19th Century Shoshone-Bannock diet, which included a wide variety of plants and animals in additional to the bison. Also, information from trappers' journals of the early 1800s was used in an effort to calculate the net return rate for bison hunting. These results indicate that bison meat provides higher net returns than does hunting for deer or antelope generated by Simms (1987). However, calculations using Holling's disc equation show that even with bison included in the diet, the over-all diet breadth for the eastern Snake River Plain is predicted to have been broad and would likely have included a variety of large and small game animals as well as plant foods. Although bison were probably always taken by hunting parties when encountered, a wide range of other foods would also have been included in the optimal diet, indicating the necessity for regular movement between resource patches as their returns decelerated.

Aspects of bison behavior and hunting techniques specific to the eastern Snake River Plain, as well as the huge bulk of even a single kill, may be relevant to understanding why bison seem to have been exclusively selected for cold storage. Subsurface investigations at narrow topographic features and hunting blinds near Scaredy Cat, Tomcat and Wilson Butte caves consistently produced small fragments of bone and artiodactyl tooth enamel. As noted in Chapter V, the acquisition of bison in large numbers, as was done on the Great Plains, is not attested anywhere in Idaho, but bison were consistently taken in small numbers. This pattern is congruent with the account of a pedestrian bison hunt given by a Shoshone-Bannock man to Dr. Sven Liljeblad. The man recalled a bison hunt consisting of 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 (Butler 1971:10).

While fur trappers reported seeing large numbers of animals in parts of southern Idaho during the early 1800s, the number of bison that could be supported by the bunch grasses of the sagebrush steppe environment of the Snake River Plain would have been dramatically lower than the bison populations that thrived on the short-grass prairies of the Great Plains (Mack and Thompson 1982, Daubenmire 1985). Apropos of the limited bison bone evidence recovered from hunting locations near Scaredy Cat, Tomcat and Wilson Butte caves, ethnoarchaeological research among the Hadza and Dassanetch indicates that the quantity of bone waste surviving from kills of limited numbers of animals is not great.

In sum, although the relatively small bison populations of the eastern Snake River Plain did not allow for mass kills, bison were nonetheless consistently hunted. As demonstrated in Chapter IV, the high net return rate for bison would have strongly encouraged hunters to pursue this animal upon any encounter. The fact that a single bison could provide an average of 354 kilograms of usable flesh likely explains why they were exclusively selected for cold storage. While an antelope or deer could be consumed quickly, one or two bison could provide a major surplus of meat that could be stored for the most difficult times of the year. During the long and harsh winters of the eastern Snake River Plain, it seems likely that cached frozen meat could often have been critical to survival, especially as other stores dwindled. Depending on the location of a particular cold storage cave in relation to potential residential bases on the Big Wood, Little Wood or Snake rivers, access to stored meat may have required as little as a two day round trip.

The large quantity of previously generated archaeological survey data housed in the Idaho Bureau of Land Management's Geographic Information Systems database provided an excellent tool to test the viability of the patch choice model proposed here. The model predicted that residential bases likely occurred only within river resource patches while ephemeral ponds and ice caves would contain sites indicative of seasonal base camps. These specific predictions were then examined in relation to the distribution of a large sample of archaeological sites and isolated finds on the eastern Snake River Plain. The analysis of base camp distribution showed that base camps are directly associated with both ephemeral and perennial water sources, providing strong support for the model's predictions. However, the location of the Lost Lava Rings residential base on the Craters of the Moon lava flow does not fit in the model's predictions at all. The selection of such an inhospitable setting for this residential site suggests it may have been founded there not for economic reasons, but out of need for protection or defense from other groups during the tumultuous early ethnographic period, a possibility that must be evaluated in future investigations of regional prehistory.

It should also be stressed here that the simple economic models applied in this research are not designed to explain all of human behavior. If a phenomenon is not predicted by such models, it is a good indication that factors other than economic optimality are at play (Sugiyama 1996). The Lost Lava Rings Site and no doubt other, as yet unrecorded sites on the eastern Snake River Plain indicate that socio-cultural factors can also influence settlement patterns.

The temporal distribution of sites and isolated artifact finds within the study area shows that climatic and vegetational change over the last 8000 years, while unquestionably of some magnitude, 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. It is clear that ephemeral pond and ice cave patches have been used repeatedly throughout the Middle and Late Holocene, giving evidence of long term reliance on the same resource localities over millennia.

This study has helped to elucidate the role of bison and cold storage in aboriginal subsistence strategies on the eastern Snake River Plain. In opposition to Steward's (1938) contentions, it has also demonstrated striking similarities between the prehistoric seasonal round over thousands of years and the seasonal movements of the Shoshone-Bannock during the 19th century, who wintered in the Fort Hall Bottoms along the Snake River and dispersed every spring in many directions to take advantage of resource patches all across southern Idaho. As is apparent in the archaeological record of the eastern Snake River Plain, bison have been successfully hunted, "put on ice" and consumed at need in the region for at least 8000 to 9000 years.

I also suspect that cold storage caves have gone undetected in other parts of the northwest. Cold lava tube caves such as Charcoal Cave, Pictograph Cave and Lava River Cave in central Oregon reportedly contained deposits suspiciously similar to those of the storage caves on the eastern Snake River Plain (Cressman 1938, Claeyssens, personal communication 1999). While the cultural deposits in many of these Oregon caves apparently have been destroyed by ice mining and vandalism during the last 100 years, other caves may yet be discovered. I'm also certain, given the character of the regional geology, that additional cold storage caves exist on the eastern Snake River Plain and that these will likely provide additional evidence regarding the nature and temporal extent of an ingenious and enduring adaptation.

In conclusion, the storage of frozen bison meat in cold lava tube caves has little resemblance to the types of storage that occurred in other parts of the Intermontane West. Instead, this distinctive technology shares more similarities with the hunting economies of the Subarctic and Northern Plains. Cold lava tubes appear to have allowed a much more extended "shelf-life" for meat caches than the winter snow banks that were relied further north and on the Great Plains, but essentially functioned in the same way. If viewed in this light, the cold storage caves of southern Idaho were most certainly critical to the seasonal round and helpful to people during the leanest part of the year, but their isolated, stationary position in a sparse and only seasonally productive environment like the sagebrush steppe (even with its ephemeral ponds) would not have encouraged people to settle down. Although the variables that influence hunter-gatherer mobility have been extensively debated, the specific mechanism(s) that "trigger" sedentism have yet to be isolated (Ames 1994, Kelly 1995, Rafferty 1985). In fact, the tremendous variation observable in human mobility patterns suggests that the topic may be much more complex than previously supposed. Meanwhile, this investigation of cold storage caves and their influence on human mobility patterns in southern Idaho contributes toward a more comprehensive understanding of hunter-gather mobility and the diverse factors that have made it such a persistently viable option throughout human history.

APPENDIX A

OGDEN, RUSSELL AND TOWNSEND'S DAILY JOURNAL ENTRIES REGARDING HUNTING ACTIVITIES

Osbourne Russell's Journal Accounts

Date	Season	group	# party	activity	animals	purs	where	# hunters	# killed	how	parts	age/sex	distance
12-Aug	summer	58	4	hunting	bison	y	Portneuf	4	0				
13-Aug	summer	58	4	hunting	bison	y	Portneuf	4	3	ND	ND	1 c, 2 b	ND
20-Aug	summer	58		ND	grizzly	y	Portneuf	nd	1	ambush	mt & skn	m	100 yds
26-Sep	fall	58	4	hunting	nd	nd	Portneuf	4	0				
2-Mar	spring	58	15	trapping	none		Portneuf		0				
1-Apr	spring	58	15	trapping	none		Portneuf		0				
11-Apr	spring	58	15	trapping	grizzly	y	Cache V	nd	2	nd	nd	nd	nd
1-Apr	spring	58	15	trapping	grizzly	y	Thomas F	nd	1	ambush	mt & skn	m	200 yds
9-May	spring	58	15	trapping	bison	n	Soda spr.		0				
17-May	spring	58	15	trapping	bison	y	Blackfoot	nd	"success"	nd	nd	nd	nd
18-May	spring	58	15	trapping	bison	y	Blackfoot	nd	"great no."	nd	nd	bulls only	nd
16-Jun	spring	58	24	trapping	none		Blackfoot		0				
17-Jun	spring	58	24	trapping	bison	y	Blackfoot	nd	2	nd	"best mt"	bulls only	nd
18-Jun	spring	58	24	trapping	none		Grays Ck		0				
26-Sep	fall	58	24	trapping	bison	y	Island Pk	nd	"large no."	nd	nd	nd	nd
30-Sep	fall	58	1	travelling	bison	n	Camas Ck		0				
Sep-31	fall	58	1	travelling	none		Buttes		0				
2-Oct	fall	58	1	travelling	bison	n	Mud Lake		0				
3-Oct	fall	58	1	travelling	bison	n	Mud Lake		0				
4-Oct	fall	58	1	travelling	bison	n	Mud Lake		0				
5-Oct	fall		Bannocl	hunting	bison	y	Lost River	nd	1000	ifle, hors	nd	cows only	nd
13-Oct	fall	58	1	travelling	bison	n	Snake Rv		0				

John K. Townsend's Journal

12-Aug	summer	35	35	traveling	none		Lost River				
13-Aug	summer	35	35	traveling	bison	yes	Lost River	2	1	nd	nd
13-Aug	summer	35	35	traveling	deer	no	Lost River				
14-Aug	summer	35	35	traveling	none		Big Wood				
15-Aug	summer	35	35	traveling	none		Big Wood				
16-Aug	summer	35	35	traveling	none		Big Wood				
17-Aug	summer	35	35	traveling	camas	yes	Camas Pr				
18-Aug	summer	35	35	traveling	none		Camas Pr				
19-Aug	summer	35	35	traveling	none		Boise Rv				

John K. Townsend's Journal

date	Season	# group	# party	activity	animal	purs	where	# hunters	# killed	how	parts
6-Jul	summer	58	58	traveling	berries	yes	Bear River				
7-Jul	summer	58	58	traveling	none		Bear River				
8-Jul	summer	58	58	traveling	none		Bear River				
9-Jul	summer	58	nd	hunting	bison	yes	Bear River	3	2	rifle, horset,	marrow b
10-Jul	summer	58	58	traveling	grizzly	yes	Blackfoot	nd	1	rifle, horse	nd
11-Jul	summer	58	58	traveling	none		Blackfoot				
12-Jul	summer	58	58	traveling	trout	yes	Blackfoot	nd	'abundance	cord, hook	all
13-Jul	summer	58	58	camping	trout	yes	Blackfoot	nd	nd	nd	nd
14-Jul	summer	58	3	hunting	bison	yes	Ft Hl Bot	3	1	nd	nd
15-Jul	summer	58	58	camping	none		Ft Hl Bot				
16-Jul	summer	58	12	hunting	bison	yes	Portneuf	nd	1	nd	"meat"
17-Jul	summer	58	12	hunting	bison	yes	Portneuf	6	4	nd	"best parts'
18-Jul	summer	58	12	hunting	none		Portneuf				
19-Jul	summer	58	12	hunting	none		Portneuf				
20-Jul	summer	58	12	hunting	bison	yes	Portneuf	3	2	nd	"meat"
21-Jul	summer	58	12	hunting	bison	yes	Portneuf	1	1	·ifle,ambusl	nd
22-Jul	summer	58	12	hunting	nd	nd	Portneuf	nd	nd	nd	nd
23-Jul	summer	58	1	hunting	grizzly	yes	Portneuf	1	0	nd	nd
24-Jul	summer	58	12	hunting	nd	nd	Portneuf	nd	nd	nd	nd
25-Jul	summer	58	12	traveling	none		Portneuf				
26-Jul	summer	58	12	traveling	none		Ft Hl Bot				
27-Jul	summer	58	58	camping	none		Ft Hl Bot				
28-Jul	summer	58	58	camping	none		Ft Hl Bot				
29-Jul	summer	58	58	camping	none		Ft Hl Bot				
30-Jul	summer	35	35	camping	none		Ft Hl Bot				
6-Aug	summer	35	35	traveling	grizzly	yes	Ft Hl Bot	nd	1	nd	nd
6-Aug	summer	35	35	traveling	grouse	yes	Ft Hl Bot	nd	2	nd	nd
7-Aug	summer	35	35	traveling	none		SRP				
8-Aug	summer	35	35	traveling	none		SRP				
9-Aug	summer	35	35	traveling	bison	yes	Lost River	2	1	rifles,horse	nd
10-Aug	summer	35	10	trapping	bison	yes	Lost River	2	1	nd	"all"
11-Aug	summer	35	1	hunting	bison	yes	Lost River	1	2	nd	"most"

Peter Skene Ogden's Journal

5-May	24	spring	nd	trapping	beaver	yes	Raft River	nd	4	trapped	nd	nd
6-May	24	spring	nd	trapping	beaver	yes	Raft River	nd	34	trapped	nd	nd
7-May	24	spring	24	trapping	beaver	yes	Raft River	nd	23	trapped	nd	illness
8-May	24	spring	24	trapping	beaver	yes	Raft River	11	27	trapped	nd	illness
9-May	24	spring	nd	trapping	beaver	yes	Raft River	nd	12	trapped	nd	illness
9-May	24	spring	nd	hunting	bison	yes	Raft River	nd	"some"	nd	nd	nd

Peter Skene Ogden's Journal

13-Apr	24	spring	24	camped	beaver	yes	Ft Hl Bot	nd	8	trapped	nd	nd
14-Apr	24	spring	24	trapping	beaver	yes	Ft Hl Bot	nd	15	trapped	nd	nd
15-Apr	24	spring	24	trapping	beaver	yes	Ft Hl Bot	nd	25	trapped	nd	nd
15-Apr	24	spring	24	trapping	otter	yes	Ft Hl Bot	nd	4	trapped	nd	nd
16-Apr	24	spring	24	trapping	otter	yes	Ft Hl Bot	nd	4	trapped	nd	nd
16-Apr	24	spring	24	trapping	beaver	yes	Ft Hl Bot	nd	3	trapped	nd	nd
17-Apr	24	spring	24	trapping	beaver	yes	Ft Hl Bot	nd	29	trapped	nd	nd
18-Apr	24	spring	24	trapping	beaver	yes	Ft Hl Bot	nd	31	trapped	nd	nd
18-Apr	24	spring	24	trapping	elk	yes	Ft Hl Bot	nd	1	nd	nd	nd
19-Apr	24	spring	24	trapping	beaver	yes	Portneuf	nd	28	trapped	nd	nd
20-Apr	24	spring	24	trapping	bison	yes	Portneuf	nd	2	nd	nd	bulls only
20-Apr	24	spring	24	trapping	beaver	yes	Portneuf	nd	17	trapped	nd	nd
21-Apr	24	spring	24	trapping	beaver	yes	Ft Hl Bot	nd	4	trapped	nd	nd
22-Apr	24	spring	24	trapping	beaver	yes	Amer Fls.	nd	2	trapped	nd	nd
23-Apr	24	spring	24	trapping	beaver	yes	Amer Fls.	nd	17	trapped	nd	nd
24-Apr	24	spring	24	trapping	bison	yes	Amer Fls.	nd	2	nd	nd	bulls only
24-Apr	24	spring	24	trapping	beaver	yes	Amer Fls.	nd	2	trapped	nd	nd
25-Apr	24	spring	24	trapping	bison	yes	Amer Fls.	nd	2	nd	nd	bulls only
25-Apr	24	spring	24	trapping	beaver	yes	Amer Fls.	nd	7	trapped	nd	nd
25-Apr	24	spring	24	trapping	crayfish	yes	Amer Fls.	nd	nd	nd	"sufficient"	nd
26-Apr	24	spring	24	trapping	bison	yes	Raft River	nd	"some"	nd	nd	nd
26-Apr	24	spring	24	trapping	beaver	yes	Raft River	nd	8	trapped	nd	nd
27-Apr	24	spring	nd	hunting	bison	yes	Raft River	nd	10	nd	nd	cows,bulls
27-Apr	24	spring	nd	trapping	beaver	yes	Raft River	nd	17	trapped	nd	nd
28-Apr	24	spring	24	trapping	bison	nd	Raft River	nd	nd	nd	nd	nd
28-Apr	24	spring	24	trapping	beaver	yes	Raft River	nd	23	trapped	nd	nd
29-Apr	24	spring	5	hunting	bison	yes	Raft River	5	12	nd	nd	nd
29-Apr	24	spring	19	trapping	beaver	yes	Raft River	19	26	trapped	nd	nd
30-Apr	24	spring	nd	trapping	beaver	yes	Raft River	nd	12	trapped	nd	nd
1-May	24	spring	nd	trapping	beaver	yes	Raft River	nd	43	trapped	nd	nd
2-May	24	spring	nd	trapping	beaver	yes	Raft River	nd	13	trapped	nd	nd
3-May	24	spring	nd	trapping	beaver	yes	Raft River	nd	23	trapped	nd	nd
4-May	24	spring	nd	trapping	beaver	yes	Raft River	nd	7	trapped	nd	nd

Peter Skene Ogden's Journal

17-Mar	23	spring	1	hunting	elk	yes	Snake Rv	1	4	rifle, horse	nd	nd
17-Mar	23	spring	nd	hunting	bison	yes	Snake Rv	nd	2	rifle, horse	nd	nd
18-Mar	23	spring	23	trapping	beaver	yes	Snake Rv	nd	2	trapped	nd	nd
19-Mar	23	spring	23	traveling	deer	yes	Raft River	nd	none			
19-Mar	23	spring	23	traveling	beaver	yes	Raft River	nd	2	trapped	nd	nd
20-Mar	23	spring	23	trapping	beaver	yes	Raft River	nd	2	trapped	nd	nd
21-Mar	23	spring	23	trapping	beaver	yes	Raft River	nd	6	trapped	nd	nd
21-Mar	23	spring	23	trapping	otter	yes	Raft River	nd	1	trapped	nd	nd
22-Mar	23	spring	23	trapping	beaver	yes	Raft River	nd	9	trapped	nd	nd
23-Mar	23	spring	23	trapping	beaver	yes	Raft River	nd	13	trapped	nd	nd
24-Mar	23	spring	23	trapping	beaver	yes	Raft River	nd	36	trapped	nd	bad taste
25-Mar	23	spring	23	trapping	beaver	yes	Raft River	nd	45	trapped	nd	illness
26-Mar	23	spring	23	trapping	beaver	yes	Snake Rv	nd	24	trapped	nd	nd
27-Mar	23	spring	23	trapping	beaver	yes	Snake Rv	nd	10	trapped	nd	nd
28-Mar	23	spring	23	traveling	none		Amer Fls.					
29-Mar	23	spring	23	camped	none		Amer Fls.					
30-Mar	23	spring	23	trapping	beaver	yes	Amer Fls.	nd	6	trapped	nd	nd
31-Mar	23	spring	23	trapping	beaver	yes	Amer Fls.	nd	27	trapped	nd	nd
1-Apr	23	spring	23	trapping	beaver	yes	Amer Fls.	nd	19	trapped	nd	nd
2-Apr	23	spring	23	trapping	beaver	yes	Ft Hl Bot	nd	27	trapped	nd	nd
3-Apr	23	spring	23	trapping	bison	yes	Ft Hl Bot	nd	none			
3-Apr	23	spring	23	trapping	beaver	yes	Ft Hl Bot	nd	29	trapped	nd	nd
4-Apr	23	spring	nd	hunting	bison	yes	Ft Hl Bot	nd	"few"	nd	nd	nd
4-Apr	23	spring	nd	trapping	beaver	yes	Ft Hl Bot	nd	40	trapped	nd	nd
5-Apr	23	spring	23	trapping	beaver	yes	Ft Hl Bot	nd	20	trapped	nd	nd
6-Apr	23	spring	nd	hunting	bison	yes	Ft Hl Bot	nd	nd	nd	nd	"meat"
7-Apr	23	spring	23	trapping	beaver	yes	Ft Hl Bot	nd	1	trapped	nd	nd
8-Apr	23	spring	23	trapping	beaver	yes	Ft Hl Bot	nd	5	trapped	nd	nd
9-Apr	23	spring	nd	hunting	bison	nd	Ft Hl Bot	nd	nd	nd	nd	nd
9-Apr	23	spring	nd	trapping	beaver	yes	Ft Hl Bot	nd	5	trapped	nd	nd
10-Apr	23	spring	nd	trapping	beaver	yes	Ft Hl Bot	nd	15	trapped	nd	nd
11-Apr	24	spring	24	trapping	beaver	yes	Ft Hl Bot	nd	14	trapped	nd	nd
12-Apr	24	spring	24	trapping	bison	yes	Ft Hl Bot	nd	15	nd	nd	nd

Peter Skene Ogden's Journal

6-Oct	23	fall	23	traveling	none		Birch Ck					
7-Oct	23	fall	23	traveling	none		Birch Ck					
8-Oct	23	fall	23	traveling	beaver	yes	Birch Ck	nd	1	trapped	nd	nd
9-Oct	23	fall	23	traveling	bison	yes	Birch Ck	nd	nd	nd	nd	nd
10-Oct	23	fall	23	traveling	none		Lost River					
11-Oct	23	fall	23	traveling	none		Lost River					
12-Oct	23	fall	23	traveling	none		Lost River					
13-Oct	23	fall	23	traveling	none		Big Wood					
14-Oct	23	fall	23	traveling	beaver	yes	Big Wood	nd	1	trapped	nd	nd
15-Oct	23	fall	23	traveling	none		Big Wood					
16-Oct	23	fall	23	traveling	none		Big Wood					
17-Oct	23	fall	23	traveling	none		Big Wood					
18-Oct	23	fall	23	traveling	none		Big Wood					
19-Oct	23	fall	23	traveling	none		Boise Rv					
1-Mar	23	spring	23	traveling	beaver	yes	Glens Fry	nd	1	trapped	nd	nd
1-Mar	23	spring	23	traveling	horse	yes	Glens Fry	nd	1			
2-Mar	23	spring	1	hunting	deer	yes	Clover Ck	1	3	rifle,horse	nd	nd
3-Mar	23	spring	1	hunting	deer	yes	Snake Rv	1	3	rifle, horse	wolves	"poor"
3-Mar	23	spring	23	trapping	beaver	yes	Snake Rv	nd	1	trapped	nd	nd
4-Mar	23	spring	23	hunting	deer	yes	Snake Rv	nd	15	rifle, horse	nd	nd
5-Mar	23	spring	23	hunting	deer	yes	Snake Rv	nd	20	rifle, horse	nd	nd
6-Mar	23	spring	23	hunting	deer	yes	Snake Rv	nd	3	rifle, horse	nd	nd
6-Mar	23	spring	23	trapping	beaver	yes	Snake Rv	nd	1	trapped	nd	nd
7-Mar	23	spring	23	trapping	beaver	yes	Snake Rv	nd	1	trapped	nd	nd
8-Mar	23	spring	23	searching	none		Snake Rv			horses		
9-Mar	23	spring	1	hunting	antelope	yes	Snake Rv	1	3	rifle, horse	nd	nd
10-Mar	23	spring	nd	hunting	elk	yes	Snake Rv	nd	1	rifle, horse	nd	nd
11-Mar	23	spring	nd	hunting	none		Snake Rv					
12-Mar	23	spring	2	hunting	antelope	yes	Snake Rv	2	3	rifle, horse	nd	nd
13-Mar	23	spring	14	hunting	elk	yes	Shos. Fls	14	13	rifle,horse	nd	nd
14-Mar	23	spring	23	traveling	none		Snake Rv					
15-Mar	23	spring	23	trapping	beaver	yes	Snake Rv	nd	2	trapped	nd	nd
16-Mar	23	spring	23	trapping	beaver	yes	Snake Rv	nd	4	trapped	nd	nd

Peter Skene Ogden's Journal

6-Jun	23	spring	23	traveling	none		SRP					
7-Jun	23	spring	23	traveling	none		SRP					
8-Jun	23	spring	23	traveling	none		SRP					
9-Jun	23	spring	23	traveling	beaver	yes	Snake Rv	nd	3	trapped	nd	nd
10-Jun	23	spring	23	traveling	beaver	yes	Snake Rv	nd	8	trapped	nd	nd
11-Jun	23	spring	23	traveling	beaver	yes	Snake Rv	nd	8	trapped	nd	nd
12-Jun	23	spring	23	traveling	beaver	yes	Snake Rv	nd	15	trapped	nd	nd
13-Jun	23	spring	23	trapping	beaver	yes	Snake Rv	nd	20	trapped	nd	nd
14-Jun	23	spring	23	traveling	beaver	yes	Henrys Fk	nd	28	trapped	nd	nd
15-Jun	23	spring	23	traveling	beaver	yes	Henrys Fk	nd	27	trapped	nd	nd
16-Jun	23	spring	23	traveling	bison	yes	Henrys Fk	nd	"some"	nd	nd	bulls only
16-Jun	23	spring	23	traveling	beaver	yes	Henrys Fk	nd	10	trapped	nd	nd
17-Jun	23	spring	23	traveling	beaver	yes	Henrys Fk	nd	12	trapped	nd	nd
18-Jun	23	spring	23	traveling	bison	yes	Henrys Fk	nd	"many"	nd	nd	nd
19-Jun	23	spring	23	trapping	beaver	yes	Henrys Fk	nd	14	trapped	nd	nd
20-Jun	23	spring	23	trapping	beaver	yes	Henrys Fk	nd	58	trapped	nd	nd
21-Jun	23	spring	23	trapping	beaver	yes	Henrys Fk	nd	27	trapped	nd	nd
22-Jun	23	summer	23	trapping	beaver	yes	Camas Ck	nd	28	trapped	nd	nd
23-Jun	23	summer	23	trapping	beaver	yes	Camas Ck	nd	3	trapped	nd	nd
24-Jun	23	summer	23	trapping	beaver	yes	Camas Ck	nd	31	trapped	nd	nd
25-Jun	23	summer	23	trapping	beaver	yes	Camas Ck	nd	16	trapped	nd	nd
26-Jun	23	summer	23	trapping	beaver	yes	Camas Ck	nd	15	trapped	nd	nd
27-Jun	23	summer	23	traveling	none		Camas Pr	nd				
28-Jun	23	summer	23	traveling	none		Camas Pr					
29-Jun	23	summer	23	traveling	none		Camas Pr					
30-Jun	23	summer	23	traveling	none		Camas Pr					
Jul-02	23	summer	23	traveling	none		Beaver Ck					
30-Sep	23	fall	23	traveling	bison	yes	Birch Ck	nd	nd	nd	nd	nd
1-Oct	23	fall	23	traveling	beaver	yes	Birch Ck	nd	2	trapped	nd	nd
2-Oct	23	fall	23	traveling	beaver	yes	Birch Ck	nd	2	trapped	nd	nd
3-Oct	23	fall	23	traveling	none		Birch Ck					
4-Oct	23	fall	23	traveling	none		Birch Ck					
5-Oct	23	fall	23	traveling	none		Birch Ck					

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6-May	57	spring	57	trapping	none		Cub River					
7-May	57	spring	57	trapping	beaver	yes	Cub River	nd	31	trapped	nd	nd
8-May	57	spring	57	trapping	beaver	yes	Cub River	nd	22	trapped	nd	nd
9-May	57	spring	57	trapping	beaver	yes	Bear River	nd	9	trapped	nd	nd
10-May	57	spring	57	trapping	beaver	yes	Bear River	nd	25	trapped	nd	nd
11-May	57	spring	57	trapping	beaver	yes	Bear River	nd	70	trapped	nd	nd
11-May	57	spring	57	trapping	grizzly	yes	Bear River	nd	3	nd	nd	nd
12-May	57	spring	57	trapping	beaver	yes	Bear River	nd	52	trapped	nd	nd
13-May	57	spring	57	trapping	beaver	yes	Bear River	nd	79	trapped	nd	nd
13-May	57	spring	57	trapping	bison	nd	Bear River	nd	nd	nd	nd	nd
14-May	57	spring	42	trapping	beaver	yes	Bear River	nd	31	trapped	nd	nd
15-May	57	spring	42	trapping	beaver	yes	Bear River	nd	16	trapped	nd	nd
16-May	57	spring	42	trapping	beaver	yes	Bear River	nd	52	trapped	nd	nd
17-May	57	spring	57	trapping	beaver	yes	Bear River	nd	244	trapped	nd	nd
18-May	57	spring	57	trapping	beaver	yes	Bear River	nd	109	trapped	nd	nd
19-May	57	spring	57	trapping	beaver	yes	Bear River	nd	68	trapped	nd	nd
20-May	57	spring	57	trapping	beaver	yes	Bear River	nd	67	trapped	nd	nd
21-May	57	spring	57	trapping	beaver	yes	Odgen Rv	nd	23	trapped	nd	nd
22-May	57	spring	57	trapping	beaver	yes	Odgen Rv	nd	27	trapped	nd	nd
23-May	57	spring	57	in camp	none		Odgen Rv					
24-May	57	spring	57	in camp	none		Odgen Rv					
25-May	20	spring	20	traveling	none		Bear River					
26-May	26	spring	26	traveling	beaver	yes	Bear River	nd	5	trapped	nd	nd
27-May	26	spring	26	traveling	beaver	yes	Bear River	nd	1	trapped	nd	nd
28-May	26	spring	26	traveling	none		Bear River					
29-May	23	spring	23	traveling	beaver	yes	Bear River	nd	2	trapped	nd	nd
30-May	23	spring	23	traveling	bison	nd	Portneuf	nd	nd	nd	nd	nd
31-May	23	spring	23	traveling	beaver	yes	Portneuf	nd	7	trapped	nd	nd
1-Jun	23	spring	23	traveling	beaver	yes	Portneuf	nd	25	trapped	nd	nd
2-Jun	23	spring	23	traveling	beaver	yes	Portneuf	nd	62	trapped	nd	nd
3-Jun	23	spring	23	trapping	beaver	yes	Portneuf	nd	47	trapped	nd	nd
4-Jun	23	spring	23	trapping	beaver	yes	Portneuf	nd	30	trapped	nd	nd
5-Jun	23	spring	23	traveling	beaver	yes	Snake Rv	nd	6	trapped	nd	nd

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9-Apr	58	spring	57	trapping	beaver	yes	Snake Rv	nd	12	trapped	nd	nd
10-Apr	57	spring	57	trapping	beaver	yes	Blackfoot	nd	54	trapped	nd	nd
11-Apr	57	spring	57	trapping	beaver	yes	Blackfoot	nd	27	trapped	nd	nd
12-Apr	57	spring	57	trapping	beaver	yes	Blackfoot	nd	57	trapped	nd	nd
13-Apr	57	spring	57	trapping	beaver	yes	Blackfoot	nd	58	trapped	nd	nd
14-Apr	57	spring	57	trapping	beaver	yes	Blackfoot	nd	38	trapped	nd	nd
15-Apr	57	spring	57	trapping	beaver	yes	Blackfoot	nd	11	trapped	nd	nd
16-Apr	57	spring	42	trapping	beaver	yes	Blackfoot	nd	40	trapped	nd	nd
17-Apr	57	spring	42	trapping	beaver	yes	Blackfoot	nd	56	trapped	nd	nd
18-Apr	57	spring	42	trapping	beaver	yes	Blackfoot	nd	19	trapped	nd	nd
19-Apr	57	spring	42	trapping	beaver	yes	Blackfoot	nd	6	trapped	nd	nd
20-Apr	57	spring	42	trapping	beaver	yes	Portneuf	nd	46	trapped	nd	nd
20-Apr	57	spring	42	trapping	bison	yes	Portneuf	nd	5	nd	nd	nd
21-Apr	57	spring	42	trapping	beaver	yes	Portneuf	nd	7	trapped	nd	nd
22-Apr	57	spring	42	trapping	beaver	yes	Portneuf	nd	27	trapped	nd	nd
23-Apr	57	spring	42	trapping	beaver	yes	Portneuf	nd	73	trapped	nd	nd
24-Apr	57	spring	42	trapping	beaver	yes	Portneuf	nd	1	trapped	nd	nd
25-Apr	57	spring	42	traveling	none		Portneuf					
26-Apr	57	spring	42	trapping	none		Bear River					
27-Apr	57	spring	50	trapping	beaver	yes	Bear River	nd	134	trapped	nd	nd
28-Apr	57	spring	50	trapping	beaver	yes	Bear River	nd	20	trapped	nd	nd
29-Apr	57	spring	50	trapping	beaver	yes	Bear River	nd	16	trapped	nd	nd
30-Apr	57	spring	50	trapping	beaver	yes	Cottonwd	nd	76	trapped	nd	nd
1-May	57	spring	50	trapping	beaver	yes	Cottonwd	nd	40	trapped	nd	nd
1-May	57	spring	50	trapping	bison	nd	Cottonwd					
1-May	57	spring	50	trapping	elk	nd	Cottonwd					
2-May	57	spring	50	trapping	beaver	yes	Snake Rv	nd	74	trapped	nd	nd
2-May	57	spring	50	trapping	pelican	yes	Snake Rv	nd	1	trapped	nd	nd
3-May	57	spring	50	trapping	beaver	yes	Snake Rv	nd	13	trapped	nd	nd
3-May	57	spring	50	trapping	bison	yes	Snake Rv	nd	"many"	nd	nd	nd
4-May	57	spring	50	trapping	beaver	yes	Snake Rv	nd	7	trapped	nd	nd
5-May	57	spring	57	trapping	bison	nd	Cub River	nd				
5-May	57	spring	57	trapping	beaver	yes	Cub River	nd	41	trapped	nd	nd

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9-Mar	58	winter	58	trapping	otter	yes	Lemhi VA	nd	1	trapped	nd	nd
10-Mar	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	14	trapped	nd	nd
11-Mar	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	16	trapped	nd	nd
12-Mar	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	4	trapped	nd	nd
13-Mar	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	16	trapped	nd	nd
14-Mar	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	7	trapped	nd	nd
15-Mar	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	3	trapped	nd	nd
16-Mar	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	8	trapped	nd	nd
17-Mar	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	3	trapped	nd	nd
18-Mar	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	9	trapped	nd	nd
19-Mar	58	winter	58	trapping	none							
20-Mar	58	spring	58	trapping	"bustard"	yes	Lemhi VA	nd	3	nd	nd	nd
21-Mar	58	spring	58	trapping	beaver	yes	Lemhi VA	nd	12	trapped	nd	nd
22-Mar	58	spring	58	trapping	beaver	yes	Lemhi VA	nd	4	trapped	nd	nd
23-Mar	58	spring	58	trapping	beaver	yes	Lemhi VA	nd	16	trapped	nd	nd
24-Mar	58	spring	58	traveling	none		Lemhi VA	nd				
25-Mar	58	spring	58	traveling	none		Birch Ck					
26-Mar	58	spring	58	traveling	none		Birch Ck					
27-Mar	58	spring	58	traveling	bison	no	Birch Ck					
27-Mar	58	spring	58	traveling	elk	no	Birch Ck					
27-Mar	58	spring	58	traveling	goats	no	Birch Ck					
28-Mar	58	spring	58	traveling	bison	yes	Birch Ck	nd	"many"	nd	nd	nd
29-Mar	58	spring	58	traveling	none		Birch Ck					
30-Mar	58	spring	58	traveling	none		Birch Ck					
31-Mar	58	spring	58	traveling	none		Birch Ck					
1-Apr	58	spring	46	traveling	none		N of Butte					
2-Apr	58	spring	46	traveling	none		N of Butte					
3-Apr	58	spring	46	traveling	none		N of Butte					
4-Apr	58	spring	46	traveling	none		Buttes					
5-Apr	58	spring	46	traveling	none		Buttes					
6-Apr	58	spring	46	traveling	none		Snake Rv					
7-Apr	58	spring	58	trapping	beaver	yes	Snake Rv	nd	58	trapped	nd	nd
8-Apr	58	spring	56	trapping	beaver	yes	Snake Rv	nd	54	trapped	nd	nd

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Date	# group	Season	# party	activity	animal	pursued	where	# hunters	# killed	how	parts	age/sex
11-Feb	58	winter	58	traveling	bison	no	Lemhi VA	nd				
12-Feb	58	winter	58	traveling	bison	yes	Lemhi Va	5	30	hrse,rifle	300 pds	nd
12-Feb	58	winter	58	traveling	ducks	yes	Lemhi Va	nd	14	nd	nd	nd
13-Feb	58	winter	58	traveling	bison	yes	Lemhi Va	nd	"some"	nd	nd	nd
13-Feb	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	1	trapped	nd	nd
14-Feb	58	winter	58	trapping	none							
15-Feb	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	4	trapped	nd	nd
16-Feb	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	1	trapped	nd	nd
17-Feb	58	winter	58	trapping	none							
18-Feb	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	3	trapped	nd	nd
19-Feb	58	winter	58	trapping	none							
20-Feb	58	winter	58	trapping	none							
21-Feb	58	winter	58	trapping	bison	yes	Lemhi VA	nd	"many"	rifles	"a lot left"	nd
21-Feb	58	winter	58	trapping	antelope	yes	Lemhi VA	nd	"many"	rifles	"a lot left"	nd
22-Feb	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	2	trapped	nd	nd
22-Feb	58	winter	58	trapping	otter	yes	Lemhi VA	nd	1	trapped	nd	nd
23-Feb	58	winter	58	trapping	none							
24-Feb	58	winter	58	trapping	mtn sheep	yes	Lemhi VA	nd	7	nd	"very poor"	nd
24-Feb	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	1	trapped	nd	nd
25-Feb	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	1	10 traps	nd	nd
26-Feb	58	winter	58	trapping	goats	yes	Lemhi VA	nd	"some"	nd	nd	nd
27-Feb	58	winter	nd	hunting	none							
28-Feb	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	1	12 traps	nd	nd
1-Mar	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	1	trapped	nd	nd
2-Mar	58	winter	58	trapping	none		Lemhi VA					
3-Mar	58	winter	58	trapping	none		Lemhi VA					
4-Mar	58	winter	58	trapping	none		Lemhi VA					
5-Mar	58	winter	58	trapping	none		Lemhi VA					
6-Mar	58	winter	58	trapping	none		Lemhi VA					
7-Mar	58	winter	58	trapping	none		Lemhi VA					
8-Mar	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	17	50 traps	nd	nd
9-Mar	58	winter	58	trapping	beaver	yes	Lemhi VA	nd	16	trapped	nd	nd

APPENDIX B

PREHISTORIC SITE DATABASE FOR SIX COUNTIES ON THE EASTERN SNAKE RIVER PLAIN

Appendix C: Prehistoric Localities in the Study Area -Zone 12

SITE_NUMBE	TYPE	ATTRIBUTES	UTM_ZONE	ELEVATION
10BN1000	isolate	retouched flake	12.00000	4800.00000
10BN1002	isolate	point	12.00000	4850.00000
10BN1003	isolate	Rose Spring point	12.00000	4860.00000
10BN1004	isolate	flake	12.00000	4860.00000
10BN1005	isolate	flake	12.00000	4860.00000
10BN1008	isolate	flake	12.00000	4820.00000
10BN1010	isolate	flake	12.00000	4840.00000
10BN1011	isolate	flake	12.00000	4815.00000
10BN1014	isolate	flake	12.00000	4840.00000
10BN1015	isolate	flake	12.00000	4840.00000
10BN1027	isolate	flake	12.00000	4930.00000
10BN1028	isolate	flake	12.00000	4930.00000
10BN1030	isolate	point	12.00000	4950.00000
10BN1036	isolate	flake	12.00000	4950.00000
10BN1040	isolate	flake	12.00000	4960.00000
10BN1044	isolate	flake	12.00000	4960.00000
10BN1045	isolate	flake	12.00000	4950.00000
10BN1046	isolate	biface	12.00000	4950.00000
10BN1048	isolate	flake	12.00000	4910.00000
10BN1050	isolate	flake	12.00000	5020.00000
10BN1055	isolate	flake	12.00000	5220.00000
10BN1057	isolate	flake	12.00000	5320.00000
10BN1058	isolate	flake	12.00000	5320.00000
10BN1059	isolate	retouch flake	12.00000	5370.00000
10BN1060	isolate	flake	12.00000	5360.00000
10BN1061	isolate	flake	12.00000	5370.00000
10BN162	isolate	ISOLATED FIND; core	12.00000	6600.00000
10BN177	isolate	ISOLATED FIND	12.00000	
10BN184	isolate	ISOLATED FIND	12.00000	
10BN185	isolate	ISOLATED FIND	12.00000	
10BN197	isolate	ISOLATED FIND	12.00000	

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10BN198	isolate	ISOLATED FIND	12.00000	
10BN200	isolate	ISOLATED FIND	12.00000	
10BN223	isolate	ISOLATED FIND	12.00000	
10BN224	isolate	ISOLATED FIND	12.00000	
10BN225	isolate	ISOLATED FIND	12.00000	
10BN226	isolate	ISOLATED FIND	12.00000	
10BN227	isolate	ISOLATED FIND	12.00000	
10BN228	isolate	ISOLATED FIND	12.00000	
10BN229	isolate	ISOLATED FIND	12.00000	
10BN230	isolate	ISOLATED FIND	12.00000	
10BN231	isolate	ISOLATED FIND	12.00000	
10BN233	isolate	ISOLATED FIND	12.00000	
10BN234	isolate	ISOLATED FIND	12.00000	
10BN235	isolate	ISOLATED FIND	12.00000	
10BN236	isolate	ISOLATED FIND	12.00000	
10BN237	isolate	ISOLATED FIND	12.00000	
10BN239	isolate	ISOLATED FIND	12.00000	
10BN240	isolate	ISOLATED FIND	12.00000	
10BN241	isolate	ISOLATED FIND	12.00000	
10BN242	isolate	ISOLATED FIND	12.00000	
10BN243	isolate	ISOLATED FIND	12.00000	
10BN244	isolate	ISOLATED FIND	12.00000	
10BN245	isolate	ISOLATED FIND	12.00000	
10BN246	isolate	ISOLATED FIND	12.00000	
10BN247	isolate	ISOLATED FIND	12.00000	
10BN248	isolate	ISOLATED FIND	12.00000	
10BN254	isolate	ISOLATED FIND	12.00000	
10BN255	isolate	ISOLATED FIND	12.00000	
10BN256	isolate	ISOLATED FIND	12.00000	
10BN257	isolate	ISOLATED FIND	12.00000	
10BN258	isolate	ISOLATED FIND	12.00000	
10BN259	isolate	ISOLATED FIND	12.00000	

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10BN260	isolate	ISOLATED FIND	12.00000	
10BN261	isolate	ISOLATED FIND	12.00000	
10BN262	isolate	ISOLATED FIND	12.00000	
10BN263	isolate	ISOLATED FIND	12.00000	
10BN264	isolate	ISOLATED FIND	12.00000	
10BN265	isolate	ISOLATED FIND	12.00000	
10BN266	isolate	ISOLATED FIND	12.00000	
10BN267	isolate	ISOLATED FIND	12.00000	
10BN268	isolate	ISOLATED FIND	12.00000	
10BN271	isolate	ISOLATED FIND	12.00000	
10BN272	isolate	ISOLATED FIND	12.00000	
10BN277	isolate	ISOLATED FIND	12.00000	
10BN278	isolate	ISOLATED FIND	12.00000	
10BN279	isolate	ISOLATED FIND	12.00000	
10BN280	isolate	ISOLATED FIND	12.00000	
10BN281	isolate	ISOLATED FIND	12.00000	
10BN282	isolate	ISOLATED FIND	12.00000	
10BN283	isolate	ISOLATED FIND	12.00000	
10BN308	isolate	ISOLATED FIND	12.00000	
10BN310	isolate	ISOLATED FIND	12.00000	
10BN311	isolate	ISOLATED FIND	12.00000	
10BN314	isolate	ISOLATED FIND	12.00000	
10BN315	isolate	ISOLATED FIND	12.00000	
10BN343	isolate	ISOLATED FIND	12.00000	
10BN344	isolate	ISOLATED FIND	12.00000	
10BN345	isolate	ISOLATED FIND	12.00000	
10BN349	isolate	ISOLATED FIND	12.00000	
10BN358	isolate	ISOLATED FIND	12.00000	
10BN359	isolate	ISOLATED FIND	12.00000	
10BN360	isolate	ISOLATED FIND	12.00000	
10BN361	isolate	ISOLATED FIND	12.00000	
10BN362	isolate	ISOLATED FIND	12.00000	

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10BN363	isolate	ISOLATED FIND	12.00000	
10BN364	isolate	ISOLATED FIND	12.00000	
10BN365	isolate	ISOLATED FIND	12.00000	
10BN366	isolate	ISOLATED FIND	12.00000	
10BN367	isolate	ISOLATED FIND	12.00000	
10BN369	isolate	ISOLATED FIND	12.00000	
10BN370	isolate	ISOLATED FIND	12.00000	
10BN371	isolate	ISOLATED FIND	12.00000	
10BN372	isolate	ISOLATED FIND	12.00000	
10BN373	isolate	ISOLATED FIND	12.00000	
10BN374	isolate	ISOLATED FIND	12.00000	
10BN375	isolate	ISOLATED FIND	12.00000	
10BN377	isolate	ISOLATED FIND	12.00000	
10BN378	isolate	ISOLATED FIND	12.00000	
10BN379	isolate	ISOLATED FIND	12.00000	
10BN380	isolate	ISOLATED FIND	12.00000	
10BN400	isolate	ISOLATED FIND	12.00000	
10BN401	isolate	ISOLATED FIND	12.00000	
10BN406	isolate	ISOLATED FIND	12.00000	
10BN413	isolate	ISOLATED FIND	12.00000	
10BN414	isolate	ISOLATED FIND	12.00000	
10BN420	isolate	ISOLATED FIND	12.00000	
10BN587	isolate	white quartzite pestle	12.00000	4600.00000
10BN588	isolate	Elko Corner-Notched projectile point	12.00000	4520.00000
10BN589	isolate	corner-notched projectile point fragment,	12.00000	4710.00000
10BN590	isolate	corner-notched projectile point fragment,	12.00000	4640.00000
10BN591	isolate	recorder thinks it a Humboldt, probably a	12.00000	4680.00000
10BN592	isolate	projectile point midsection	12.00000	4660.00000
10BN593	isolate	biface midsection	12.00000	4620.00000
10BN594	isolate	possible Agate Basin projectile point	12.00000	4700.00000
10BN595	isolate	biface	12.00000	4760.00000
10BN596	isolate	projectile point midsection	12.00000	4640.00000

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10BN599	isolate	Elko Corner-Notched projectile point	12.00000	4640.00000
10BN600	isolate	Humboldt projectile point	12.00000	4360.00000
10BN601	isolate	Desert Side-Notched projectile point	12.00000	4500.00000
10BN602	isolate	biface midsection	12.00000	4600.00000
10BN604	isolate	corner-notched projectile point, Rose Spri	12.00000	4480.00000
10BN605	isolate	stemmed projectile point, probably an Elko	12.00000	4540.00000
10BN606	isolate	stemmed projectile point base	12.00000	4410.00000
10BN608	isolate	side-notched projectile point, Rose Spring	12.00000	4600.00000
10BN609	isolate	biface	12.00000	4430.00000
10BN611	isolate	Pinto point base	12.00000	4410.00000
10BN612	isolate	biface tip	12.00000	4420.00000
10BN614	isolate	Desert Side-Notched projectile point	12.00000	4440.00000
10BN616	isolate	ignimbrite biface midsection	12.00000	4480.00000
10BN617	isolate	white chert drill	12.00000	4360.00000
10BN619	isolate	ignimbrite point midsection	12.00000	4380.00000
10BN621	isolate	Rose Spring Corner-Notched projectile poin	12.00000	4340.00000
10BN622	isolate	Elko Corner-Notched projectile point	12.00000	4330.00000
10BN623	isolate	corner-notched projectile point	12.00000	4330.00000
10BN624	isolate	Elko Corner-Notched projectile point	12.00000	4380.00000
10BN625	isolate	obsidian projectile point midsection	12.00000	4520.00000
10BN627	isolate	obsidian Elko Corner-Notched projectile po	12.00000	4460.00000
10BN628	isolate	obsidian projectile point midsection	12.00000	4360.00000
10BN629	isolate	obsidian projectile point midsection	12.00000	4440.00000
10BN630	isolate	obsidian side-notched reworked projectile	12.00000	4440.00000
10BN633	isolate	flake tool	12.00000	4420.00000
10BN634	isolate	biface midsection	12.00000	4520.00000
10BN635	isolate	biface	12.00000	4460.00000
10BN636	isolate	biface	12.00000	4300.00000
10BN638	isolate	point	12.00000	4300.00000
10BN639	isolate	Elko point	12.00000	4400.00000
10BN640	isolate	point	12.00000	4540.00000
10BN641	isolate	uniface	12.00000	4440.00000

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BN642	isolate	uniface	12.00000	4460.00000
10BN644	isolate	biface	12.00000	4360.00000
10BN645	isolate	core	12.00000	4440.00000
10BN646	isolate	biface	12.00000	4520.00000
10BN650	isolate	mano	12.00000	4360.00000
10BN653	isolate	mano-hammerstone frag	12.00000	4340.00000
10BN656	isolate	mano	12.00000	4330.00000
10BN659	isolate	biface	12.00000	4330.00000
10BN667	isolate	flake	12.00000	4440.00000
10BN670	isolate	biface	12.00000	4300.00000
10BN671	isolate	biface	12.00000	4108.00000
10BN675	isolate	point	12.00000	4400.00000
10BN679	isolate	possible mano	12.00000	4410.00000
10BN682	isolate	comer-notched projectile point, Elko?	12.00000	4650.00000
10BN695	isolate	scraper	12.00000	4700.00000
10BN699	isolate	biface	12.00000	4520.00000
10BN708	isolate	biface	12.00000	4480.00000
10BN711	isolate	biface	12.00000	4520.00000
10BN712	isolate	biface	12.00000	4600.00000
10BN713	isolate	biface frag	12.00000	4580.00000
10BN714	isolate	biface fram	12.00000	4790.00000
10BN715	isolate	biface frag	12.00000	4620.00000
10BN716	isolate	uniface	12.00000	4700.00000
10BN717	isolate	biface frag	12.00000	4500.00000
10BN718	isolate	endscraper	12.00000	4680.00000
10BN719	isolate	preform	12.00000	4600.00000
10BN720	isolate	point frag	12.00000	4619.00000
10BN721	isolate	point frag	12.00000	4660.00000
10BN722	isolate	biface frag	12.00000	4640.00000
10BN725	isolate	point frag	12.00000	4480.00000
10BN728	isolate	biface frag	12.00000	4450.00000
10BN729	isolate	biface frag	12.00000	4600.00000

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BN731	isolate	biface		12.00000	4630.00000
10BN734	isolate	biface		12.00000	4420.00000
10BN739	isolate	biface frag		12.00000	4540.00000
10BN741	isolate	biface frag		12.00000	4560.00000
10BN749	isolate	biface frag		12.00000	4500.00000
10BN753	isolate	biface frag		12.00000	4460.00000
10BN755	isolate	biface frag		12.00000	4500.00000
10BN757	isolate	scraper		12.00000	4540.00000
10BN759	isolate	biface frag		12.00000	4500.00000
10BN761	isolate	biface		12.00000	4540.00000
10BN764	isolate	point		12.00000	4720.00000
10BN766	isolate	biface base		12.00000	4630.00000
10BN767	isolate	point		12.00000	4780.00000
10BN768	isolate	biface		12.00000	4550.00000
10BN784	isolate	biface frag		12.00000	4710.00000
10BN790	isolate	2 flakes		12.00000	5090.00000
10BN791	isolate	midsection		12.00000	5110.00000
10BN792	isolate	flake		12.00000	5090.00000
10BN793	isolate	biface tip		12.00000	5130.00000
10BN794	isolate	3 flakes		12.00000	5060.00000
10BN795	isolate	flake		12.00000	5120.00000
10BN906	isolate	comer-notched point		12.00000	4820.00000
10BN907	isolate	cottonwood point		12.00000	4780.00000
10BN969	isolate	Elko eared point		12.00000	4880.00000
10BN971	isolate	flake		12.00000	4880.00000
10BN972	isolate	flake		12.00000	4840.00000
10BN973	isolate	biface frag		12.00000	4800.00000
10BN974	isolate	DSN point		12.00000	4900.00000
10BN975	isolate	point		12.00000	4780.00000
10BN976	isolate	Eastgate point		12.00000	4820.00000
10BN977	isolate	flake		12.00000	4760.00000
10BN978	isolate	flake		12.00000	4900.00000

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BN979	isolate	biface frag	12.00000	4750.00000
10BN980	isolate	biface frag	12.00000	4780.00000
10BN982	isolate	biface frag	12.00000	4880.00000
10BN983	isolate	core	12.00000	4760.00000
10BN984	isolate	modified flake	12.00000	4780.00000
10BN987	isolate	point	12.00000	4800.00000
10BT1000	isolate	ISOLATED FIND	12.00000	
10BT1001	isolate	ISOLATED FIND	12.00000	
10BT1005	isolate	ISOLATED FIND	12.00000	
10BT1007	isolate	ISOLATED FIND	12.00000	
10BT1010	isolate	ISOLATED FIND	12.00000	
10BT1014	isolate	ISOLATED FIND	12.00000	
10BT1017	isolate	ISOLATED FIND	12.00000	
10BT1019	isolate	ISOLATED FIND	12.00000	
10BT1023	isolate	ISOLATED FIND	12.00000	
10BT1024	isolate	ISOLATED FIND	12.00000	
10BT1027	isolate	ISOLATED FIND	12.00000	
10BT1031	isolate	ISOLATED FIND	12.00000	
10BT1033	isolate	ISOLATED FIND	12.00000	
10BT1040	isolate	ISOLATED FIND	12.00000	
10BT1042	isolate	ISOLATED FIND	12.00000	
10BT1047	isolate	ISOLATED FIND	12.00000	
10BT1048	isolate	ISOLATED FIND	12.00000	
10BT1050	isolate	ISOLATED FIND	12.00000	
10BT1051	isolate	ISOLATED FIND	12.00000	
10BT1054	isolate	ISOLATED FIND	12.00000	
10BT1055	isolate	ISOLATED FIND	12.00000	
10BT1057	isolate	ISOLATED FIND	12.00000	
10BT1058	isolate	ISOLATED FIND	12.00000	
10BT1060	isolate	ISOLATED FIND	12.00000	
10BT1061	isolate	ISOLATED FIND	12.00000	
10BT1064	isolate	ISOLATED FIND	12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BT1065	isolate	ISOLATED FIND	12.00000	
10BT1067	isolate	ISOLATED FIND	12.00000	
10BT1070	isolate	ISOLATED FIND	12.00000	
10BT1071	isolate	ISOLATED FIND	12.00000	
10BT1072	isolate	ISOLATED FIND	12.00000	
10BT1073	isolate	ISOLATED FIND	12.00000	
10BT1074	isolate	ISOLATED FIND	12.00000	
10BT1077	isolate	ISOLATED FIND	12.00000	
10BT1080	isolate	ISOLATED FIND	12.00000	
10BT1081	isolate	ISOLATED FIND	12.00000	
10BT1084	isolate	ISOLATED FIND	12.00000	
10BT1088	isolate	ISOLATED FIND	12.00000	
10BT1089	isolate	ISOLATED FIND	12.00000	
10BT1090	isolate	ISOLATED FIND	12.00000	
10BT1092	isolate	ISOLATED FIND	12.00000	
10BT1093	isolate	ISOLATED FIND	12.00000	
10BT1094	isolate	ISOLATED FIND	12.00000	
10BT1095	isolate	ISOLATED FIND	12.00000	
10BT1096	isolate	ISOLATED FIND	12.00000	
10BT1097	isolate	ISOLATED FIND	12.00000	
10BT1098	isolate	ISOLATED FIND	12.00000	
10BT1099	isolate	ISOLATED FIND	12.00000	
10BT1100	isolate	ISOLATED FIND	12.00000	
10BT1103	isolate	ISOLATED FIND	12.00000	
10BT1105	isolate	ISOLATED FIND	12.00000	
10BT1107	isolate	ISOLATED FIND	12.00000	
10BT1111	isolate	ISOLATED FIND	12.00000	
10BT1113	isolate	ISOLATED FIND	12.00000	
10BT1114	isolate	ISOLATED FIND	12.00000	
10BT1115	isolate	ISOLATED FIND	12.00000	
10BT1116	isolate	ISOLATED FIND	12.00000	
10BT1117	isolate	ISOLATED FIND	12.00000	

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10BT1118	isolate	ISOLATED FIND	12.00000	
10BT1119	isolate	ISOLATED FIND	12.00000	
10BT112	isolate	ISOLATED FIND	12.00000	
10BT1120	isolate	ISOLATED FIND	12.00000	
10BT1121	isolate	ISOLATED FIND	12.00000	
10BT1124	isolate	ISOLATED FIND	12.00000	
10BT1125	isolate	ISOLATED FIND	12.00000	
10BT1126	isolate	ISOLATED FIND	12.00000	
10BT1127	isolate	ISOLATED FIND	12.00000	
10BT1132	isolate	ISOLATED FIND	12.00000	
10BT1136	isolate	ISOLATED FIND	12.00000	
10BT1138	isolate	ISOLATED FIND	12.00000	
10BT1144	isolate	ISOLATED FIND	12.00000	
10BT1150	isolate	ISOLATED FIND	12.00000	
10BT1151	isolate	ISOLATED FIND	12.00000	
10BT1153	isolate	ISOLATED FIND	12.00000	
10BT1154	isolate	ISOLATED FIND	12.00000	
10BT1155	isolate	ISOLATED FIND	12.00000	
10BT1158	isolate	ISOLATED FIND	12.00000	
10BT1159	isolate	ISOLATED FIND	12.00000	
10BT116	isolate	ISOLATED FIND, Folsom point	12.00000	
10BT1162	isolate	ISOLATED FIND	12.00000	
10BT1163	isolate	ISOLATED FIND	12.00000	
10BT1164	isolate	ISOLATED FIND	12.00000	
10BT1165	isolate	ISOLATED FIND	12.00000	
10BT1168	isolate	ISOLATED FIND	12.00000	
10BT1169	isolate	ISOLATED FIND	12.00000	
10BT1175	isolate	ISOLATED FIND	12.00000	
10BT1176	isolate	ISOLATED FIND	12.00000	
10BT1178	isolate	ISOLATED FIND	12.00000	
10BT1179	isolate	ISOLATED FIND	12.00000	
10BT1180	isolate	ISOLATED FIND	12.00000	

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10BT1182	isolate	ISOLATED FIND	12.00000	
10BT1183	isolate	ISOLATED FIND	12.00000	
10BT1184	isolate	ISOLATED FIND	12.00000	
10BT1186	isolate	ISOLATED FIND	12.00000	
10BT1187	isolate	ISOLATED FIND	12.00000	
10BT1192	isolate	ISOLATED FIND	12.00000	
10BT1195	isolate	ISOLATED FIND	12.00000	
10BT1196	isolate	ISOLATED FIND	12.00000	
10BT1197	isolate	ISOLATED FIND	12.00000	
10BT1198	isolate	ISOLATED FIND	12.00000	
10BT1199	isolate	ISOLATED FIND	12.00000	
10BT1201	isolate	ISOLATED FIND	12.00000	
10BT1203	isolate	ISOLATED FIND	12.00000	
10BT1204	isolate	ISOLATED FIND	12.00000	
10BT1206	isolate	ISOLATED FIND	12.00000	
10BT1210	isolate	ISOLATED FIND	12.00000	
10BT1213	isolate	ISOLATED FIND	12.00000	
10BT1217	isolate	ISOLATED FIND	12.00000	
10BT1218	isolate	ISOLATED FIND	12.00000	
10BT1219	isolate	ISOLATED FIND	12.00000	
10BT1220	isolate	ISOLATED FIND	12.00000	
10BT1228	isolate	ISOLATED FIND	12.00000	
10BT1229	isolate	ISOLATED FIND	12.00000	
10BT1231	isolate	ISOLATED FIND	12.00000	
10BT1233	isolate	ISOLATED FIND	12.00000	
10BT1235	isolate	ISOLATED FIND	12.00000	
10BT1236	isolate	ISOLATED FIND	12.00000	
10BT1237	isolate	ISOLATED FIND	12.00000	
10BT1238	isolate	ISOLATED FIND	12.00000	
10BT1239	isolate	ISOLATED FIND	12.00000	
10BT1240	isolate	ISOLATED FIND	12.00000	
10BT1243	isolate	ISOLATED FIND	12.00000	

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10BT1244	isolate	ISOLATED FIND	12.00000	
10BT1245	isolate	ISOLATED FIND	12.00000	
10BT1246	isolate	ISOLATED FIND	12.00000	
10BT1248	isolate	ISOLATED FIND	12.00000	
10BT1249	isolate	ISOLATED FIND	12.00000	
10BT1253	isolate	ISOLATED FIND	12.00000	
10BT1254	isolate	ISOLATED FIND	12.00000	
10BT1255	isolate	ISOLATED FIND	12.00000	
10BT1275	isolate	ISOLATED FIND	12.00000	
10BT1276	isolate	ISOLATED FIND	12.00000	
10BT1277	isolate	ISOLATED FIND	12.00000	
10BT1278	isolate	ISOLATED FIND	12.00000	
10BT1287	isolate	ISOLATED FIND	12.00000	
10BT1288	isolate	ISOLATED FIND	12.00000	
10BT1290	isolate	ISOLATED FIND	12.00000	
10BT1291	isolate	ISOLATED FIND	12.00000	
10BT1292	isolate	ISOLATED FIND	12.00000	
10BT1298	isolate	ISOLATED FIND	12.00000	
10BT1311	isolate	ISOLATED FIND	12.00000	
10BT1312	isolate	ISOLATED FIND	12.00000	
10BT1313	isolate	ISOLATED FIND	12.00000	
10BT1316	isolate	ISOLATED FIND	12.00000	
10BT1320	isolate	ISOLATED FIND	12.00000	
10BT1323	isolate	ISOLATED FIND	12.00000	
10BT1325	isolate	ISOLATED FIND	12.00000	
10BT1326	isolate	ISOLATED FIND	12.00000	
10BT1331	isolate	ISOLATED FIND	12.00000	
10BT1337	isolate	ISOLATED FIND	12.00000	
10BT1339	isolate	ISOLATED FIND	12.00000	
10BT1340	isolate	ISOLATED FIND	12.00000	
10BT1342	isolate	ISOLATED FIND	12.00000	
10BT1343	isolate	ISOLATED FIND	12.00000	

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10BT1344	isolate	ISOLATED FIND	12.00000	
10BT1347	isolate	ISOLATED FIND	12.00000	
10BT1350	isolate	ISOLATED FIND	12.00000	
10BT1353	isolate	ISOLATED FIND	12.00000	
10BT1355	isolate	ISOLATED FIND	12.00000	
10BT1356	isolate	ISOLATED FIND	12.00000	
10BT1358	isolate	ISOLATED FIND	12.00000	
10BT1360	isolate	ISOLATED FIND	12.00000	
10BT1361	isolate	ISOLATED FIND	12.00000	
10BT1362	isolate	ISOLATED FIND	12.00000	
10BT1364	isolate	ISOLATED FIND	12.00000	
10BT1365	isolate	ISOLATED FIND	12.00000	
10BT1367	isolate	ISOLATED FIND	12.00000	
10BT1368	isolate	ISOLATED FIND	12.00000	
10BT1369	isolate	ISOLATED FIND	12.00000	
10BT1371	isolate	ISOLATED FIND	12.00000	
10BT1372	isolate	ISOLATED FIND	12.00000	
10BT1373	isolate	ISOLATED FIND	12.00000	
10BT1374	isolate	ISOLATED FIND	12.00000	
10BT1376	isolate	ISOLATED FIND	12.00000	
10BT1379	isolate	ISOLATED FIND	12.00000	
10BT1381	isolate	ISOLATED FIND	12.00000	
10BT1384	isolate	ISOLATED FIND	12.00000	
10BT1386	isolate	ISOLATED FIND	12.00000	
10BT1387	isolate	ISOLATED FIND	12.00000	
10BT1388	isolate	ISOLATED FIND	12.00000	
10BT1391	isolate	ISOLATED FIND	12.00000	
10BT1392	isolate	ISOLATED FIND	12.00000	
10BT1393	isolate	ISOLATED FIND	12.00000	
10BT1394	isolate	ISOLATED FIND	12.00000	
10BT1395	isolate	ISOLATED FIND	12.00000	
10BT1396	isolate	ISOLATED FIND	12.00000	

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10BT1400	isolate	ISOLATED FIND	12.00000	
10BT1401	isolate	ISOLATED FIND	12.00000	
10BT1404	isolate	ISOLATED FIND	12.00000	
10BT1405	isolate	ISOLATED FIND	12.00000	
10BT1406	isolate	ISOLATED FIND	12.00000	
10BT1407	isolate	ISOLATED FIND	12.00000	
10BT1409	isolate	ISOLATED FIND	12.00000	
10BT1411	isolate	ISOLATED FIND	12.00000	
10BT1412	isolate	ISOLATED FIND	12.00000	
10BT1414	isolate	ISOLATED FIND	12.00000	
10BT1415	isolate	ISOLATED FIND	12.00000	
10BT1416	isolate	ISOLATED FIND	12.00000	
10BT1418	isolate	ISOLATED FIND	12.00000	
10BT1423	isolate	ISOLATED FIND	12.00000	
10BT1430	isolate	ISOLATED FIND	12.00000	
10BT1433	isolate	ISOLATED FIND	12.00000	
10BT1435	isolate	ISOLATED FIND	12.00000	
10BT1439	isolate	ISOLATED FIND	12.00000	
10BT1440	isolate	ISOLATED FIND	12.00000	
10BT1441	isolate	ISOLATED FIND	12.00000	
10BT1442	isolate	ISOLATED FIND	12.00000	
10BT1443	isolate	ISOLATED FIND	12.00000	
10BT1446	isolate	ISOLATED FIND	12.00000	
10BT1447	isolate	ISOLATED FIND	12.00000	
10BT1452	isolate	ISOLATED FIND	12.00000	
10BT1453	Isolate	projectile point midsection	12.00000	5040.00000
10BT1459	isolate	biface frag	12.00000	5200.00000
10BT1461	isolate	ISOLATED FIND	12.00000	
10BT1463	isolate	ISOLATED FIND	12.00000	
10BT1465	isolate	ISOLATED FIND	12.00000	
10BT1470	isolate	ISOLATED FIND	12.00000	
10BT1472	isolate	ISOLATED FIND	12.00000	

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10BT1475	isolate	ISOLATED FIND	12.00000	
10BT1480	isolate	ISOLATED FIND	12.00000	
10BT1481	isolate	ISOLATED FIND	12.00000	
10BT1482	isolate	ISOLATED FIND	12.00000	
10BT1491	isolate	ISOLATED FIND	12.00000	
10BT1492	isolate	ISOLATED FIND	12.00000	
10BT1493	isolate	ISOLATED FIND	12.00000	
10BT1495	isolate	ISOLATED FIND	12.00000	
10BT1496	isolate	ISOLATED FIND	12.00000	
10BT1501	isolate	ISOLATED FIND	12.00000	
10BT1504	isolate	ISOLATED FIND	12.00000	
10BT1506	isolate	ISOLATED FIND	12.00000	
10BT1507	isolate	ISOLATED FIND	12.00000	
10BT1508	isolate	ISOLATED FIND	12.00000	
10BT1510	isolate	ISOLATED FIND	12.00000	
10BT1511	isolate	ISOLATED FIND	12.00000	
10BT1512	isolate	ISOLATED FIND	12.00000	
10BT1514	isolate	ISOLATED FIND	12.00000	
10BT1516	isolate	ISOLATED FIND	12.00000	
10BT1519	isolate	ISOLATED FIND	12.00000	
10BT1520	isolate	ISOLATED FIND	12.00000	
10BT1523	isolate	ISOLATED FIND	12.00000	
10BT1524	isolate	ISOLATED FIND	12.00000	
10BT1525	isolate	ISOLATED FIND	12.00000	
10BT1527	isolate	ISOLATED FIND	12.00000	
10BT1528	isolate	ISOLATED FIND	12.00000	
10BT1529	isolate	ISOLATED FIND	12.00000	
10BT1531	isolate	ISOLATED FIND	12.00000	
10BT1532	isolate	ISOLATED FIND	12.00000	
10BT1533	isolate	ISOLATED FIND	12.00000	
10BT1542	isolate	ISOLATED FIND	12.00000	
10BT1543	isolate	ISOLATED FIND	12.00000	

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10BT1547	isolate	ISOLATED FIND	12.00000	
10BT1549	isolate	ISOLATED FIND	12.00000	
10BT1552	isolate	ISOLATED FIND	12.00000	
10BT1555	isolate	ISOLATED FIND	12.00000	
10BT1557	isolate	ISOLATED FIND	12.00000	
10BT1558	isolate	ISOLATED FIND	12.00000	
10BT1564	isolate	ISOLATED FIND	12.00000	
10BT1568	isolate	ISOLATED FIND	12.00000	
10BT1569	isolate	ISOLATED FIND	12.00000	
10BT1570	isolate	ISOLATED FIND	12.00000	
10BT1571	isolate	ISOLATED FIND	12.00000	
10BT1572	isolate	ISOLATED FIND	12.00000	
10BT1575	isolate	ISOLATED FIND	12.00000	
10BT1576	isolate	ISOLATED FIND	12.00000	
10BT1577	isolate	ISOLATED FIND	12.00000	
10BT1578	isolate	ISOLATED FIND	12.00000	
10BT1579	isolate	ISOLATED FIND	12.00000	
10BT1580	isolate	ISOLATED FIND	12.00000	
10BT1583	isolate	ISOLATED FIND	12.00000	
10BT1584	isolate	ISOLATED FIND	12.00000	
10BT1586	isolate	ISOLATED FIND	12.00000	
10BT1587	isolate	ISOLATED FIND	12.00000	
10BT1588	isolate	ISOLATED FIND	12.00000	
10BT1589	isolate	ISOLATED FIND	12.00000	
10BT1590	isolate	ISOLATED FIND	12.00000	
10BT1591	isolate	ISOLATED FIND	12.00000	
10BT1594	isolate	ISOLATED FIND	12.00000	
10BT1597	isolate	ISOLATED FIND	12.00000	
10BT1598	isolate	ISOLATED FIND	12.00000	
10BT1599	isolate	ISOLATED FIND	12.00000	
10BT1600	isolate	ISOLATED FIND	12.00000	
10BT1601	isolate	ISOLATED FIND	12.00000	

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10BT1602	isolate	ISOLATED FIND	12.00000	
10BT1603	isolate	ISOLATED FIND	12.00000	
10BT1604	isolate	ISOLATED FIND	12.00000	
10BT1607	isolate	ISOLATED FIND	12.00000	
10BT1610	isolate	ISOLATED FIND	12.00000	
10BT1611	isolate	ISOLATED FIND	12.00000	
10BT1612	isolate	ISOLATED FIND	12.00000	
10BT1614	isolate	ISOLATED FIND	12.00000	
10BT1615	isolate	ISOLATED FIND	12.00000	
10BT1618	isolate	ISOLATED FIND	12.00000	
10BT1620	isolate	ISOLATED FIND	12.00000	
10BT1621	isolate	ISOLATED FIND	12.00000	
10BT1623	isolate	scraper	12.00000	4925.00000
10BT1624	isolate	6 flakes	12.00000	4915.00000
10BT1628	isolate	ISOLATED FIND	12.00000	
10BT1631	isolate	ISOLATED FIND	12.00000	
10BT1632	isolate	ISOLATED FIND	12.00000	
10BT1633	isolate	ISOLATED FIND	12.00000	
10BT1634	isolate	ISOLATED FIND	12.00000	
10BT1635	isolate	ISOLATED FIND	12.00000	
10BT1636	isolate	ISOLATED FIND	12.00000	
10BT1637	isolate	ISOLATED FIND	12.00000	
10BT1640	isolate	ISOLATED FIND	12.00000	
10BT1643	isolate	ISOLATED FIND	12.00000	
10BT1645	isolate	ISOLATED FIND	12.00000	
10BT1648	isolate	ISOLATED FIND	12.00000	
10BT1649	isolate	ISOLATED FIND	12.00000	
10BT1650	isolate	ISOLATED FIND	12.00000	
10BT1652	isolate	ISOLATED FIND	12.00000	
10BT1654	isolate	ISOLATED FIND	12.00000	
10BT1655	isolate	ISOLATED FIND	12.00000	
10BT1658	isolate	ISOLATED FIND	12.00000	

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10BT1661	isolate	ISOLATED FIND	12.00000	
10BT1663	isolate	ISOLATED FIND	12.00000	
10BT1668	isolate	ISOLATED FIND	12.00000	
10BT1669	isolate	ISOLATED FIND	12.00000	
10BT1674	isolate	ISOLATED FIND	12.00000	
10BT1675	isolate	ISOLATED FIND	12.00000	
10BT1680	isolate	ISOLATED FIND	12.00000	
10BT1681	isolate	ISOLATED FIND	12.00000	
10BT1683	isolate	ISOLATED FIND	12.00000	
10BT1684	isolate	ISOLATED FIND	12.00000	
10BT1686	isolate	ISOLATED FIND	12.00000	
10BT1689	isolate	ISOLATED FIND	12.00000	
10BT1691	isolate	ISOLATED FIND	12.00000	
10BT1701	isolate	ISOLATED FIND	12.00000	
10BT1702	isolate	ISOLATED FIND	12.00000	
10BT1703	isolate	ISOLATED FIND	12.00000	
10BT1704	isolate	ISOLATED FIND	12.00000	
10BT1705	isolate	ISOLATED FIND	12.00000	
10BT1706	isolate	ISOLATED FIND	12.00000	
10BT1707	isolate	ISOLATED FIND	12.00000	
10BT1708	isolate	ISOLATED FIND	12.00000	
10BT1709	isolate	ISOLATED FIND	12.00000	
10BT1710	isolate	ISOLATED FIND	12.00000	
10BT1711	isolate	ISOLATED FIND	12.00000	
10BT1712	isolate	ISOLATED FIND	12.00000	
10BT1714	isolate	ISOLATED FIND	12.00000	
10BT1715	isolate	ISOLATED FIND	12.00000	
10BT1716	isolate	ISOLATED FIND	12.00000	
10BT1717	isolate	ISOLATED FIND	12.00000	
10BT1718	isolate	ISOLATED FIND	12.00000	
10BT1719	isolate	ISOLATED FIND	12.00000	
10BT1720	isolate	ISOLATED FIND	12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BT1721	isolate	ISOLATED FIND	12.00000	
10BT1724	isolate	ISOLATED FIND	12.00000	
10BT1725	isolate	ISOLATED FIND	12.00000	
10BT1726	isolate	ISOLATED FIND	12.00000	
10BT1727	isolate	ISOLATED FIND	12.00000	
10BT1728	isolate	ISOLATED FIND	12.00000	
10BT1743	isolate	projectile point	12.00000	4940.00000
10BT1750	isolate	ISOLATED FIND	12.00000	
10BT1751	isolate	ISOLATED FIND	12.00000	
10BT1752	isolate	ISOLATED FIND	12.00000	
10BT1753	isolate	ISOLATED FIND	12.00000	
10BT1758	isolate	ISOLATED FIND	12.00000	
10BT1760	isolate	ISOLATED FIND	12.00000	
10BT1761	isolate	ISOLATED FIND	12.00000	
10BT1762	isolate	ISOLATED FIND	12.00000	
10BT1764	isolate	ISOLATED FIND	12.00000	
10BT1765	isolate	ISOLATED FIND	12.00000	
10BT1766	isolate	ISOLATED FIND	12.00000	
10BT1767	isolate	ISOLATED FIND	12.00000	
10BT1768	isolate	ISOLATED FIND	12.00000	
10BT1771	isolate	ISOLATED FIND	12.00000	
10BT1774	isolate	ISOLATED FIND	12.00000	
10BT1775	isolate	ISOLATED FIND	12.00000	
10BT1777	isolate	ISOLATED FIND	12.00000	
10BT1778	isolate	ISOLATED FIND	12.00000	
10BT1782	isolate	ISOLATED FIND	12.00000	
10BT1785	isolate	ISOLATED FIND	12.00000	
10BT1787	isolate	ISOLATED FIND	12.00000	
10BT1789	isolate	ISOLATED FIND	12.00000	
10BT1795	isolate	ISOLATED FIND	12.00000	
10BT1796	isolate	ISOLATED FIND	12.00000	
10BT1799	isolate	ISOLATED FIND	12.00000	

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10BT1801	isolate	ISOLATED FIND	12.00000	
10BT1806	isolate	ISOLATED PROJECTILE POINT	12.00000	
10BT1807	isolate	ISOLATED FIND	12.00000	
10BT1810	isolate	ISOLATED FIND	12.00000	
10BT1811	isolate	ISOLATED FIND	12.00000	
10BT1813	isolate	ISOLATED FIND	12.00000	
10BT1814	isolate	ISOLATED FIND	12.00000	
10BT1817	isolate	ISOLATED FIND	12.00000	
10BT1825	isolate	ISOLATED FIND	12.00000	
10BT1827	isolate	ISOLATED FIND	12.00000	
10BT1828	isolate	ISOLATED FIND	12.00000	
10BT1829	isolate	ISOLATED FIND	12.00000	
10BT1830	isolate	ISOLATED FIND	12.00000	
10BT1838	isolate	ISOLATED FIND	12.00000	
10BT1839	isolate	ISOLATED FIND	12.00000	
10BT1842	isolate	ISOLATED FIND	12.00000	
10BT1845	isolate	ISOLATED FIND	12.00000	
10BT1849	isolate	ISOLATED FIND	12.00000	
10BT1850	isolate	ISOLATED FIND	12.00000	
10BT1851	isolate	ISOLATED FIND	12.00000	
10BT1852	isolate	ISOLATED FIND	12.00000	
10BT1854	isolate	ISOLATED FIND	12.00000	
10BT1856	isolate	ISOLATED FIND	12.00000	
10BT1857	isolate	ISOLATED FIND	12.00000	
10BT1858	isolate	ISOLATED FIND	12.00000	
10BT1859	isolate	ISOLATED FIND	12.00000	
10BT1860	isolate	ISOLATED FIND	12.00000	
10BT1863	isolate	ISOLATED FIND	12.00000	
10BT1880	isolate	ISOLATED FIND	12.00000	
10BT1881	isolate	ISOLATED FIND - LITHIC	12.00000	
10BT1884	isolate	ISOLATED FIND - LITHIC	12.00000	
10BT1885	isolate	ISOLATED FIND - LITHIC	12.00000	

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10BT1886	isolate	ISOLATED FIND. LITHIC	12.00000	
10BT1889	isolate	ISOLATED FIND	12.00000	
10BT1890	isolate	ISOLATED FIND	12.00000	
10BT1894	isolate	ISOLATED FIND	12.00000	
10BT1897	isolate	ISOLATED FIND	12.00000	
10BT1899	isolate	ISOLATED FIND	12.00000	
10BT1900	isolate	ISOLATED FIND	12.00000	
10BT1902	isolate	ISOLATED FIND	12.00000	
10BT1905	isolate	ISOLATED FIND	12.00000	
10BT1906	isolate	ISOLATED FIND	12.00000	
10BT1908	isolate	ISOLATED FIND	12.00000	
10BT1909	isolate	ISOLATED FIND	12.00000	
10BT1910	isolate	ISOLATED FIND	12.00000	
10BT1911	isolate	ISOLATED FIND	12.00000	
10BT1913	isolate	ISOLATED FIND	12.00000	
10BT1914	isolate	ISOLATED FIND	12.00000	
10BT1916	isolate	ISOLATED FIND	12.00000	
10BT1919	isolate	ISOLATED FIND	12.00000	
10BT1920	isolate	ISOLATED FIND	12.00000	
10BT1921	isolate	ISOLATED FIND	12.00000	
10BT1923	isolate	ISOLATED FIND	12.00000	
10BT1925	isolate	ISOLATED FIND	12.00000	
10BT1928	isolate	ISOLATED FIND	12.00000	
10BT1930	isolate	ISOLATED FIND	12.00000	
10BT1931	isolate	ISOLATED FIND	12.00000	
10BT1932	isolate	ISOLATED FIND	12.00000	
10BT1933	isolate	ISOLATED FIND	12.00000	
10BT1934	isolate	ISOLATED FIND	12.00000	
10BT1935	isolate	ISOLATED FIND	12.00000	
10BT1937	isolate	ISOLATED FIND	12.00000	
10BT1938	isolate	ISOLATED FIND	12.00000	
10BT1940	isolate	ISOLATED FIND	12.00000	

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10BT1943	isolate	ISOLATED FIND	12.00000	
10BT1944	isolate	ISOLATED FIND	12.00000	
10BT1946	isolate	ISOLATED FIND	12.00000	
10BT1947	isolate	ISOLATED FIND	12.00000	
10BT1948	isolate	ISOLATED FIND	12.00000	
10BT1950	isolate	ISOLATED FIND	12.00000	
10BT1951	isolate	ISOLATED FIND	12.00000	
10BT1952	isolate	ISOLATED FIND	12.00000	
10BT1954	isolate	ISOLATED FIND	12.00000	
10BT1955	isolate	ISOLATED FIND	12.00000	
10BT1956	isolate	ISOLATED FIND	12.00000	
10BT1958	isolate	ISOLATED FIND	12.00000	
10BT1959	isolate	ISOLATED FIND	12.00000	
10BT1962	isolate	ISOLATED FIND	12.00000	
10BT1963	isolate	ISOLATED FIND	12.00000	
10BT1964	isolate	ISOLATED FIND	12.00000	
10BT1965	isolate	ISOLATED FIND	12.00000	
10BT1966	isolate	ISOLATED FIND	12.00000	
10BT1968	isolate	ISOLATED FIND	12.00000	
10BT1975	isolate	ISOLATED FIND	12.00000	
10BT1977	isolate	ISOLATED FIND	12.00000	
10BT1978	isolate	ISOLATED FIND	12.00000	
10BT1979	isolate	ISOLATED FIND	12.00000	
10BT1980	isolate	ISOLATED FIND	12.00000	
10BT1981	isolate	ISOLATED FIND	12.00000	
10BT1982	isolate	ISOLATED FIND	12.00000	
10BT1984	isolate	ISOLATED FIND	12.00000	
10BT2001	isolate	ISOLATED FIND	12.00000	
10BT2002	isolate	ISOLATED FIND	12.00000	
10BT2003	isolate	ISOLATED FIND	12.00000	
10BT2004	isolate	ISOLATED FIND	12.00000	
10BT2005	isolate	ISOLATED FIND	12.00000	

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10BT2007	isolate	ISOLATED FIND	12.00000	
10BT2016	isolate	ISOLATED FIND PROJECT. PT	12.00000	
10BT2017	isolate	ISOLATED FIND PROJECT. PT	12.00000	
10BT2019	isolate	ISOLATED FIND (BIFACE)	12.00000	
10BT2031	isolate	ISOLATED FIND	12.00000	
10BT2032	isolate	ISOLATED FIND	12.00000	
10BT2034	isolate	ISOLATED FIND	12.00000	
10BT2035	isolate	ISOLATED FIND	12.00000	
10BT2043	isolate	biface frag	12.00000	4970.00000
10BT2047	isolate	scraper	12.00000	4915.00000
10BT2067	isolate	point	12.00000	5940.00000
10BT2071	isolate	biface	12.00000	4785.00000
10BT2072	isolate	biface	12.00000	4785.00000
10BT2077	isolate	point midsection	12.00000	4936.00000
10BT2079	isolate	biface tip	12.00000	4940.00000
10BT2081	isolate	biface	12.00000	5560.00000
10BT2082	isolate	point	12.00000	5722.00000
10BT2084	isolate	biface midsection	12.00000	5060.00000
10BT2088	isolate	possible blank	12.00000	4980.00000
10BT2089	isolate	biface frag	12.00000	4980.00000
10BT2090	isolate	biface	12.00000	4965.00000
10BT2091	isolate	point	12.00000	4970.00000
10BT2126	isolate	Elko comer-notched point	12.00000	6200.00000
10BT2134	isolate	point	12.00000	5230.00000
10BT258	isolate	ISOLATED FIND	12.00000	
10BT299	isolate	ISOLATED FIND	12.00000	
10BT376	isolate	ISOLATED FIND	12.00000	
10BT379	isolate	ISOLATED FIND	12.00000	
10BT381	isolate	ISOLATED FIND	12.00000	
10BT382	isolate	ISOLATED FIND	12.00000	
10BT384	isolate	ISOLATED FIND	12.00000	
10BT389	isolate	ISOLATED FIND	12.00000	

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10BT391	isolate	ISOLATED FIND	12.00000	
10BT392	isolate	ISOLATED FIND	12.00000	
10BT399	isolate	ISOLATED FIND	12.00000	
10BT401	isolate	ISOLATED FIND	12.00000	
10BT402	isolate	ISOLATED FIND	12.00000	
10BT403	isolate	ISOLATED FIND	12.00000	
10BT408	isolate	ISOLATED FIND	12.00000	
10BT409	isolate	ISOLATED FIND	12.00000	
10BT410	isolate	ISOLATED FIND	12.00000	
10BT411	isolate	ISOLATED FIND	12.00000	
10BT412	isolate	ISOLATED FIND	12.00000	
10BT414	isolate	ISOLATED FIND	12.00000	
10BT416	isolate	ISOLATED FIND	12.00000	
10BT418	isolate	ISOLATED FIND	12.00000	
10BT419	isolate	ISOLATED FIND	12.00000	
10BT421	isolate	ISOLATED FIND	12.00000	
10BT428	isolate	ISOLATED FIND	12.00000	
10BT433	isolate	ISOLATED FIND	12.00000	
10BT442	isolate	ISOLATED FIND	12.00000	
10BT449	isolate	ISOLATED FIND	12.00000	
10BT451	isolate	ISOLATED FIND	12.00000	
10BT454	isolate	ISOLATED FIND	12.00000	
10BT455	isolate	ISOLATED FIND	12.00000	
10BT456	isolate	ISOLATED FIND	12.00000	
10BT585	isolate	ISOLATED FIND	12.00000	
10BT586	isolate	ISOLATED FIND	12.00000	
10BT587	isolate	ISOLATED FIND	12.00000	
10BT593	isolate	ISOLATED FIND	12.00000	
10BT599	isolate	ISOLATED FIND	12.00000	
10BT601	isolate	ISOLATED FIND	12.00000	
10BT602	isolate	ISOLATED FIND	12.00000	
10BT609	isolate	ISOLATED FIND	12.00000	

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10BT611	isolate	ISOLATED FIND	12.00000	
10BT613	isolate	ISOLATED FIND	12.00000	
10BT622	isolate	ISOLATED FIND	12.00000	
10BT624	isolate	ISOLATED FIND	12.00000	
10BT625	isolate	ISOLATED FIND	12.00000	
10BT626	isolate	ISOLATED FIND	12.00000	
10BT631	isolate	ISOLATED FIND	12.00000	
10BT633	isolate	ISOLATED FIND	12.00000	
10BT634	isolate	ISOLATED FIND	12.00000	
10BT636	isolate	ISOLATED FIND	12.00000	
10BT637	isolate	ISOLATED FIND	12.00000	
10BT638	isolate	ISOLATED FIND	12.00000	
10BT640	isolate	ISOLATED FIND	12.00000	
10BT641	isolate	ISOLATED FIND	12.00000	
10BT642	isolate	ISOLATED FIND	12.00000	
10BT643	isolate	ISOLATED FIND	12.00000	
10BT644	isolate	ISOLATED FIND	12.00000	
10BT645	isolate	ISOLATED FIND	12.00000	
10BT655	isolate	ISOLATED FIND	12.00000	
10BT656	isolate	ISOLATED FIND	12.00000	
10BT660	isolate	ISOLATED FIND	12.00000	
10BT664	isolate	ISOLATED FIND	12.00000	
10BT666	isolate	ISOLATED FIND	12.00000	
10BT667	isolate	ISOLATED FIND	12.00000	
10BT671	isolate	ISOLATED FIND	12.00000	
10BT672	isolate	ISOLATED FIND	12.00000	
10BT681	isolate	ISOLATED FIND	12.00000	
10BT682	isolate	ISOLATED FIND	12.00000	
10BT686	isolate	ISOLATED FIND	12.00000	
10BT687	isolate	ISOLATED FIND	12.00000	
10BT688	isolate	ISOLATED FIND	12.00000	
10BT689	isolate	ISOLATED FIND	12.00000	

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10BT690	isolate	ISOLATED FIND	12.00000	
10BT691	isolate	ISOLATED FIND	12.00000	
10BT692	isolate	ISOLATED FIND	12.00000	
10BT693	isolate	ISOLATED FIND	12.00000	
10BT694	isolate	ISOLATED FIND	12.00000	
10BT697	isolate	ISOLATED FIND	12.00000	
10BT698	isolate	ISOLATED FIND	12.00000	
10BT706	isolate	ISOLATED FIND; point	12.00000	5020.00000
10BT707	isolate	ISOLATED FIND; point	12.00000	5020.00000
10BT709	isolate	ISOLATED FIND; point	12.00000	5040.00000
10BT710	isolate	ISOLATED FIND	12.00000	
10BT713	isolate	ISOLATED FIND; biface	12.00000	5020.00000
10BT714	isolate	ISOLATED FIND; point	12.00000	5025.00000
10BT715	isolate	ISOLATED FIND; point	12.00000	5030.00000
10BT722	isolate	ISOLATED FIND	12.00000	
10BT723	isolate	ISOLATED FIND	12.00000	
10BT724	isolate	ISOLATED FIND	12.00000	
10BT725	isolate	ISOLATED FIND	12.00000	
10BT728	isolate	ISOLATED FIND	12.00000	
10BT730	isolate	ISOLATED FIND	12.00000	
10BT733	isolate	ISOLATED FIND	12.00000	
10BT734	isolate	ISOLATED FIND	12.00000	
10BT735	isolate	ISOLATED FIND	12.00000	
10BT736	isolate	ISOLATED FIND	12.00000	
10BT737	isolate	ISOLATED FIND	12.00000	
10BT739	isolate	ISOLATED FIND	12.00000	
10BT741	isolate	ISOLATED FIND	12.00000	
10BT744	isolate	ISOLATED FIND	12.00000	
10BT746	isolate	ISOLATED FIND	12.00000	
10BT761	isolate	ISOLATED FIND	12.00000	
10BT777	isolate	ISOLATED FIND	12.00000	
10BT823	isolate	ISOLATED FIND	12.00000	

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10BT824	isolate	ISOLATED FIND	12.00000	
10BT825	isolate	ISOLATED FIND	12.00000	
10BT826	isolate	ISOLATED FIND	12.00000	
10BT827	isolate	ISOLATED FIND	12.00000	
10BT828	isolate	ISOLATED FIND	12.00000	
10BT829	isolate	ISOLATED FIND	12.00000	
10BT830	isolate	ISOLATED FIND	12.00000	
10BT831	isolate	ISOLATED FIND	12.00000	
10BT832	isolate	ISOLATED FIND	12.00000	
10BT833	isolate	ISOLATED FIND	12.00000	
10BT834	isolate	ISOLATED FIND	12.00000	
10BT835	isolate	ISOLATED FIND	12.00000	
10BT836	isolate	ISOLATED FIND	12.00000	
10BT837	isolate	ISOLATED FIND	12.00000	
10BT838	isolate	ISOLATED FIND	12.00000	
10BT839	isolate	ISOLATED FIND	12.00000	
10BT840	isolate	ISOLATED FIND	12.00000	
10BT841	isolate	ISOLATED FIND	12.00000	
10BT842	isolate	ISOLATED FIND	12.00000	
10BT843	isolate	ISOLATED FIND	12.00000	
10BT844	isolate	ISOLATED FIND	12.00000	
10BT845	isolate	ISOLATED FIND	12.00000	
10BT846	isolate	ISOLATED FIND	12.00000	
10BT847	isolate	ISOLATED FIND	12.00000	
10BT849	isolate	ISOLATED FIND	12.00000	
10BT850	isolate	ISOLATED FIND	12.00000	
10BT851	isolate	ISOLATED FIND	12.00000	
10BT852	isolate	ISOLATED FIND	12.00000	
10BT853	isolate	ISOLATED FIND	12.00000	
10BT854	isolate	ISOLATED FIND	12.00000	
10BT855	isolate	ISOLATED FIND	12.00000	
10BT856	isolate	ISOLATED FIND	12.00000	

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10BT857	isolate	ISOLATED FIND	12.00000	
10BT858	isolate	ISOLATED FIND	12.00000	
10BT859	isolate	ISOLATED FIND	12.00000	
10BT860	isolate	ISOLATED FIND	12.00000	
10BT861	isolate	ISOLATED FIND	12.00000	
10BT862	isolate	ISOLATED FIND	12.00000	
10BT863	isolate	ISOLATED FIND	12.00000	
10BT864	isolate	ISOLATED FIND	12.00000	
10BT865	isolate	ISOLATED FIND	12.00000	
10BT866	isolate	ISOLATED FIND	12.00000	
10BT867	isolate	ISOLATED FIND	12.00000	
10BT868	isolate	ISOLATED FIND	12.00000	
10BT869	isolate	ISOLATED FIND	12.00000	
10BT870	isolate	ISOLATED FIND	12.00000	
10BT871	isolate	ISOLATED FIND	12.00000	
10BT872	isolate	ISOLATED FIND	12.00000	
10BT873	isolate	ISOLATED FIND	12.00000	
10BT874	isolate	ISOLATED FIND	12.00000	
10BT875	isolate	ISOLATED FIND	12.00000	
10BT876	isolate	ISOLATED FIND	12.00000	
10BT877	isolate	ISOLATED FIND	12.00000	
10BT878	isolate	ISOLATED FIND	12.00000	
10BT879	isolate	ISOLATED FIND	12.00000	
10BT880	isolate	ISOLATED FIND	12.00000	
10BT881	isolate	ISOLATED FIND	12.00000	
10BT882	isolate	ISOLATED FIND	12.00000	
10BT883	isolate	ISOLATED FIND	12.00000	
10BT884	isolate	ISOLATED FIND	12.00000	
10BT885	isolate	ISOLATED FIND	12.00000	
10BT886	isolate	ISOLATED FIND	12.00000	
10BT887	isolate	ISOLATED FIND	12.00000	
10BT888	isolate	ISOLATED FIND	12.00000	

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10BT889	isolate	ISOLATED FIND	12.00000	
10BT890	isolate	ISOLATED FIND	12.00000	
10BT891	isolate	ISOLATED FIND	12.00000	
10BT892	isolate	ISOLATED FIND	12.00000	
10BT893	isolate	ISOLATED FIND	12.00000	
10BT894	isolate	ISOLATED FIND	12.00000	
10BT895	isolate	ISOLATED FIND	12.00000	
10BT896	isolate	ISOLATED FIND	12.00000	
10BT897	isolate	ISOLATED FIND	12.00000	
10BT899	isolate	ISOLATED FIND	12.00000	
10BT900	isolate	ISOLATED FIND	12.00000	
10BT901	isolate	ISOLATED FIND	12.00000	
10BT902	isolate	ISOLATED FIND	12.00000	
10BT903	isolate	ISOLATED FIND	12.00000	
10BT904	isolate	ISOLATED FIND	12.00000	
10BT905	isolate	ISOLATED FIND	12.00000	
10BT906	isolate	ISOLATED FIND	12.00000	
10BT908	isolate	ISOLATED FIND	12.00000	
10BT909	isolate	ISOLATED FIND	12.00000	
10BT910	isolate	ISOLATED FIND	12.00000	
10BT911	isolate	ISOLATED FIND	12.00000	
10BT912	isolate	ISOLATED FIND	12.00000	
10BT913	isolate	ISOLATED FIND	12.00000	
10BT918	isolate	ISOLATED FIND	12.00000	
10BT919	isolate	ISOLATED FIND	12.00000	
10BT920	isolate	ISOLATED FIND	12.00000	
10BT921	isolate	ISOLATED FIND	12.00000	
10BT922	isolate	ISOLATED FIND	12.00000	
10BT923	isolate	ISOLATED FIND	12.00000	
10BT924	isolate	ISOLATED FIND	12.00000	
10BT925	isolate	ISOLATED FIND	12.00000	
10BT926	isolate	ISOLATED FIND	12.00000	

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10BT927	isolate	ISOLATED FIND	12.00000	
10BT928	isolate	ISOLATED FIND	12.00000	
10BT929	isolate	ISOLATED FIND	12.00000	
10BT930	isolate	ISOLATED FIND	12.00000	
10BT931	isolate	ISOLATED FIND	12.00000	
10BT932	isolate	ISOLATED FIND	12.00000	
10BT935	isolate	ISOLATED FIND	12.00000	
10BT936	isolate	ISOLATED FIND	12.00000	
10BT938	isolate	ISOLATED FIND	12.00000	
10BT939	isolate	ISOLATED FIND	12.00000	
10BT942	isolate	ISOLATED FIND	12.00000	
10BT943	isolate	ISOLATED FIND	12.00000	
10BT946	isolate	ISOLATED FIND	12.00000	
10BT952	isolate	ISOLATED FIND	12.00000	
10BT955	isolate	ISOLATED FIND	12.00000	
10BT960	isolate	ISOLATED FIND	12.00000	
10BT961	isolate	ISOLATED FIND	12.00000	
10BT962	isolate	ISOLATED FIND	12.00000	
10BT963	isolate	ISOLATED FIND	12.00000	
10BT964	isolate	ISOLATED FIND	12.00000	
10BT965	isolate	ISOLATED FIND	12.00000	
10BT966	isolate	ISOLATED FIND	12.00000	
10BT969	isolate	ISOLATED FIND	12.00000	
10BT971	isolate	ISOLATED FIND	12.00000	
10BT972	isolate	ISOLATED FIND	12.00000	
10BT973	isolate	ISOLATED FIND	12.00000	
10BT976	isolate	ISOLATED FIND	12.00000	
10BT977	isolate	ISOLATED FIND	12.00000	
10BT978	isolate	ISOLATED FIND	12.00000	
10BT982	isolate	ISOLATED FIND	12.00000	
10BT984	isolate	ISOLATED FIND	12.00000	
10BT985	isolate	ISOLATED FIND	12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BT986	isolate	ISOLATED FIND	12.00000	
10BT987	isolate	ISOLATED FIND	12.00000	
10BT988	isolate	ISOLATED FIND	12.00000	
10BT989	isolate	ISOLATED FIND	12.00000	
10BT991	isolate	ISOLATED FIND	12.00000	
10BT992	isolate	ISOLATED FIND	12.00000	
10BT993	isolate	ISOLATED FIND	12.00000	
10BT994	isolate	ISOLATED FIND	12.00000	
10BT999	isolate	ISOLATED FIND	12.00000	
10JE99	isolate	ISOLATED FIND	12.00000	
10LN120	isolate	ISOLATED FIND	12.00000	
10LN122	isolate	ISOLATED FIND	12.00000	
10LN123	isolate	ISOLATED FIND	12.00000	
10LN124	isolate	ISOLATED FIND	12.00000	
10LN141	isolate	ISOLATED FIND	12.00000	
10LN144	isolate	ISOLATED FIND	12.00000	
10LN145	isolate	ISOLATED FIND	12.00000	
10LN146	isolate	ISOLATED FIND	12.00000	
10LN147	isolate	ISOLATED FIND	12.00000	
10LN148	isolate	ISOLATED FIND	12.00000	
10LN149	isolate	ISOLATED FIND	12.00000	
10LN150	isolate	ISOLATED FIND	12.00000	
10LN151	isolate	ISOLATED FIND	12.00000	
10LN153	isolate	ISOLATED FIND	12.00000	
10LN154	isolate	ISOLATED FIND	12.00000	
10LN155	isolate	ISOLATED FIND	12.00000	
10LN156	isolate	ISOLATED FIND	12.00000	
10LN158	isolate	ISOLATED FIND	12.00000	
10LN159	isolate	ISOLATED FIND	12.00000	
10LN162	isolate	ISOLATED FIND	12.00000	
10LN163	isolate	ISOLATED FIND	12.00000	
10LN164	isolate	ISOLATED FIND	12.00000	

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10LN165	isolate	ISOLATED FIND	12.00000	
10LN166	isolate	ISOLATED FIND	12.00000	
10LN167	isolate	ISOLATED FIND	12.00000	
10LN168	isolate	ISOLATED FIND	12.00000	
10LN169	isolate	ISOLATED FIND	12.00000	
10LN170	isolate	ISOLATED FIND	12.00000	
10LN171	isolate	ISOLATED FIND	12.00000	
10LN172	isolate	ISOLATED FIND	12.00000	
10LN173	isolate	ISOLATED FIND	12.00000	
10LN174	isolate	ISOLATED FIND	12.00000	
10LN175	isolate	ISOLATED FIND	12.00000	
10LN235	isolate	ISOLATED FIND	12.00000	
10LN236	isolate	ISOLATED FIND, LITHICS	12.00000	
10LN237	isolate	ISOLATED FIND, LITHICS	12.00000	
10LN238	isolate	ISOLATED FIND, LITHICS	12.00000	
10LN239	isolate	ISOLATED FIND, LITHICS	12.00000	
10LN240	isolate	ISOLATED FIND, LITHICS	12.00000	
10LN241	isolate	ISOLATED FIND, LITHICS	12.00000	
10LN242	isolate	ISOLATED FIND	12.00000	
10LN243	isolate	ISOLATED FIND	12.00000	
10LN244	isolate	ISOLATED FIND	12.00000	
10LN245	isolate	ISOLATED FIND	12.00000	
10LN246	isolate	ISOLATED FIND, LITHICS	12.00000	
10LN247	isolate	ISOLATED FIND, LITHICS	12.00000	
10LN248	isolate	ISOLATED FIND, LITHICS	12.00000	
10LN249	isolate	ISOLATED FIND	12.00000	
10LN250	isolate	ISOLATED FIND	12.00000	
10LN251	isolate	ISOLATED FIND	12.00000	
10LN252	isolate	ISOLATED FIND	12.00000	
10LN253	isolate	ISOLATED FIND	12.00000	
10LN254	isolate	ISOLATED FIND, LITHICS	12.00000	
10LN255	isolate	ISOLATED FIND, LITHICS	12.00000	

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10LN256	isolate	ISOLATED FIND	12.00000	
10LN257	isolate	ISOLATED FIND	12.00000	
10LN258	isolate	ISOLATED FIND	12.00000	
10LN259	isolate	ISOLATED FIND	12.00000	
10LN261	isolate	ISOLATED FIND, LITHICS	12.00000	
10LN262	isolate	ISOLATED FIND, LITHICS	12.00000	
10LN263	isolate	ISOLATED FIND	12.00000	
10LN264	isolate	ISOLATED FIND	12.00000	
10LN265	isolate	ISOLATED FIND	12.00000	
10LN268	isolate	ISOLATED FIND	12.00000	
10LN271	isolate	ISOLATED FIND	12.00000	
10LN308	isolate	5 volcanic glass ssecondary waste flakes	12.00000	4430.00000
10LN309	isolate	one red volcanic glass biface fragment	12.00000	4500.00000
10LN310	isolate	point midsection	12.00000	4240.00000
10LN311	isolate	biface midsection	12.00000	4245.00000
10LN312	isolate	point frag	12.00000	4270.00000
10LN334	isolate	biface midsection	12.00000	4720.00000
10LN335	isolate	Desert side-notched point	12.00000	4730.00000
10LN337	isolate	side-notched point	12.00000	4730.00000
10LN338	isolate	comer-notched point	12.00000	4700.00000
10LN444	isolate	point base	12.00000	4405.00000
10LN446	isolate	scraper	12.00000	4450.00000
10LN449	isolate	point midsection	12.00000	4460.00000
10LN450	isolate	point	12.00000	4405.00000
10LN451	isolate	flake	12.00000	4225.00000
10LN454	isolate	flake	12.00000	4375.00000
10LN458	isolate	point	12.00000	4518.00000
10LN461	isolate	point midsection	12.00000	4440.00000
10LN462	isolate	flake	12.00000	4470.00000
10LN467	isolate	point base	12.00000	4510.00000
10LN468	isolate	flake	12.00000	4240.00000
10LN469	isolate	flake	12.00000	4235.00000

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10LN470	isolate	point base		12.00000	4230.00000
10LN476	isolate	biface		12.00000	4430.00000
10LN480	isolate	point frag		12.00000	4430.00000
10LN483	isolate	flake		12.00000	4370.00000
10LN486	isolate	flake		12.00000	4370.00000
10LN487	isolate	point		12.00000	4395.00000
10LN493	isolate	point		12.00000	4375.00000
10LN497	isolate	point		12.00000	4470.00000
10LN498	isolate	flake		12.00000	4435.00000
10LN500	isolate	flake		12.00000	4505.00000
10LN506	isolate	flake		12.00000	4420.00000
10LN508	isolate	flake		12.00000	4480.00000
10LN516	isolate	flake		12.00000	4440.00000
10LN517	isolate	flake		12.00000	4425.00000
10LN520	isolate	flake		12.00000	4450.00000
10LN521	isolate	point midsection		12.00000	4470.00000
10LN523	isolate	flake		12.00000	4410.00000
10LN524	isolate	flake		12.00000	4410.00000
10LN525	isolate	scraper		12.00000	4365.00000
10LN526	isolate	biface midsection		12.00000	4380.00000
10LN527	isolate	flake		12.00000	4340.00000
10LN528	isolate	flake		12.00000	4390.00000
10LN530	isolate	flake		12.00000	4430.00000
10LN533	isolate	point midsection		12.00000	4375.00000
10LN537	isolate	point		12.00000	4460.00000
10LN538	isolate	point		12.00000	4515.00000
10LN542	isolate	point base		12.00000	4405.00000
10LN543	isolate	flake		12.00000	4425.00000
10LN544	isolate	biface frag		12.00000	4395.00000
10LN545	isolate	flake		12.00000	4215.00000
10LN553	isolate	scraper		12.00000	4400.00000
10LN557	isolate	flake		12.00000	4450.00000

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10LN558	isolate	bifce frag	12.00000	4350.00000
10LN559	isolate	point	12.00000	4345.00000
10LN561	isolate	point	12.00000	4225.00000
10LN563	isolate	flake	12.00000	4430.00000
10LN565	isolate	flake	12.00000	4520.00000
10LN576	isolate	scraper	12.00000	4440.00000
10LN577	isolate	biface	12.00000	4330.00000
10LN578	isolate	flake	12.00000	4390.00000
10LN583	isolate	flake	12.00000	4450.00000
10LN585	isolate	biface midsection	12.00000	4350.00000
10LN591	isolate	flake	12.00000	4395.00000
10LN595	isolate	flake	12.00000	4240.00000
10LN597	isolate	biface frag	12.00000	4225.00000
10LN599	isolate	flake	12.00000	4225.00000
10LN602	isolate	flake	12.00000	4235.00000
10LN609	isolate	point	12.00000	4510.00000
10LN610	isolate	point	12.00000	4590.00000
10LN611	isolate	flake	12.00000	4420.00000
10MA116	isolate	ISOLATED FIND	12.00000	
10MA117	isolate	ISOLATED FIND	12.00000	
10MA118	isolate	ISOLATED FIND	12.00000	
10MA119	isolate	ISOLATED FIND	12.00000	
10MA120	isolate	ISOLATED FIND	12.00000	
10MA121	isolate	ISOLATED FIND	12.00000	
10MA122	isolate	ISOLATED FIND	12.00000	
10MA123	isolate	ISOLATED FIND	12.00000	
10MA124	isolate	ISOLATED FIND	12.00000	
10MA125	isolate	ISOLATED FIND	12.00000	
10MA126	isolate	ISOLATED FIND	12.00000	
10MA127	isolate	ISOLATED FIND	12.00000	
10MA128	isolate	ISOLATED FIND	12.00000	
10MA129	isolate	ISOLATED FIND	12.00000	

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10MA130	isolate	ISOLATED FIND	12.00000	
10MA131	isolate	ISOLATED FIND	12.00000	
10MA134	isolate	ISOLATED FIND	12.00000	
10MA135	isolate	1 black volcanic glass biface midsection	12.00000	4315.00000
10MA136	isolate	1 volcanic glass biface fragment	12.00000	4325.00000
10MA137	isolate	1 volcanic glass stemmed projectile point	12.00000	4335.00000
10MA140	isolate	biface tip	12.00000	4560.00000
10MA142	isolate	lanceolate projectile point base	12.00000	4500.00000
10MA154	isolate	point	12.00000	4840.00000
10MA155	isolate	point	12.00000	4840.00000
10MA156	isolate	point	12.00000	4850.00000
10MA157	isolate	biface	12.00000	4920.00000
10MA158	isolate	scraper	12.00000	4910.00000
10MA159	isolate	point	12.00000	4840.00000
10MA160	isolate	poing	12.00000	4875.00000
10MA161	isolate	point	12.00000	4900.00000
10MA57	isolate	ISOLATED FIND	12.00000	
10MA58	isolate	ISOLATED FIND	12.00000	
10MA59	isolate	ISOLATED FIND	12.00000	
10MA60	isolate	ISOLATED FIND	12.00000	
10MA61	isolate	ISOLATED FIND	12.00000	
10MA62	isolate	ISOLATED FIND	12.00000	
10MA63	isolate	ISOLATED FIND	12.00000	
10MA64	isolate	ISOLATED FIND	12.00000	
10MA65	isolate	ISOLATED FIND	12.00000	
10MA66	isolate	ISOLATED FIND	12.00000	
10MA67	isolate	ISOLATED FIND	12.00000	
10MA68	isolate	ISOLATED FIND	12.00000	
10MA69	isolate	ISOLATED FIND	12.00000	
10MA70	isolate	ISOLATED FIND	12.00000	
10MA71	isolate	ISOLATED FIND	12.00000	
10MA72	isolate	ISOLATED FIND	12.00000	

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10MA73	isolate	ISOLATED FIND	12.00000	
10MA74	isolate	ISOLATED FIND	12.00000	
10MA75	isolate	ISOLATED FIND	12.00000	
10MA76	isolate	ISOLATED FIND	12.00000	
10MA77	isolate	ISOLATED FIND	12.00000	
10MA139	isolate	biface base and amethyst whiskey bottle	12.00000	4520.00000
10MA162	landscape feat	lithic scatter and five depressions; flake	12.00000	4800.00000
10BT2009	landscape feat	LITHICS/HISTORIC DAM	12.00000	
10BN1006	open	end scraper, 11 flakes	12.00000	4860.00000
10BN1007	open	2 flakes	12.00000	4840.00000
10BN1013	open	lithic scatter; biface, 17 flakes, 2 utili	12.00000	4860.00000
10BN1017	open	lithic scatter; 2 retouched flakes, 8 flak	12.00000	4840.00000
10BN1018	open	lithic scatter; Humboldt point, 10 flakes	12.00000	4840.00000
10BN1020	open	lithic scatter; point, biface, 80-plus fla	12.00000	4820.00000
10BN1021	open	lithic scatter; biface, 2 scrapers, flakes	12.00000	4830.00000
10BN1022	open	lithic scatter; DSN point, 75-plus flakes	12.00000	4820.00000
10BN1023	open	lithic scatter; scraper, biface, flakes	12.00000	4820.00000
10BN1024	open	lithic scatter; 300-plus flakes	12.00000	4820.00000
10BN1025	open	lithic scatter; 11 flakes	12.00000	4920.00000
10BN1026	open	3 flakes	12.00000	4930.00000
10BN1029	open	lithic scatter; point, flakes	12.00000	4930.00000
10BN1031	open	4 flakes, core	12.00000	4960.00000
10BN1032	open	5 flakes	12.00000	4980.00000
10BN1033	open	lithic scatter; 10 flakes	12.00000	4960.00000
10BN1035	open	5 flakes	12.00000	4960.00000
10BN1037	open	lithic scatter; DSN point, biface, scraper	12.00000	4930.00000
10BN1041	open	2 flakes	12.00000	5000.00000
10BN1042	open	lithic scatter; cobble, flakes	12.00000	5000.00000
10BN1043	open	lithic scatter; Elko point, flakes	12.00000	4970.00000
10BN1047	open	lithic scatter; flakes, retouched flake	12.00000	4950.00000
10BN1049	open	lithic scatter; flakes	12.00000	4900.00000
10BN1051	open	7 flakes	12.00000	5040.00000

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10BN1052	open	point, 3 flakes	12.00000	5080.00000
10BN1053	open	2 flakes	12.00000	5020.00000
10BN1054	open	2 flakes	12.00000	4980.00000
10BN1056	open	point, flake	12.00000	5320.00000
10BN1062	open	6 flakes	12.00000	5370.00000
10BN1063	open	3 flakes	12.00000	5370.00000
10BN125	open	LITHIC SCATTER; flakes	12.00000	5180.00000
10BN126	open	LITHIC SCATTER; points, flake tools, flake	12.00000	5300.00000
10BN127	open	LITHIC SCATTER; flake tools, flakes	12.00000	5360.00000
10BN128	open	LITHIC SCATTER; flakes	12.00000	5360.00000
10BN130	open	LITHIC SCATTER; flake tools, flakes	12.00000	4572.00000
10BN131	open	LITHIC SCATTER; flake tools, unifaces, bif	12.00000	4572.00000
10BN132	open	LITHIC SCATTER; flake tools, points (DSN,E	12.00000	4640.00000
10BN133	open	LITHIC SCATTER; bifaces, flakes	12.00000	4900.00000
10BN134	open	LITHIC SCATTER; flake tools, points (corne	12.00000	4885.00000
10BN135	open	2 chalcedony flakes (one heat altered), 1	12.00000	5100.00000
10BN136	open	LITHIC SCATTER; points (triangular, side-n	12.00000	4885.00000
10BN137	open	LITHIC SCATTER; points, flake tools, flake	12.00000	4860.00000
10BN148	open	LITHIC SCATTER	12.00000	
10BN149	open	LITHIC SCATTER	12.00000	
10BN150	open	LITHIC SCATTER	12.00000	
10BN151	open	LITHIC SCATTER	12.00000	
10BN157	open	LITHIC SCATTER	12.00000	
10BN160	open	LITHIC SCATTER; biface	12.00000	5200.00000
10BN161	open	LITHIC SCATTER	12.00000	
10BN172	open	LITHIC SCATTER	12.00000	
10BN173	open	LITHIC SCATTER	12.00000	
10BN174	open	LITHIC SCATTER	12.00000	
10BN176	open	LITHIC SCATTER	12.00000	
10BN199	open	LITHIC SCATTER	12.00000	
10BN203	open	LITHIC SCATTER	12.00000	
10BN204	open	LITHIC SCATTER	12.00000	

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10BN206	open	LITHIC SCATTER	12.00000	
10BN209	open	LITHIC SCATTER	12.00000	
10BN210	open	LITHIC SCATTER	12.00000	
10BN212	open	LITHIC SCATTER	12.00000	
10BN213	open	LITHIC SCATTER	12.00000	
10BN215	open	LITHIC SCATTER	12.00000	
10BN216	open	LITHIC SCATTER	12.00000	
10BN219	open	LITHIC SCATTER	12.00000	
10BN220	open	LITHIC SCATTER	12.00000	
10BN249	open	LITHIC SCATTER	12.00000	
10BN250	open	LITHIC SCATTER	12.00000	
10BN251	open	LITHIC SCATTER	12.00000	
10BN252	open	LITHIC SCATTER	12.00000	
10BN273	open	LITHIC SCATTER	12.00000	
10BN275	open	LITHIC SCATTER	12.00000	
10BN276	open	LITHIC SCATTER	12.00000	
10BN307	open	LITHIC SCATTER	12.00000	
10BN312	open	LITHIC SCATTER	12.00000	
10BN313	open	LITHIC SCATTER	12.00000	
10BN316	open	LITHIC SCATTER	12.00000	
10BN336	open	LITHIC SCATTER	12.00000	
10BN381	open	LITHIC SCATTER	12.00000	
10BN382	open	LITHIC SCATTER	12.00000	
10BN383	open	LITHIC SCATTER	12.00000	
10BN384	open	LITHIC SCATTER	12.00000	
10BN385	open	LITHIC SCATTER	12.00000	
10BN386	open	LITHIC SCATTER	12.00000	
10BN387	open	LITHIC SCATTER	12.00000	
10BN388	open	LITHIC SCATTER	12.00000	
10BN390	open	LITHIC SCATTER	12.00000	
10BN391	open	LITHIC, POTTERY SCATTER	12.00000	
10BN392	open	LITHIC SCATTER	12.00000	

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10BN393	open	LITHIC SCATTER	12.00000	
10BN395	open	LITHIC SCATTER	12.00000	
10BN396	open	LITHIC SCATTER	12.00000	
10BN397	open	LITHIC SCATTER	12.00000	
10BN398	open	LITHIC SCATTER	12.00000	
10BN399	open	LITHIC SCATTER	12.00000	
10BN411	open	CAMP SITE	12.00000	
10BN46	open	lithic scatter; flakes, point	12.00000	4800.00000
10BN47	open	LITHIC SCATTER; flakes	12.00000	4815.00000
10BN504	open	large lithic scatter, mostly obsidian	12.00000	4750.00000
10BN505	open	lithic scatter consisting of 10-20 obsidia	12.00000	4820.00000
10BN507	open	lithic scatter composed of mostly obsidian	12.00000	4605.00000
10BN508	open	lithic scatter composed of obsidian/chert	12.00000	4620.00000
10BN509	open	lithic scatter composed of obsidian/CCS fl	12.00000	4710.00000
10BN511	open	lithic scatter, mostly obsidian flakes	12.00000	4640.00000
10BN512	open	lithic scatter--flakes, scraper, and possi	12.00000	4570.00000
10BN513	open	lithic scatter consisting of chert/obsidia	12.00000	4655.00000
10BN514	open	lithic scatter composed of obsidian flakes	12.00000	4675.00000
10BN515	open	lithic scatter--bifaces, projectile points	12.00000	4690.00000
10BN518	open	lithic scatter composed of obsidian flakes	12.00000	4770.00000
10BN519	open	lithic scatter composed of obsidian/chalce	12.00000	4820.00000
10BN520	open	lithic scatter composed of flakes, biface	12.00000	4745.00000
10BN521	open	lithic scatter composed of flakes and one	12.00000	4800.00000
10BN522	open	lithic scatter composed of chalcedony/obsi	12.00000	4640.00000
10BN524	open	lithic scatter composed of obsidian flakes	12.00000	4720.00000
10BN526	open	lithic scatter composed of flakes, scraper	12.00000	4605.00000
10BN527	open	lithic scatter composed of obsidian flakes	12.00000	4560.00000
10BN528	open	lithic scatter/campsite--artifacts are mos	12.00000	4835.00000
10BN529	open	lithic scatter composed of obsidian flakes	12.00000	4680.00000
10BN532	open	lithic scatter composed obsidian flakes an	12.00000	4560.00000
10BN533	open	lithic scatter composed of obsidian flakes	12.00000	4740.00000
10BN534	open	multi-component lithic scatter having a va	12.00000	4460.00000

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10BN538	open	lithic scatter including flakes and tools	12.00000	4625.00000
10BN539	open	lithic scatter composed of flakes, biface	12.00000	4590.00000
10BN54	open	LITHIC SCATTER; flakes, side-notched point	12.00000	5220.00000
10BN540	open	lithic scatter including flakes, tool frag	12.00000	4490.00000
10BN541	open	lithic scatter composed of obsdian, CCS, a	12.00000	4600.00000
10BN542	open	lithic scatter with assorted tools	12.00000	4700.00000
10BN543	open	lithic scatter	12.00000	4740.00000
10BN544	open	lithic scatter composed of chalcedony flak	12.00000	4470.00000
10BN546	open	lithic scatter composed of flakes, one cor	12.00000	4380.00000
10BN548	open	lithic scatter composed of flakes, biface	12.00000	4415.00000
10BN549	open	lithic scatter composed of flakes, scraper	12.00000	4646.00000
10BN55	open	LITHIC SCATTER; flakes, point tip; on a la	12.00000	5350.00000
10BN550	open	lithic scatter with lanceolate-shaped proj	12.00000	4500.00000
10BN552	open	lithic scatter with possible paleo point a	12.00000	4660.00000
10BN553	open	lithic scatter with one projectile point a	12.00000	4660.00000
10BN554	open	lithic scatter with one Rose Spring Corner	12.00000	4650.00000
10BN555	open	lithic scatter composed of obsidian flakes	12.00000	4730.00000
10BN557	open	lithic scatter/campsite	12.00000	4380.00000
10BN558	open	lithic scatter with one chert utilized fla	12.00000	4430.00000
10BN559	open	lithic scatter/campsite with one projectil	12.00000	4415.00000
10BN56	open	LITHIC SCATTER; flakes, utilized core, end	12.00000	5000.00000
10BN560	open	lithic scatter	12.00000	4430.00000
10BN561	open	lithic scatter with one core	12.00000	4400.00000
10BN562	open	lithic scatter with projectile points, bif	12.00000	4560.00000
10BN563	open	lithic scatter with an ignimbrite core	12.00000	4610.00000
10BN564	open	lithic scatter with one obsidian projectil	12.00000	4380.00000
10BN566	open	lithic scatter with one Elko Corner-Notche	12.00000	4580.00000
10BN569	open	lithic scatter with obsidian Elko projecti	12.00000	4582.00000
10BN573	open	lithic scatter with one obsidian corner-no	12.00000	4370.00000
10BN574	open	lithic scatter with several tools	12.00000	4360.00000
10BN575	open	lithic scatter	12.00000	4485.00000
10BN576	open	lithic scatter with six flaked stone tools	12.00000	4230.00000

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10BN577	open	lithic scatter with Elko-earred projectile	12.00000	4460.00000
10BN578	open	lithic scatter with obsidian projectile po	12.00000	4440.00000
10BN579	open	lithic scatter with obsidian and chalcedon	12.00000	4420.00000
10BN580	open	lithic scatter with obsidian and ignimbrit	12.00000	4420.00000
10BN582	open	lithic scatter with biface midsection, man	12.00000	4400.00000
10BN583	open	lithic scatter of obsidian flakes	12.00000	4340.00000
10BN584	open	lithic scatter with shale awl and obsidian	12.00000	4100.00000
10BN585	open	lithic scatter with obsidian and CCS flake	12.00000	4515.00000
10BN586	open	lithic scatter	12.00000	4270.00000
10BN60	open	LITHIC SCATTER; flakes	12.00000	4419.00000
10BN607	open	two Pinto point bases	12.00000	4540.00000
10BN61	open	LITHIC SCATTER; flakes, several with worke	12.00000	4265.00000
10BN610	open	scraper and Agate Basin point base	12.00000	4390.00000
10BN613	open	three obsdian flakes and a chert drill	12.00000	4500.00000
10BN615	open	corner-notched projectile point, biface ti	12.00000	4460.00000
10BN618	open	basalt tertiary flake, obsidian secondary	12.00000	4382.00000
10BN62	open	LITHIC SCATTER; flakes, worked flake	12.00000	4265.00000
10BN620	open	obsidian flake tool, white chalcedony knif	12.00000	4340.00000
10BN626	open	obsidian projectile point midsection, obsi	12.00000	4440.00000
10BN631	open	chert corner-notched projectile point, pro	12.00000	4440.00000
10BN632	open	chert drill and flake, American Falls obsi	12.00000	4400.00000
10BN637	open	2 Rose Spring points	12.00000	4400.00000
10BN643	open	Rose Spring corner notched point, biface,	12.00000	4440.00000
10BN647	open	2 flakes	12.00000	4380.00000
10BN648	open	10 flakes	12.00000	4630.00000
10BN649	open	4 flakes	12.00000	4440.00000
10BN651	open	4 flakes	12.00000	4335.00000
10BN652	open	2 flakes	12.00000	4325.00000
10BN654	open	14 flakes	12.00000	4340.00000
10BN655	open	3 flakes	12.00000	4350.00000
10BN657	open	2 flakes	12.00000	4340.00000
10BN658	open	8 flakes	12.00000	4340.00000

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BN660	open	3 flakes, core	12.00000	4380.00000
10BN661	open	3 flakes	12.00000	4400.00000
10BN662	open	2 flakes	12.00000	4400.00000
10BN663	open	1 flake, 1 flake tool	12.00000	4400.00000
10BN665	open	2 flakes	12.00000	4380.00000
10BN666	open	7 flakes	12.00000	4540.00000
10BN668	open	2 flakes	12.00000	4480.00000
10BN669	open	2 flakes, scraper	12.00000	4400.00000
10BN672	open	4 flakes	12.00000	4340.00000
10BN673	open	flake, tool	12.00000	4340.00000
10BN674	open	5 flakes	12.00000	4400.00000
10BN676	open	2 bifaces	12.00000	4400.00000
10BN677	open	ten white chert flakes and one obsidian fl	12.00000	4480.00000
10BN678	open	obsidian biface fragment, secondary obsidi	12.00000	4380.00000
10BN680	open	two flakes	12.00000	4660.00000
10BN681	open	flakes--3 obsidian tertiary, 1 obsidian se	12.00000	4700.00000
10BN683	open	6 obsidian flakes-1 decort, 2 secondary, 3	12.00000	4710.00000
10BN686	open	4 tertiary obsidian pressure flakes	12.00000	4630.00000
10BN687	open	3 obsidian flakes-2 secondary, 1 tertiary	12.00000	4615.00000
10BN688	open	2 tertiary flakes	12.00000	4760.00000
10BN689	open	2 secondary obsidian flakes	12.00000	4540.00000
10BN690	open	1 secondary and 5 tertiary obsidian flakes	12.00000	4560.00000
10BN691	open	1 grey chert secondary flake and 1 shatter	12.00000	4500.00000
10BN696	open	4 flakes	12.00000	4600.00000
10BN697	open	8 flakes	12.00000	4780.00000
10BN698	open	2 flakes	12.00000	4610.00000
10BN70	open	3 utilized flakes	12.00000	5120.00000
10BN700	open	core, 2 flakes	12.00000	4580.00000
10BN701	open	3 flakes	12.00000	4640.00000
10BN706	open	3 flakes	12.00000	4640.00000
10BN709	open	2 flakes	12.00000	4560.00000
10BN710	open	point, flake	12.00000	4580.00000

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BN723	open	3 flakes	12.00000	4480.00000
10BN724	open	2 flakes	12.00000	4540.00000
10BN726	open	6 flakes	12.00000	4455.00000
10BN727	open	2 flakes	12.00000	4390.00000
10BN73	open	LITHIC SCATTER; flakes	12.00000	4950.00000
10BN730	open	biface, 5 flakes	12.00000	4635.00000
10BN732	open	2 flakes	12.00000	4540.00000
10BN733	open	biface, flake	12.00000	4420.00000
10BN735	open	4 flakes	12.00000	4780.00000
10BN736	open	2 flakes	12.00000	4620.00000
10BN737	open	7 flakes	12.00000	4580.00000
10BN738	open	2 flakes	12.00000	4560.00000
10BN74	open	LITHIC SCATTER; flakes, nodules	12.00000	5000.00000
10BN740	open	2 flakes 30 meters apart	12.00000	4580.00000
10BN742	open	5 flakes	12.00000	4520.00000
10BN744	open	biface frag, flake	12.00000	4460.00000
10BN746	open	5 flakes	12.00000	4400.00000
10BN75	open	LITHIC SCATTER; flakes, point, ground ston	12.00000	5200.00000
10BN750	open	2 flakes	12.00000	4560.00000
10BN751	open	flake tool, flake	12.00000	4540.00000
10BN752	open	3 flakes	12.00000	4460.00000
10BN754	open	biface frag, chunk	12.00000	4500.00000
10BN756	open	2 biface frags	12.00000	4640.00000
10BN758	open	biface frag, point	12.00000	4600.00000
10BN760	open	biface frag, flake	12.00000	4500.00000
10BN763	open	biface tip, 2 flakes	12.00000	4620.00000
10BN765	open	biface, 3 flakes	12.00000	4740.00000
10BN77	open	LITHIC SCATTER; flakes, bone, tooth enamel	12.00000	4900.00000
10BN774	open	6 flakes, biface	12.00000	4535.00000
10BN78	open	LITHIC SCATTER; flakes, tooth enamel	12.00000	4900.00000
10BN782	open	4 flakes	12.00000	4690.00000
10BN783	open	lithic scatter; 6 flakes	12.00000	4710.00000

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BN788	open	lithic scatter; flakes, biface tip, point	12.00000	5120.00000
10BN789	open	lithic scatter; flakes	12.00000	5135.00000
10BN79	open	LITHIC SCATTER; flakes, nodules, micaceous	12.00000	4860.00000
10BN8	open	LITHIC SCATTER; several campsites with poi	12.00000	4400.00000
10BN80	open	LITHIC SCATTER; flakes, spall, points (Pin	12.00000	4860.00000
10BN81	open	LITHIC SCATTER; flakes, corner-notched poi	12.00000	4900.00000
10BN861	open	large, highly dispersed lithic scatter	12.00000	4920.00000
10BN956	open	lithic scatter; point, modified flake, fla	12.00000	4840.00000
10BN957	open	lithic scatter; point, endscraper, flakes	12.00000	4800.00000
10BN965	open	lithic scatter and historic scatter; point	12.00000	4840.00000
10BN968	open	lithic scatter; points, biface, flakes	12.00000	4820.00000
10BN970	open	3 flakes	12.00000	4920.00000
10BN985	open	3 flakes	12.00000	4760.00000
10BN986	open	core and 3 flakes	12.00000	4760.00000
10BN988	open	4 flakes	12.00000	4800.00000
10BN999	open	lithic scatter; flakes, points, scraper	12.00000	4940.00000
10BT100	open	LITHIC SCATTER	12.00000	
10BT1002	open	LITHIC SCATTER	12.00000	
10BT1003	open	LITHIC SCATTER	12.00000	
10BT1004	open	LITHIC SCATTER	12.00000	
10BT1006	open	TEMPORARY CAMP	12.00000	
10BT1008	open	LITHIC SCATTER	12.00000	
10BT1009	open	LITHIC SCATTER	12.00000	
10BT101	open	LITHIC SCATTER	12.00000	
10BT1011	open	LITHIC SCATTER	12.00000	
10BT1012	open	LITHIC SCATTER	12.00000	
10BT1013	open	LITHIC SCATTER	12.00000	
10BT1015	open	LITHIC SCATTER	12.00000	
10BT1016	open	LITHIC SCATTER	12.00000	
10BT1018	open	LITHIC SCATTER,PROCESSING	12.00000	
10BT1020	open	LITHIC SCATTER	12.00000	
10BT1021	open	TEMPORARY CAMP	12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BT1022	open	PROCESSING	12.00000	
10BT1025	open	LITHIC SCATTER	12.00000	
10BT1028	open	LITHIC SCATTER	12.00000	
10BT1029	open	TEMPORARY CAMP	12.00000	
10BT1030	open	TEMPORARY CAMP	12.00000	
10BT1032	open	LITHIC SCATTER	12.00000	
10BT1034	open	LITHIC SCATTER	12.00000	
10BT1036	open	LITHIC SCATTER	12.00000	
10BT1038	open	LITHIC SCATTER	12.00000	
10BT1039	open	LITHIC SCATTER	12.00000	
10BT104	open	LITHIC SCATTER	12.00000	
10BT1041	open	LITHIC SCATTER	12.00000	
10BT1043	open	LITHIC SCATTER	12.00000	
10BT1044	open	LITHIC SCATTER	12.00000	
10BT1045	open	LITHIC SCATTER	12.00000	
10BT1046	open	LITHIC SCATTER	12.00000	
10BT1049	open	LITHIC SCATTER	12.00000	
10BT105	open	LITHIC SCATTER	12.00000	
10BT1052	open	LITHIC SCATTER	12.00000	
10BT1053	open	LITHIC SCATTER	12.00000	
10BT1056	open	LITHIC SCATTER	12.00000	
10BT1059	open	LITHIC SCATTER	12.00000	
10BT1062	open	LITHIC SCATTER	12.00000	
10BT1063	open	LITHIC SCATTER	12.00000	
10BT1066	open	KILL SITE	12.00000	
10BT1068	open	LITHIC SCATTER	12.00000	
10BT1069	open	LITHIC SCATTER	12.00000	
10BT107	open	LITHIC SCATTER	12.00000	
10BT1075	open	LITHIC SCATTER	12.00000	
10BT1076	open	KILL SITE	12.00000	
10BT1078	open	KILL SITE	12.00000	
10BT1079	open	LITHIC SCATTER	12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BT1082	open	KILL SITE	12.00000	
10BT1083	open	HUNTING CAMP	12.00000	
10BT1085	open	LITHIC SCATTER	12.00000	
10BT1086	open	LITHIC SCATTER	12.00000	
10BT1087	open	PROCESSING	12.00000	
10BT109	open	LITHIC SCATTER	12.00000	
10BT1091	open	LITHIC SCATTER	12.00000	
10BT110	open	LITHIC SCATTER	12.00000	
10BT1101	open	LITHIC SCATTER	12.00000	
10BT1102	open	LITHIC SCATTER	12.00000	
10BT1104	open	LITHIC SCATTER	12.00000	
10BT1106	open	LITHIC SCATTER	12.00000	
10BT1108	open	LITHIC SCATTER	12.00000	
10BT1109	open	LITHIC SCATTER	12.00000	
10BT111	open	LITHIC SCATTER	12.00000	
10BT1110	open	LITHIC SCATTER	12.00000	
10BT1112	open	LITHIC SCATTER	12.00000	
10BT1122	open	LITHIC SCATTER	12.00000	
10BT1123	open	LITHIC SCATTER	12.00000	
10BT1128	open	LITHIC SCATTER	12.00000	
10BT1129	open	LITHIC SCATTER	12.00000	
10BT113	open	CAMP SITE	12.00000	
10BT1130	open	LITHIC SCATTER	12.00000	
10BT1131	open	LITHIC SCATTER	12.00000	
10BT1133	open	LITHIC SCATTER	12.00000	
10BT1134	open	LITHIC SCATTER	12.00000	
10BT1135	open	LITHIC SCATTER	12.00000	
10BT1137	open	LITHIC SCATTER	12.00000	
10BT1139	open	LITHIC SCATTER	12.00000	
10BT114	open	CAMP SITE	12.00000	
10BT1140	open	LITHIC SCATTER	12.00000	
10BT1141	open	LITHIC SCATTER	12.00000	

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10BT1142	open	LITHIC SCATTER	12.00000	
10BT1145	open	LITHIC SCATTER	12.00000	
10BT1146	open	LITHIC SCATTER	12.00000	
10BT1147	open	LITHIC SCATTER	12.00000	
10BT1148	open	LITHIC SCATTER	12.00000	
10BT1149	open	LITHIC SCATTER	12.00000	
10BT115	open	CAMP SITE	12.00000	
10BT1152	open	LITHIC SCATTER	12.00000	
10BT1156	open	LITHIC SCATTER	12.00000	
10BT1157	open	TEMPORARY CAMP	12.00000	
10BT1160	open	LITHIC SCATTER	12.00000	
10BT1161	open	LITHIC SCATTER	12.00000	
10BT1166	open	LITHIC SCATTER	12.00000	
10BT1167	open	LITHIC SCATTER	12.00000	
10BT117	open	CAMP SITE	12.00000	
10BT1170	open	LITHIC SCATTER	12.00000	
10BT1171	open	TEMPORARY CAMP	12.00000	
10BT1172	open	TEMPORARY CAMP	12.00000	
10BT1173	open	LITHIC SCATTER	12.00000	
10BT1174	open	LITHIC SCATTER	12.00000	
10BT1177	open	LITHIC SCATTER	12.00000	
10BT118	open	CAMP SITE	12.00000	
10BT1181	open	LITHIC SCATTER	12.00000	
10BT1185	open	LITHIC SCATTER	12.00000	
10BT1188	open	LITHIC SCATTER	12.00000	
10BT1189	open	LITHIC REDUCTION AREA	12.00000	
10BT119	open	CAMP SITE	12.00000	
10BT1190	open	PROCESSING	12.00000	
10BT1191	open	LITHIC SCATTER	12.00000	
10BT1193	open	LITHIC SCATTER	12.00000	
10BT1194	open	LITHIC SCATTER	12.00000	
10BT12	open	large campsite	12.00000	

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10BT120	open	LITHIC SCATTER	12.00000	
10BT1200	open	LITHIC SCATTER	12.00000	
10BT1202	open	LITHIC SCATTER	12.00000	
10BT1205	open	LITHIC SCATTER	12.00000	
10BT1207	open	LITHIC SCATTER	12.00000	
10BT1208	open	LITHIC SCATTER	12.00000	
10BT1209	open	LITHIC SCATTER	12.00000	
10BT121	open	CAMP SITE	12.00000	
10BT1211	open	LITHIC SCATTER	12.00000	
10BT1212	open	HABITATION/CAMP	12.00000	
10BT1214	open	LITHIC SCATTER	12.00000	
10BT1215	open	LITHIC SCATTER	12.00000	
10BT1216	open	LITHIC SCATTER	12.00000	
10BT122	open	LITHIC SCATTER	12.00000	
10BT1221	open	LITHIC SCATTER	12.00000	
10BT1222	open	LITHIC SCATTER	12.00000	
10BT1223	open	LITHIC SCATTER	12.00000	
10BT1224	open	LITHIC SCATTER	12.00000	
10BT1225	open	LITHIC SCATTER	12.00000	
10BT1226	open	LITHIC SCATTER	12.00000	
10BT1227	open	PROCESSING	12.00000	
10BT123	open	LITHIC SCATTER	12.00000	
10BT1230	open	LITHIC SCATTER	12.00000	
10BT1232	open	LITHIC SCATTER, CAMP SITE	12.00000	
10BT1234	open	LITHIC SCATTER	12.00000	
10BT1242	open	LITHIC SCATTER	12.00000	
10BT1247	open	TEMPORARY CAMP	12.00000	
10BT1250	open	HEARTH	12.00000	
10BT1251	open	LITHIC SCATTER	12.00000	
10BT1252	open	LITHIC SCATTER	12.00000	
10BT1257	open	LITHIC SCATTER	12.00000	
10BT1258	open	LITHIC SCATTER	12.00000	

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10BT1266	open	LITHIC SCATTER	12.00000	
10BT1269	open	LITHIC SCATTER	12.00000	
10BT1272	open	LITHIC SCATTER	12.00000	
10BT1273	open	LITHIC SCATTER	12.00000	
10BT1274	open	LITHIC SCATTER	12.00000	
10BT1279	open	LITHIC SCATTER	12.00000	
10BT1280	open	LITHIC SCATTER	12.00000	
10BT1281	open	LITHIC SCATTER	12.00000	
10BT1282	open	LITHIC SCATTER	12.00000	
10BT1283	open	LITHIC SCATTER	12.00000	
10BT1284	open	LITHIC SCATTER	12.00000	
10BT1285	open	LITHIC SCATTER	12.00000	
10BT1286	open	LITHIC SCATTER	12.00000	
10BT1289	open	LITHIC SCATTER	12.00000	
10BT129	open	LITHIC SCATTER	12.00000	
10BT1297	open	LITHIC SCATTER	12.00000	
10BT1299	open	LITHIC SCATTER	12.00000	
10BT1300	open	LITHIC SCATTER	12.00000	
10BT1306	open	LITHIC SCATTER	12.00000	
10BT1307	open	LITHIC SCATTER	12.00000	
10BT1309	open	LITHIC SCATTER	12.00000	
10BT131	open	LITHIC SCATTER	12.00000	
10BT1310	open	LITHIC SCATTER	12.00000	
10BT1314	open	LITHIC SCATTER	12.00000	
10BT1315	open	LITHIC SCATTER	12.00000	
10BT1317	open	LITHIC SCATTER	12.00000	
10BT1318	open	LITHIC SCATTER	12.00000	
10BT1319	open	LITHIC SCATTER	12.00000	
10BT1321	open	LITHIC SCATTER	12.00000	
10BT1322	open	LITHIC SCATTER	12.00000	
10BT1324	open	CAMP SITE	12.00000	
10BT1327	open	LITHIC SCATTER	12.00000	

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10BT1328	open	LITHIC SCATTER	12.00000	
10BT1329	open	LITHIC SCATTER	12.00000	
10BT133	open	LITHIC SCATTER	12.00000	
10BT1330	open	LITHIC SCATTER	12.00000	
10BT1332	open	LITHIC SCATTER	12.00000	
10BT1333	open	LITHIC SCATTER	12.00000	
10BT1334	open	LITHIC SCATTER	12.00000	
10BT1335	open	CAMP SITE	12.00000	
10BT1336	open	LITHIC SCATTER	12.00000	
10BT1338	open	LITHIC SCATTER	12.00000	
10BT134	open	CAMP SITE	12.00000	
10BT1341	open	LITHIC SCATTER	12.00000	
10BT1345	open	LITHIC SCATTER	12.00000	
10BT1346	open	LITHIC SCATTER	12.00000	
10BT1348	open	LITHIC SCATTER	12.00000	
10BT1349	open	LITHIC SCATTER	12.00000	
10BT1351	open	LITHIC SCATTER	12.00000	
10BT1352	open	LITHIC SCATTER	12.00000	
10BT1354	open	LITHIC SCATTER	12.00000	
10BT1357	open	LITHIC SCATTER	12.00000	
10BT1359	open	LITHIC SCATTER	12.00000	
10BT1363	open	LITHIC SCATTER	12.00000	
10BT1366	open	LITHIC SCATTER	12.00000	
10BT1370	open	LITHIC SCATTER	12.00000	
10BT1375	open	LITHIC SCATTER	12.00000	
10BT1377	open	LITHIC SCATTER	12.00000	
10BT1378	open	LITHIC SCATTER	12.00000	
10BT1380	open	LITHIC SCATTER	12.00000	
10BT1382	open	LITHIC SCATTER	12.00000	
10BT1383	open	LITHIC SCATTER	12.00000	
10BT1385	open	LITHIC SCATTER	12.00000	
10BT1389	open	LITHIC SCATTER	12.00000	

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10BT1390	open	LITHIC SCATTER	12.00000	
10BT1397	open	LITHIC SCATTER	12.00000	
10BT1398	open	LITHIC SCATTER	12.00000	
10BT1399	open	LITHIC SCATTER	12.00000	
10BT1402	open	LITHIC SCATTER	12.00000	
10BT1403	open	LITHIC SCATTER	12.00000	
10BT1408	open	LITHIC SCATTER	12.00000	
10BT1410	open	LITHIC SCATTER	12.00000	
10BT1413	open	LITHIC SCATTER	12.00000	
10BT1417	open	LITHIC SCATTER	12.00000	
10BT1419	open	LITHIC SCATTER	12.00000	
10BT1420	open	LITHIC SCATTER	12.00000	
10BT1421	open	LITHIC SCATTER	12.00000	
10BT1422	open	LITHIC SCATTER	12.00000	
10BT1424	open	LITHIC SCATTER	12.00000	
10BT1425	open	LITHIC SCATTER	12.00000	
10BT1426	open	LITHIC SCATTER	12.00000	
10BT1427	open	LITHIC SCATTER	12.00000	
10BT1428	open	LITHIC SCATTER	12.00000	
10BT1429	open	LITHIC SCATTER	12.00000	
10BT1431	open	LITHIC SCATTER	12.00000	
10BT1432	open	LITHIC SCATTER	12.00000	
10BT1434	open	LITHIC SCATTER	12.00000	
10BT1436	open	LITHIC SCATTER	12.00000	
10BT1437	open	LITHIC SCATTER	12.00000	
10BT1438	open	LITHIC SCATTER	12.00000	
10BT1445	open	LITHIC SCATTER	12.00000	
10BT1449	open	LITHIC SCATTER	12.00000	
10BT1450	open	LITHIC SCATTER	12.00000	
10BT1451	open	LITHIC SCATTER	12.00000	
10BT1454	open	lithic scatter	12.00000	5040.00000
10BT1455	open	lithic scatter	12.00000	5040.00000

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10BT1456	open	lithic scatter		12.00000	4925.00000
10BT1457	open	LITHIC SCATTER		12.00000	
10BT1460	open	LITHIC SCATTER		12.00000	
10BT1462	open	LITHIC SCATTER		12.00000	
10BT1464	open	LITHIC SCATTER		12.00000	
10BT1466	open	LITHIC SCATTER		12.00000	
10BT1467	open	LITHIC SCATTER		12.00000	
10BT1468	open	LITHIC SCATTER		12.00000	
10BT1469	open	LITHIC SCATTER		12.00000	
10BT1471	open	LITHIC SCATTER		12.00000	
10BT1473	open	LITHIC SCATTER		12.00000	
10BT1474	open	LITHIC SCATTER		12.00000	
10BT1476	open	LITHIC SCATTER		12.00000	
10BT1477	open	LITHIC SCATTER		12.00000	
10BT1478	open	LITHIC SCATTER		12.00000	
10BT1479	open	LITHIC SCATTER		12.00000	
10BT1483	open	LITHIC SCATTER		12.00000	
10BT1484	open	campsite of over 500 flakes		12.00000	4940.00000
10BT1486	open	LITHIC SCATTER		12.00000	
10BT1487	open	LITHIC SCATTER		12.00000	
10BT1488	open	LITHIC SCATTER		12.00000	
10BT1489	open	LITHIC SCATTER		12.00000	
10BT149	open	LITHIC SCATTER		12.00000	
10BT1490	open	LITHIC SCATTER		12.00000	
10BT1494	open	LITHIC SCATTER		12.00000	
10BT1497	open	LITHIC SCATTER		12.00000	
10BT1498	open	LITHIC SCATTER		12.00000	
10BT1499	open	LITHIC SCATTER		12.00000	
10BT150	open	CAMP SITE		12.00000	
10BT1500	open	LITHIC SCATTER		12.00000	
10BT1502	open	LITHIC SCATTER		12.00000	
10BT1503	open	LITHIC SCATTER		12.00000	

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10BT1505	open	LITHIC SCATTER	12.00000	
10BT1509	open	LITHIC SCATTER	12.00000	
10BT151	open	CAMP SITE	12.00000	
10BT1513	open	LITHIC SCATTER	12.00000	
10BT1515	open	LITHIC SCATTER	12.00000	
10BT1517	open	lithic scatter	12.00000	4945.00000
10BT1518	open	LITHIC SCATTER	12.00000	
10BT152	open	LITHIC SCATTER	12.00000	
10BT1521	open	LITHIC SCATTER	12.00000	
10BT1522	open	LITHIC SCATTER	12.00000	
10BT1526	open	LITHIC SCATTER	12.00000	
10BT1530	open	LITHIC SCATTER	12.00000	
10BT1534	open	LITHIC SCATTER	12.00000	
10BT1535	open	LITHIC SCATTER	12.00000	
10BT1536	open	LITHIC SCATTER	12.00000	
10BT1537	open	LITHIC SCATTER	12.00000	
10BT1538	open	LITHIC SCATTER	12.00000	
10BT1539	open	LITHIC SCATTER	12.00000	
10BT1540	open	LITHIC SCATTER	12.00000	
10BT1541	open	LITHIC SCATTER	12.00000	
10BT1544	open	LITHIC SCATTER	12.00000	
10BT1545	open	LITHIC SCATTER	12.00000	
10BT1546	open	LITHIC SCATTER	12.00000	
10BT1548	open	LITHIC SCATTER	12.00000	
10BT155	open	LITHIC SCATTER	12.00000	
10BT1551	open	LITHIC SCATTER	12.00000	
10BT1553	open	LITHIC SCATTER	12.00000	
10BT1554	open	CAMP SITE	12.00000	
10BT1556	open	LITHIC SCATTER	12.00000	
10BT1559	open	LITHIC SCATTER	12.00000	
10BT1560	open	LITHIC SCATTER	12.00000	
10BT1561	open	CAMP SITE	12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BT1566	open	lithic scatter	12.00000	4930.00000
10BT1567	open	lithic scatter	12.00000	4920.00000
10BT1573	open	LITHIC SCATTER	12.00000	
10BT1574	open	LITHIC SCATTER	12.00000	
10BT1581	open	LITHIC SCATTER	12.00000	
10BT1585	open	LITHIC SCATTER	12.00000	
10BT1592	open	LITHIC SCATTER	12.00000	
10BT1593	open	LITHIC SCATTER	12.00000	
10BT1595	open	LITHIC SCATTER	12.00000	
10BT1596	open	LITHIC SCATTER	12.00000	
10BT160	open	LITHIC SCATTER	12.00000	
10BT1605	open	LITHIC SCATTER	12.00000	
10BT1608	open	LITHIC SCATTER	12.00000	
10BT1609	open	LITHIC SCATTER	12.00000	
10BT161	open	LITHIC SCATTER	12.00000	
10BT1613	open	LITHIC SCATTER	12.00000	
10BT1617	open	LITHIC SCATTER	12.00000	
10BT1619	open	LITHIC SCATTER	12.00000	
10BT1622	open	LITHIC SCATTER	12.00000	
10BT1625	open	LITHIC SCATTER	12.00000	
10BT1627	open	LITHIC SCATTER	12.00000	
10BT1629	open	LITHIC SCATTER	12.00000	
10BT1630	open	LITHIC SCATTER	12.00000	
10BT1638	open	LITHIC SCATTER	12.00000	
10BT1639	open	HUNTING BLIND	12.00000	
10BT164	open	LITHIC SCATTER	12.00000	
10BT1641	open	LITHIC SCATTER	12.00000	
10BT1642	open	LITHIC SCATTER	12.00000	
10BT1644	open	LITHIC SCATTER	12.00000	
10BT1646	open	LITHIC SCATTER	12.00000	
10BT1647	open	LITHIC SCATTER	12.00000	
10BT1651	open	LITHIC SCATTER	12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BT1653	open	LITHIC SCATTER	12.00000	
10BT1656	open	LITHIC SCATTER	12.00000	
10BT1657	open	LITHIC SCATTER	12.00000	
10BT1659	open	LITHIC SCATTER	12.00000	
10BT166	open	LITHIC SCATTER	12.00000	
10BT1660	open	LITHIC SCATTER	12.00000	
10BT1662	open	LITHIC SCATTER	12.00000	
10BT1664	open	LITHIC SCATTER	12.00000	
10BT1665	open	LITHIC SCATTER	12.00000	
10BT1667	open	LITHIC SCATTER	12.00000	
10BT167	open	LITHIC SCATTER	12.00000	
10BT1670	open	LITHIC SCATTER	12.00000	
10BT1671	open	LITHIC SCATTER	12.00000	
10BT1672	open	LITHIC SCATTER	12.00000	
10BT1673	open	LITHIC SCATTER	12.00000	
10BT1676	open	LITHIC SCATTER	12.00000	
10BT1677	open	LITHIC SCATTER	12.00000	
10BT1678	open	LITHIC SCATTER	12.00000	
10BT1679	open	LITHIC SCATTER	12.00000	
10BT168	open	LITHIC SCATTER	12.00000	
10BT1682	open	LITHIC SCATTER	12.00000	
10BT1685	open	LITHIC SCATTER	12.00000	
10BT1687	open	LITHIC SCATTER	12.00000	
10BT1688	open	LITHIC SCATTER	12.00000	
10BT1690	open	LITHIC SCATTER	12.00000	
10BT1692	open	LITHIC SCATTER	12.00000	
10BT1693	open	LITHIC SCATTER	12.00000	
10BT1694	open	LITHIC SCATTER	12.00000	
10BT1695	open	LITHIC SCATTER	12.00000	
10BT1696	open	LITHIC SCATTER	12.00000	
10BT1697	open	LITHIC SCATTER	12.00000	
10BT1698	open	LITHIC SCATTER	12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BT1699	open	LITHIC SCATTER	12.00000	
10BT1700	open	LITHIC SCATTER	12.00000	
10BT1713	open	LITHIC SCATTER	12.00000	
10BT172	open	LITHIC SCATTER	12.00000	
10BT1722	open	LITHIC SCATTER	12.00000	
10BT1723	open	LITHIC SCATTER	12.00000	
10BT1729	open	LITHIC SCATTER	12.00000	
10BT173	open	LITHIC SCATTER	12.00000	
10BT1730	open	LITHIC SCATTER	12.00000	
10BT1731	open	LITHIC SCATTER; flakes, biface	12.00000	4970.00000
10BT1732	open	LITHIC SCATTER	12.00000	
10BT1733	open	LITHIC SCATTER	12.00000	
10BT1734	open	LITHIC SCATTER	12.00000	
10BT1735	open	LITHIC SCATTER	12.00000	
10BT1736	open	LITHIC SCATTER	12.00000	
10BT1737	open	LITHIC SCATTER	12.00000	
10BT1738	open	LITHIC SCATTER	12.00000	
10BT1739	open	LITHIC SCATTER	12.00000	
10BT174	open	LITHIC SCATTER	12.00000	
10BT1740	open	LITHIC SCATTER	12.00000	
10BT1741	open	LITHIC SCATTER	12.00000	
10BT1744	open	lithic scattter	12.00000	4955.00000
10BT1745	open	lithic scatter	12.00000	4950.00000
10BT1746	open	lithic scatter	12.00000	4940.00000
10BT1747	open	LITHIC SCATTER	12.00000	
10BT1748	open	LITHIC SCATTER	12.00000	
10BT175	open	LITHIC SCATTER	12.00000	
10BT1754	open	LITHIC SCATTER	12.00000	
10BT1755	open	LITHIC SCATTER	12.00000	
10BT1756	open	LITHIC SCATTER	12.00000	
10BT1757	open	LITHIC SCATTER	12.00000	
10BT1759	open	LITHIC SCATTER	12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BT176	open	LITHIC SCATTER	12.00000	
10BT1763	open	LITHIC SCATTER	12.00000	
10BT1769	open	LITHIC SCATTER	12.00000	
10BT177	open	LITHIC SCATTER	12.00000	
10BT1770	open	POTTERY SCATTER	12.00000	
10BT1772	open	LITHIC SCATTER	12.00000	
10BT1773	open	LITHIC SCATTER	12.00000	
10BT1776	open	LITHIC SCATTER	12.00000	
10BT1783	open	LITHIC SCATTER	12.00000	
10BT1784	open	LITHIC SCATTER	12.00000	
10BT1786	open	LITHIC SCATTER	12.00000	
10BT1788	open	LITHIC SCATTER	12.00000	
10BT1790	open	LITHIC SCATTER	12.00000	
10BT1791	open	LITHIC SCATTER	12.00000	
10BT1792	open	LITHIC SCATTER	12.00000	
10BT1794	open	LITHIC SCATTER	12.00000	
10BT180	open	HUNTING BLINDS	12.00000	
10BT1802	open	LITHIC SCATTER	12.00000	
10BT1803	open	LITHIC SCATTER	12.00000	
10BT1804	open	LITHIC SCATTER	12.00000	
10BT1805	open	LITHIC SCATTER	12.00000	
10BT1808	open	LITHIC SCATTER	12.00000	
10BT1809	open	LITHIC SCATTER	12.00000	
10BT181	open	LITHIC SCATTER	12.00000	
10BT1812	open	LITHIC SCATTER	12.00000	
10BT1815	open	LITHIC SCATTER	12.00000	
10BT1816	open	LITHIC SCATTER	12.00000	
10BT1818	open	LITHIC SCATTER	12.00000	
10BT1821	open	CAMP SITE	12.00000	
10BT1826	open	LITHIC SCATTER	12.00000	
10BT183	open	LITHIC SCATTER	12.00000	
10BT1836	open	LITHIC SCATTER	12.00000	

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10BT1837	open	LITHIC SCATTER	12.00000	
10BT184	open	LITHIC SCATTER	12.00000	
10BT1840	open	CAMP SITE	12.00000	
10BT1841	open	LITHIC SCATTER	12.00000	
10BT1843	open	LITHIC SCATTER	12.00000	
10BT1844	open	LITHIC SCATTER	12.00000	
10BT1846	open	CAMP SITE	12.00000	
10BT1847	open	CAMP SITE	12.00000	
10BT1848	open	LITHIC SCATTER	12.00000	
10BT185	open	LITHIC SCATTER	12.00000	
10BT1853	open	LITHIC SCATTER	12.00000	
10BT1855	open	LITHIC SCATTER	12.00000	
10BT186	open	LITHIC SCATTER	12.00000	
10BT1861	open	LITHIC SCATTER	12.00000	
10BT1862	open	LITHIC SCATTER	12.00000	
10BT1864	open	LITHIC SCATTER	12.00000	
10BT1865	open	CAMP SITE	12.00000	
10BT1866	open	LITHIC SCATTER	12.00000	
10BT187	open	LITHIC SCATTER	12.00000	
10BT1875	open	LITHIC SCATTER	12.00000	
10BT188	open	LITHIC SCATTER	12.00000	
10BT1883	open	LITHIC SCATTER	12.00000	
10BT1887	open	LITHIC SCATTER	12.00000	
10BT1888	open	CAMP SITE	12.00000	
10BT189	open	LITHIC SCATTER	12.00000	
10BT1891	open	LITHIC SCATTER	12.00000	
10BT1892	open	LITHIC SCATTER	12.00000	
10BT1893	open	LITHIC SCATTER	12.00000	
10BT1895	open	LITHIC SCATTER	12.00000	
10BT1896	open	LITHIC SCATTER	12.00000	
10BT1898	open	LITHIC SCATTER	12.00000	
10BT19	open	LITHIC SCATTER	12.00000	

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10BT190	open	LITHIC SCATTER	12.00000	
10BT1901	open	LITHIC SCATTER	12.00000	
10BT1903	open	LITHIC SCATTER	12.00000	
10BT1904	open	LITHIC SCATTER	12.00000	
10BT1907	open	LITHIC SCATTER	12.00000	
10BT191	open	LITHIC SCATTER	12.00000	
10BT1912	open	LITHIC SCATTER	12.00000	
10BT1915	open	CAMP SITE	12.00000	
10BT1917	open	LITHIC SCATTER	12.00000	
10BT1918	open	LITHIC SCATTER	12.00000	
10BT192	open	LITHIC SCATTER	12.00000	
10BT1922	open	LITHIC SCATTER	12.00000	
10BT1924	open	LITHIC SCATTER	12.00000	
10BT1926	open	LITHIC SCATTER	12.00000	
10BT1927	open	CAMP SITE	12.00000	
10BT1929	open	CAMP SITE	12.00000	
10BT193	open	LITHIC SCATTER	12.00000	
10BT1936	open	LITHIC SCATTER	12.00000	
10BT1939	open	LITHIC SCATTER	12.00000	
10BT194	open	LITHIC SCATTER	12.00000	
10BT1941	open	LITHIC SCATTER	12.00000	
10BT1942	open	LITHIC SCATTER	12.00000	
10BT1945	open	CAMP SITE	12.00000	
10BT1949	open	LITHIC SCATTER	12.00000	
10BT195	open	LITHIC SCATTER	12.00000	
10BT1953	open	LITHIC SCATTER	12.00000	
10BT1957	open	LITHIC SCATTER	12.00000	
10BT196	open	LITHIC SCATTER	12.00000	
10BT1960	open	LITHIC SCATTER	12.00000	
10BT1961	open	LITHIC SCATTER	12.00000	
10BT1967	open	CAMP SITE	12.00000	
10BT1969	open	LITHIC SCATTER	12.00000	

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10BT197	open	LITHIC SCATTER	12.00000	
10BT1970	open	LITHIC SCATTER	12.00000	
10BT1974	open	LITHIC SCATTER	12.00000	
10BT1976	open	LITHIC SCATTER	12.00000	
10BT198	open	LITHIC SCATTER	12.00000	
10BT1985	open	LITHIC SCATTER	12.00000	
10BT1986	open	LITHIC SCATTER	12.00000	
10BT1988	open	LITHIC SCATTER	12.00000	
10BT1989	open	LITHIC SCATTER	12.00000	
10BT199	open	LITHIC SCATTER	12.00000	
10BT1990	open	LITHIC SCATTER	12.00000	
10BT1996	open	CAMP SITE	12.00000	
10BT200	open	LITHIC SCATTER	12.00000	
10BT2000	open	CAMP SITE	12.00000	
10BT2006	open	LITHIC SCATTER	12.00000	
10BT201	open	LITHIC SCATTER	12.00000	
10BT2010	open	LITHIC SCATTER	12.00000	
10BT2012	open	LITHIC SCATTER	12.00000	
10BT2013	open	LITHIC SCATTER	12.00000	
10BT2014	open	LITHIC SCATTER	12.00000	
10BT2015	open	STONE TOOL AND LITHIC SCA	12.00000	
10BT2018	open	LITHIC SCATTER	12.00000	
10BT202	open	LITHIC SCATTER	12.00000	
10BT2020	open	LITHIC SCATTER	12.00000	
10BT2021	open	LITHIC SCATTER	12.00000	
10BT203	open	LITHIC SCATTER	12.00000	
10BT2039	open	small lithic scatter; point, flakes	12.00000	5410.00000
10BT204	open	LITHIC SCATTER	12.00000	
10BT2041	open	5 flakes	12.00000	5700.00000
10BT2048	open	5 flakes	12.00000	4900.00000
10BT2050	open	lithic scatter; flakes, scraper, point	12.00000	4825.00000
10BT2051	open	lithic scatter; flakes, biface, fcr	12.00000	4825.00000

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10BT2052	open	lithic scatter; flakes, fcr, 2 bifaces	12.00000	4825.00000
10BT2053	open	lithic scatter; flakes, fcr, bone, ceramic	12.00000	4825.00000
10BT2066	open	lithic scatter; flakes	12.00000	5940.00000
10BT2068	open	lithic scatter; biface, flakes	12.00000	5940.00000
10BT207	open	LITHIC SCATTER	12.00000	
10BT2070	open	lithic scatter; flakes	12.00000	4805.00000
10BT2075	open	knife frag, biface frag, utilized flake, p	12.00000	5010.00000
10BT2076	open	campsite with flakes, scraper, biface grag	12.00000	4910.00000
10BT2078	open	large notched point frag, biface tip	12.00000	4940.00000
10BT208	open	LITHIC SCATTER	12.00000	
10BT2080	open	lithic scatter; flakes, point	12.00000	4940.00000
10BT2085	open	lithic scatter; point, scrapers, flakes	12.00000	5070.00000
10BT2086	open	lithic scatter; biface, flakes	12.00000	5030.00000
10BT2087	open	lithic scatter; 4 points, flakes	12.00000	5030.00000
10BT209	open	LITHIC SCATTER	12.00000	
10BT2092	open	lithic scatter; flakes	12.00000	5070.00000
10BT2093	open	lithic scatter; scraper, flakes	12.00000	5070.00000
10BT2094	open	lithic scatter; points, flakes	12.00000	5070.00000
10BT210	open	LITHIC SCATTER	12.00000	
10BT211	open	LITHIC SCATTER	12.00000	
10BT212	open	LITHIC SCATTER	12.00000	
10BT2127	open	lithic scatter; flakes	12.00000	5250.00000
10BT213	open	LITHIC SCATTER	12.00000	
10BT2130	open	lithic scatter; flakes	12.00000	5230.00000
10BT2131	open	3 flakes	12.00000	5230.00000
10BT2132	open	lithic scatter; flakes, point	12.00000	5200.00000
10BT2133	open	lithic scatter; flakes, retouch flake, bif	12.00000	5200.00000
10BT2136	open	3 flakes	12.00000	5320.00000
10BT215	open	LITHIC SCATTER	12.00000	
10BT216	open	LITHIC SCATTER	12.00000	
10BT217	open	LITHIC SCATTER	12.00000	
10BT219	open	LITHIC SCATTER	12.00000	

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10BT220	open	LITHIC SCATTER	12.00000	
10BT226	open	LITHIC SCATTER	12.00000	
10BT227	open	LITHIC SCATTER	12.00000	
10BT228	open	LITHIC SCATTER	12.00000	
10BT229	open	LITHIC SCATTER	12.00000	
10BT230	open	LITHIC SCATTER	12.00000	
10BT231	open	LITHIC SCATTER	12.00000	
10BT233	open	LITHIC SCATTER	12.00000	
10BT234	open	LITHIC SCATTER	12.00000	
10BT235	open	LITHIC SCATTER	12.00000	
10BT248	open	LITHIC SCATTER	12.00000	
10BT249	open	LITHIC SCATTER	12.00000	
10BT25	open	LITHIC SCATTER	12.00000	6480.00000
10BT250	open	LITHIC SCATTER	12.00000	
10BT255	open	LITHIC SCATTER	12.00000	
10BT256	open	LITHIC SCATTER	12.00000	
10BT257	open	LITHIC SCATTER	12.00000	
10BT259	open	LITHIC SCATTER	12.00000	
10BT260	open	LITHIC SCATTER	12.00000	
10BT262	open	LITHIC SCATTER	12.00000	
10BT266	open	LITHIC SCATTER	12.00000	
10BT270	open	LITHIC SCATTER	12.00000	
10BT271	open	LITHIC SCATTER	12.00000	
10BT272	open	LITHIC SCATTER	12.00000	
10BT273	open	LITHIC SCATTER	12.00000	
10BT274	open	LITHIC SCATTER	12.00000	
10BT275	open	LITHIC SCATTER	12.00000	
10BT276	open	LITHIC SCATTER	12.00000	
10BT277	open	LITHIC SCATTER	12.00000	
10BT278	open	LITHIC SCATTER	12.00000	
10BT279	open	LITHIC SCATTER	12.00000	
10BT28	open	LITHIC SCATTER	12.00000	

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10BT280	open	LITHIC SCATTER	12.00000	
10BT281	open	LITHIC SCATTER	12.00000	
10BT282	open	LITHIC SCATTER	12.00000	
10BT283	open	LITHIC SCATTER	12.00000	
10BT284	open	LITHIC SCATTER	12.00000	
10BT285	open	LITHIC SCATTER	12.00000	
10BT286	open	CAMP	12.00000	
10BT287	open	LITHIC SCATTER	12.00000	
10BT288	open	LITHIC SCATTER	12.00000	
10BT289	open	LITHIC SCATTER	12.00000	
10BT29	open	LITHIC SCATTER	12.00000	
10BT290	open	LITHIC SCATTER	12.00000	
10BT291	open	LITHIC SCATTER	12.00000	
10BT292	open	LITHIC SCATTER	12.00000	
10BT293	open	LITHIC SCATTER	12.00000	
10BT294	open	LITHIC SCATTER	12.00000	
10BT295	open	LITHIC SCATTER	12.00000	
10BT296	open	LITHIC SCATTER	12.00000	
10BT297	open	LITHIC SCATTER	12.00000	
10BT298	open	LITHIC SCATTER	12.00000	
10BT3	open	CAMP	12.00000	
10BT300	open	LITHIC SCATTER	12.00000	
10BT301	open	LITHIC SCATTER	12.00000	
10BT302	open	CAMP/LITHIC SCATTER	12.00000	
10BT303	open	LITHIC SCATTER	12.00000	
10BT304	open	LITHIC SCATTER	12.00000	
10BT305	open	LITHIC SCATTER	12.00000	
10BT307	open	LITHIC SCATTER	12.00000	
10BT308	open	LITHIC SCATTER	12.00000	
10BT31	open	LITHIC SCATTER	12.00000	
10BT310	open	LITHIC SCATTER	12.00000	
10BT311	open	LITHIC SCATTER	12.00000	

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10BT312	open	LITHIC SCATTER	12.00000	
10BT313	open	LITHIC SCATTER	12.00000	
10BT314	open	LITHIC SCATTER	12.00000	
10BT315	open	LITHIC SCATTER	12.00000	
10BT317	open	LITHIC SCATTER	12.00000	
10BT318	open	LITHIC SCATTER	12.00000	
10BT320	open	LITHIC SCATTER	12.00000	
10BT323	open	LITHIC SCATTER	12.00000	
10BT33	open	CAMP SITE	12.00000	
10BT330	open	LITHIC SCATTER	12.00000	
10BT331	open	LITHIC SCATTER	12.00000	
10BT332	open	LITHIC SCATTER	12.00000	
10BT333	open	LITHIC SCATTER	12.00000	
10BT334	open	LITHIC SCATTER	12.00000	
10BT336	open	LITHIC SCATTER	12.00000	
10BT337	open	LITHIC SCATTER	12.00000	
10BT338	open	LITHIC SCATTER	12.00000	
10BT339	open	LITHIC SCATTER	12.00000	
10BT34	open	crater with material at rimrock	12.00000	
10BT341	open	LITHIC SCATTER	12.00000	
10BT342	open	LITHIC SCATTER	12.00000	
10BT343	open	LITHIC SCATTER	12.00000	
10BT344	open	LITHIC SCATTER	12.00000	
10BT345	open	LITHIC SCATTER	12.00000	
10BT348	open	LITHIC SCATTER	12.00000	
10BT349	open	LITHIC SCATTER	12.00000	
10BT353	open	LITHIC SCATTER	12.00000	
10BT355	open	LITHIC SCATTER	12.00000	
10BT356	open	LITHIC SCATTER	12.00000	
10BT357	open	LITHIC SCATTER	12.00000	
10BT359	open	LITHIC SCATTER	12.00000	
10BT360	open	LITHIC SCATTER	12.00000	

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10BT361	open	LITHIC SCATTER	12.00000	
10BT362	open	LITHIC SCATTER	12.00000	
10BT363	open	LITHIC SCATTER	12.00000	
10BT371	open	LITHIC SCATTER	12.00000	
10BT372	open	LITHIC SCATTER	12.00000	
10BT373	open	LITHIC SCATTER	12.00000	
10BT374	open	LITHIC SCATTER	12.00000	
10BT375	open	LITHIC SCATTER	12.00000	
10BT377	open	LITHIC SCATTER	12.00000	
10BT378	open	LITHIC SCATTER	12.00000	
10BT380	open	LITHIC SCATTER	12.00000	
10BT383	open	LITHIC SCATTER	12.00000	
10BT385	open	LITHIC SCATTER	12.00000	
10BT386	open	LITHIC SCATTER	12.00000	
10BT387	open	LITHIC SCATTER, CAMP SITE	12.00000	
10BT39	open	CAMP SITE	12.00000	
10BT390	open	LITHIC SCATTER	12.00000	
10BT393	open	LITHIC SCATTER	12.00000	
10BT394	open	LITHIC SCATTER	12.00000	
10BT395	open	LITHIC SCATTER	12.00000	
10BT396	open	LITHIC SCATTER	12.00000	
10BT397	open	LITHIC SCATTER	12.00000	
10BT398	open	LITHIC SCATTER	12.00000	
10BT4	open	CAMP	12.00000	
10BT40	open	LITHIC SCATTER	12.00000	
10BT400	open	LITHIC SCATTER	12.00000	
10BT404	open	LITHIC SCATTER	12.00000	
10BT405	open	LITHIC SCATTER	12.00000	
10BT406	open	LITHIC SCATTER	12.00000	
10BT407	open	LITHIC SCATTER	12.00000	
10BT41	open	LITHIC SCATTER	12.00000	
10BT413	open	LITHIC SCATTER	12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BT415	open	LITHIC SCATTER	12.00000	
10BT417	open	LITHIC SCATTER	12.00000	
10BT420	open	LITHIC SCATTER	12.00000	
10BT422	open	LITHIC SCATTER	12.00000	
10BT423	open	LITHIC SCATTER	12.00000	
10BT424	open	LITHIC SCATTER	12.00000	
10BT425	open	LITHIC SCATTER	12.00000	
10BT426	open	LITHIC SCATTER	12.00000	
10BT427	open	LITHIC SCATTER	12.00000	
10BT429	open	LITHIC SCATTER	12.00000	
10BT430	open	LITHIC SCATTER	12.00000	
10BT431	open	LITHIC SCATTER	12.00000	
10BT432	open	LITHIC SCATTER	12.00000	
10BT434	open	LITHIC SCATTER	12.00000	
10BT435	open	LITHIC SCATTER	12.00000	
10BT436	open	LITHIC SCATTER	12.00000	
10BT437	open	LITHIC SCATTER	12.00000	
10BT439	open	LITHIC SCATTER	12.00000	
10BT440	open	LITHIC SCATTER	12.00000	
10BT441	open	LITHIC SCATTER	12.00000	
10BT443	open	LITHIC SCATTER	12.00000	
10BT444	open	LITHIC SCATTER	12.00000	
10BT445	open	LITHIC SCATTER	12.00000	
10BT446	open	LITHIC SCATTER	12.00000	
10BT447	open	LITHIC SCATTER	12.00000	
10BT448	open	LITHIC SCATTER	12.00000	
10BT450	open	LITHIC SCATTER	12.00000	
10BT452	open	LITHIC SCATTER	12.00000	
10BT453	open	LITHIC SCATTER	12.00000	
10BT457	open	LITHIC SCATTER	12.00000	
10BT48	open	LITHIC SCATTER	12.00000	
10BT481	open	LITHIC SCATTER	12.00000	

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10BT482	open	LITHIC SCATTER	12.00000	
10BT49	open	LITHIC SCATTER	12.00000	
10BT5	open	CAMP	12.00000	
10BT51	open	CAMP SITE	12.00000	
10BT522	open	LITHIC SCATTER	12.00000	
10BT566	open	LITHIC SCATTER	12.00000	
10BT567	open	LITHIC SCATTER	12.00000	
10BT568	open	LITHIC SCATTER	12.00000	
10BT569	open	LITHIC SCATTER	12.00000	
10BT572	open	LITHIC SCATTER	12.00000	
10BT58	open	LITHIC SCATTER	12.00000	
10BT581	open	LITHIC SCATTER	12.00000	
10BT582	open	LITHIC SCATTER	12.00000	
10BT584	open	LITHIC SCATTER	12.00000	
10BT588	open	LITHIC SCATTER	12.00000	
10BT589	open	LITHIC SCATTER	12.00000	
10BT590	open	LITHIC SCATTER	12.00000	
10BT591	open	LITHIC SCATTER	12.00000	
10BT592	open	LITHIC SCATTER	12.00000	
10BT594	open	LITHIC SCATTER	12.00000	
10BT595	open	LITHIC SCATTER	12.00000	
10BT596	open	LITHIC SCATTER	12.00000	
10BT597	open	LITHIC SCATTER	12.00000	
10BT598	open	LITHIC SCATTER	12.00000	
10BT600	open	LITHIC SCATTER	12.00000	
10BT603	open	LITHIC SCATTER	12.00000	
10BT604	open	LITHIC SCATTER	12.00000	
10BT605	open	LITHIC SCATTER	12.00000	
10BT606	open	LITHIC SCATTER	12.00000	
10BT607	open	LITHIC SCATTER	12.00000	
10BT608	open	LITHIC SCATTER	12.00000	
10BT610	open	LITHIC SCATTER	12.00000	

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10BT612	open	LITHIC SCATTER	12.00000	
10BT614	open	LITHIC SCATTER	12.00000	
10BT615	open	LITHIC SCATTER	12.00000	
10BT616	open	LITHIC SCATTER	12.00000	
10BT617	open	LITHIC SCATTER	12.00000	
10BT618	open	LITHIC SCATTER	12.00000	
10BT619	open	LITHIC SCATTER	12.00000	
10BT620	open	LITHIC SCATTER	12.00000	
10BT621	open	LITHIC SCATTER	12.00000	
10BT623	open	LITHIC SCATTER	12.00000	
10BT627	open	LITHIC SCATTER	12.00000	
10BT628	open	LITHIC SCATTER	12.00000	
10BT629	open	LITHIC SCATTER	12.00000	
10BT630	open	LITHIC SCATTER	12.00000	
10BT632	open	LITHIC SCATTER	12.00000	
10BT635	open	LITHIC SCATTER	12.00000	
10BT64	open	LITHIC SCATTER	12.00000	
10BT646	open	LITHIC SCATTER	12.00000	
10BT647	open	LITHIC SCATTER	12.00000	
10BT648	open	LITHIC SCATTER	12.00000	
10BT649	open	LITHIC SCATTER	12.00000	
10BT650	open	LITHIC SCATTER	12.00000	
10BT651	open	LITHIC SCATTER	12.00000	
10BT652	open	LITHIC SCATTER	12.00000	
10BT653	open	LITHIC SCATTER	12.00000	
10BT654	open	LITHIC SCATTER	12.00000	
10BT657	open	LITHIC SCATTER	12.00000	
10BT658	open	LITHIC SCATTER	12.00000	
10BT659	open	LITHIC SCATTER	12.00000	
10BT661	open	LITHIC SCATTER	12.00000	
10BT662	open	LITHIC SCATTER	12.00000	
10BT663	open	LITHIC SCATTER	12.00000	

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10BT665	open	LITHIC SCATTER	12.00000	
10BT668	open	LITHIC SCATTER	12.00000	
10BT669	open	LITHIC SCATTER	12.00000	
10BT670	open	LITHIC SCATTER	12.00000	
10BT673	open	LITHIC SCATTER	12.00000	
10BT674	open	LITHIC SCATTER	12.00000	
10BT675	open	LITHIC SCATTER	12.00000	
10BT676	open	LITHIC SCATTER	12.00000	
10BT677	open	LITHIC SCATTER	12.00000	
10BT678	open	LITHIC SCATTER	12.00000	
10BT679	open	LITHIC SCATTER	12.00000	
10BT680	open	LITHIC SCATTER	12.00000	
10BT683	open	LITHIC SCATTER	12.00000	
10BT684	open	LITHIC SCATTER	12.00000	
10BT685	open	LITHIC SCATTER	12.00000	
10BT695	open	LITHIC SCATTER	12.00000	
10BT696	open	LITHIC SCATTER	12.00000	
10BT699	open	LITHIC SCATTER	12.00000	
10BT700	open	LITHIC SCATTER	12.00000	
10BT701	open	LITHIC SCATTER	12.00000	
10BT702	open	LITHIC SCATTER	12.00000	
10BT704	open	LITHIC SCATTER	12.00000	
10BT705	open	LITHIC SCATTER	12.00000	5015.00000
10BT708	open	LITHIC SCATTER	12.00000	
10BT711	open	LITHIC SCATTER	12.00000	
10BT712	open	LITHIC SCATTER	12.00000	
10BT716	open	LITHIC SCATTER	12.00000	
10BT717	open	LITHIC SCATTER	12.00000	
10BT718	open	LITHIC SCATTER; 3 points, 2 are Folsom	12.00000	5010.00000
10BT719	open	LITHIC SCATTER; flakes, point, biface	12.00000	5020.00000
10BT720	open	LITHIC SCATTER	12.00000	
10BT721	open	LITHIC SCATTER	12.00000	

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10BT726	open	LITHIC SCATTER	12.00000	
10BT727	open	LITHIC SCATTER	12.00000	
10BT729	open	LITHIC SCATTER	12.00000	
10BT731	open	LITHIC SCATTER	12.00000	
10BT732	open	LITHIC SCATTER	12.00000	
10BT738	open	LITHIC SCATTER	12.00000	
10BT740	open	LITHIC SCATTER	12.00000	
10BT742	open	LITHIC SCATTER	12.00000	
10BT743	open	LITHIC SCATTER	12.00000	
10BT745	open	LITHIC SCATTER	12.00000	
10BT747	open	LITHIC SCATTER	12.00000	
10BT748	open	LITHIC SCATTER	12.00000	
10BT749	open	LITHIC SCATTER	12.00000	
10BT750	open	LITHIC SCATTER	12.00000	
10BT751	open	SECONDARY REDUCTION	12.00000	
10BT752	open	LITHIC SCATTER	12.00000	
10BT753	open	LITHIC SCATTER	12.00000	
10BT754	open	LITHIC SCATTER	12.00000	
10BT755	open	LITHIC SCATTER	12.00000	
10BT756	open	LITHIC SCATTER	12.00000	
10BT757	open	LITHIC SCATTER	12.00000	
10BT758	open	LITHIC SCATTER	12.00000	
10BT759	open	LITHIC SCATTER	12.00000	
10BT760	open	LITHIC SCATTER	12.00000	
10BT762	open	LITHIC SCATTER	12.00000	
10BT763	open	LITHIC SCATTER	12.00000	
10BT764	open	LITHIC PROCESSING	12.00000	
10BT765	open	LITHIC SCATTER	12.00000	
10BT766	open	LITHIC SCATTER	12.00000	
10BT767	open	LITHIC SCATTER	12.00000	
10BT768	open	LITHIC SCATTER	12.00000	
10BT769	open	LITHIC SCATTER	12.00000	

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10BT770	open	LITHIC SCATTER	12.00000	
10BT771	open	LITHIC SCATTER	12.00000	
10BT772	open	LITHIC SCATTER	12.00000	
10BT773	open	LITHIC SCATTER	12.00000	
10BT774	open	LITHIC SCATTER	12.00000	
10BT775	open	LITHIC SCATTER	12.00000	
10BT776	open	LITHIC SCATTER	12.00000	
10BT778	open	LITHIC SCATTER	12.00000	
10BT779	open	LITHIC SCATTER	12.00000	
10BT780	open	LITHIC SCATTER	12.00000	
10BT781	open	LITHIC SCATTER	12.00000	
10BT782	open	LITHIC SCATTER	12.00000	
10BT783	open	LITHIC SCATTER	12.00000	
10BT784	open	LITHIC SCATTER	12.00000	
10BT785	open	LITHIC SCATTER	12.00000	
10BT786	open	LITHIC SCATTER	12.00000	
10BT787	open	LITHIC SCATTER	12.00000	
10BT788	open	LITHIC SCATTER	12.00000	
10BT789	open	LITHIC SCATTER	12.00000	
10BT790	open	LITHIC SCATTER	12.00000	
10BT791	open	LITHIC SCATTER	12.00000	
10BT792	open	LITHIC SCATTER	12.00000	
10BT793	open	LITHIC SCATTER	12.00000	
10BT794	open	LITHIC SCATTER	12.00000	
10BT795	open	LITHIC SCATTER	12.00000	
10BT796	open	LITHIC SCATTER	12.00000	
10BT797	open	LITHIC SCATTER	12.00000	
10BT798	open	LITHIC SCATTER	12.00000	
10BT799	open	LITHIC SCATTER	12.00000	
10BT800	open	LITHIC SCATTER	12.00000	
10BT801	open	LITHIC SCATTER	12.00000	
10BT802	open	LITHIC SCATTER	12.00000	

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10BT803	open	LITHIC SCATTER	12.00000	
10BT804	open	LITHIC SCATTER	12.00000	
10BT806	open	LITHIC SCATTER	12.00000	
10BT808	open	LITHIC SCATTER, CAMP SITE	12.00000	
10BT809	open	LITHIC SCATTER	12.00000	
10BT810	open	LITHIC SCATTER	12.00000	
10BT811	open	LITHIC SCATTER	12.00000	
10BT812	open	CAMP SITE	12.00000	
10BT813	open	LITHIC SCATTER	12.00000	
10BT814	open	LITHIC SCATTER	12.00000	
10BT816	open	LITHIC SCATTER	12.00000	
10BT817	open	LITHIC SCATTER	12.00000	
10BT818	open	FCR CONCENTRATION	12.00000	
10BT819	open	LITHIC SCATTER	12.00000	
10BT82	open	LITHIC SCATTER	12.00000	
10BT820	open	LITHIC SCATTER	12.00000	
10BT821	open	PROCESSING	12.00000	
10BT822	open	LITHIC SCATTER	12.00000	
10BT90	open	LITHIC SCATTER	12.00000	
10BT92	open	LITHIC SCATTER	12.00000	
10BT93	open	LITHIC SCATTER	12.00000	
10BT933	open	LITHIC SCATTER	12.00000	
10BT934	open	LITHIC SCATTER	12.00000	
10BT937	open	LITHIC SCATTER	12.00000	
10BT94	open	LITHIC SCATTER	12.00000	
10BT940	open	LITHIC SCATTER	12.00000	
10BT941	open	LITHIC SCATTER	12.00000	
10BT944	open	LITHIC SCATTER	12.00000	
10BT945	open	LITHIC SCATTER	12.00000	
10BT947	open	LITHIC SCATTER	12.00000	
10BT948	open	LITHIC SCATTER	12.00000	
10BT949	open	LITHIC SCATTER	12.00000	

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10BT95	open	LITHIC SCATTER	12.00000	
10BT950	open	LITHIC SCATTER	12.00000	
10BT953	open	LITHIC SCATTER	12.00000	
10BT954	open	LITHIC SCATTER	12.00000	
10BT956	open	LITHIC SCATTER	12.00000	
10BT957	open	LITHIC SCATTER	12.00000	
10BT958	open	LITHIC SCATTER	12.00000	
10BT959	open	LITHIC SCATTER	12.00000	
10BT96	open	CAMP	12.00000	
10BT967	open	SHORT TERM CAMP	12.00000	
10BT968	open	SHORT TERM CAMP	12.00000	
10BT97	open	LITHIC SCATTER	12.00000	
10BT970	open	LITHIC SCATTER	12.00000	
10BT974	open	TEMPORARY CAMP	12.00000	
10BT975	open	LITHIC SCATTER	12.00000	
10BT979	open	LITHIC SCATTER	12.00000	
10BT98	open	LITHIC SCATTER	12.00000	
10BT980	open	LITHIC SCATTER	12.00000	
10BT981	open	LITHIC SCATTER	12.00000	
10BT983	open	LITHIC SCATTER	12.00000	
10BT99	open	LITHIC SCATTER	12.00000	
10BT990	open	LITHIC SCATTER	12.00000	
10BT995	open	LITHIC SCATTER	12.00000	
10BT996	open	LITHIC SCATTER	12.00000	
10BT997	open	LITHIC SCATTER	12.00000	
10BT998	open	LITHIC SCATTER	12.00000	
10LN11	open	LITHIC SCATTER	12.00000	
10LN112	open	POTTERY, LITHIC SCATTER	12.00000	
10LN113	open	LITHIC SCATTER	12.00000	
10LN114	open	LITHIC SCATTER	12.00000	
10LN115	open	LITHIC SCATTER	12.00000	
10LN116	open	LITHIC SCATTER	12.00000	

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10LN117	open	LITHIC SCATTER	12.00000	
10LN118	open	LITHIC SCATTER	12.00000	
10LN119	open	LITHIC SCATTER	12.00000	
10LN12	open	CAMP SITE	12.00000	
10LN121	open	LITHIC SCATTER	12.00000	
10LN125	open	LITHIC SCATTER	12.00000	
10LN126	open	LITHIC SCATTER	12.00000	
10LN127	open	LITHIC SCATTER	12.00000	
10LN128	open	LITHIC SCATTER	12.00000	
10LN129	open	LITHIC SCATTER	12.00000	
10LN130	open	LITHIC SCATTER	12.00000	
10LN133	open	LITHIC SCATTER	12.00000	
10LN134	open	LITHIC SCATTER	12.00000	
10LN135	open	LITHIC SCATTER	12.00000	
10LN136	open	LITHIC SCATTER	12.00000	
10LN137	open	LITHIC SCATTER	12.00000	
10LN142	open	LITHIC SCATTER	12.00000	
10LN143	open	LITHIC SCATTER	12.00000	
10LN152	open	LITHIC SCATTER	12.00000	
10LN157	open	LITHIC SCATTER	12.00000	
10LN176	open	LITHIC SCATTER	12.00000	
10LN178	open	LITHIC SCATTER	12.00000	
10LN179	open	LITHIC SCATTER	12.00000	
10LN180	open	LITHIC SCATTER	12.00000	
10LN186	open	LITHIC SCATTER	12.00000	
10LN187	open	LITHIC SCATTER	12.00000	
10LN188	open	LITHIC SCATTER	12.00000	
10LN189	open	LITHIC SCATTER	12.00000	
10LN196	open	LITHIC SCATTER	12.00000	
10LN197	open	LITHIC SCATTER	12.00000	
10LN198	open	LITHIC SCATTER	12.00000	
10LN199	open	LITHIC SCATTER	12.00000	

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10LN200	open	LITHIC SCATTER	12.00000	
10LN201	open	LITHIC SCATTER	12.00000	
10LN208	open	LITHIC SCATTER	12.00000	
10LN209	open	LITHIC SCATTER	12.00000	
10LN210	open	LITHIC SCATTER	12.00000	
10LN211	open	LITHIC SCATTER	12.00000	
10LN214	open	LITHIC SCATTER	12.00000	
10LN215	open	LITHIC SCATTER	12.00000	
10LN216	open	LITHIC SCATTER	12.00000	
10LN217	open	LITHIC SCATTER	12.00000	
10LN218	open	LITHIC SCATTER	12.00000	
10LN219	open	LITHIC SCATTER	12.00000	
10LN221	open	LITHIC SCATTER	12.00000	
10LN222	open	LITHIC SCATTER	12.00000	
10LN223	open	LITHIC SCATTER	12.00000	
10LN224	open	LITHIC SCATTER	12.00000	
10LN225	open	LITHIC SCATTER	12.00000	
10LN226	open	LITHIC SCATTER	12.00000	
10LN227	open	LITHIC SCATTER	12.00000	
10LN228	open	LITHIC SCATTER	12.00000	
10LN260	open	LITHIC SCATTER	12.00000	
10LN267	open	LITHIC, CERAMIC SCATTER	12.00000	
10LN313	open	lithic scatter; 10 flakes in a small playa	12.00000	4250.00000
10LN332	open	lithic scatter; flakes, 5 bifaces, 3 point	12.00000	4750.00000
10LN336	open	lithic scatter; over 150 flakes, 2 corner-	12.00000	4700.00000
10LN380	open	high density flaked stone scatter	12.00000	4260.00000
10LN381	open	small flaked stone scatter	12.00000	4260.00000
10LN384	open	1 secondary and 1 tertiary flake	12.00000	4260.00000
10LN386	open	1 obsidian utilized flake, 1 projectile po	12.00000	4293.00000
10LN388	open	1 tertiary flake, 1 obsidian secondary fla	12.00000	4238.00000
10LN391	open	lithic scatter; flakes, points, biface, pr	12.00000	4420.00000
10LN393	open	lithic scatter; flakes, point, biface	12.00000	4230.00000

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10LN394	open	lithic scatter; flakes, points	12.00000	4235.00000
10LN395	open	lithic scatter; flakes	12.00000	4560.00000
10LN396	open	lithic scatter; flakes, drill, points, scr	12.00000	4230.00000
10LN401	open	moderately dense flake scatter; flakes, po	12.00000	4590.00000
10LN404	open	large, dense flake scatter with small hist	12.00000	4220.00000
10LN406	open	large lithic scatter; flakes, cores, point	12.00000	4450.00000
10LN408	open	moderate lithic scatter; flakes, bifaces,	12.00000	4410.00000
10LN412	open	moderately dense lithic scatter; flakes, p	12.00000	4370.00000
10LN413	open	small lithic scatter; flakes, biface	12.00000	4415.00000
10LN414	open	moderately dense lithic scatter; flakes	12.00000	4425.00000
10LN416	open	low density lithic scatter; flakes	12.00000	4335.00000
10LN418	open	sparse lithic scatter; flakes	12.00000	4410.00000
10LN42	open	LITHIC SCATTER	12.00000	
10LN420	open	lithic scatter; flakes, bifaces	12.00000	4355.00000
10LN421	open	moderately dense lithic scatter; flakes, p	12.00000	4230.00000
10LN426	open	large, moderately dense lithic scatter; fl	12.00000	4590.00000
10LN43	open	LITHIC SCATTER	12.00000	
10LN432	open	small lithic scatter; flakes	12.00000	4505.00000
10LN439	open	low density lithic scatter; flakes	12.00000	4415.00000
10LN44	open	LITHIC SCATTER	12.00000	
10LN442	open	sparse lithis catter; flakes, point, utili	12.00000	4220.00000
10LN448	open	lithic scatter; flakes	12.00000	4465.00000
10LN45	open	LITHIC SCATTER	12.00000	
10LN452	open	lithic scatter; flakes, points	12.00000	4225.00000
10LN453	open	lithic scatter; flakes	12.00000	4235.00000
10LN459	open	2 points	12.00000	4540.00000
10LN460	open	2 points	12.00000	4535.00000
10LN489	open	scraper, flake	12.00000	4475.00000
10LN490	open	lithic scatter; flakes, metate frag	12.00000	4225.00000
10LN513	open	lithic scatter; 3 flakes	12.00000	4445.00000
10LN515	open	lithic scatter;flakes, biface	12.00000	4425.00000
10LN522	open	2 flakes	12.00000	4430.00000

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10LN531	open	2 points	12.00000	4320.00000
10LN532	open	3 flakes	12.00000	4440.00000
10LN534	open	5 flakes	12.00000	4525.00000
10LN546	open	2 flakes	12.00000	4235.00000
10LN556	open	7 flakes	12.00000	4450.00000
10LN566	open	3 flakes, 1 utilized flake	12.00000	4530.00000
10LN573	open	2 flakes	12.00000	4335.00000
10LN575	open	3 flakes	12.00000	4475.00000
10LN596	open	3 flakes	12.00000	4230.00000
10LN600	open	2 flakes	12.00000	4235.00000
10LN615	open	lithic scatter; drill, flakes	12.00000	4260.00000
10LN9	open	LITHIC SCATTER	12.00000	
10MA1	open	CAMP SITE	12.00000	
10MA10	open	LITHIC SCATTER	12.00000	
10MA101	open	LITHIC SCATTER	12.00000	
10MA102	open	LITHIC SCATTER	12.00000	
10MA104	open	LITHIC SCATTER	12.00000	
10MA105	open	LITHIC SCATTER	12.00000	
10MA106	open	LITHIC SCATTER	12.00000	
10MA107	open	LITHIC SCATTER	12.00000	
10MA108	open	LITHIC SCATTER	12.00000	
10MA109	open	LITHIC SCATTER	12.00000	
10MA11	open	LITHIC SCATTER	12.00000	
10MA110	open	LITHIC SCATTER	12.00000	
10MA111	open	LITHIC SCATTER	12.00000	
10MA112	open	LITHIC SCATTER	12.00000	
10MA113	open	LITHIC SCATTER	12.00000	
10MA114	open	LITHIC, POTTERY SCATTER	12.00000	
10MA115	open	LITHIC SCATTER	12.00000	
10MA12	open	LITHIC SCATTER	12.00000	
10MA13	open	LITHIC SCATTER; flakes	12.00000	4350.00000
10MA132	open	LITHIC SCATTER	12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10MA138	open	lithic scatter, 3 tools noted	12.00000	4480.00000
10MA164	open	lithic scatter; flakes, points, biface	12.00000	4800.00000
10MA165	open	lithic scatter; flakes, core	12.00000	4770.00000
10MA166	open	lithic scatter; flakes, points, bifaces, m	12.00000	4800.00000
10MA167	open	lithic scatter; flakes	12.00000	4865.00000
10MA168	open	lithic scatter; flakes, points, teshoa, fl	12.00000	4860.00000
10MA169	open	lithic scatter; flakes, points, core	12.00000	4880.00000
10MA170	open	lithic scatter; flakes, biface, chunk	12.00000	4835.00000
10MA171	open	lithic scatter; flakes, tooth enamel, bone	12.00000	4855.00000
10MA172	open	lithic scatter; flakes	12.00000	4850.00000
10MA173	open	lithic scatter; flakes	12.00000	4880.00000
10MA3	open	CAMP SITE	12.00000	
10MA30	open	LITHIC SCATTER	12.00000	
10MA33	open	LITHIC SCATTER	12.00000	
10MA34	open	LITHIC SCATTER	12.00000	
10MA4	open	CAMP SITE	12.00000	
10MA44	open	LITHIC SCATTER	12.00000	
10MA5	open	CAMP SITE	12.00000	
10MA50	open	LITHIC SCATTER	12.00000	
10MA52	open	LITHIC SCATTER	12.00000	
10MA53	open	LITHIC SCATTER	12.00000	
10MA54	open	LITHIC SCATTER; flake, point, features cal	12.00000	
10MA56	open	LITHIC SCATTER	12.00000	
10MA6	open	LITHIC SCATTER	12.00000	
10MA7	open	LITHIC SCATTER	12.00000	
10MA78	open	LITHIC SCATTER	12.00000	
10MA79	open	LITHIC SCATTER	12.00000	
10MA8	open	LITHIC SCATTER	12.00000	
10MA80	open	LITHIC SCATTER	12.00000	
10MA81	open	LITHIC SCATTER	12.00000	
10MA82	open	LITHIC SCATTER	12.00000	
10MA83	open	LITHIC SCATTER	12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10MA84	open	LITHIC SCATTER	12.00000	
10MA85	open	LITHIC SCATTER	12.00000	
10MA88	open	LITHIC SCATTER	12.00000	
10MA89	open	LITHIC SCATTER	12.00000	
10MA9	open	LITHIC SCATTER	12.00000	
10MA90	open	LITHIC SCATTER	12.00000	
10MA92	open	LITHIC SCATTER	12.00000	
10MA93	open	LITHIC SCATTER	12.00000	
10MA97	open	LITHIC SCATTER	12.00000	
10MA98	open	LITHIC SCATTER	12.00000	
10MA99	open	LITHIC SCATTER	12.00000	
10BN389	open	LITHIC SCATTER/HISTORIC	12.00000	
10BN537	open	large lithic scatter/historic trash scatte	12.00000	4540.00000
10BN545	open	prehistoric flake scatter; historic cans,	12.00000	4580.00000
10BN547	open	prehistoric lithic scatter; historic cans	12.00000	4430.00000
10BN664	open	4 flakes, centerfire 25-30 shell, several	12.00000	4440.00000
10BN684	open	1 obsidian tertiary flake, broken whiskey	12.00000	4590.00000
10BN685	open	modified chert flake, 3 in one oil bottle	12.00000	4570.00000
10BN762	open	biface, shell button	12.00000	4640.00000
10BN958	open	lithic scatter; biface, point, knife, dril	12.00000	4780.00000
10BN961	open	lithic scatter and can; point, flakes	12.00000	4800.00000
10BT1448	open	lithic scatter, historic debris; drill/per	12.00000	4965.00000
10BT1831	open	LITHIC SCATTER/HISTORIC	12.00000	
10BT1987	open	LITHICS/HISTORIC CAMP	12.00000	
10BT2011	open	LITHICS/HISTORIC DUMP	12.00000	
10BT2030	open	LITHIC SCATTER/HISTORIC	12.00000	
10BT306	open	LITHICS/HISTORIC MINING	12.00000	
10BT328	open	LITHIC SCATTER/HISTORIC	12.00000	
10BT358	open	ROCKSHELTER/HISTORIC	12.00000	
10BT364	open	LITHIC SCATTER/HISTORIC	12.00000	
10BT807	open	LITHIC SCATTER/HISTORIC	12.00000	
10LN177	open	LITHICS/HISTORIC SCATTER	12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10LN382	open	low density flaked stone scatter; milk can	12.00000	4240.00000
10LN392	open	lithic scatter and 5 cans; flakes, points,	12.00000	4225.00000
10LN399	open	high density lithic scatter, historic comp	12.00000	4410.00000
10LN400	open	high density flake scatter, historic compo	12.00000	4224.00000
10LN405	open	moderately dense lithic scatter with small	12.00000	4410.00000
10LN415	open	moderately dense lithic scatter with 1 can	12.00000	4432.00000
10LN419	open	can scatter with 1 point	12.00000	4425.00000
10LN427	open	1 flake and 1 scraper with 1 glass jar and	12.00000	4355.00000
10LN433	open	low density can scatter with prehistoric b	12.00000	4410.00000
10LN434	open	historic scatter with 4 prehistoric flakes	12.00000	4380.00000
10LN438	open	moderately dense lithic scatter and histor	12.00000	4445.00000
10LN584	open	biface and historic bucket	12.00000	4415.00000
10BN205	open, rock fea	ROCK RING	12.00000	
10BN53	open, rock fea	LITHIC SCATTER and possible blind; flakes,	12.00000	4870.00000
10BN565	open, rock fea	four small cairns aligned in diamond shape	12.00000	4560.00000
10BN57	open, rock fea	LITHIC SCATTER and rock pile; chopper, chu	12.00000	4980.00000
10BN71	open, rock fea	LITHIC SCATTER and 2 basalt enclosures; bi	12.00000	5240.00000
10BN952	open, rock fea	cairn and flake	12.00000	4880.00000
10BT1616	open, rock fea	ROCK CIRCLES/LITHIC SCATT	12.00000	
10BT1749	open, rock fea	STONE CIRCLES	12.00000	
10BT2038	open, rock fea	lithic scatter; fcr, hearth, cobbles in ci	12.00000	5090.00000
10LN160	open, rock fea	ROCK ALLIGNMENT, LITHICS	12.00000	
10LN212	open, rock fea	CAIRN/ISOLATED FIND	12.00000	
10LN429	open, rock fea	lithic scatter; flakes, scraper, possible	12.00000	4430.00000
10LN636	open, rock fea	lithic scatter, extensive rock features li	12.00000	4620.00000
10LN92	open, rock fea	ROCK FEATURE	12.00000	
10MA100	open, rock fea	LITHIC SCATTER, CAIRN	12.00000	
10MA163	open, rock fea	lithic scatter with walled shelters; flake	12.00000	4745.00000
10BN1038	open, rock fea	cairn and 9 flakes	12.00000	4950.00000
10BN523	open, rock fea	lithic scatter, rock alignment inside rock	12.00000	4700.00000
10BN567	open, rock fea	historic debris, obsidian flakes, cairn	12.00000	4620.00000
10BN955	open, rock fea	2 cairns and lithic scatter; flakes, point	12.00000	4890.00000

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BN962	open, rock fea	lithic scatter, cairn, frying pan; cairn m	12.00000	4780.00000
10BN967	open, rock fea	lithic scatter, historic scatter, 2 cairns	12.00000	4774.00000
10BN998	open, rock fea	lithic scatter; flakes, point; fire ring w	12.00000	4950.00000
10LN422	open, rock fea	low density lithic scatter with linear his	12.00000	4230.00000
10LN424	open, rock fea	moderately dense lithic scatter with sever	12.00000	4235.00000
10LN425	open, rock fea	high density lithic scatter and historic s	12.00000	4220.00000
10LN431	open, rock fea	moderately dense lithic scatter with histo	12.00000	4530.00000
10BN1066	open, rockshel	2 rockshelters overlooking lava flow, lith	12.00000	5440.00000
10BN530	open, rockshel	three large rockshelters and an associated	12.00000	4640.00000
10BN536	open, rockshel	small lithic scatter with lava tube cave	12.00000	4570.00000
10BN568	open, rockshel	lithic scatter with Lanceolate point and n	12.00000	4600.00000
10BT165	open, rockshel	rockshelter with lithic scatter near mouth	12.00000	6400.00000
10LN131	open, rockshel	OVERHANG	12.00000	
10MA143	open, rockshel	lithic scatter, lava tube	12.00000	4800.00000
10BN964	open, rockshel	historic scatter, lithic scatter and cave	12.00000	4780.00000
10BT103	quarry	QUARRY	12.00000	
10BT135	quarry	QUARRY	12.00000	
10BT136	quarry	QUARRY	12.00000	
10BT1877	quarry	QUARRY	12.00000	
10BT335	quarry	QUARRY	12.00000	
10BT340	quarry	QUARRY	12.00000	
10BT153	rock art	PICTOGRAPHS	12.00000	
10BT159	rock art	PICTOGRAPH	12.00000	
10BT163	rock art	PICTOGRAPH	12.00000	
10BT178	rock art	PICTOGRAPH	12.00000	
10BT232	rock art	PICTOGRAPH	12.00000	
10BT247	rock art	PICTOGRAPH	12.00000	
10LN74	rock art	PETROGLYPHS	12.00000	
10BT46	rock art, rock	CAVE	12.00000	
10LN61	rock art, rock	CAVE	12.00000	
10BN1012	rock feature	cairn	12.00000	4840.00000
10BN1016	rock feature	cairn	12.00000	4840.00000

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BN503	rock feature	cairn	12.00000	4600.00000
10BN510	rock feature	rock wall, age and function unknown (proba	12.00000	4710.00000
10BN525	rock feature	rock ring, may have served as a hinting bl	12.00000	4580.00000
10BN535	rock feature	18 cairns in alignment	12.00000	4460.00000
10BN571	rock feature	hunting blind with modern debris, possibly	12.00000	4446.00000
10BN597	rock feature	cairn	12.00000	4460.00000
10BN951	rock feature	cairn, likely to be historic	12.00000	4840.00000
10BT1143	rock feature	STONE CIRCLE	12.00000	
10BT1876	rock feature	ROCK FEATURE	12.00000	
10BT1882	rock feature	CAIRN	12.00000	
10BT388	rock feature	STONE CIRCLE	12.00000	
10BT438	rock feature	STONE CIRCLE	12.00000	
10BT50	rock feature	ROCK RINGS	12.00000	
10LN138	rock feature	ROCK FEATURE	12.00000	
10LN333	rock feature	1 rock feature and 2 small walls of piled	12.00000	4720.00000
10LN435	rock feature	rock alignment	12.00000	4340.00000
10LN539	rock feature	rock alignment	12.00000	4360.00000
10MA55	rock feature	STONE CIRCLE/ROCK FEATURE	12.00000	
10BN1039	rock feature	cairn	12.00000	4930.00000
10BN959	rock feature	cairn	12.00000	4740.00000
10BN960	rock feature	cairn	12.00000	4800.00000
10BN147	rockshelter	ROCKSHELTER, LITHICS	12.00000	
10BN153	rockshelter	CAVE/LITHIC SCATTER	12.00000	
10BN154	rockshelter	CAVE	12.00000	
10BN156	rockshelter	ROCKSHELTER	12.00000	
10BN211	rockshelter	CAVE	12.00000	
10BN412	rockshelter	ROCKSHELTER	12.00000	
10BN44	rockshelter	CAVE with point, flakes, and bones of bear	12.00000	4930.00000
10BN45	rockshelter	lava tube rockshelter; blank, bovid remain	12.00000	5200.00000
10BT1	rockshelter	CAVE	12.00000	
10BT106	rockshelter	ROCKSHELTER	12.00000	
10BT11	rockshelter	CAVE	12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BT1241	rockshelter	ROCKSHELTER	12.00000	
10BT1268	rockshelter	ROCKSHELTER	12.00000	
10BT1295	rockshelter	ROCKSHELTER	12.00000	
10BT1301	rockshelter	ROCKSHELTER	12.00000	
10BT1304	rockshelter	ROCKSHELTER	12.00000	
10BT132	rockshelter	CAVE	12.00000	
10BT157	rockshelter	ROCKSHELTER	12.00000	
10BT158	rockshelter	ROCKSHELTER	12.00000	
10BT162	rockshelter	ROCKSHELTER	12.00000	
10BT179	rockshelter	ROCKSHELTER	12.00000	
10BT182	rockshelter	CAVE	12.00000	
10BT205	rockshelter	ROCKSHELTER	12.00000	
10BT206	rockshelter	ROCKSHELTER	12.00000	
10BT218	rockshelter	ROCKSHELTER	12.00000	
10BT222	rockshelter	ROCKSHELTER	12.00000	
10BT223	rockshelter	ROCKSHELTER	12.00000	
10BT224	rockshelter	ROCKSHELTER	12.00000	
10BT225	rockshelter	ROCKSHELTER	12.00000	
10BT26	rockshelter	ROCKSHELTER	12.00000	
10BT261	rockshelter	ROCKSHELTER	12.00000	
10BT30	rockshelter	ROCKSHELTER	12.00000	
10BT346	rockshelter	ROCKSHELTER	12.00000	
10BT351	rockshelter	ROCKSHELTER	12.00000	
10BT37	rockshelter	ROCKSHELTER	12.00000	
10BT38	rockshelter	lava cave	12.00000	
10BT43	rockshelter	LIMESTONE CAVITY	12.00000	
10BT44	rockshelter	LIMESTONE CAVITY	12.00000	
10BT45	rockshelter	ROCKSHELTER	12.00000	
10BT47	rockshelter	ROCKSHELTER	12.00000	
10BT573	rockshelter	ROCKSHELTER	12.00000	
10BT574	rockshelter	ROCKSHELTER	12.00000	
10BT575	rockshelter	ROCKSHELTER	12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BT576	rockshelter	ROCKSHELTER	12.00000	
10BT577	rockshelter	ROCKSHELTER	12.00000	
10BT578	rockshelter	ROCKSHELTER	12.00000	
10BT579	rockshelter	ROCKSHELTER	12.00000	
10BT580	rockshelter	ROCKSHELTER	12.00000	
10BT583	rockshelter	ROCKSHELTER/ISOLATED FIND	12.00000	
10BT7	rockshelter	CAVE	12.00000	
10BT108	unknown	NOT GIVEN	12.00000	
10BT124	unknown	NOT GIVEN	12.00000	
10BT125	unknown	NOT GIVEN	12.00000	
10BT126	unknown	NOT GIVEN	12.00000	
10BT127	unknown	NOT GIVEN	12.00000	
10BT128	unknown	NOT GIVEN	12.00000	
10BT137	unknown	NOT GIVEN	12.00000	
10BT146	unknown	NOT GIVEN	12.00000	
10BT148	unknown	NOT GIVEN	12.00000	
10BT538			12.00000	
10BT539			12.00000	
10BT540			12.00000	
10BT541			12.00000	
10BT542			12.00000	
10BT543			12.00000	
10BT544			12.00000	
10BT545			12.00000	
10BT546			12.00000	
10BT547			12.00000	
10BT548			12.00000	
10BT549			12.00000	
10BT550			12.00000	
10BT551			12.00000	
10BT553			12.00000	
10BT554			12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 12

10BT555			12.00000	
10BT556			12.00000	
10BT557			12.00000	
10BT558			12.00000	
10BT559			12.00000	
10BT560			12.00000	
10BT561			12.00000	
10BT562			12.00000	
10BT563			12.00000	
10BT564			12.00000	
10BT565			12.00000	

Appendix C: Prehistoric Localities in the Study Area -Zone 11

10LN1	open	LITHICS/ISOLATED FIND	11.00000
10LN100	open	ISOLATED FIND	11.00000
10LN101	open	ISOLATED FIND	11.00000
10LN102	open, quarry	ISOLATED FIND	11.00000
10LN103	open, quarry	ISOLATED FIND	11.00000
10LN104	open, quarry	LITHIC SCATTER	11.00000
10LN105	open, quarry, roc	LITHIC SCATTER/HISTORIC	11.00000
10LN108	open, rock art	LITHIC SCATTER	11.00000
10LN111	open, rock art	LITHIC SCATTER/HISTORIC	11.00000
10LN13	open, rock art	CAMP SITE	11.00000
10LN139	open, rock art	ISOLATED FIND	11.00000
10LN14	open, rock art	LITHIC SCATTER, BONE	11.00000
10LN140	open, rock art	LITHIC, POTTERY SCATTER	11.00000
10LN15	open, rock art	LITHIC SCATTER	11.00000
10LN161	open, rock art	ISOLATED FIND	11.00000
10LN2	open, rock art	CAMP SITE	11.00000
10LN229	open, rock art	LITHIC SCATTER	11.00000
10LN230	open, rock art, r	ISOLATED FIND	11.00000
10LN231	open, rock art, r	ISOLATED FIND	11.00000
10LN232	open, rock art, r	ISOLATED FIND	11.00000
10LN233	open, rock art, r	ISOLATED FIND	11.00000
10LN234	open, rock art, r	ISOLATED FIND	11.00000
10LN276	open, rock art, r	ISOLATED FIND	11.00000
10LN277	open, rock art, r	LITHIC SCATTER	11.00000
10LN280	open, rock art, r	LITHIC SCATTER	11.00000
10LN282	open, rock art, r	LITHIC SCATTER	11.00000
10LN283	open, rock art, r	LITHIC SCATTER	11.00000
10LN284	open, rock featur	ISOLATED FIND	11.00000
10LN289	open, rock featur	LITHIC SCATTER	11.00000
10LN290	open, rock featur	LITHIC SCATTER	11.00000
10LN291	open, rock featur	LITHIC SCATTER	11.00000
10LN293	open, rock featur	lithic scatter	11.00000
10LN294	open, rock featur	lithic scatter	11.00000

Appendix C: Prehistoric Localities in the Study Area -Zone 11

10LN295	open, rock featur	red ignimbrite small comer-notched point	11.00000
10LN299	open, rock featur	1 volcanic glass nondiagnostic biface fragment	11.00000
10LN300	open, rock featur	1 Desert Side-notched projectile point	11.00000
10LN301	open, rock featur	one red volcanic glass biface fragment-nondiagnosti	11.00000
10LN302	open, rock featur	lithic/bone scatter	11.00000
10LN303	open, rock featur	lithic scatter	11.00000
10LN304	open, rock featur	lithic scatter	11.00000
10LN305	open, rock featur	lithic scatter	11.00000
10LN306	open, rock featur	lithic scatter	11.00000
10LN307	open, rock featur	lithic scatter	11.00000
10LN314	open, rock featur	end-scraper	11.00000
10LN315	open, rock featur	comer-notched point	11.00000
10LN316	open, rock featur	comer-notched point	11.00000
10LN317	open, rock featur	lithic scatter; 3 flakes	11.00000
10LN318	open, rock featur	biface tip	11.00000
10LN319	open, rock featur	corner-notched point	11.00000
10LN320	open, rock featur	lithic scatter; flakes, 3 bifaces, lanceolate point	11.00000
10LN321	open, rock featur	lithic scatter; flakes, point, biface	11.00000
10LN323	open, rock featur	flake	11.00000
10LN324	open, rock featur	corner-notched point	11.00000
10LN325	open, rock featur	lithic scatter; flakes, 4 bifaces, 3 northern side-	11.00000
10LN326	open, rock featur	corner-notched point	11.00000
10LN327	open, rock featur	stemmed lanceolate point	11.00000
10LN328	open, rock featur	lithic scatter; about 100 flakes and 9 pieces of gr	11.00000
10LN330	open, rock featur	corner-notched point, trash scatter; cans, bottle	11.00000
10LN331	open, rockshelter	Desert side-notched point	11.00000
10LN339	open, rockshelter	corner-notched point, flake	11.00000
10LN340	open, rockshelter	biface midsection	11.00000
10LN342	open, rockshelter	small hunting camp/lithic scatter	11.00000
10LN343	open, rockshelter	base camp with a lithic scatter and pottery	11.00000
10LN344	open, rockshelter	lithic scatter near lava tube	11.00000
10LN345	open, rockshelter		11.00000
10LN346	open, rockshelter		11.00000

Appendix C: Prehistoric Localities in the Study Area -Zone 11

10LN347	open, rockshelter	lithic scatter	11.00000
10LN348	open, rockshelter	sparse lithic scatter	11.00000
10LN349	open, rockshelter	lithic scatter	11.00000
10LN35	open, rockshelter	LITHIC SCATTER	11.00000
10LN350	open, rockshelter	lithic scatter	11.00000
10LN351	open, rockshelter	lithic scatter/herders camp	11.00000
10LN352	open, rockshelter	lava tube with lithic scatter	11.00000
10LN353	open, rockshelter	volcanic glass Desert side notched point	11.00000
10LN354	open, rockshelter	point tip	11.00000
10LN355	open, rockshelter	volcanic glass biface fragment	11.00000
10LN356	open, rockshelter	small ccs biface base	11.00000
10LN357	open, rockshelter	Eastgate point fragment of volcanic glass	11.00000
10LN358	open, structure	large ccs corner notched point	11.00000
10LN359	quarry	volcanic glass biface	11.00000
10LN36	quarry	LITHIC SCATTER	11.00000
10LN360	quarry	green silicate point midsection	11.00000
10LN361	quarry	quartz cobble split in half and flakes were removed	11.00000
10LN362	quarry	overhang	11.00000
10LN363	quarry	utilized flake of black ignimbrite	11.00000
10LN366	quarry	sparse scatter of flakes with pottery rim sherd	11.00000
10LN367	rock art	ignimbrite Elko projectile point fragment	11.00000
10LN368	rock art	ignimbrite Northern side notch projectile point	11.00000
10LN369	rock art	ignimbrite McKean Lanceolate projectile point	11.00000
10LN37	rock art	LITHIC SCATTER	11.00000
10LN370	rock art	lithic scatter	11.00000
10LN371	rock art	lithic scatter	11.00000
10LN372	rock art	lithic scatter	11.00000
10LN373	rock art	lithic scatter	11.00000
10LN374	rock art	small side notch point	11.00000
10LN375	rock art	Lanceolate-shaped basal fragment of black ignimbrit	11.00000
10LN376	rock art	small Lanceolate point made of obsidian	11.00000
10LN377	rock art	lithic scatter	11.00000
10LN378	rock art	large comer-notched projectile point	11.00000

Appendix C: Prehistoric Localities in the Study Area -Zone 11

10LN379	rock art	1 large, black volcanic glass, side-notched project	11.00000
10LN38	rock art	LITHIC SCATTER	11.00000
10LN39	rock art	LITHIC SCATTER	11.00000
10LN397	rock art	lithic scatter; flakes, scraper	11.00000
10LN398	rock art	historic scatter with biface and flake; glass, meta	11.00000
10LN4	rock art	LITHIC SCATTER	11.00000
10LN40	rock art	LITHIC SCATTER	11.00000
10LN41	rock art	LITHIC SCATTER	11.00000
10LN410	rock art	low density lithic scatter; flakes	11.00000
10LN423	rock art	low density lithic scatter; flakes, point	11.00000
10LN441	rock art	small lithic scatter; flakes, biface, scraper	11.00000
10LN46	rock art	LITHIC SCATTER	11.00000
10LN463	rock art	lithic scatter; flakes	11.00000
10LN464	rock art	flake	11.00000
10LN47	rock art	LITHIC SCATTER	11.00000
10LN471	rock art	lithic scatter; flakes	11.00000
10LN472	rock art	biface	11.00000
10LN48	rock art, rock fe	LITHIC SCATTER	11.00000
10LN49	rock art, rock fe	LITHIC SCATTER	11.00000
10LN5	rock art, rockshe	LAVA BLISTER/LITHICS	11.00000
10LN50	rock art, rockshe	LITHIC SCATTER	11.00000
10LN501	rock art, rockshe	point tip	11.00000
10LN509	rock art, rockshe	scraper	11.00000
10LN51	rock art, rockshe	TIPI RINGS; STONE CIRCLES	11.00000
10LN52	rock feature	LITHIC SCATTER	11.00000
10LN53	rock feature	ROCKSHELTER/PICTOGRAPH	11.00000
10LN54	rock feature	ROCKSHELTER/PICTOGRAPH	11.00000
10LN548	rock feature	biface base	11.00000
10LN549	rock feature	2 uniface tools	11.00000
10LN55	rock feature	ROCKSHELTER	11.00000
10LN550	rock feature	flake	11.00000
10LN551	rock feature	flake	11.00000
10LN56	rock feature	ROCKSHELTER/PICTOGRAPHS	11.00000

Appendix C: Prehistoric Localities in the Study Area -Zone 11

10LN57	rock feature	LITHIC SCATTER	11.00000
10LN58	rock feature	LITHIC SCATTER	11.00000
10LN59	rock feature	LITHIC SCATTER	11.00000
10LN6	rock feature	LITHIC SCATTER	11.00000
10LN60	rock feature	ROCKSHELTER/PICTOGRAPHS	11.00000
10LN601	rock feature	scraper	11.00000
10LN603	rock feature	biface frag	11.00000
10LN604	rock feature	flake	11.00000
10LN607	rock feature	2 flakes	11.00000
10LN608	rock feature	7 flakes	11.00000
10LN614	rock feature	point tip	11.00000
10LN616	rock feature	flake	11.00000
10LN617	rock feature	2 flakes	11.00000
10LN619	rock feature	lithic scatter; flakes	11.00000
10LN62	rock feature	LITHIC SCATTER	11.00000
10LN623	rock feature	lithic and groundstone scatter; flakes, DSN, Cascad	11.00000
10LN624	rock feature	corner-notched point	11.00000
10LN625	rock feature	lithic scatter; flakes, biface, large side-notched	11.00000
10LN626	rock feature	point	11.00000
10LN627	rock feature	point	11.00000
10LN628	rock feature	corner-notched point	11.00000
10LN629	rock feature, roc	corner-notched point	11.00000
10LN63	rockshelter	LITHIC SCATTER	11.00000
10LN630	rockshelter	corner-notched point	11.00000
10LN631	rockshelter	lithic and ground stone scatter; flakes, point, gri	11.00000
10LN632	rockshelter	Eastgate point	11.00000
10LN633	rockshelter	lithic scatter; flakes, biface, point	11.00000
10LN634	rockshelter	lithic scatter; flakes	11.00000
10LN635	rockshelter	lithic scatter; point, scraper, flakes	11.00000
10LN637	rockshelter	lithic scatter; flakes	11.00000
10LN638	rockshelter	lithic and historic debris scatter; flakes, point,	11.00000
10LN639	rockshelter	lithic scatter; flakes, modified flake	11.00000
10LN640	rockshelter	lithic and historic debris scatter; flakes, point,	11.00000

Appendix C: Prehistoric Localities in the Study Area -Zone 11

10LN645	rockshelter	point midsection	11.00000
10LN646	rockshelter	flake	11.00000
10LN648	rockshelter	Elko point	11.00000
10LN65	rockshelter	LITHIC SCATTER	11.00000
10LN651	rockshelter	flake	11.00000
10LN652	rockshelter	flake	11.00000
10LN653	rockshelter	flake	11.00000
10LN654	rockshelter	point midsection	11.00000
10LN655	rockshelter	flake	11.00000
10LN656	rockshelter	Eastgate point	11.00000
10LN657	rockshelter	lithic scatter; awl, points, modified flake, flake	11.00000
10LN658	rockshelter	lithic scatter and 2 historic cairns; biface, flake	11.00000
10LN659	rockshelter	lithic scatter; flakes	11.00000
10LN66	rockshelter	LITHIC SCATTER	11.00000
10LN662	rockshelter	lithic scatter; point, biface, modified flakes, fla	11.00000
10LN663	rockshelter	point	11.00000
10LN664	rockshelter	Elko point and flake	11.00000
10LN665	rockshelter	Elko point	11.00000
10LN666	rockshelter	4 flakes	11.00000
10LN667	rockshelter	Eastgate point and 2 flakes	11.00000
10LN668	rockshelter	2 flakes	11.00000
10LN669	rockshelter	flake	11.00000
10LN67	rockshelter	LITHIC SCATTER	11.00000
10LN68	rockshelter	LITHIC SCATTER	11.00000
10LN7	rockshelter	LITHIC SCATTER	11.00000
10LN71	rockshelter	LITHIC SCATTER	11.00000
10LN72	rockshelter	LITHIC SCATTER	11.00000
10LN73	rockshelter	LITHIC SCATTER	11.00000
10LN75	rockshelter	ISOLATED FIND	11.00000
10LN83	rockshelter	LITHIC SCATTER	11.00000
10LN84	rockshelter	LITHIC SCATTER	11.00000
10LN85	rockshelter	LITHIC SCATTER	11.00000
10LN86	rockshelter	LITHIC SCATTER	11.00000

Appendix C: Prehistoric Localities in the Study Area -Zone 11

10LN87	rockshelter	LITHIC SCATTER		11.00000
10LN88	rockshelter	ISOLATED FIND		11.00000
10LN89	rockshelter	LITHIC SCATTER		11.00000
10LN90	rockshelter	LITHIC SCATTER		11.00000
10LN91	rockshelter	LITHIC SCATTER		11.00000
10LN93	rockshelter	ROCK FEATURE		11.00000
10LN94	rockshelter	LITHIC SCATTER		11.00000
10LN95	rockshelter	ISOLATED FIND		11.00000
10LN97	rockshelter	LITHIC SCATTER		11.00000
10LN98	unknown	ISOLATED FIND		11.00000
10LN99	unknown	ISOLATED FIND		11.00000

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