ARCHAEOLOGICAL INVESTIGATIONS AT THE KELLY FORKS WORK CENTER SITE (10CW34): CLEARWATER RIVER NATIONAL FOREST, NORTH CENTRAL IDAHO

A Thesis

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ABSTRACT

Kelly Forks Work Center, located on the upper North Fork of the Clearwater River on the Clearwater National Forest, was recorded as an archaeological site (10CW34) in 1969. Surveys and limited testing projects conducted in the 1970s, 1980s, and 1990s demonstrated the presence of significant archaeological deposits at the site and this is supported by the findings of the most recent and comprehensive investigations conducted by the University of Idaho (UI) at 10CW34 between 2010 and 2012. In response to proposed developments by the United States Forest Service (USFS), testing was conducted in four areas of the site, two of which provided intact evidence of repeated use of the site throughout the Holocene. Twenty-six radiocarbon dates, ranging from 13,740 to 280 cal. BP, documented recurring occupations of the site beginning in the early prehistoric period and continuing through the middle and late-prehistoric periods into historic times. Seventy-five obsidian and vitrophyre items from 10CW34 were submitted for x-ray fluorescence analysis and sixty were sourced to locations in Montana, Oregon, and southern Idaho, with Timber Butte comprising the largest percentage. Three soil samples and 123 artifacts recovered at 10CW34 were submitted for protein residue analysis. Twenty-nine tools and each of the soil samples registered forty-four positive reactions with nine mammal antisera, of which rabbit was the most frequent. The abundance and variety of stone tools and debitage recovered at 10CW34, along with the spatial and temporal distribution of these materials, indicates that this location served as an important upland campsite where hunting, fishing, game processing, and tool manufacture and repair were carried out within a wide-ranging network of trade and resource procurement in the southern Plateau, Northwest Plains, and Northern Rockies.

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41 Units 52, 59, 71, and 73 artifact distributions and Feature 2011B, Block C9, Area E 370

42 Feature 2011B artifact inventory and mapped coordinates, 60-80 cm BD, Block C9, Area E 370

43 10CW34 obsidian and vitrophyre NWORSL submission inventory 374

44 10CW34 protein residue analysis positive results inventory 380

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1. INTRODUCTION

Project Background

The Kelly Forks Work Center site (10CW34) is located at the confluence of the North Fork of the Clearwater River and Kelly Creek in north central Idaho (Figures 1-2). The site is managed by the United States Forest Service (USFS) and presently serves as an administrative center within the Kelly Creek Ranger District of the Clearwater National Forest. Intermittent and limited archaeological projects have been conducted at 10CW34 since its recordation as an archaeological site in 1969 by Forest Service archaeologist Tom Schenarts. Between 1979 and 1996 these projects, which included ground surveys and subsurface testing, resulted in the recovery of some two hundred prehistoric artifacts demonstrating the presence of a significant prehistoric component. In 2009, developments were proposed by the Forest Service to improve existing structures and infrastructure at the work center. It was determined that these activities had the potential to adversely affect 10CW34 and that mitigation was necessary.

In June, 2010, following a series of total field magnetic and ground penetrating radar surveys conducted in 2009 (Carlson and Sheriff 2009) (Appendix 2, see Appendix 1b), the University of Idaho began field school excavations. Four areas of the site were tested in order to identify the nature and extent of any vulnerable deposits. Concentrations of cultural material corresponding to both prehistoric and historic occupations were recovered in two of these areas while stratified cultural deposits of considerable and unanticipated antiquity were encountered in one location which had prior to 2010, remained unexplored. A stemmed Windust biface base and an intact Cascade point were recovered from the lower levels during this first year. In addition, a

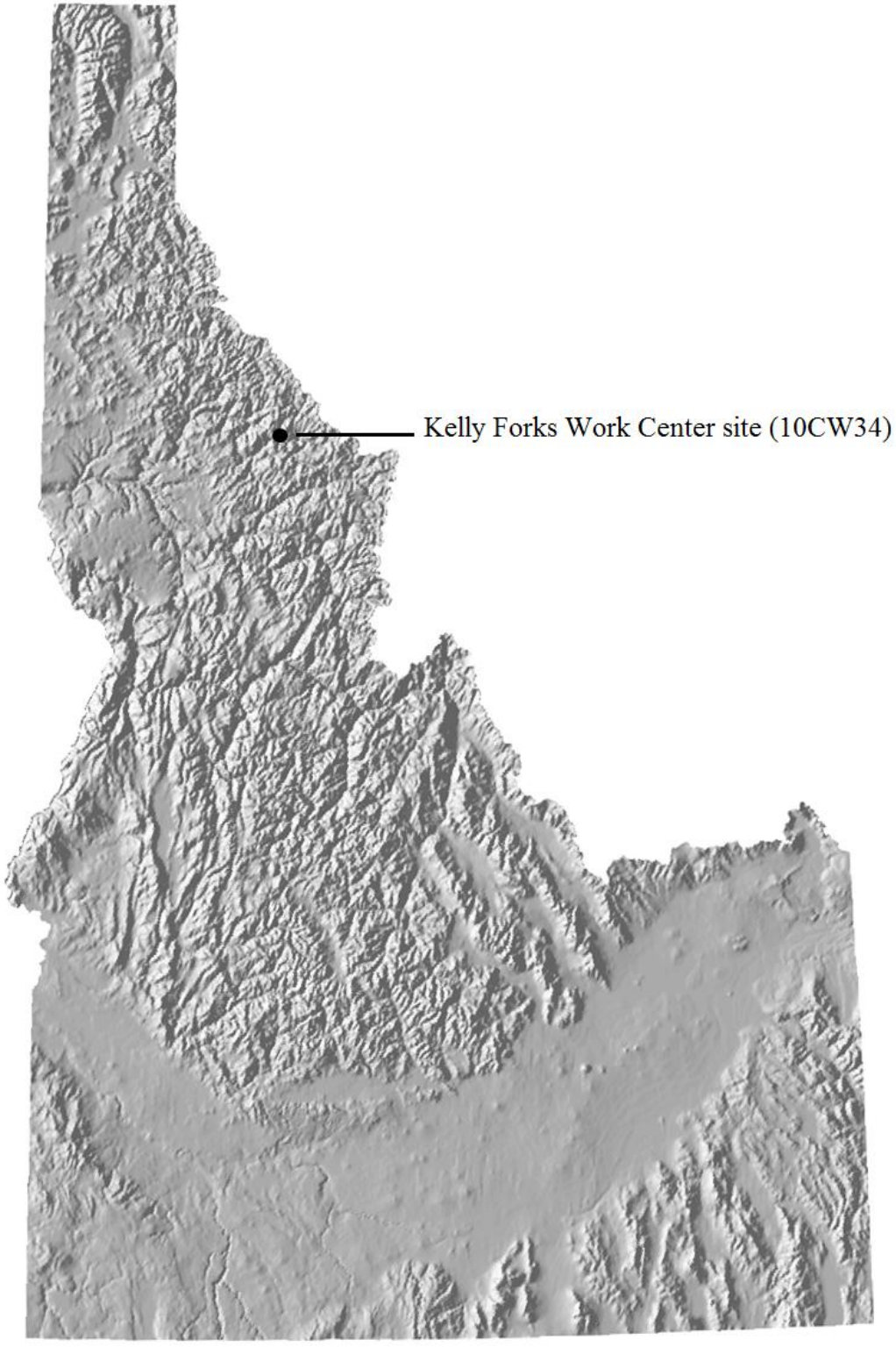


Figure 1. Location of the Kelly Forks Work Center site (10CW34 in Idaho (adapted from: http://imnhisu.edu/digitalatlas).

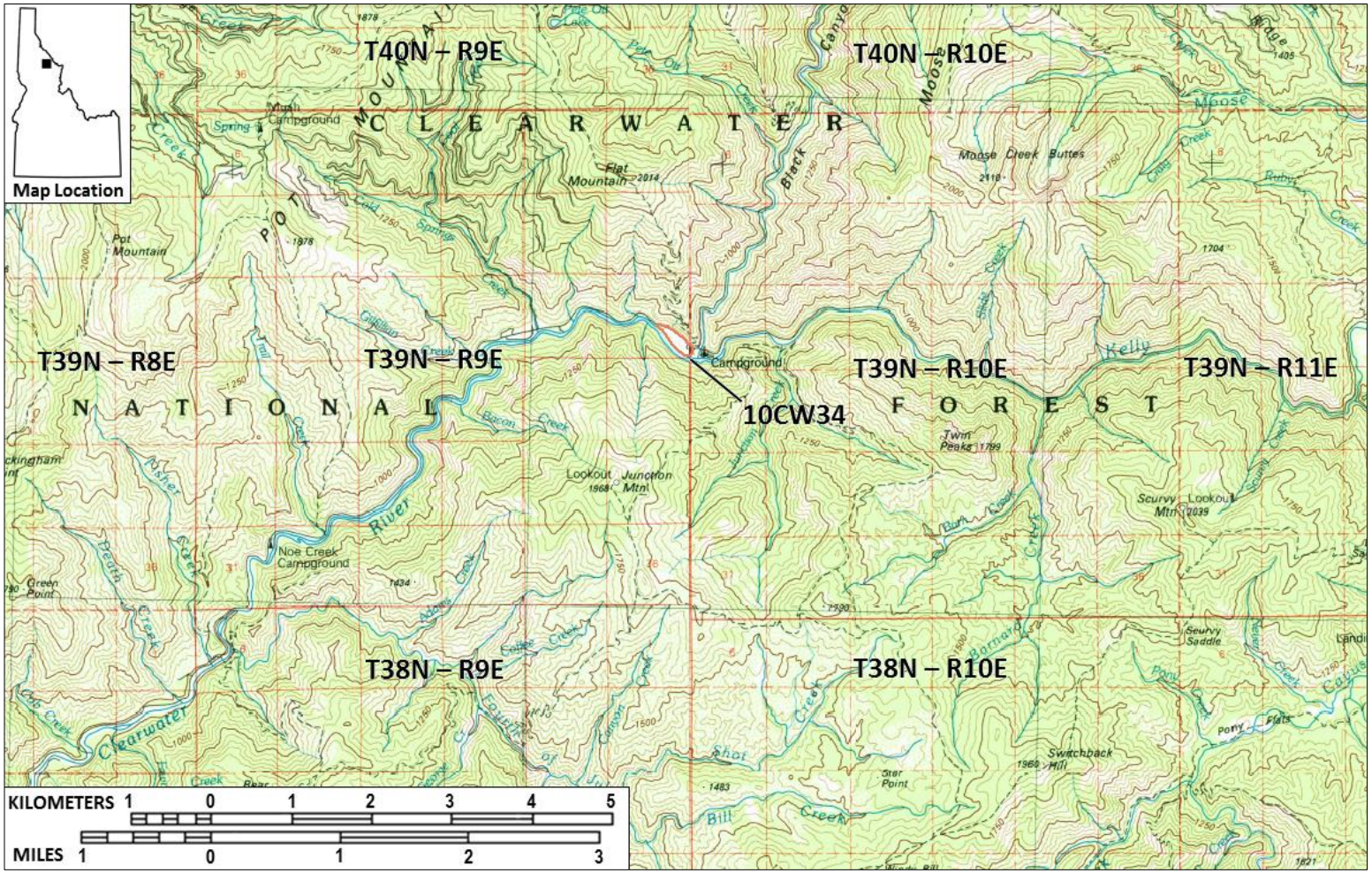


Figure 2. Location of the Kelly Forks Work Center site (10CW34) at the confluence of Kelly Creek and the North Fork of the Clearwater River on the Clearwater National Forest (USFS) (USGS Headquarters 1:100,000 quadrangle, 1982, contour interval 50 m).

range of eight radiocarbon dates beginning at ca. 12,820 years B.P. indicated that human occupation at the site had occurred repeatedly throughout the Holocene and into the historic period. What began as a single-year testing plan became an extended archaeological venture in which UI students and archaeologists returned for the 2011 and 2012 seasons to investigate the early deposits discovered in 2010 and to examine the temporal sequence and cultural nature of occupations at 10CW34.

Research Questions

Archaeological investigations at the Kelly Forks Work Center site were conducted by the University of Idaho during the 2010, 2011, and 2012 field seasons with the objective to evaluate, as a whole, the nature, depth, integrity, extent, and age of cultural deposits at 10CW34 (Appendices 1a-1b). More specifically, these topics respectively articulate the following inquiries:

1. In what forms do the cultural deposits occur at 10CW34 and what types of artifacts are present?

2. At what depths are cultural strata present at 10CW34?

3. How intensively was 10CW34 utilized in the past and are occupations pervasive over more than one area of the terrace?

4. Are there discrete boundaries to site 10CW34?

5. What is the temporal sequence for occupations at 10CW34?

In addition to these inquiries, this study addresses a number of topics which aid in the examination of 10CW34 within a regional context of temporal and cultural trends:

1. How do the prehistoric occupations at 10CW34 compare with the cultural chronology of the Clearwater River region?

2. How are technology, trade, and subsistence practices represented at 10CW34?

3. Can episodic patterns in occupation and site-use be identified?

4. Are there spatial patterns in site-use? In what ways were separate areas of 10CW34 used differently?

All materials and information recovered at 10CW34 since 1969 are applied to address these research questions throughout this report, as well as in the final chapter, where a more detailed discussion of results and conclusions is included.

2. THE NATURAL SETTING

Introduction

The Kelly Forks Work Center site (10CW34) is in Clearwater County at the confluence of Kelly Creek with the North Fork of the Clearwater River in north central Idaho (Figure 3). The site is within the Clearwater National Forest and located 101 river miles upstream from the North Fork's confluence with the Clearwater River at Ahsahka, Idaho (Google Earth calculations 2011). Most of the site is on a ca. 50 acre, broad, level alluvial terrace that ranges from an elevation of 843 m to 844 m (2767-2769 ft.) above sea level (asl), which is about 2 m above high river flow. Elevation rises to approximately 850 m (2788 ft.) asl at the northwest edge of the site on a higher terrace that extends to the base of the slope which forms the north canyon side (Google Earth calculations 2011). Forest Service Road 250 runs along this base and crosses the North Fork at the north east corner of the site (Figures 4-6).

The North Fork drainage comprises the northern extent of the Clearwater River drainage and, along with most of the rivers in Idaho, is part of the Columbia River drainage system. The North Fork drains an area of approximately 2440 square miles of the western slopes of the Bitterroot Range, flowing westward for 130 miles from the divide on the Idaho-Montana border to Ahsahka where it joins the mainstem of the Clearwater River (Idaho Department of Environmental Quality [IDEQ] 2003:7; Mattson et al. 1983:5) (Figure 7). From Ahsahka the Clearwater River flows westward to its mouth at Lewiston, Idaho where it joins the Snake River 139 river miles upstream of the Columbia River which empties into the Pacific Ocean (Figure 8) (Ecovista et al. 2003:28).

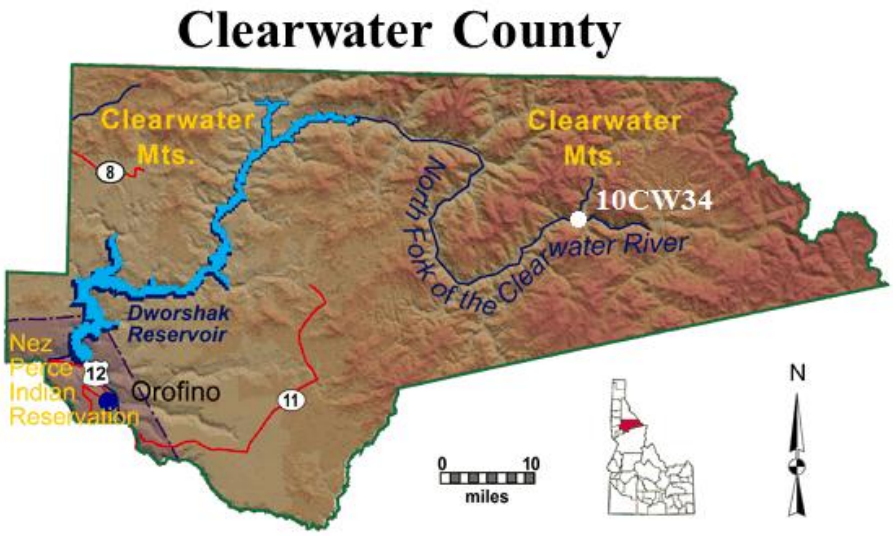


Figure 3. Location of the Kelly Forks Work Center site (10CW34) in Clearwater County (adapted from: http://imnh.isu.edu/digitalatlas/counties/clear/clear.htm).



Figure 4. Google Earth aerial image of the Kelly Forks Work Center site (10CW34). The locations and directions of flow of the North Fork of the Clearwater River and Kelly Creek are indicated (Google Earth 2010).



Figure 5. Low oblique aerial photograph of the Kelly Forks Work Center site (10CW34) looking south. Kelly Creek (at top left) flows into the North Fork of the Clearwater River from the east (left). The view is toward the south. Photo taken by Bruce Ellis, August, 2010.



Figure 6. Aerial photograph of 10CW34, showing the work center structures on the east and central portions the terrace. Kelly Creek joins the North Fork of the Clearwater River at bottom right-center. The view is to the west and slightly north. Photo by Andrew Rose.

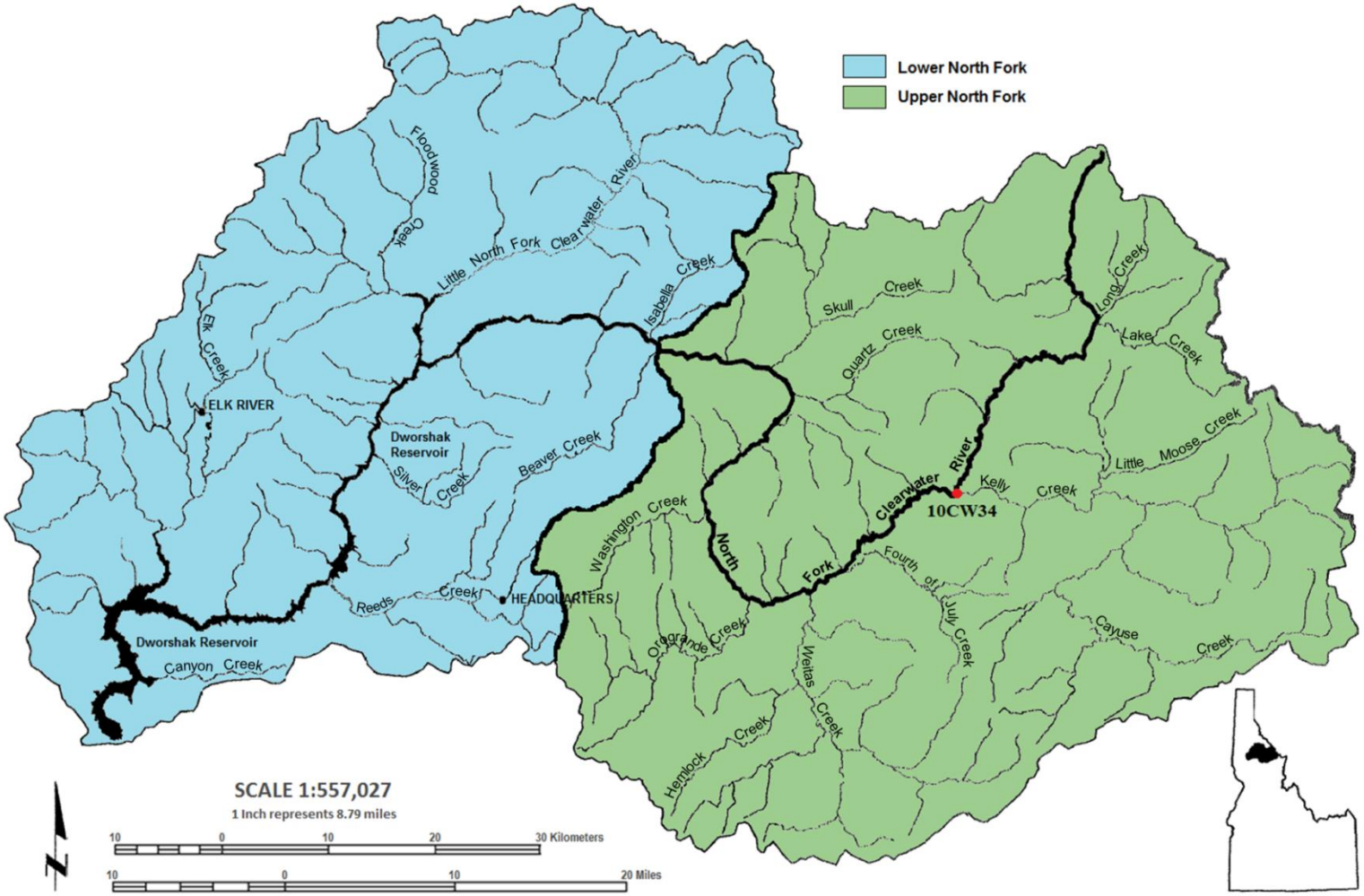


Figure 7. Drainage map of the North Fork of the Clearwater River showing major tributaries and the location of 10CW34. The drainage is divided into upper and lower portions by a line running roughly north/south which crosses the North Fork at the mouth of Beaver Creek (adapted from Idaho Water Resource Board [IWRB] 1996:vii, Figure 1).



Figure 8. Map of the Columbia River drainage system showing the location of 10CW34. The Columbia River is highlighted. (1) North Fork of the Clearwater River; (2) Clearwater River; (3) Snake River (adapted from https://upload.wikimedia.org/wikipedia/commons/thumb/e/e4/Columbiarivermap.png/1024px-Columbiarivermap.png).

Kelly Creek is a tributary of the North Fork and flows 37 miles from its headwaters in the Bitterroot Mountains to where it joins the North Fork at an elevation just below 843 m (2767 ft.) (Google Earth calculations 2011; United States Department of Agriculture, Forest Service [USDA, FS] 1994:II-8). Topographic relief of 900 m (3000 ft.) asl or more is common in the canyons of the upper North Fork and the slopes that surround 10CW34 rise over 1200 m (4000 ft.) above the river bed (Ecovista et al. 2003: 40; Google Earth calculations 2011) (Figure 9). The stream flow and levels of the North Fork and Kelly Creek vary throughout the year with low flows occurring during the late summer, fall, and winter months and high runoff occurring in the late spring as mountain snows begin to melt.

Geomorphology

The North Fork of the Clearwater River flows through two physiographic provinces (Figure 10). Most of the drainage above Ahsahka is within the Northern Rocky Mountain Province, characterized by Fenneman (1931:183) as having variously shaped divides of nearly uniform height with "a multitude of minor crests running in all directions between the streams of a mature drainage system." The valleys of the region are generally of the canyon type and rise from around 300 m (1000 ft.) to a mile above the stream beds, while the crest height level in the Clearwater Mountains is a little more than 2100 m (7000 ft.) asl (Fenneman 1931:183, 188, 191). The lower portion of the drainage in the vicinity of the mouth of the North Fork is included in the northeastern edge of what Freeman et al. (1945:54) have called the Tristate Uplands, a subsection of the Central Mountains subprovince in the Columbia Intermontane Province. The topography of the Tristate Uplands lies mostly between the altitudes of 900 and 1500 m

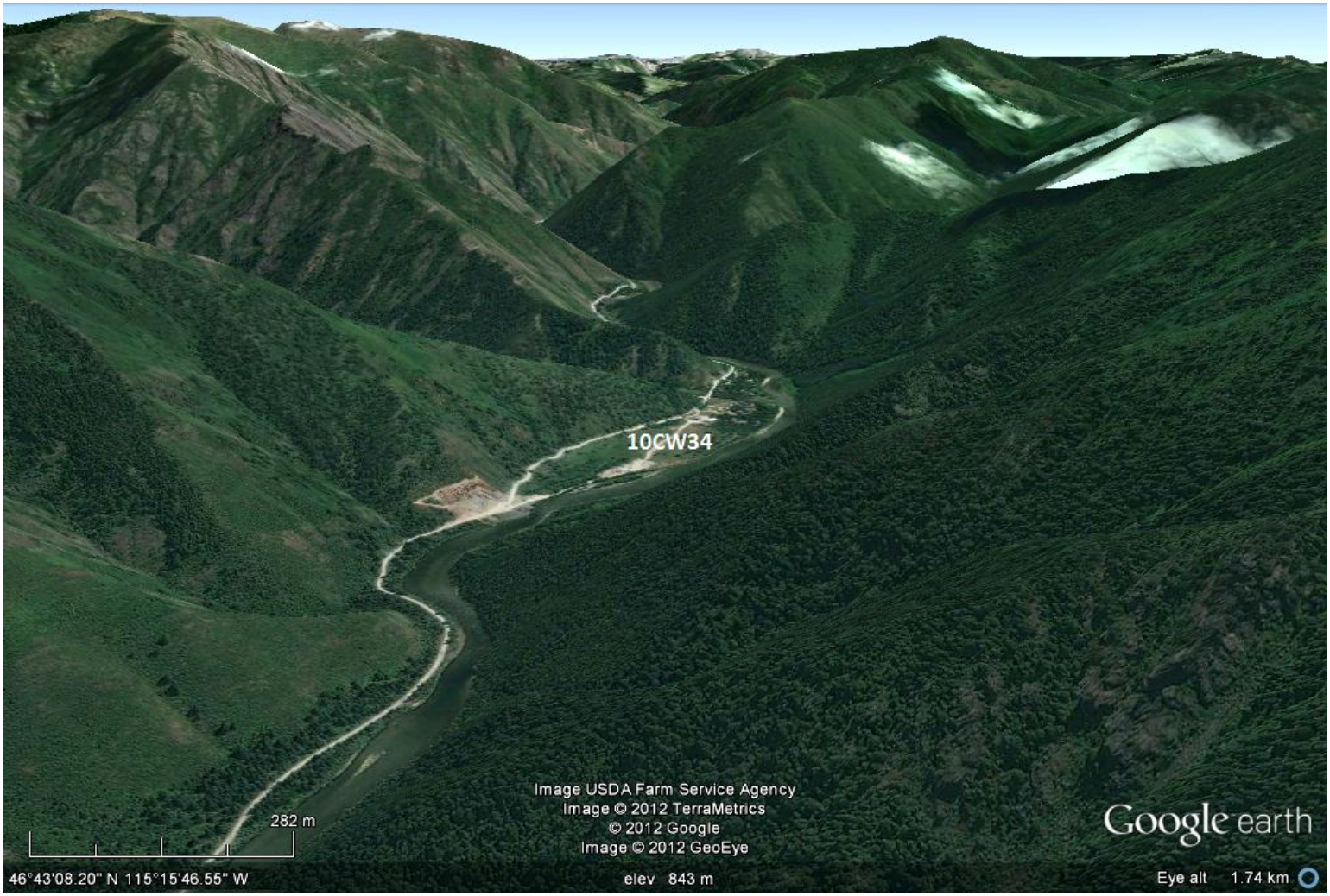


Figure 9. Low oblique Google Earth image of the location of the Kelly Forks Work Center site (10CW34) looking eastward down the Kelly Creek Canyon.

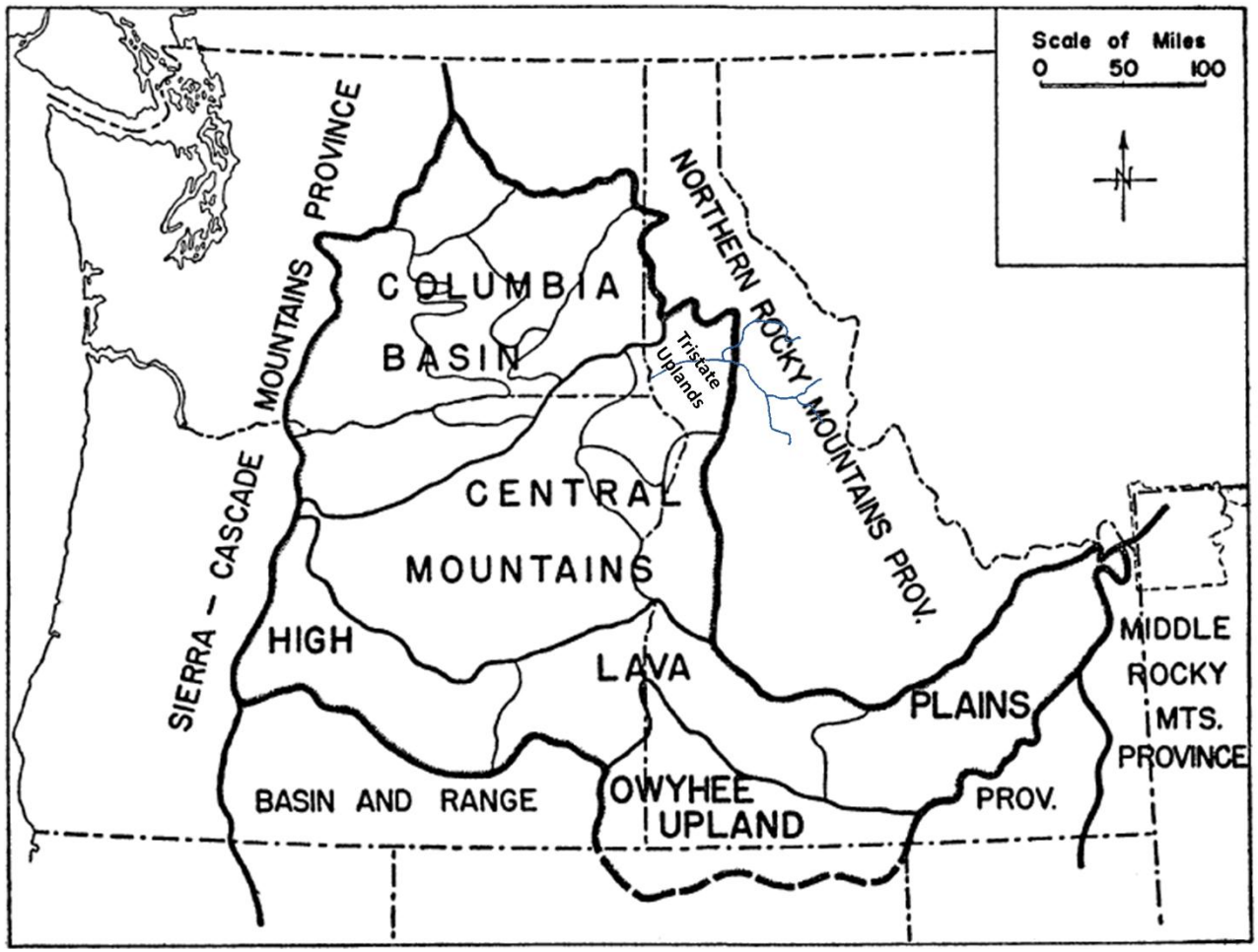


Figure 10. Relative location of subprovinces within the Columbia Intermontane physiographic province, including the Tristate Uplands. The location of the Clearwater River along with the North Fork and portions of its Middle and South forks are superimposed in blue. Much of the North Fork is within the Rocky Mountains Province while its mouth is included in the Tristate Uplands (adapted from Freeman et al. 1945:56).

(3000 and 5000 ft.) and is described as "a gently warped upland surface of Columbia River basalt which has been deeply incised by the Clearwater, Salmon, Snake, and Grand Ronde Rivers and their tributaries" (Freeman et al. 1945:69).

Geology

The oldest rocks known to have originated in the vicinity of the North Fork of the Clearwater River are part of what is known as the Belt-Purcell Supergroup or the Precambrian Belt formations which are distributed across north Idaho and extend into western Montana, southern British Columbia, and the northeastern edge of Washington. These sedimentary rocks consisting of argillites, shales, limestone, and metamorphosed quartzites are remnants of sediments deposited over a period from about 1500 to 800 million years ago (mya) in a large rift basin that formed as the ancient Columbia supercontinent broke apart and reassembled (Alt and Hyndman 1989:10-12; Ecovista et al. 2003:33; Figge 2009:5; Mattson et al. 1983:5). During this period of Belt accumulation and continental rifting magma intrusions rising through the crust formed large sills of igneous rock and granitic plutons between the layers of sediments, resulting in deformation and metamorphism of the Belt rocks in the zones of contact (Alt and Hyndman 1989:12-13; Ecovista et al. 2003:33). About 800 mya the supercontinent of Rodinia broke apart, forming a new ocean basin and the ancestral western margin of North America through what is now western Canada, eastern Washington and southeast Idaho. The edge of the ancestral coastline is considered to have existed in the vicinity of Dworshak Dam (Alt and Hyndman 1989:13-15, 125; Ecovista et al. 2003:33; Figge 2009:16-17).

The western coastal margin persisted for about 700 million years through the

Paleozoic and into the early Mesozoic during which large areas of Idaho were intermittently submerged below shallow sea water. Small Paleozoic deposits of interbedded limestone and dolomite marble are present in the upper north fork area while intrusive igneous and metamorphic dikes and sills dating to the Mesozoic are distributed throughout (Alt and Hyndman 1989:15-16; Lewis et al. 1992). More than 100 mya terranes that had formed as oceanic and island arcs began to accrete to the western edge of the continental margin resulting in magmatic activity and thrust faulting associated with the subduction of the Pacific plate. The intense metamorphism and deformation that occurred along the zones of accretion, known as "border zones" or "suture zones," resulted in a plutonic distribution of the mylonitic diorite gneisses and highly metamorphosed schists that make up the majority of the surface geology in the central, north, and northwestern parts of the lower North Fork drainage today (Alt and Hyndman 1989:123-126; IDEQ 2002:6, 2003:16; Maley 1987:63).

As deformation and metamorphism produced by the terrane accretion along the western suture zones continued through the Cretaceous, intrusions of granodioritic and quartz monzonite plutons were emplaced by magmas generated from the subduction process, forming the Idaho Batholith over much of central Idaho. The North Fork basin is located on the northern edge of the Bitterroot lobe which was formed by a series of intrusions into the existing Precambrian sedimentary rocks that began in the Cretaceous about 105 mya and continued through the Tertiary period to about 50 mya (Alt and Hyndman 1989:101). Much of the bedrock found in the Clearwater and Bitterroot Mountains is composed of sedimentary- and igneous-type granites, gneisses, and muscovite and biotite schists that were metamorphosed around the zones of contact and

uplifted to form the Bitterroot Range (Johnson and Raines 1995; Maley 1987:64-65). The coarse-grained granites and gneisses of the batholith have been deeply dissected into narrow valleys by the North Fork and its tributaries, a process that continues to promote erosion and sedimentation, resulting in frequent mass failures and landslides throughout the basin (Ecovista et al. 2003:38).

By about 17 mya, gradual uplifting of the Bitterroot Mountains was taking place and the Tertiary topography of the lower Clearwater basin had matured into a landscape of relatively low, rolling uplands when the basalt flows of the Columbia River Group entered the region. Over a period of roughly 11 million years highly fluid basaltic lava spread eastward from northeastern Oregon and flooded over 4000 square miles of the valleys and foothills of the Clearwater Mountains, forming what is known as the Clearwater Embayment (Bond 1963:1; Maley 1987:76; USDA, FS 1994:II-5). The basalt flows extended roughly 15 miles into lower canyons of the ancestral North Fork and established a new surface which was gradually downcut and eroded by the drainage through the Pliocene and Pleistocene, a process that is ongoing today (Bond 1963:1, 40) (Figure 11).

The most recent ice age began with the Pleistocene around 2 mya and the Wisconsin glaciation reached a maximum about 18,000 years before present (BP). During this time the Cordilleran ice sheet that covered most of western British Columbia advanced southward into northwestern Montana and the northernmost portions of Washington and Idaho (Alt and Hyndman 1989:60; Figge 2009:274). Though the Clearwater region was not covered by the Wisconsin ice sheets, alpine glaciers formed on many of the higher peaks in the Clearwater and Bitterroot mountains and isolated

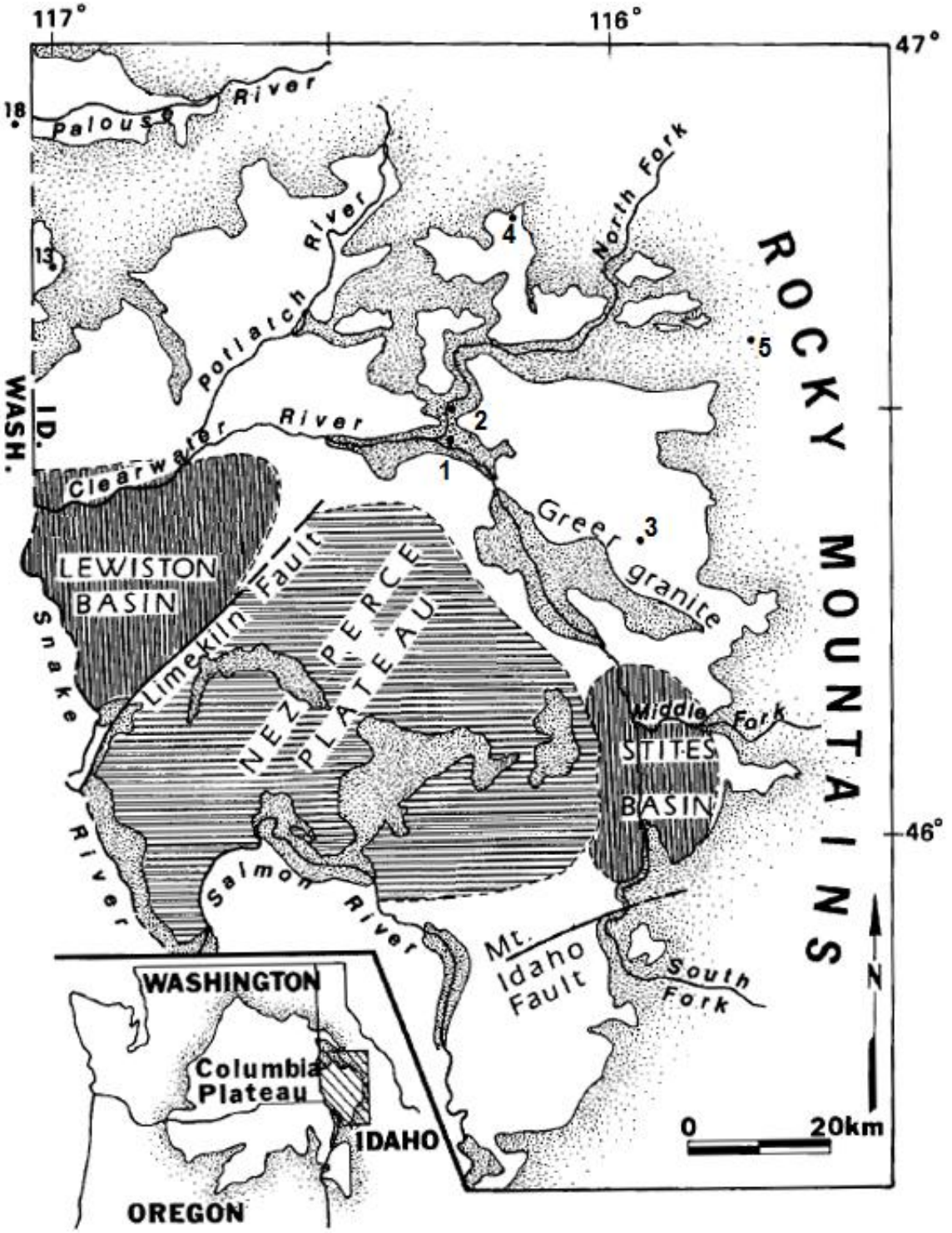


Figure 11. Map of the Clearwater Embayment. Stippled area indicates rock older than the Columbia River Group. (1) Orofino; (2) Dworshak Reservoir; (3) Weippe; (4) Elk River; (5) Headquarters (adapted from Camp 1981:669, Figure 1).

moraines reached elevations in the valleys as low as 900 m (3000 ft.) The glaciers began to withdraw near the end of the Pleistocene, approximately 14,000 BP, leaving behind glacial cirque basins and alpine lakes in the higher elevations of the Bitterroot range, many of which comprise stream headwaters in the drainage today, including those of the North Fork and Kelly Creek (Anderson 1930:5; Mattson et al. 1983:8; USDA, FS 1994 II-14-15). As temperatures gradually warmed near the beginning of the Holocene, the erosion cycle initiated in the Miocene was accelerated by increased amounts of glacial melt water. The development of the modern breaklands and river terraces of the North Fork occurred during this time (Bond 1963:1; Corliss and Gallagher 1972:7; Ecovista et al. 2003:34).

Geology and Landforms near 10CW34

Since the end of glaciation, the primary processes influencing the landscape have been fluvial, windblown sediment accumulation, and mass wasting, or landslides (Ecovista et al. 2003:34). The major landform types in the vicinity of the 10CW34 are narrow valley bottoms bounded by rolling breaklands with steep, colluvial midslopes, capped by alpine ridges that rise over 2000 m (6500 ft.) asl (Ecovista et al. 2003:44; IDEQ 2003:14) (Figure 12). Geological materials immediately surrounding the site consist of Precambrian metamorphosed quartzites, schists, and gneisses which have been faulted, foliated, folded, and steadily downcut by the North Fork and Kelly Creek (Figure 13). The low terrace on which 10CW34 is located is composed of relatively recent alluvial deposits of Holocene and possibly older age, while a major high-angle fault, known as the Kelly Forks Fault trends in a northwest-southwest direction, separating Proterozoic materials to the north and south (Lewis et al. 1992; Lewis et al. 2007).

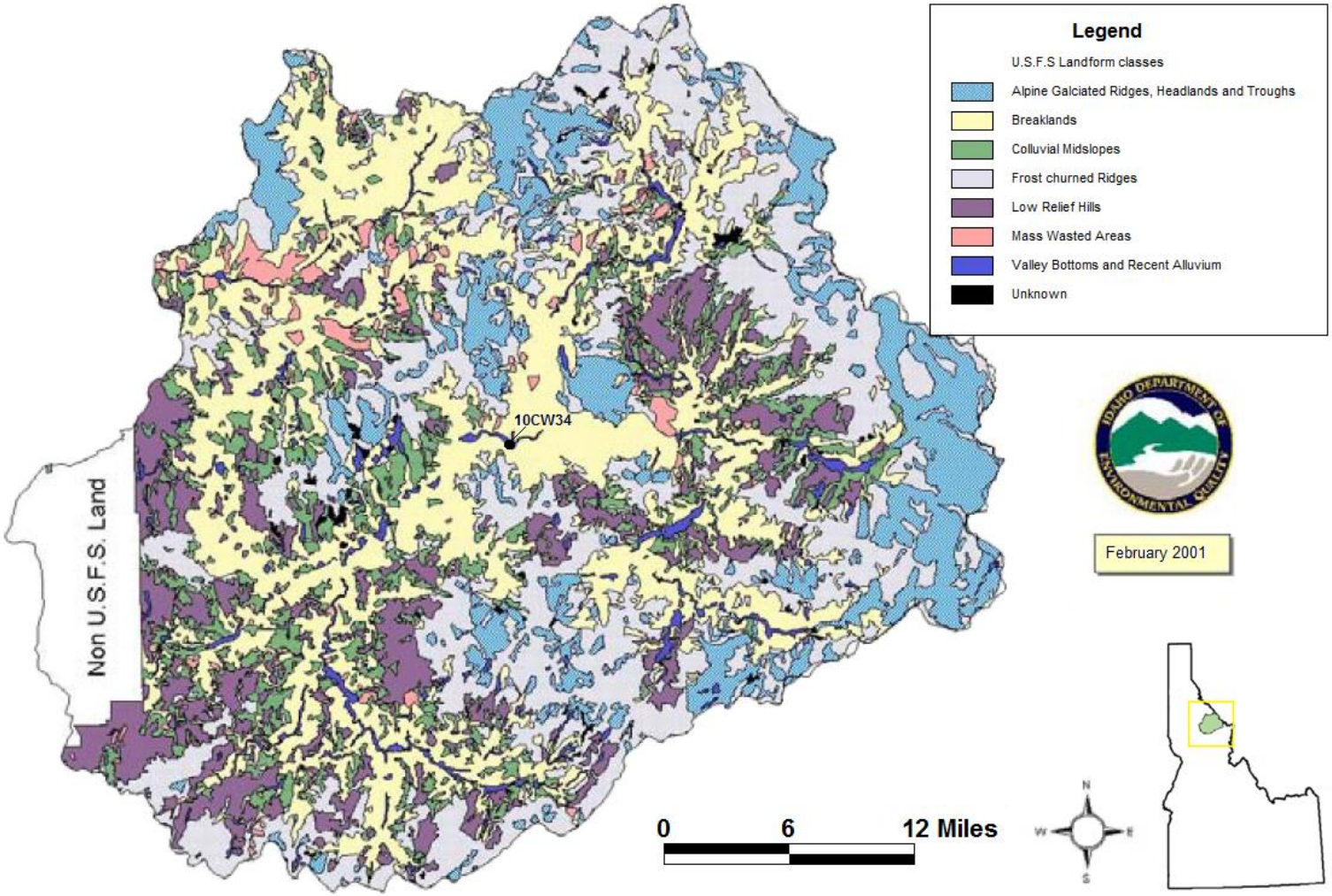


Figure 12. Map of USFS landform class types within the upper North Fork of the Clearwater drainage and the location of 10CW34 (adapted from IDEQ 2003:14, Map 4).

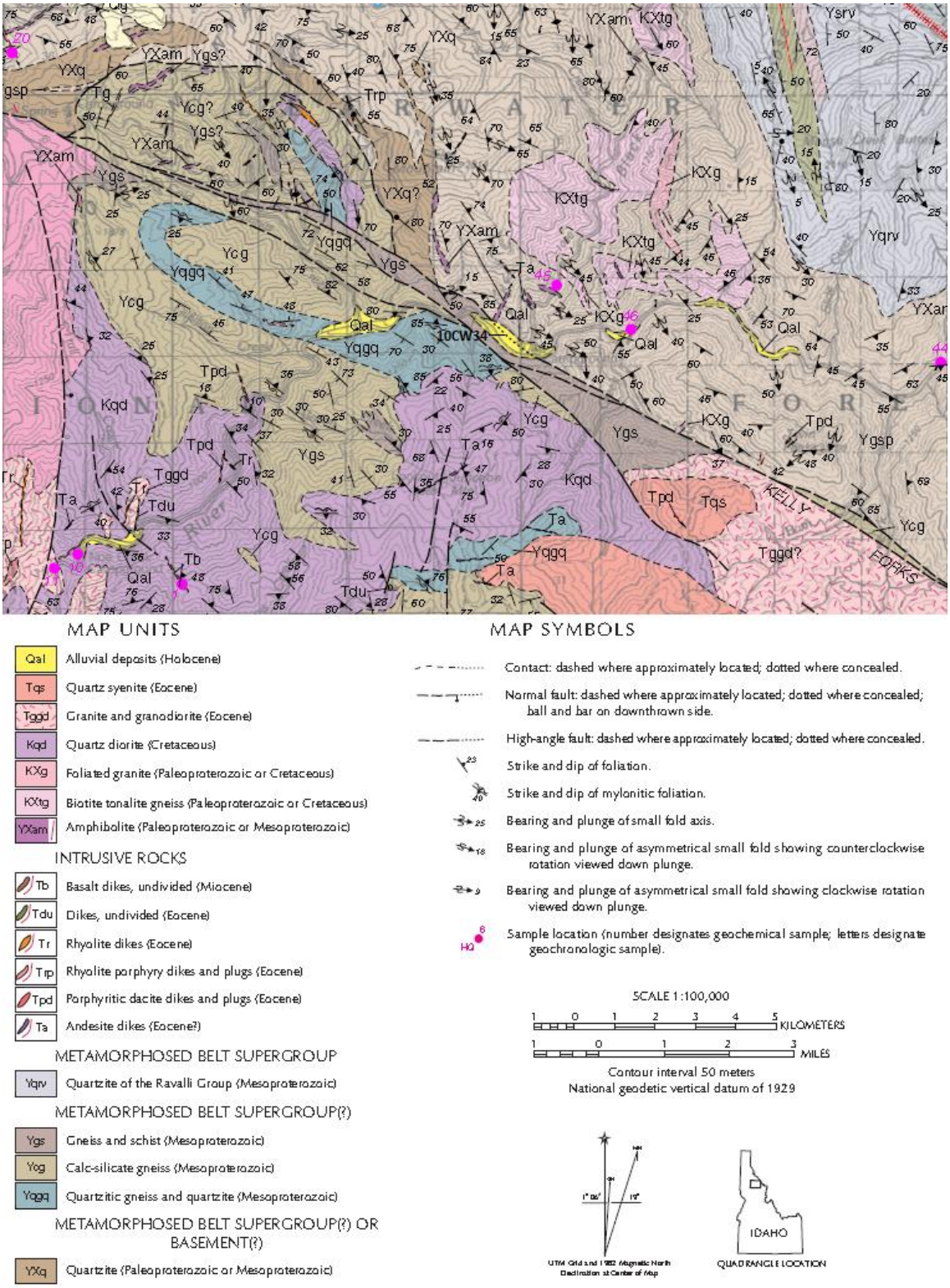


Figure 13. Close-up image of the geologic map of the 30 x 60 minute Headquarters quadrangle, Idaho showing the geologic units in the vicinity of 10CW34, labeled at center (adapted from Lewis et al. 2007).

Paleoclimate

A number of sites containing lake deposits of pollen and charcoal in the northern Rocky Mountains and the Clearwater Mountains have provided environmental records that cover the last 17,000 years (Figure 14). Low-elevation (920-1270 m [3018-4166 ft.] asl) sites, located in the Cabinet Mountains and the Flathead Valley region in northwest Montana, include McKillop Creek Pond, Foy Lake, Johns Lake, Kintla Lake Bog, and Tepee Lake. The longest record from these sites was recovered at Kintla Lake Bog and extends to 14,000 BP. Hoodoo Lake (1770 m [5807 ft.] asl) and Mary's Frog Pond (2152 m [7060 ft.] asl), located on the western side of the Bitterroot range, are mid- and high-elevation sites nearest to 10CW34 and contain pollen data extending to 7700 and 11,500 BP, respectively (Figures 15-16). Burnt Knob Lake (2250 m [7381 ft.] asl) is a high elevation site in the Clearwater range of the Selway-Bitterroot Wilderness Area and contains a record to 15,000 BP (Figures 15-16). Pollen sequences extending to 15,000 BP on the eastern side of the Bitterroot range in south-central Montana come from Pintlar Lake (1921 m [6302 ft.] asl), Lost Trail Pass Bog (2147 m [7043 ft.] asl), and Baker Lake (2300 m [7545 ft.] asl). In the northern Yellowstone National Park area Slough Creek Lake (1884 m [6181 ft.] asl) and Cygnet Lake (2530 m [8300 ft.] asl) have provided data for the last 17,000 years (Brunelle et al. 2005; Brunelle and Whitlock 2003; Power et al. 2011).

Warming from the last glacial maximum began approximately 17,000 BP. The main phase of warming occurred between 14,500 and 10,000 BP and was accompanied by the retreat of the continental ice sheets which had expanded over much of North America during the Pleistocene (Barnosky et al. 1987:294; Grotzinger et al. 2007:360).

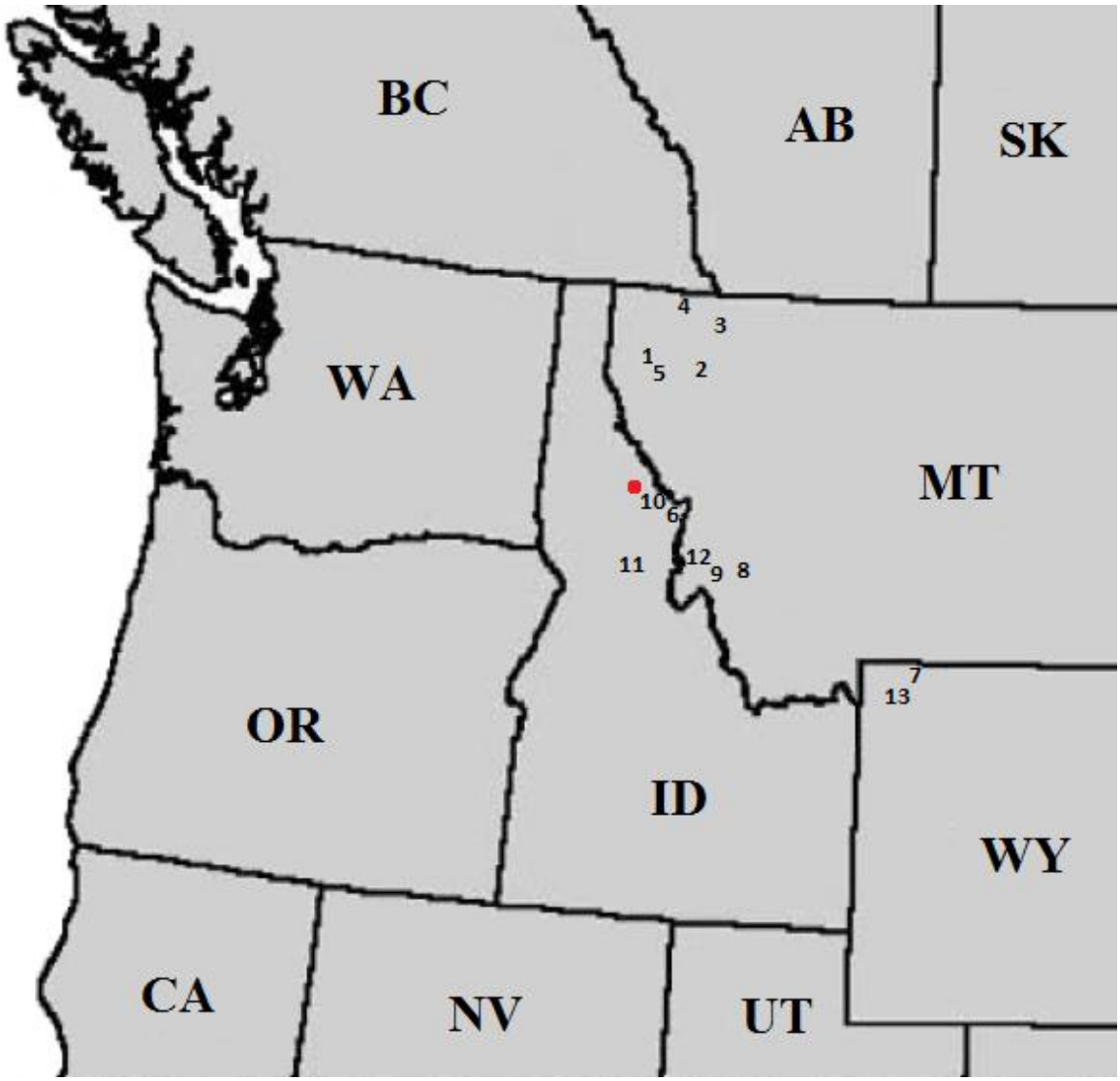


Figure 14. Map showing the generalized locations of 10CW34 (red point) and pollen record sites in the northern Rocky Mountains of Idaho, Montana, and Wyoming. (1) McKillop Creek Pond; (2) Foy Lake; (3) Johns Lake (4) Kintla Lake Bog; (5) Tepee Lake; (6) Hoodoo Lake; (7) Slough Creek Lake; (8) Pintlar Lake; (9) Lost Trail Pass Bog; (10) Mary's Frog Pond; (11) Burnt Knob Lake; (12) Baker Lake; (13) Cygnet Lake (adapted from Brunelle and Whitlock 2003:308; Brunelle et al. 2005:2282; Power et al. 2011:2529).

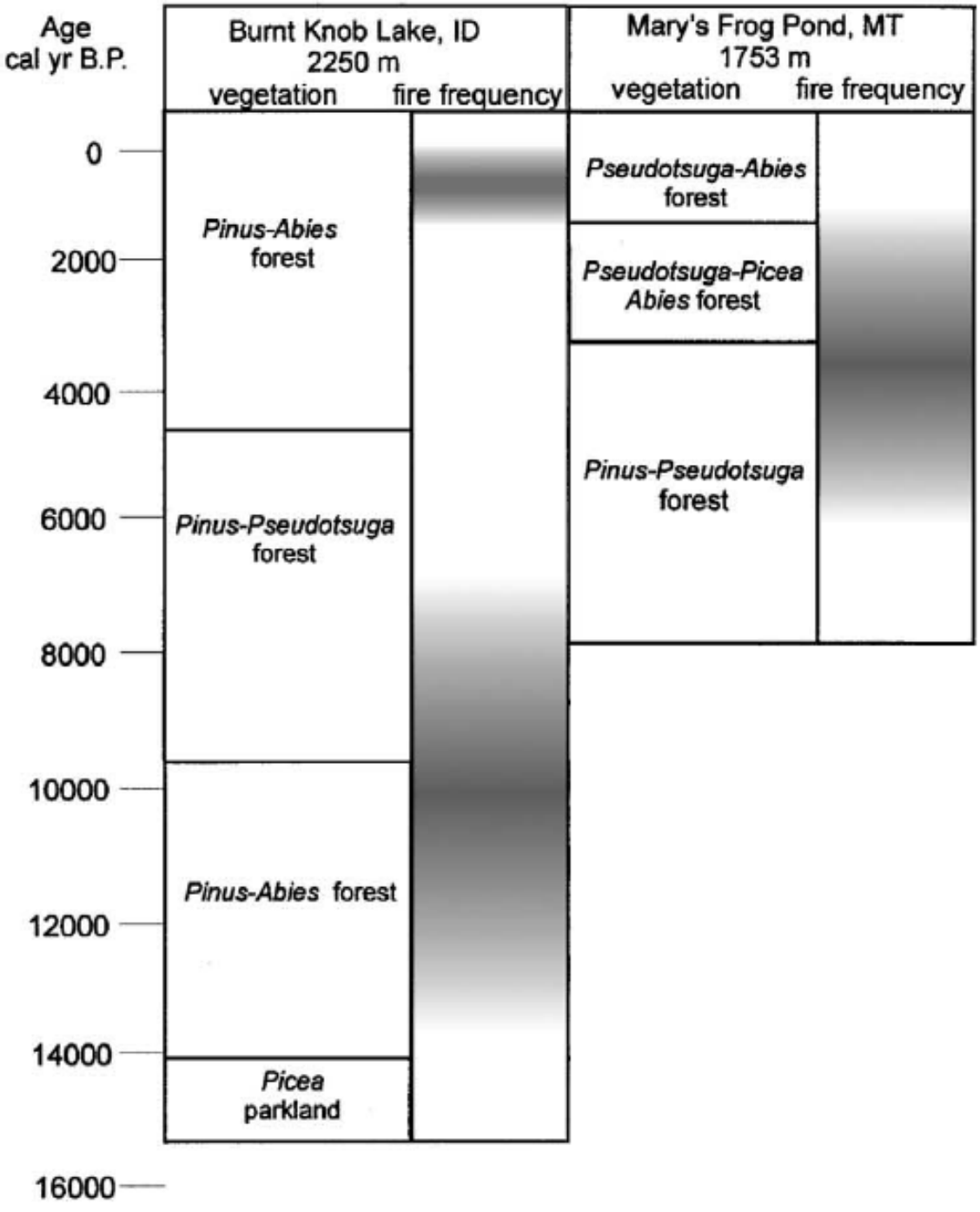


Figure 15. Vegetation and fire reconstructions for Burnt Knob Lake and Mary's Frog Pond in the Northern Rocky Mountains (adapted from Brunelle and Whitlock 2003:315, Figure 6).

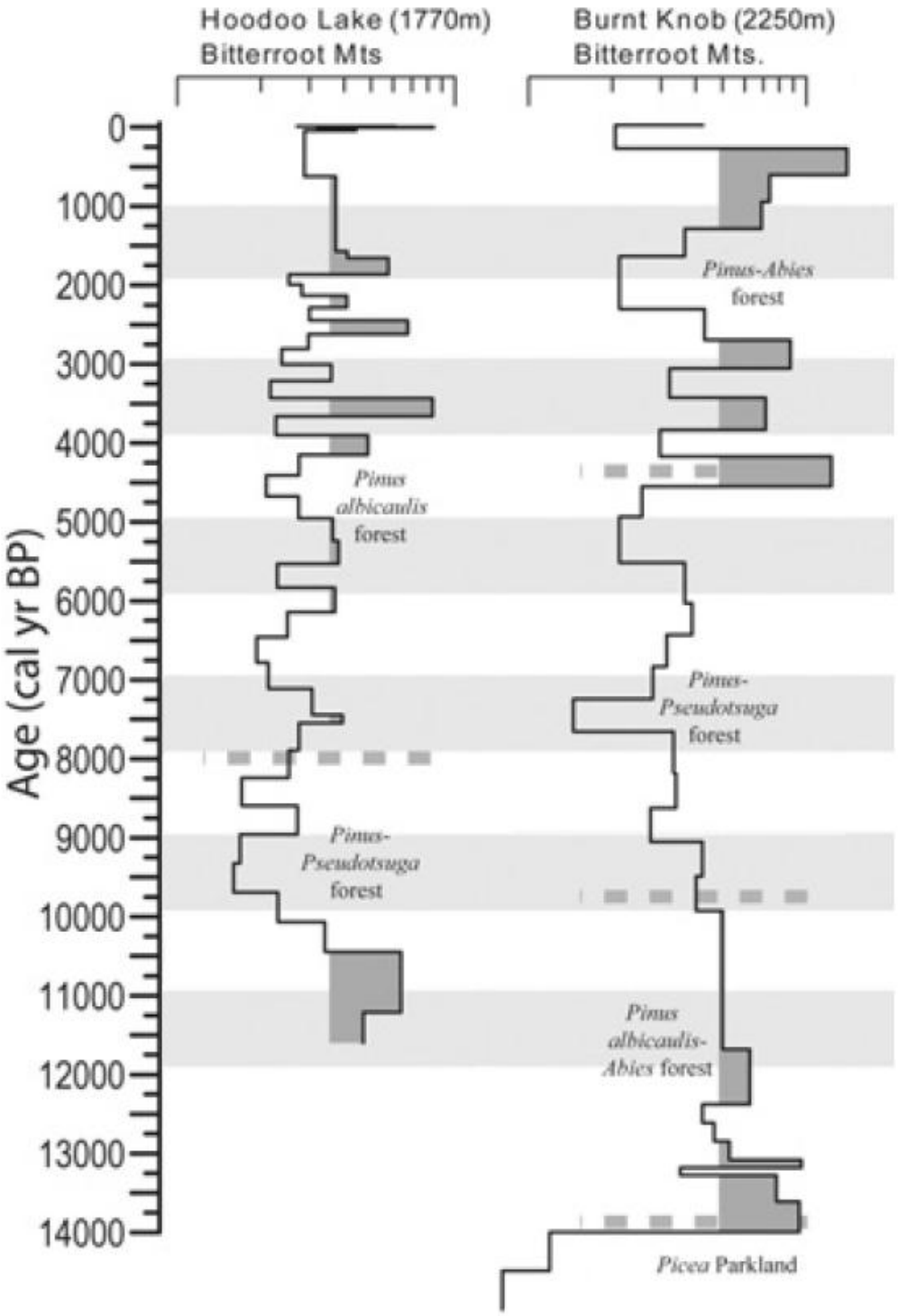


Figure 16. Vegetation sequences for Hoodoo Lake and Burnt Knob Lake showing changes in tree and shrub versus herb communities, increasing toward the right. Gray shading represents ratio values above the long-term average (adapted from Power et al. 2011:2530, Figure 7).

During this time temperature and moisture levels in the Pacific Northwest oscillated from cold-dry to warm-moist conditions as the periglacial steppe, tundra, and subalpine parkland landscape was gradually replaced with the spread of temperate forests to higher elevations. By 12,000 BP the atmospheric influence of the ice sheets over jet stream circulation had weakened and as a result, late-glacial environments began to exhibit significant regional variation associated with local topography, a pattern that has persisted through the Holocene and into the present (Barnosky et al. 1987:316; Mehringer 1985:172).

During the late-glacial period, ca. 15,000-11,000 BP, pollen data from all sites in the northern Rocky Mountains indicate initial cold-moist conditions with tundra and the later development of subalpine parkland and alpine meadow environments following deglaciation. Pine and subalpine fir forests began replacing spruce forests in higher elevations (>2000 m [6500 ft.] asl) at ca. 14,000 BP. The fall of Glacier Peak tephra (ca. 13,000 BP) is recorded at Burnt Knob, Baker, Hoodoo, and Pintlar lakes. By ca. 11,000 BP pine forests were common at lower elevations and lodgepole pine, whitebark pine, and Douglas-fir were present at several sites, including Mary's Frog Pond and Hoodoo Lake, demonstrating the spread of montane forests as moist conditions and summer temperatures increased in the western Rocky Mountains near the beginning of the Holocene (Brunelle and Whitlock 2003:313, 314; Brunelle et al. 2005:2295; Power et al. 2011:2526).

Between ca. 11,000 and 7000 BP an upward shift of the treeline was accompanied by the expansion of mixed Pine-, Fir-, Douglas fir-, and Larch-forests along elevational gradients and an increase in the abundance of thermophilous taxa at all sites, indicating

continued warming. After ca. 8000 BP seasonal cycles in moisture levels fluctuated from dry, cold winters to higher-than-present precipitation levels during warm summers (Brunelle et al. 2005:2290, 2294; Power et al. 2011:2526, 2528). The fall of Mazama ash, dated at 7589 and 7750 cal. BP, has been identified at Burnt Knob, Baker, Hoodoo, and Pintlar Lakes and is associated with decreases in conifer pollen accumulation and disruptions from which the vegetation at Foy Lake did not recover for nearly a thousand years (Brunelle and Whitlock 2003:314; Power et al. 2011:2530-31). Contrasts between seasonal sun exposure became more moderate between ca. 6800 and 2500 BP as dry winters persisted and summers received less precipitation than the previous period. Increased forest cover during this time coincided with droughts and severe low-water levels at both high- and low-elevation sites throughout the northern Rocky Mountains (Brunelle and Whitlock 2003:316; Power et al. 2011:2530).

The late Holocene (ca. 2500 BP-present) is characterized by an overall trend of increased moisture and cooling throughout the region with a growing diversity of climatic variations relative to elevation and topographic features. Pine-spruce forests became more dense at high-elevation sites such as Burnt Knob and Baker lakes, while mesophytic forests of spruce and fir expanded at lower elevations due to enhanced moisture availability. Intense and prolonged droughts persisted at many low elevation sites throughout the late-Holocene, while higher elevations experienced cool, wet summers and deeper snowpacks (Power et al. 2006:432). The development of modern precipitation patterns and forest compositions began at ca. 3000 BP. At Burnt Knob Lake and Mary's Frog Pond this transition occurred by 2500 BP and modern forests were established at

Hoodoo Lake by 2000 BP (Brunelle and Whitlock 2003:316; Brunelle et al. 2005:2290; Power et al. 2011:2531).

Modern Climate

Seasonal cycles of temperature and precipitation in the Clearwater River drainage and North Fork basin are strongly influenced by maritime air masses produced by weather systems that form in the northeast Pacific Ocean. These air masses contain warm moisture that originates in the subtropical and central western Pacific Ocean, and are transported westward over northern Washington and northern and central Idaho by what is known as the Pacific storm track, the effect of which produces a relatively mild climate in north Idaho. As the storm track reaches the elevated ridges of the Rocky Mountains and Bitterroot range, the air cools and releases considerable precipitation which primarily occurs during the fall, winter and early spring (Brunelle et al. 2005:2282; Chatters 1998: 32-33; Corliss and Gallagher 1972:5-6).

Precipitation in the North Fork drainage varies with topography but generally increases toward the east as elevations rise (Ecovista et al. 2003:28; Stapp et al. 1984:6) (Figure 17). Annual precipitation in the lower portion of the drainage near Ahsahka ranges from a minimum of 23 in. (58.4 cm) to a maximum of 87 in. (221 cm) and averages 43.1 in. (109.5 cm). The upper portion of the drainage receives higher levels that range from a minimum of 31 in. (78.7 cm) to a maximum of 97 in. (246 cm), averaging at 59 in. (150 cm) (Ecovista et al. 2003:30, Table 5). Much of the precipitation occurs as snowfall, especially in mountainous areas above 1219 m (4000 ft.) asl, while lower elevations may receive intervals of heavy rainfall during the winter months (Ecovista et al. 2003:1; IDEQ 2004:4). From November through April the seasonal

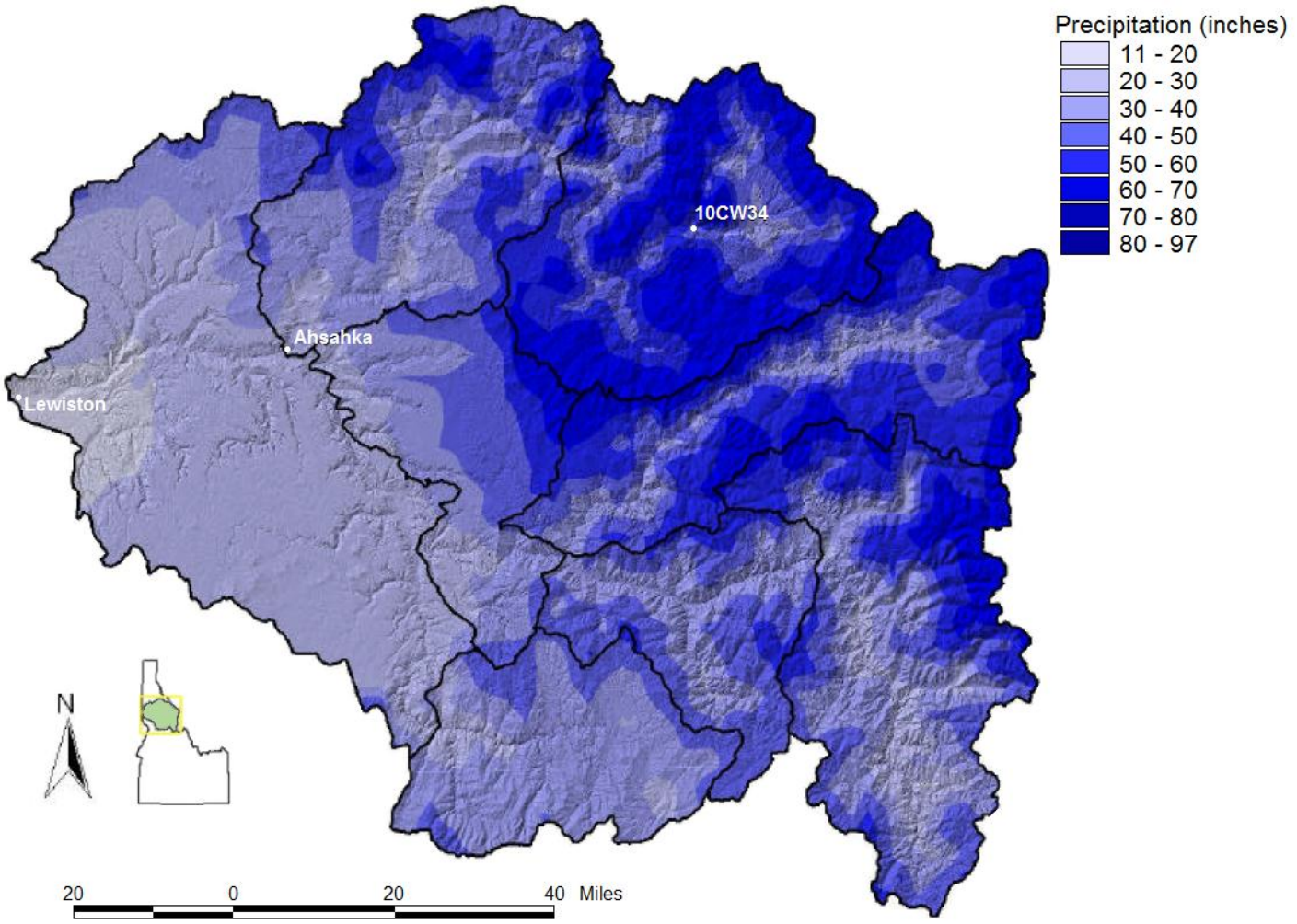


Figure 17. Map showing modern annual precipitation levels in the Clearwater River drainage basin and the location of 10CW34 (adapted from Ecovista et al. 2003:29, Figure 3).

snowpack accumulates and can remain on higher ridges until late-summer. Snowmelt begins in early-Spring and contributes to heavy runoff and greatly increased stream flows which occur from late April through early June (Ecovista et al. 2003:1; IDEQ 2003:12).

The average annual temperature for the Clearwater River drainage ranges from 50-55° F (10-13° C) at low elevations and 25-32° F (-3-0° C) in the east where elevations increase (Ecovista et al. 2003:30) (Figure 18). The annual mean temperature differences between the lower and upper portions of the North Fork drainage also follow this pattern. Winters are long and cold with temperatures from October through May generally below freezing while the short summers consist of typically hot and dry days with cool nights. At low elevations near the mouth of the North Fork such as Orofino (314 m [1030 ft.] asl) and the Dworshak Fish Hatchery (305 m [1000 ft.] asl) annual mean temperatures are close to 52° F (11° C) and summer temperatures exceed 90° F (32° C) for an average of about fifty days of the year (IDEQ 2002:5; Mattson 1983:9). Higher elevations such as at Headquarters (956 m [3138 ft.]) and Elk Butte (1734 m [5690 ft.]) average between 38° F (3° C) and 43° F (6° C) annually with less than thirteen days of greater than 90° F (32 C) temperatures (IDEQ 2002:5). While only about 9 to 15% of the annual precipitation falls in the summer, stationary high-pressure systems periodically produce electric storms which can ignite wildfires (IDEQ 2004:5; USDA, FS 1994:II-5).

Soils and Vegetation

Ecosystems in North America have been organized into hierarchical ecoregions with the use of a multi-level classification system based on spatial patterns in both biotic and abiotic components of a region which include geology, physiography, vegetation, climate, and soils. Land use, wildlife, and hydrology are also important factors. This

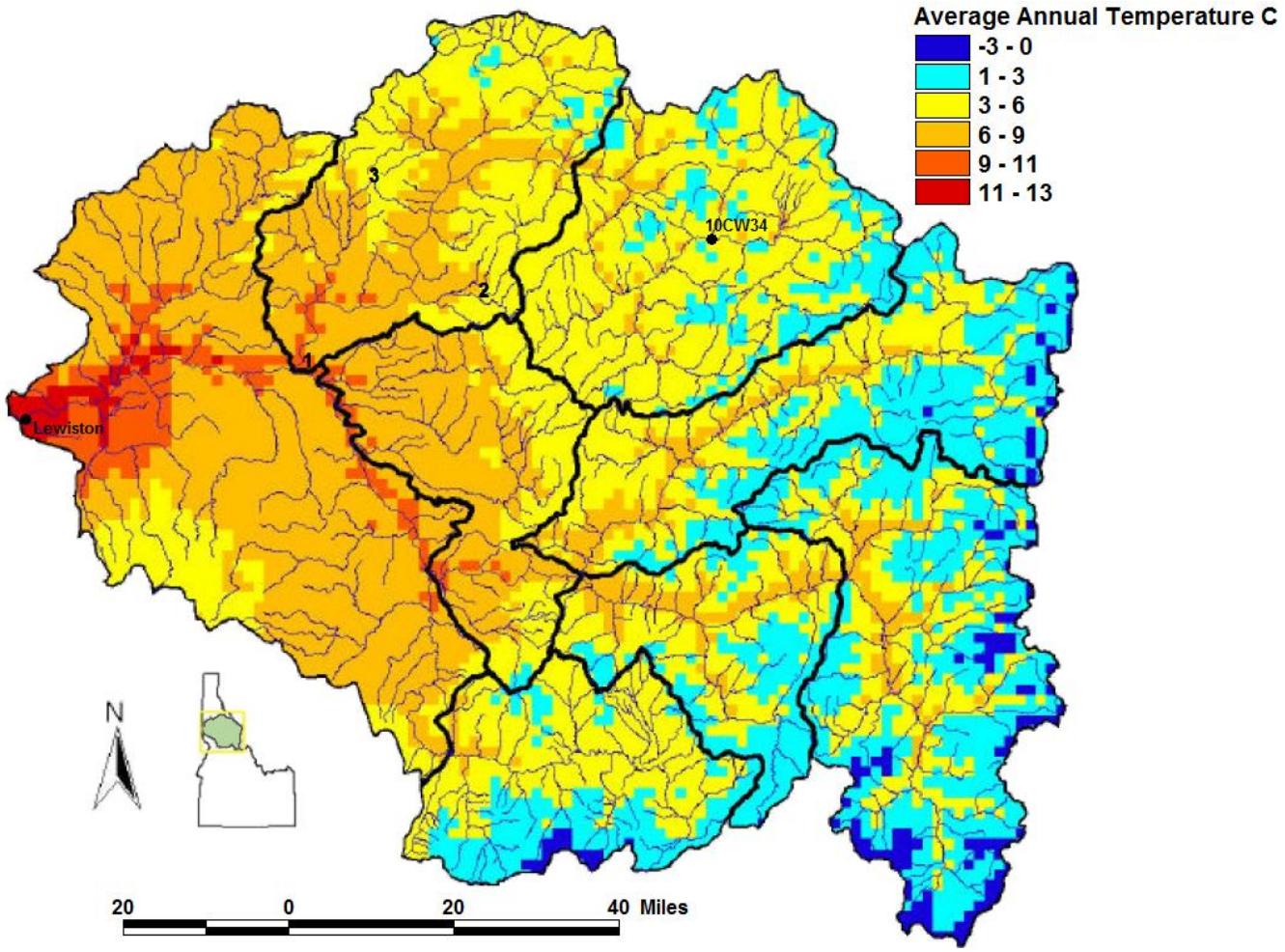


Figure 18. Map showing average annual temperature in the Clearwater River drainage basin, and the locations of 10CW34 and sites mentioned in the text. (1) Orofino and the Dworshak Fish Hatchery; (2) Headquarters; (3) Elk Butte (adapted from Ecovista et al. 2003:31, Figure 4).

ecological framework has been refined from original work by Omernik (1987) and consists of four levels designated by increasing Roman numerals that signify the most broad common characteristics (level I) to the most distinctive (level IV) (Bailey et al. 1994; McGrath et al. 2002).

The North Fork drainage basin and the majority of the main Clearwater River comprise the southernmost portion of the Northern Rockies level III ecoregion (Figure 19). The Northern Rockies are further divided into level IV ecoregions, five of which the North Fork flows through, and a sixth that occurs in the highest elevations areas in the basin (Figure 20). The St. Joe Schist-Gneiss Zone and Clearwater Mountains and Breaks cover the largest area which surrounds the upper North Fork and extends to just above the Dworshak Reservoir. As elevations decrease around the Reservoir the North Fork enters the Clearwater River in the Lower Clearwater Canyons which are bordered by the Weippe Prairie and the Northern Idaho Hills and Low Relief Mountains to the north. The High Northern Rockies ecoregion is present at elevations above 1500 m (5000 ft.) asl in the upper reaches of the North Fork's tributaries (McGrath et al. 2007; USEPA 2007).

Soil orders in the North Fork basin are predominantly of three types: Andisols, made up of volcanic ejecta such as ash; Inceptisols consisting of underdeveloped, shallow horizons with, relatively unweathered parent materials; and Alfisols, which have a high clay content. Mollisols, which are moist and rich in organics, occur in the Weippe Prairie and are primary in the Lower Clearwater Canyons (Brady and Weil 2000:71-79; McGrath et al. 2002). Soil moisture regimes range from Udic (high year-round moisture) in the High Northern Rockies, Clearwater Mountains and Breaks, and St. Joe Schist-Gneiss Zone to Xeric (moist winters and dry summers) in the Lower Clearwater Canyons. Both

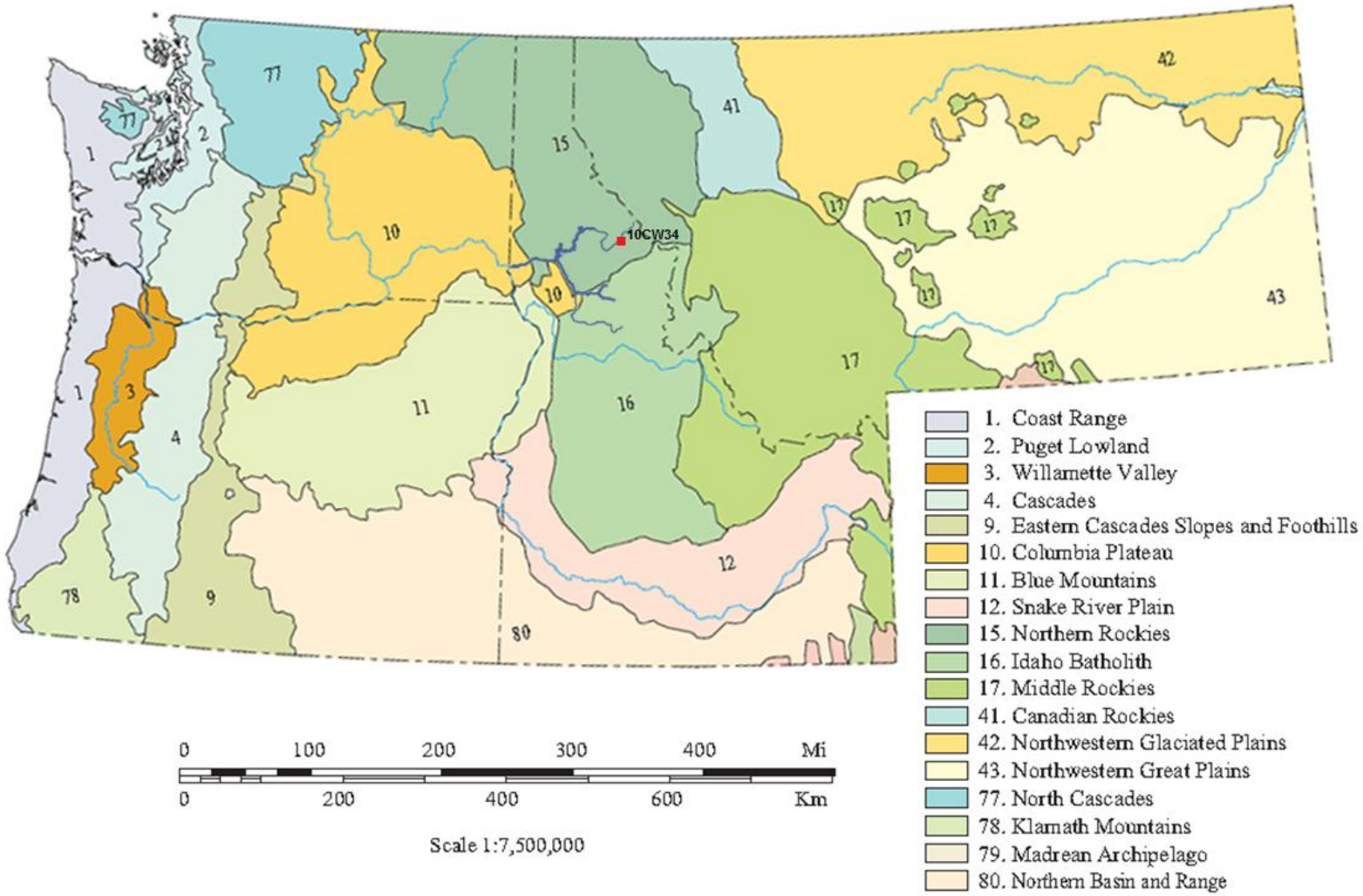


Figure 19. Map showing Level III Ecoregions of the Northwest and the locations of the North Fork of the Clearwater River and 10CW34 (adapted from United States Environmental Protection Agency [USEPA] 2007).

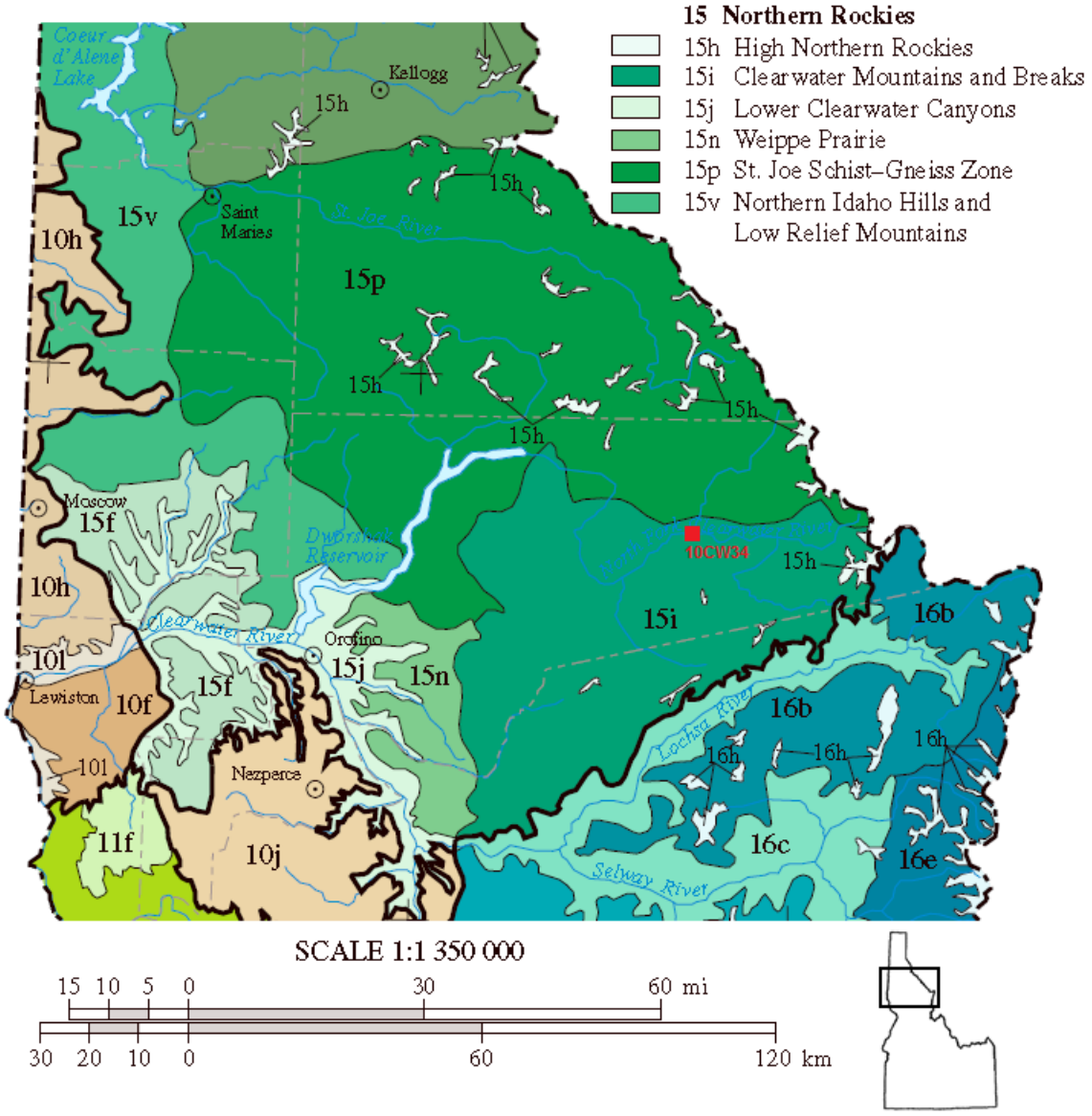


Figure 20. Map showing Level IV Ecoregions in the vicinity of the North Fork of the Clearwater River and the location of 10CW34 in Idaho (adapted from McGrath et al. 2002).

Udic and Xeric regimes are present in the Weippe Prairie and the Northern Idaho Hills and Low Relief Mountains regions (Brady and Weil 2000:64-65; McGrath et al. 2002).

Natural vegetation zones in the vicinity of Dworshak Reservoir and the lower North Fork consist of a western ponderosa pine forest interspersed with wheatgrass-bluegrass in the warmer Lower Clearwater Canyons, a cedar-hemlock pine forest in the Northern Idaho Hills and Low Relief Mountains, and a cedar-pine forest in the Weippe Prairie. In the upper North Fork drainage a cedar-hemlock-pine forest is present in the St. Joe Schist-Gneiss Zone while the moist cedar-pine forests in the Clearwater Mountains and Breaks lacks western hemlock (*Tsuga heterophylla*). The High Northern Rockies ecoregion is characterized by an alpine meadows-barren type with open parklands occurring at the treeline and grading into tundra, alpine grassland, meadows, and wetlands as elevations increase (McGrath et al. 2002).

Forest cover at low- and mid-elevations throughout the North Fork basin includes grand fir (*Abies grandis*), Douglas fir (*Pseudotsuga menziesii*), western redcedar (*Thuja plicata*), western white pine (*Pinus monticola*), western larch (*Larix occidentalis*), lodgepole pine (*Pinus contorta*), and ponderosa pine (*Pinus ponderosa*). Engelmann spruce (*Picea engelmannii*), mountain hemlock (*Tsuga mertensiana*), western hemlock, subalpine fir (*Abies lasiocarpa*), and whitebark pine (*Pinus albicaulis*) are present at higher altitudes while alpine larch (*Larix lyallii*) is restricted to portions of the High Northern Rockies (McGrath et al. 2002).

The understory vegetation found in the mixed coniferous setting consists of upland deciduous shrub communities that occur both naturally and as dense brush initiated by fire or clear-cutting. Bracken fern (*Pteridium aquilinum*) is widespread while

common species, many of which provided edible berries for aboriginal collectors, include huckleberry (*Vaccinium membranaceum*), salmonberry (*Rubus spectabilis*), serviceberry (*Amelanchier* spp.), elderberry (*Sambucus canadensis*), snowberry (*Symphoricarpos albus*), blackberry (*Rubus macropetalus*), wild cherry (*Prunus emarginata*), ocean spray (*Holodiscus discolor*), mallow ninebark (*Physocarpus malvaceus*), cascara (*Rhamnus purshiana*), mountain maple (*Acer glabrum*), wild rose (*Rosa* spp.), redstem ceanothus (*Ceanothus sanguineus*), and willow (*Salix scouleriana*) (Corliss and Gallagher 1972:57; Draper and Olson 1990:14; Keeler 1973:10; Mattson 1983:10). Various grasses such as bluebunch wheatgrass (*Agropyron spicatum*) and native bluegrass (*Poa secunda*) coincide with historically abundant root crops such as kouse (*Lomatium cous*), wild onion (*Allium douglasii*), and camas (*Camassia quamash*) in the warm, summer-dry areas of the Lower Clearwater Canyons and Weippe Prairie (Toups 1970:21).

Vegetation at 10CW34

The forests on the slopes adjacent to 10CW34 consist of a variety of conifers which include western white pine, western red cedar, Douglas fir, grand fir, ponderosa pine, and a few lodgepole pine and western larch. Tall snags, remnants of the fires that burned large areas of the North Fork in the early 20th century, can be seen throughout. Forest cover is particularly dense on the north-facing slopes to the south of the terrace while small trees on the south-facing slopes are more sparsely distributed amid a thick cover of various shrubs and brush (Figures 21-22). The site terrace may have originally supported an old growth cedar stand, while a dense mixed-conifer and deciduous forest covering the terrace is visible in early photographs (McFarland 1996) (see Chapter 6). In the last century, however, the vegetation has been greatly modified beginning in the



Figure 21. Photograph showing the mixed-coniferous forest cover on the north-facing slopes at 10CW34. Field school excavations are taking place in Area E on the western portion of the terrace and on the southern edge of the pasture. The North Fork of the Clearwater River is located just below the trees. The view is to the south and slightly east. Photo by author, 18 June 2012.



Figure 22. Photograph showing the small conifers and brush on the south-facing slopes at 10CW34. Note the remaining snow cover on the distant ridge at top-center. A thick stand of cottonwoods is visible just south of where Forest Road 250 runs along the base of the slope. The stockpile and associated equipment, located on the far western portion of the terrace, are beyond the fence and to the left. Field school students are working in Area E on the southern edge of the pasture which is used for horses. The view is to the north and slightly west. Photo by Lee Sappington, 12 June 2012.

1920s when the Forest Service began construction of the Kelly Forks Ranger Station which would later become the work center. In the 1930s portions of the terrace were leveled by the Civilian Conservation Corps (CCC) for the construction of Road 250 and an air strip. The original forests were gradually cleared and seeded with pasture grass, possibly a variety of Kentucky Bluegrass (*Poa pratensis*) which, along with bracken fern and oxeye daisy (*Leucanthemum vulgare*), continues to be a dominant component of the ground cover in areas of the site which still function as pasture (Bryan 1979; Willig 1981b).

Conifers, including young cedars, and understory remain fairly thick along the east and north edges of the terrace while open stands of ponderosa pine and cedar grow among the structures of the work center. In the far western portion of the site, black cottonwood (*Populus trichocarpa*) and paper birch (*Betula papyrifera*) are well-established on the banks of the North Fork and in the vicinity bordering the moist, swampy area fed by springs flowing from the north (Figure 23). Other species that occur in these areas include common horsetail (*Equisetum arvense*), white alder (*Alnus rhombifolia*), syringa (*Philadelphus lewisii*), serviceberry (*Amelanchier alnifolia*) (Figure 24), elderberry (*Sambucus* spp.), thimbleberry (*Rubus parviflorus*), huckleberry (*Vaccinium membranaceum*) (Figure 25), wild strawberry (*Fragaria* spp.), creeping Oregon grape (*Mahonia repens*) (Figure 26), wild rose (*Rosa* spp.), red-osier dogwood (*Cornus* spp.), beargrass (*Xerophyllum tenax*), goldenrod (*Solidago gigantea*), and fireweed (*Epilobium augustifolium*) (Felix Aripa, personal communication 2012; Bryan 1979; Willig 1981b).



Figure 23. Photograph showing a portion of the swampy area located at the northwestern edge of 10CW34. Cottonwoods and birch trees surround the standing water while grasses and oxeye daisies grow around the marshy pockets. The view is to the east and slightly north. Photo by author, 26 June 2012.



Figure 24. Photograph showing green serviceberries (*Amelanchier alnifolia*) collected by Felix Aripa, a Coeur d'Alene tribal elder, from the bank of the North Fork of the Clearwater River near Area E. Photo by author, 25 June 2012.



Figure 25. Photograph showing huckleberries (*Vaccinium membranaceum*) growing among bracken fern (*Pteridium aquilinum*) on the bank of the North Fork of the Clearwater River near Area E. Photo by author, 25 June 2012.



Figure 26. Photograph showing green berries of a creeping Oregon grape (*Mahonia repens*) collected by Felix Aripa, a Coeur d'Alene tribal elder from the bank of the North Fork of the Clearwater River near Area E. Photo by author, 25 June 2012.

Fauna

The Clearwater River region contains a diverse variety of habitats that support over 300 terrestrial wildlife species including over 200 bird species and approximately 73 mammal, 13 amphibian, and 13 reptile species (Ecovista et al. 2003:245; Sappington 1994:60). Many of these species are present in the North Fork basin, however, development in the region over the last century, particularly the construction of the Dworshak Dam and Reservoir, has resulted in alterations to and reductions in the historic distribution and frequency of both aquatic and terrestrial wildlife. Prior to dam construction at the mouth of the North Fork and along the Columbia and Snake rivers, many tributaries of the Upper and Lower North Fork provided excellent spawning habitat for anadromous fish such as chinook salmon (*Oncorhynchus tshawytscha*), silver or coho salmon (*Oncorhynchus kisutch*), steelhead trout (*Oncorhynchus mykiss*), and lamprey eels (*Lampetra* spp.) (Draper and Olson 1990:14; Mattson 1983:11). White sturgeon (*Acipenser transmontanus*) were also abundant in the main Clearwater River as far upriver as Ahsahka (Landeen and Pinkham 1999:184).

Other native fish that were well established in the North Fork basin include westslope cutthroat trout (*Oncorhynchus clarki lewisi*), rainbow trout (*Oncorhynchus mykiss*), bull trout (*Salvelinus confluentus*), Dolly varden trout (*Salvelinus malma*), mottled sculpin (*Cottus bairdi*), paiute sculpin (*Cottus beldingi*), shorthead sculpin (*Cottus confusus*), torrent sculpin (*Cottus rhotheus*), speckled dace (*Rhinichthys osculus*), longnose dace (*Rhinichthys cataractae*), redside shiner (*Richardsonius balteatus*), and mountain whitefish (*Prosopium williamsoni*). Also present on the North Fork were northern squawfish (*Ptychocheilus oregonensis*), mountain sucker (*Catostomus*

platyrhyncus), bridgelip sucker (*Catostomus columbianus*), largescale sucker (*Catostomus macrocheilus*), chiselmouth (*Acrocheilus alutaceus*), as well as fresh water mussels (*Margaritifera* spp.) (Draper and Olson 1990:15; Ecovista et al. 2003:290; IDEQ 2003:17; Mattson 1983:11; USDA, FS 1994:II-24).

Important big game animals found historically in the North Fork area include elk (*Cervus canadensis*), white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), black bear (*Ursus americanus*), grizzly bear (*Ursus idahoensis*), mountain sheep or bighorn sheep (*Ovis canadensis*), moose (*Alces americanus*), and mountain goat (*Oreamnos americanus*). White-tailed deer, mule deer, and elk are the most abundant in the basin today while mountain sheep, mountain goat, and moose are more sparsely distributed (Draper and Olson 1990:16-17; Mattson 1983:10). The absence of salmon in the North Fork basin has contributed to a decline in both black bear and grizzly bear which depended on upstream migrations and post-spawning adults as a primary seasonal food source (Ecovista et al. 2003:207). Additional small and fur-bearing mammals present in the North Fork basin are beaver (*Castor canadensis*), northern river otter (*Lutra canadensis*), (mink (*Mustela vison*), common raccoon (*Procyon lotor*), weasel (*Mustela* spp.), muskrat (*Ondatra zibethicus*), fisher (*Martes pennanti*), marten (*Martes* spp.), wolverine (*Gulo gulo*), lynx (*Lynx canadensis*), bobcat (*Lynx rufus*), mountain lion (*Felis concolor*), badger (*Taxidea taxus*), coyote (*Canis latrans*), and gray wolf (*Canis lupus*) (Mattson 1983:11; Sappington 1994:61; USDA, FS 1994:II-24).

Many upland-game birds and raptors, as well as ducks and geese can be found in the North Fork basin in residential habitats and along migratory routes. These include ruffed grouse (*Bonasa umbellus*), Franklin's grouse (*Canachites canadensis*), blue grouse

(*Dendragapus obscurus*), pileated woodpecker (*Dryocopus pileatus*), boreal owl (*Aegellus funereus*), flammulated owl (*Otus flammeolus*), and harlequin duck (*Histrionicus histrionicus*). Golden eagles (*Aquila chrysaetos*), bald eagles (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*), and northern goshawk (*Accipiter gentilis*) were historically common in the area and can be found nesting along the entire North Fork corridor throughout the year (Mattson 1983:11; USDA, FS 1994:II-24). A variety of amphibian and reptile species are known or suspected to inhabit the area and these include the long-toed salamander (*Ambystoma macrodactylum*), Coeur d'Alene salamander (*Plethodon vandykei idahoensis*), Idaho giant salamander (*Dicamptodon ateriimus*), tiger salamander (*Ambystoma tigrinum*), common garter snake (*Thamnophis sirtalis*), western toad (*Bufo boreas*), Pacific chorus frog (*Pseudacris regilla*), and tailed frog (*Ascaphus truei*) (Groves 1988:10-11; IDEQ 2003:17).

Fauna at Kelly Creek and 10CW34

The Kelly Creek drainage, which includes Cayuse and Little Moose creeks as major tributaries, provides important habitat for the wolverine and harlequin duck, two species listed for potential protection under the Endangered Species Act. Additional sensitive species found in the area are the boreal owl, the fisher, and the Coeur d'Alene salamander. Kelly Creek, along with Cayuse Creek, is nationally recognized for its blue-ribbon catch-and-release westslope cutthroat trout fishery and contains some of the most critical habitat in Idaho for this native fish and others such as bull trout. Kokanee salmon (*Oncorhynchus nerka*), an exotic species introduced to the Dworshak Reservoir spawns in the lower areas of Kelly and Cayuse creeks, a good indication that these locations would have provided important spring spawning environments for chinook salmon and

steelhead trout prior to inundation of the lower North Fork (Ecovista et al. 2003:279; Landeen and Pinkham 1999:23; USDA, FS 1994:III-8-9). The general vicinity around the 10CW34 terrace is within big game winter range and both mule deer and white-tailed deer are frequent visitors to the site during the summer months and throughout the year, (Figure 27). Columbian ground squirrels (*Spermophilus columbianus*) and deer mice (*Peromyscus maniculatus*) are permanent residents and have successfully colonized the grassy areas of the terrace (Figure 28). Additional wildlife observed at the site include black bear, elk, raccoon, snowshoe hare (*Lepus americanus*), garter snakes (Figure 29), bats (*Myotis* spp.), and mountain lions. Osprey (Figure 30), golden eagle, bald eagle, as well as a pileated woodpecker (Figure 31) and an eastern kingbird (*Tyrannus tyrannus*) (Figure 32) have been also been spotted at the site.



Figure 27. Photograph showing a young mule deer (*Odocoileus hemionus*) at 10CW34 in the area of the Work Center huts. Photo by Laura Lehmons, 24 June 2010.



Figure 28. Photograph showing a Columbian ground squirrel (*Spermophilus columbianus*) near its burrow in a grassy area of 10CW34. Photo by Lee Sappington, 15 June 2010.



Figure 29. Photograph showing a common garter snake (*Thamnophis sirtalis*) near the bank of the North Fork in Area B at 10CW34. Photo by Laura Lehmons, 22 June 2010.



Figure 30. Photograph showing an osprey (*Pandion haliaetus*) nest on a tree snag (center) located across the North Fork of the Clearwater River southwest from the 10CW34 terrace. The view is to the west. Photo by author, 20 June 2011.

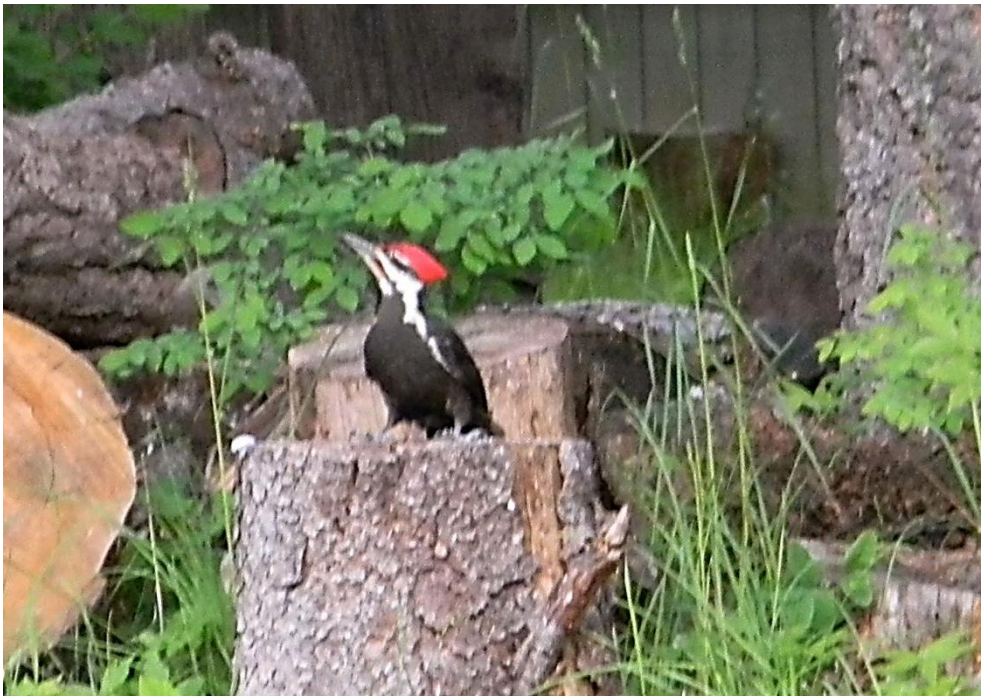


Figure 31. Photograph showing a pileated woodpecker (*Dryocopus pileatus*) on a tree stump near a Work Center building. Photo by Lee Sappington, 15 June 2010.



Figure 32. Photograph showing an eastern kingbird (*Tyrannus tyrannus*) perched on a tree at 10CW34. Photo by Lee Sappington, 15 June 2010.

3. **The Cultural and Historical Background**

The Plateau Culture Area

The Plateau region of northwestern North America extends westward from the Rocky Mountains to the Coast and Cascade ranges, and south from the Fraser River to the Snake River Plain (Figure 33). Drained by the Columbia and Fraser rivers, the environments of both the Northern, or Canadian Plateau, and the Southern Columbia Plateau traditionally supported an abundance and diversity of plant and animal resources, which were utilized continuously by Plateau peoples for over 10,000 years (Andrefsky 2004:26; Prentiss and Kuijt 2004:xi). Since the late 1800s the Plateau region has been identified as a distinct cultural area in which shared cultural features include riverine settlement orientation, complex fishing technology, extensive trade and kinship relationships, emphasis on village and band political autonomy, and a reliance on a diverse subsistence strategy based on anadromous fish, game, berries, and root resources utilized mutually among a variety of ethnic groups residing in the region (Anastasio 1985:118-125; Walker 1967:7-9, 1998a:1-3) (Figure 34). Historically, the Plateau was inhabited by at least twenty groups who spoke fifteen languages, and twenty-six dialects. The two primary language families were spoken by the Interior Salishan of the north and east, and the Sahaptian peoples who lived in the southern Plateau (Kinkade et al. 1998:49-51).

Nez Perce Territory

Plateau societies were built on an annual cycle of subsistence which followed seasonal patterns of resource availability. Collection strategies required an intimate knowledge of local ecologies and involved extensive movement throughout the region to



Figure 33. Map of the Plateau region (adapted from Prentiss and Kuijt 2004:x, Figure I.1).

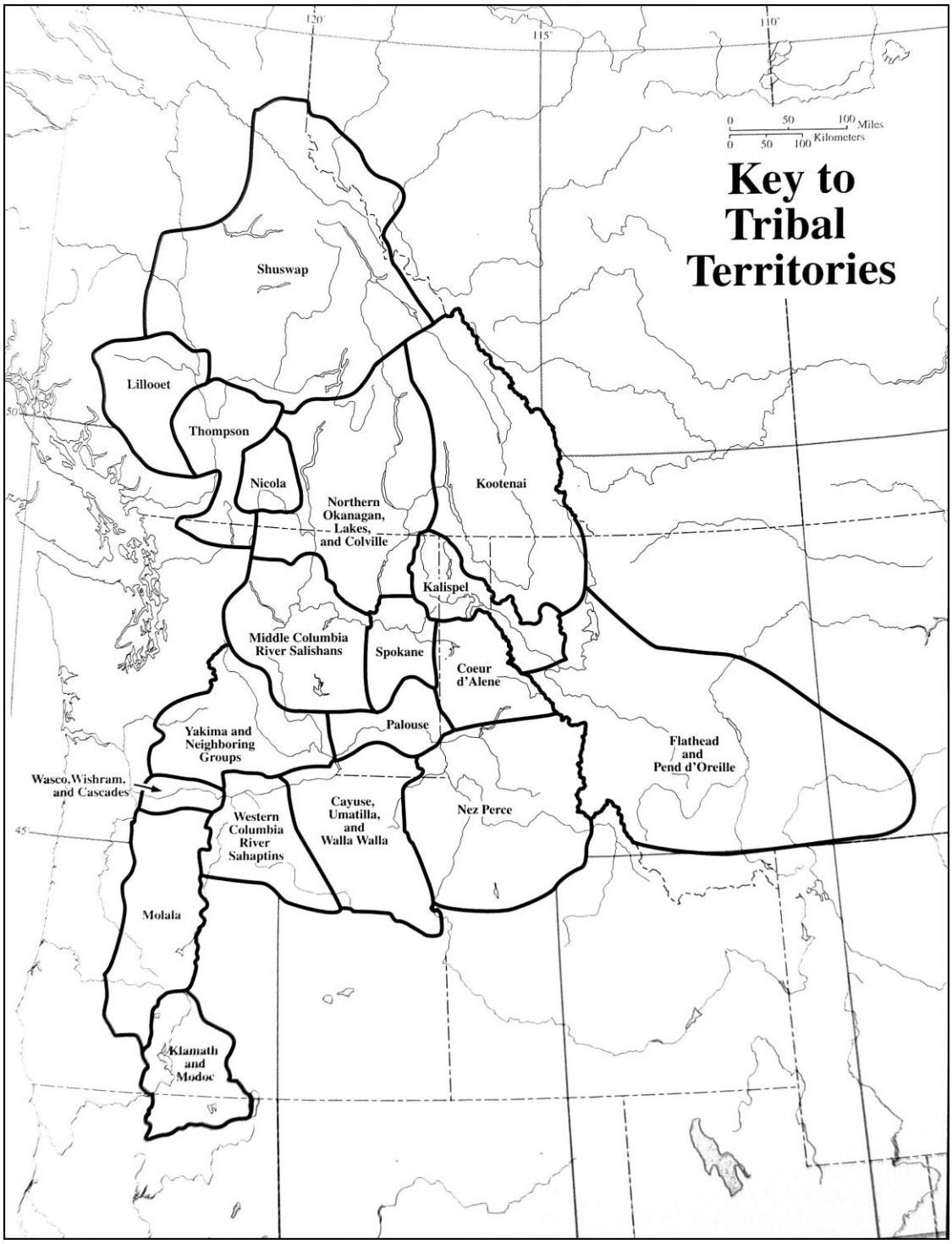


Figure 34. Generalized map of tribal territories of the Plateau Culture Area (adapted from Walker 1998:ix).

customary locations as specific resources became available. Among the most widely traveled people were the Nez Perce, or the Nee-Mee-Poo ("The Real People"), whose regular seasonal round encompassed an area of approximately 27,000 square miles over all of north central Idaho from the Bitterroot Divide to adjoining parts of northeastern Oregon and southeastern Washington. Nez Perce groups routinely exploited a much greater area of ca. 230,000 square miles which included Kettle Falls in the north, Burnt River in east central Oregon, Willamette Falls in the west and a large portion of the Plains in the east (Josephy 2007:2, 15-16; Landeen and Pinkham 1999:53; Walker 1967:1) (Figure 35).

Geographically, the Clearwater River basin comprises the northeastern vicinity of traditional Nez Perce territory, however, the landscape is central to the birth of their culture. In the Nez Perce creation story, it was Coyote, who, after having defeated the great monster in the Kamiah valley and freed all of the animals, cut the monster's body into pieces and scattered them with the four winds, making all the different tribes of people from them. When Fox reminded him that he had forgotten to place people in the Clearwater Valley, Coyote took water from the Clearwater River, washed the blood from the monster's heart from his hands, and sprinkled the drops over the region. Where the drops hit the earth, the Nez Perce people emerged. The monster's heart and liver can still be seen near Kamiah, Idaho where Coyote turned them to stone (Clark 1966:26-30; FiveCrows 2007:x; Landeen and Pinkham 1999:51-52). The oral traditions of the Nez Perce are spiritual and practical narratives that contain generations of assembled knowledge and wisdom, of which the plants, animals, and geological features throughout the region are integral. These accounts, along with archaeological and ethnographic

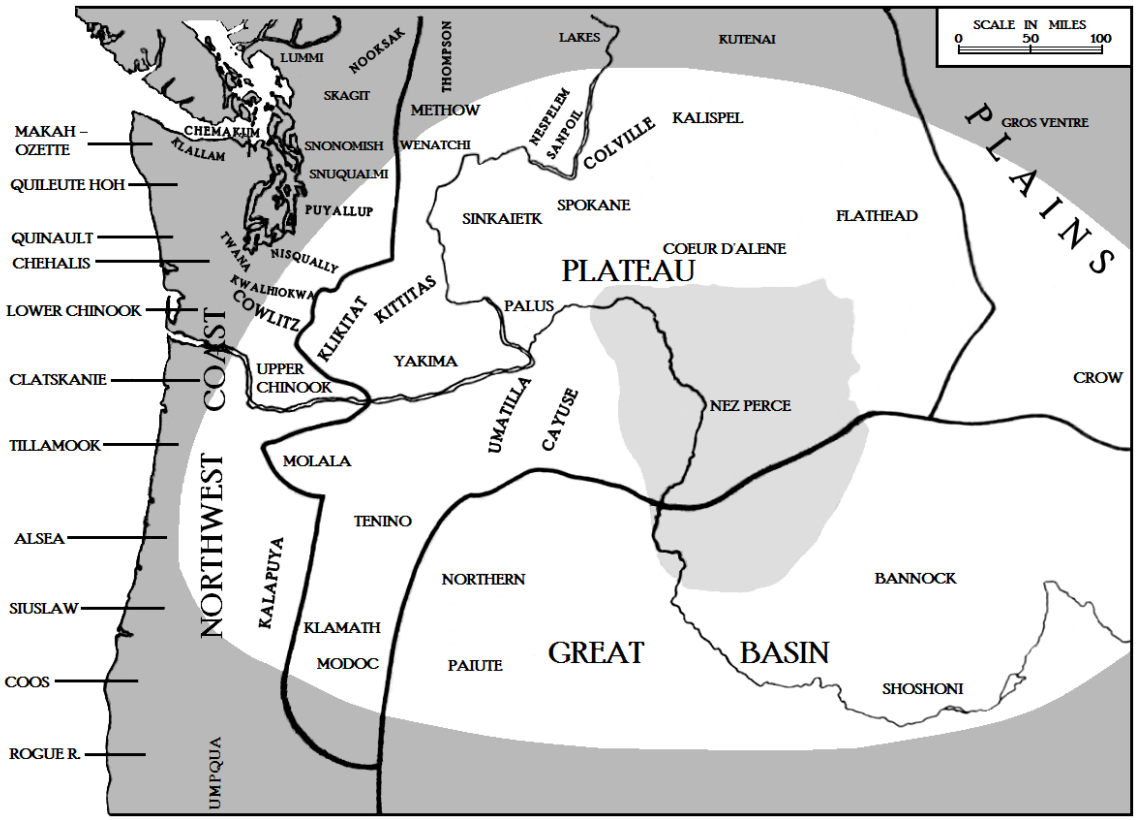


Figure 35. Map of Northwest ethnic groups and culture areas with Nez Perce territory (shaded grey at center) and effective resource area exploited by the Nez Perce (non-shaded area) (adapted from Walker 1967:2, Figure 1).

studies, demonstrate the long-established presence of the Nez Perce in the Clearwater River region (Chalfant 1974:115; Sappington 1994:21-22).

Nez Perce Seasonal Subsistence Cycle

Traditional settlement patterns of the Nez Perce and many groups in the southern Plateau correlated closely with the seasonal round of resource collection (Figure 36). Villages were established along major river courses and were inhabited by independent bands many of which belonged to larger, regional groups called composite bands. Occupation of villages was most intense during the coldest times of the year when the narrow valleys provided warmth, and survival depended on stored foods which had been

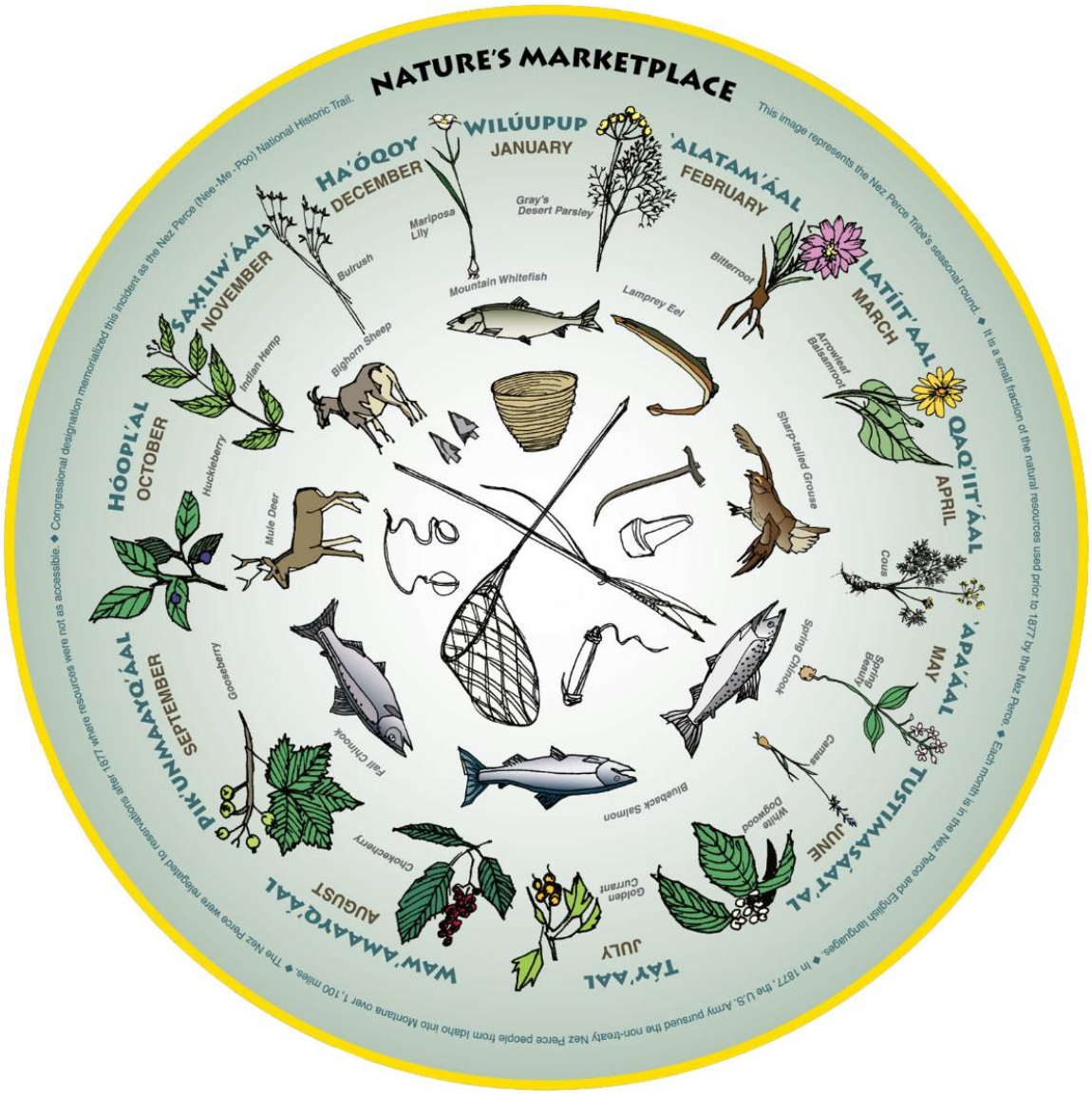


Figure 36. Image of the Nez Perce Seasonal Round, representing a small fraction of the natural resources utilized prior to 1877 (adapted from http://www.fs.usda.gov/Internet/FSE_MEDIA/stelprdb5357952.jpg).

gathered in the previous seasons. The most active seasons were spring and summer, in which families and bands dispersed and traveled throughout the region to gather, hunt, fish, and trade at customary areas. Temporary and communal camps were usually established near small streams or at the mouths of large tributaries where vegetable resources, game, or fish could be procured simultaneously. Root harvesting began when

Khouse became available in late March at lower elevations. As the summer progressed, camas digging drew large groups to areas such as the Weippe and Camas prairies, and the meadows at Musselshell and Moscow. Wild onions, carrots, and berries such as hawthorn, huckleberries, and serviceberries were also be harvested near these areas during the warmest periods (Anastasio 1985:118-119; Josephy 2007:8-9; Sappington 1994:68-69; Walker 1998:420-421).

The first salmon runs of the year reached Nez Perce territory in late June and during this time thousands were caught. Large weirs and traps were usually constructed and managed communally by villages. Harpoons, dip nets, hook and line, weirs, and traps were used to catch salmon as well as eels, sturgeon, whitefish, suckers and trout. Fishing was the principal activity throughout the summer and by fall, the runs of sockeye, silver, and dog salmon provided much of the food stored for winter use.

Game animals were hunted through the summer and into the fall, and these included deer, moose, elk, mountain sheep, goat, and bison, as well as birds such as grouse, sage hens, and geese. The Nez Perce regularly traveled into the Great Basin and northern Plains and throughout the southern Plateau to attend meetings, trade, or fish at communal spots along the Columbia River. By late fall most travel subsided and the Nez Perce returned to their winter villages. The cold season was a time for village gatherings and storytelling with a heavy reliance on stored foods harvested in the previous seasons (Josephy 2007:11-15; Landeen and Pinkham 1999:55-57; Walker 1978:70-73, 1998:420-421).

By 1800, large herds of horses were well established among Plateau peoples, and many places in the southern Plateau and the Clearwater River valley provided excellent

grazing for horses throughout the year. The adoption of the horse by the Nez Perce between 1730 and 1750 brought many changes to the seasonal subsistence round and their culture (Anastasio 1985:127). Less time was required for travel, allowing for the expansion of the range over which the Nez Perce engaged in trade and communication. Additional fishing, gathering, and hunting sites became accessible, as greater quantities of items such as meat, trade goods, and provisions could be transported through mountainous areas. While the Nez Perce had long hunted buffalo, both in their own territory and in Flathead country, trips to the northern Plains on horseback became more frequent and extensive. Increased contact and trade with the Plains peoples led to frequent exchanges of cultural elements and the use of new items, such as conical tipis, rawhide, and feathered adornments. The practical benefits of owning horses transformed the Plateau economy, and their significance as personal property and wealth led to the development of economic class distinctions among individuals, villages, and bands. By the time of the arrival of the Corps of Discovery in 1805, horses were fully integrated with Nez Perce culture. (Anastasio 1985:125-130; Broncheau-McFarland 1992:68-73; Josephy 2007:22-26).

Nez Perce Use of the North Fork of the Clearwater River

The North Fork corridor was an important fishing and hunting area where plant resources such as hemp, tree moss, and berries were also available. Camas was abundant in mid-summer at Weippe, where Nez Perce bands from throughout the region gathered to collect it, and it could also be obtained at isolated locations along the some of the North Fork's tributaries (Osmundson and Hulse 1966:18). In 1891, Billy Williams, a Nez Perce informant for the anthropologist and allotment agent, Alice Fletcher, gave the name

Al-sok-ka for the North Fork of the Clearwater River (Sappington et al. 1995:182-183). The band that occupied the village at the mouth of the North Fork was called *Atskaaiwawixpu*, and the present town of Ahsahka retains the pronunciation (Spinden 1908:174). Harry Wheeler, a Nez Perce elder who descended from the *Atskaaiwawixpu*, translated the word as "mouth of a stream" or "stream junction" (Osmundson and Hulse 1966:12).

An area from Big Canyon Creek, near Peck, Idaho, to Jim Ford Creek, approximately six to eight miles beyond the mouth of the North Fork, was identified by Billy Williams as a region occupied by a group of villages. The leader of this group, *Lock-ka-yah-'ma,* granted permission to fish that portion of the Clearwater River and hunt on Craig Mountain (Sappington et al. 1995:203). Spinden (1908:174) referred to the leader village location as *Painīma*, and as related by Harry Wheeler, the *Atskaaiwawixpu* would hunt near there, however their primary hunting and fishing was done in the North Fork area, which they regarded as their country (Osmundson and Hulse 1966:12). Salmon were intercepted at many spots along the North Fork in early summer, as well as late summer when camas became available. Winter was the principal time for hunting on the North Fork when the animals were forced down from the hills by snow. According to Harry Wheeler, the uplands of the North Fork were also used by young people seeking guardian spirits, and Pot Mountain was a favored location (Osmundson and Hulse 1966:18).

A large number of trails ran between various places in the North Fork area, and these formed part of a network which connected to larger, well-traveled routes that extended from one region of the southern Plateau to another. At least nine major routes

intersected Nez Perce territory and led to adjoining territories in the north, south, east, and west (Osmundson and Hulse 1966:17-18; Walker 1984:6-7) (Figure 37). The Nez Perce were positioned as a cultural and economic link between the west and the Plains, and the Clearwater River valley provided direct passage for several routes over the Bitterroots, including the Lolo Trail which was used by Lewis and Clark in 1805 and 1806. The North Fork corridor may have provided access to another northern trail which led to Kutenai and Blackfeet territories in the northern Plains. According to Walker (1984:7) this trail was especially used by the Flathead as well as other Plateau groups.

Historic Use of 10CW34

The Forest Service began developing the Kelly Forks Ranger Station in the 1920s and it served as an important stopover for packers, rangers, and forest service personnel working and traveling throughout the Upper North Fork. Explorations of Clearwater country and the North Fork area had been conducted for more than a century prior, and the region saw a gradual growth in population as railroad surveyors, military parties, miners, and homesteaders entered by the Lolo Trail (Space 1964). The earliest map of the 10CW34 terrace was made in 1926 following a 1924 U.S.G.S. survey of the Clearwater River and tributaries (Figure 38). One structure was indicated on this map at the far northeast corner of the terrace near the North Fork Trail which followed the present path of Forest Service Road 250 and crossed the North Fork to continue upstream along the north side of Kelly Creek. A photograph, believed to have been taken in the early 1930s, also provides documentation of the Ranger Station (Figure 39). A log cabin enclosed by a wire post fence is shown with what appears to be the North Fork in the background. The photographer was likely standing on the lower slopes of Flat Mountain, looking south

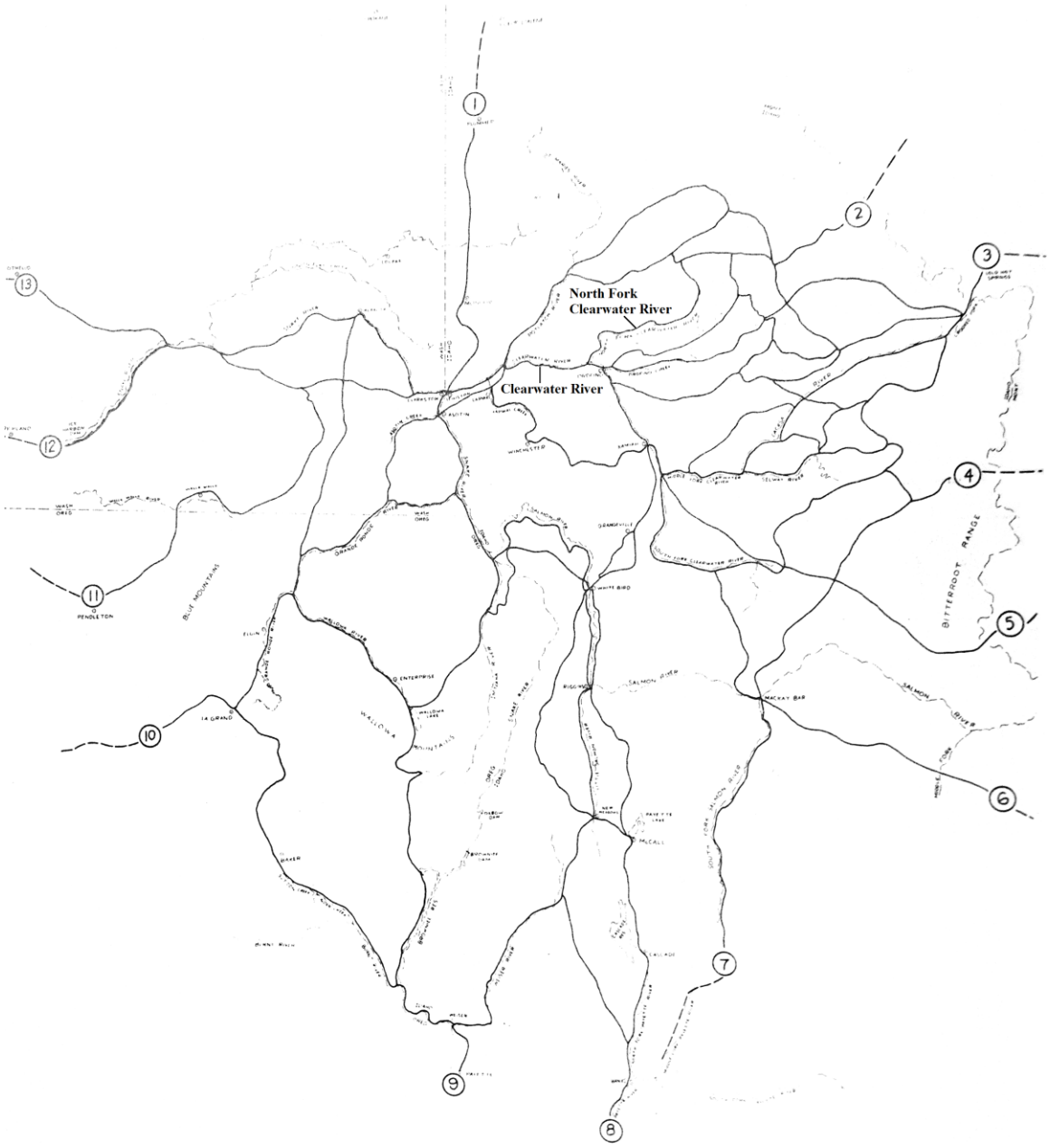


Figure 37. Map of overall trails of Nez Perce territory with the locations of the Clearwater River and the North Fork indicated (adapted from Walker 1984:6, Map 1).

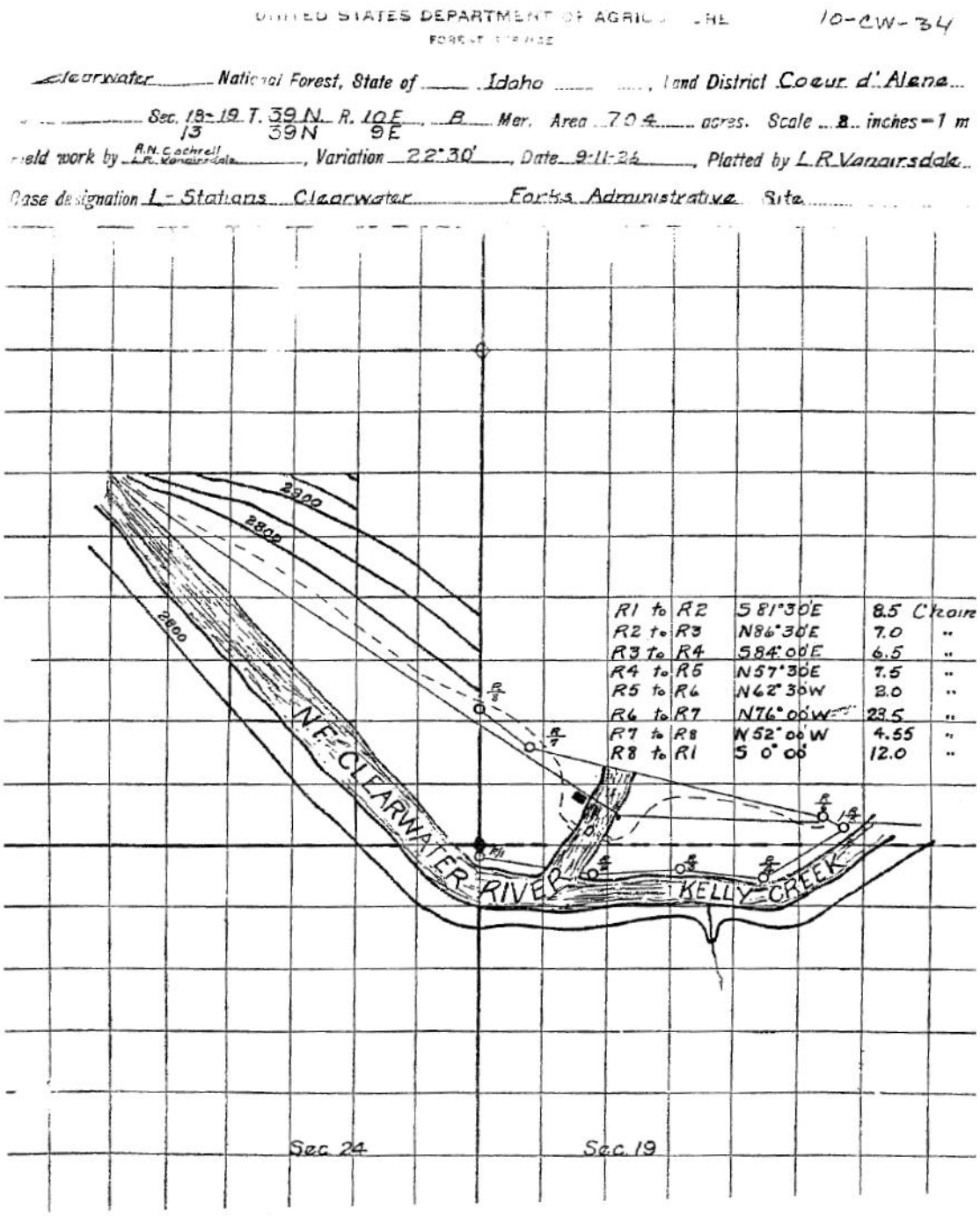


Figure 38. Survey map of 10CW34 prepared by the U.S.G.S. in 1926. The North Fork Trail is depicted by a dotted line and one structure is indicated near the trail at the northeast corner of the terrace (Willig 1981a:Appendix D).

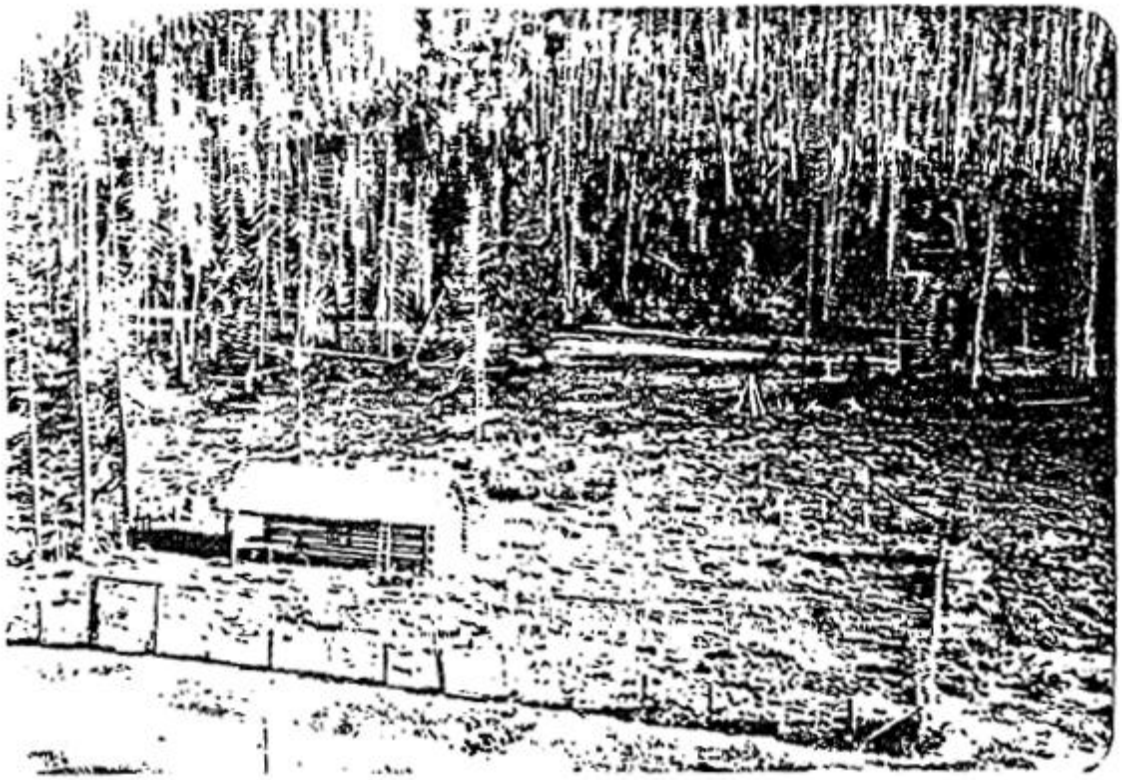


Figure 39. Early 1930s photograph looking south over the northeast portion of 10CW34. A log cabin surrounded by a wire fence is shown adjacent to the south side of the North Fork Trail (Willig 1981a:Appendix D).

across the terrace. The area surrounding the cabin appears to have recently recovered from fire, as many snags are present on the terrace as well as the hillside beyond. This structure is no longer present at the site today.

In the mid-1930s, the Forest Service began making improvements in the Clearwater National Forest using federal work programs such as the Civilian Conservation Corps (CCC). During this period 10CW34 was used as an Emergency Relief Administration camp, where men employed through the CCC worked on a variety of projects including firefighting, and road and bridge building. Aerial photos show the camp, consisting of about twenty structures, on the northeastern corner of the terrace (Figures 40-41). The bridge which crosses the North Fork above the mouth of Kelly Creek, was constructed by the CCC in 1935 (Figure 42) and it can be seen clearly in the 1936 aerial (Figure 41). The photograph in Figure 40 was likely taken in 1935, as bridge construction appears to be in progress. Also constructed during this time, the Kelly Forks Cabin, known as the Old Guard Station, remains the oldest structure at 10CW34 today (see The "Old Guard Station," Chapter 6).

The termination of the ERA camp at 10CW34 likely coincided with the beginning of World War II in 1939. Improvements to the Work Center continued with the addition of a woodshed and outhouse to the cabin in the 1950s. During the 1960s many new structures were added to the Work Center including an office/warehouse, three residences, and a garage and shop, all of which are still in use (Figure 43). Additional residential trailers and other portable buildings were brought to the site in the 1970s and by 1979, the Forest Service began conducting archaeological surveys and testing in preparation for the placement of what would become the stockpile in the west end of the

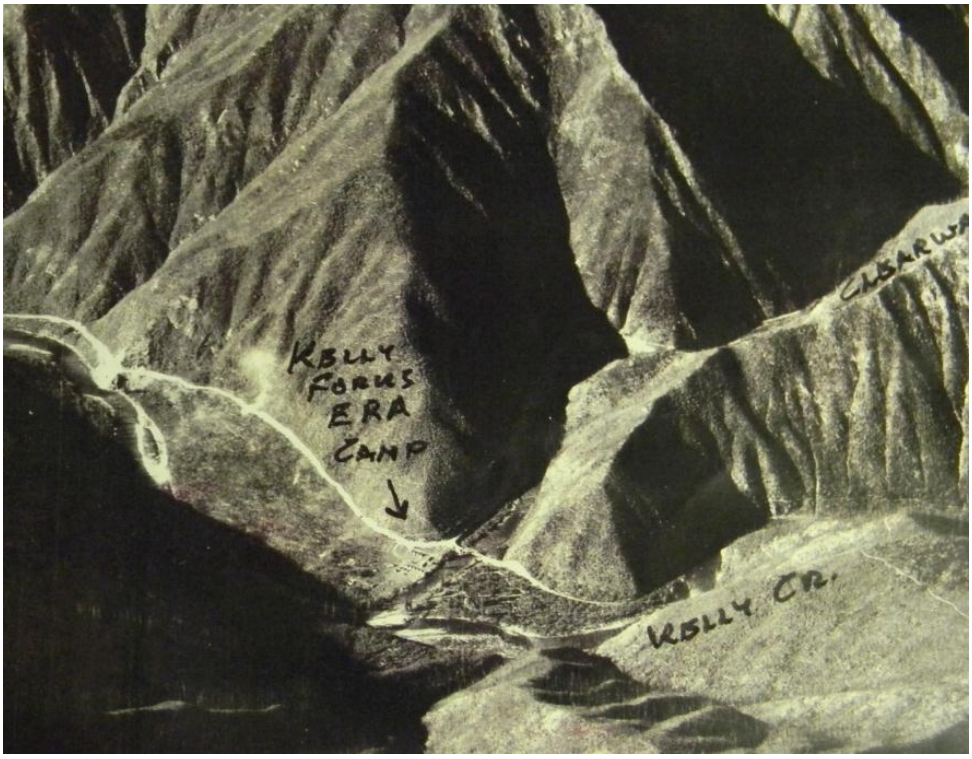


Figure 40. Aerial photograph of 10CW34 believed to have been taken in 1935. The ERA camp is visible at the northeastern corner of the terrace and where construction of the bridge crossing the North Fork appears to be taking place.

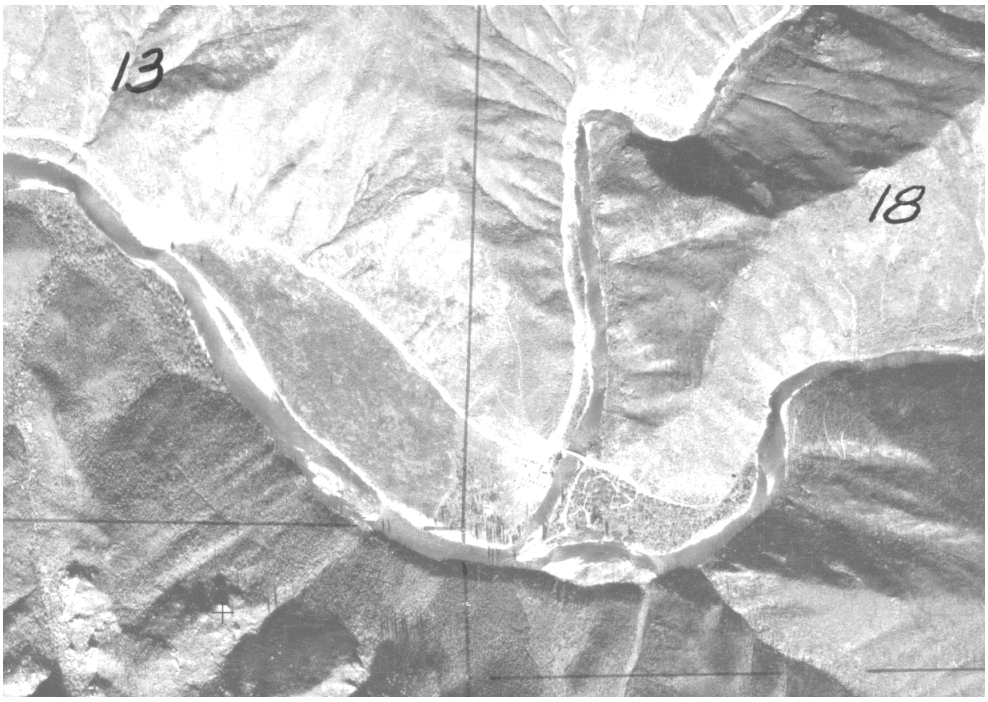


Figure 41. Aerial photograph of 10CW34 taken in 1936. In this image the bridge crossing the North Fork appears to have been completed (adapted from University of Idaho Library 1999).



CCC Is Bridging Kelly Creek

The dust was lifting after the early evening passage of a train of pack-horses as this picture was taken at Kelly creek, just above where it empties into the Clearwater river of Idaho. A steel and concrete bridge is being built by the Civilian Conservation corps. The machinery and bridge material was an odd sight in that remote place, at a road's end. The bridge will connect with a road to be built to the Kelly creek ranger station.

Figure 42. Image of a newspaper clipping from the Spokesman Review documenting the construction of the bridge across the North Fork in 1935 (WSU Digital Collection, http://kaga.wsulibs.wsu.edu/u?/clipping_II,18161).

$153,000 Will Build Part Of New Kelly Station

Clearwater Forest announced today that R. C. Worst & Co. Coeur d'Alene has been awarded a contract for $153,758 to build a new ranger station at Kelly Forks on the North Fork. An office warehouse, three residences, water, sewer and electric systems and a garage and shop make up the units under the present contract to replace much of the activity now centered at Kelly creek which will be used sparingly.

Another segment of the new station will be built at a later time when more funds are available, Keith Thompson, supervisor explains. Portable bunkhouses will be moved in to house workers next spring when the station is manned by Ranger Ken Larson.

Near Cold Springs

Kelly Forks is near Cold Springs and lies about 12 miles west of the present station which was subject to ice jams and drainage problems. Diamond National has housing at Cold Springs not now being used.

Some of the Kelly station housing will be trucked to Gravey creek to establish facilities for the big timber sale made to Van Evans company last month. Accelerated public works funds were allotted to the forest for the station.

Powell System

Grand Coulee Plumbing company was successful bidder at $31,357 on a new water system for the Powell ranger station in a contract let Tuesday.

The forest has also completed by force account crews a $21,000 garage and shop at the Kooskia station and a new $3000 hay storage shed for government mules.

Surfacing is complete on the early day Pierce-Musselshell timber access road by Garrick Construction company of Missoula at a cost of $36,000.

Cardiff Is Buyer

French Mountain Timber sale of 3,000,000 feet was bid by L. Cardiff, Inc., at the appraised price of $26,028 Tuesday. Stumpage prices were pine, $23.70; spruce and fir, $5.30; white fir, $1.05; cedar $3.80 per thousand. Slash disposal is $1.70 per M.

Chronic Disease Survey Completed

The Idaho Department of Public Health did a Comprehensive Chronic Disease Survey of 340 patients at State Hospital North last week, under the direction of Mrs. Laura Larson, RN, who is Administrative Assistant of the Idaho Chronic Disease Program. Patients received complete physical examinations, X-rays by the Idaho Department of Public Health Mobile Unit, blood tests and dental examinations.

The program was organized by Mrs. Bernice Rousar, RN, Director of Psychiatric Nursing and her assistant Mrs. Helen Allen, RN. Staff members were part of the survey team, and were assisted by Mrs. Jean Brown, RN; of Lewis County; Mrs. Sundy McDonald, RN of Clearwater County; Dr. Calvin Reber, Orofino; and Dr. Kent Staley, Pocatello. Many off-duty employees returned to complete the survey in record time.

A group of women volunteers gave two full days assisting in the work. They are Mrs. M. R.

More Plans Made For Fall Show

une

Thursday, June 27, 1963



AYS—Kathy Currin, left, daugh- Currin, Weippe, will represent Rodeo Association; and Pat Mc- Mrs. Charles McCollister, repre- are sharing the royalty spotlight show next week. The Queen's,

Mail Keeps Same Time; Hour Later For Holiday Mail

Post office mail arrival and departure times will remain the same when the Lewiston-Orofino truck contract goes into effect on July 1 Postmaster Melvin J. Snook announces.

Tentative plans for advancing the schedule were canceled and the truck will arrive at 9:25 a.m. and leave at 3:55 p.m., as at present. Mail closing time is 9:20

Figure 43. Newspaper clipping describing the development of a new ranger station at 10CW34 (*Clearwater Tribune* 1963).

site. An aerial photograph taken in 1981 indicates that by this time the layout of the Work Center resembled that of the present, however the stockpile had not yet been constructed (Figure 44).



Figure 44. Aerial photograph of 10CW34 taken in 1981, prior to the construction of the stockpile in the western portion of the terrace.

4. REGIONAL ARCHAEOLOGICAL OVERVIEW

Review of Archaeology in the Southern Plateau

The archaeological account of the southern Columbia Plateau and the Clearwater River region is largely informed by the intensification of salvage and compliance projects conducted along the Columbia, Snake, and Clearwater rivers since the mid-twentieth century. The volume of historic records, ethnographic interviews, and early archaeological explorations extends as far back as 1805 to the observations of the Lewis and Clark Expedition who passed within a hundred miles of 10CW34 when they camped with the Nez Perce for the first time at Weippe Prairie (Moulton 1988:222; Sappington 1989:5). Nez Perce village locations, camp sites, and structures have been documented from the journals and maps recorded by members of the Expedition, as well as from manuscripts and a map prepared by Alice Fletcher, the first professional anthropologist to visit Nez Perce Country, between 1889 and 1894 (Sappington 1989; Sappington 1996:124; Sappington et al. 1995). Additional archaeological site descriptions and artifact illustrations were also provided at the turn of the twentieth century by Herbert J. Spinden, a Harvard graduate student who investigated Nez Perce sites in 1907 and 1908 (Spinden 1908). These early investigations, along with more recent studies in the late-twentieth century, have identified aboriginal routes of travel within the Clearwater River drainage and the locations of more than 300 Nez Perce villages and camps, many of which were situated along the main Clearwater River (Paul 1987; Sappington 1996; Schwede 1966; Schwede 1970; Shawley 1984; Slickpoo and Walker 1973; Stapp et al. 1984; Teit 1930).

Modern archaeological work in the southern Columbia Plateau began with the escalation of dam and reservoir construction in southeastern and central Washington at

the end of World War II. From 1947 to 1953 teams of archaeologists working for the River Basin Surveys Columbia Basin Project examined proposed reservoir sites and tested archaeological sites along the Columbia and lower Snake rivers (Butler 1968:6-7; Lohse and Sprague 1998:18). During the 1950s and early 1960s, systematic excavations conducted at sites such as Lind Coulee, The Dalles Dam and Reservoir, McNary Reservoir, and John Day Reservoir produced the first evidence of an early human presence in the southern Plateau (Reid and Gallison 1996; Sappington 1994). It was also during this period that a revision of American culture-historical archaeology was taking place through the application of regional chronologies and typologies to archaeological assemblages (Trigger 2006:289). Shortly after the publication of G. R. Willey and Philip Phillip's *Method and Theory in American Archaeology* (1958), a chronological sequence of cultural phases was proposed for the lower Snake River, demarcating it as a distinct archaeological province in 1959 (Daugherty 1959). This sequence was later modified (Leonhardy and Rice 1970) and revised (Leonhardy 1975; Leonhardy and Rice 1980) and it has since served as a standardized method for interpreting the cultural and temporal contexts of archaeological sites throughout the Columbia Plateau (Lohse and Sprague 1998:22; Sappington 1994:16).

Review of Archaeology in the Clearwater River Region

Beginning in the late 1960s and continuing through the 1970s, excavation increased significantly along the Clearwater and lower Snake rivers in response to major developments such as improvements to the Highway 12 corridor and the construction of the Dworshak Dam and Reservoir at Ahsahka. The lower Snake River sequence has been generally applied to sites within the Clearwater drainage, and in 1994, the Clearwater

drainage area was designated as a distinct archaeological region (Sappington 1994). Based on a comprehensive analysis of archaeological assemblages from over twenty key sites throughout the Clearwater basin and the findings of many smaller investigations, a regional sequence of four temporal periods, each including its own representative cultural phase, was developed for the Clearwater River region.

The early prehistoric period, from about 10,000 to 6000 years BP, includes both Windust and Cascade phase occupations, each characterized by distinctive projectile point forms and toolkits very similar to the technologies identified at sites across the lower Snake River region and the southern Plateau. The Windust phase represents the earliest evidence of human occupation in the Clearwater River region, and the distinctive, stemmed Windust lanceolate points have been recovered at numerous sites throughout the region, often however, as surface finds or from disturbed contexts (Sappington 1994:106, 374). An exception is Hatwai (10NP143), excavated in 1977 and 1978 on the lower Clearwater River near Lewiston. Excavations produced the largest early period assemblage of Windust and Cascade tools and provided the only radiocarbon date associated with a Windust occupation in the region calibrated at over 10,000 years BP (Ames et al. 1981:62). As in the Lower Snake river region, the Windust culture in the Clearwater River region is associated with a broad-spectrum foraging subsistence and highly mobile residence patterns based on local resource availability, and it is considered to be ancestral to the Cascade phase. Both are widespread throughout the Plateau and diagnostic artifacts relating to each often occur together at early sites in the Clearwater River region (Sappington 1994:103, 374-376).

After about 6000 years BP material culture in the Clearwater River region

begins to exhibit local cultural developments with the appearance of the first semisubterranean pit house at ca. 5900 BP at Hatwai (Ames et al. 1981:64; Sappington 1994:155) and an increased emphasis on fishing, root gathering and processing, and storage pits. By the end of the middle prehistoric period, a trend toward more sedentary or semi-permanent occupations is apparent along the Lower Clearwater (Sappington 1994:190). Characteristic tool technology during the Hatwai phase includes an increased variety of simultaneously occurring projectile point styles and the introduction of tools associated with plant processing such as edge-ground cobbles, mortars, and pestles (Keeler 1973:74-75; Sappington 1994:188-189). While the middle period in the Clearwater River region coincides temporally with the late Cascade and early to late Tucannon phases in the lower Snake River region, material culture in the Clearwater River region during this period is more comparable with characteristics of the Tucannon phase which are marked by a greater diversity of ground stone and cobble tools and a changing settlement pattern oriented toward more permanent occupations along main river channels (Sappington 1994:141-143, 381).

Many sites in the Clearwater River region that were occupied during the Hatwai phase also demonstrate a continued occupation into the late prehistoric and historic periods (Sappington 1994:190). By about 3000 BP, the construction of pit houses and the corresponding development of village settlement patterns had become widespread. The late prehistoric Ahsahka phase is the most clearly represented period in the Clearwater River region and it is marked by the emergence and intensification of cultural traits similar to that observed ethnographically (Sappington 1994:381-382). While the prevalence of pestles, mortars, anvils, and net weights demonstrates increased reliance on

plant resources and fishing, the recovery of a wider range of projectile point styles such as small corner-notched and side-notched points indicates that hunting with the bow and arrow was also a major activity (Sappington 1994:321-322, 329). The Ahsahka phase is distinguished from the earlier middle prehistoric period by discernible growth in regional stability and an increased sophistication of adaptive strategies employed for exploiting the natural resources in the Clearwater River region.

The protohistoric period in the Clearwater River region is accompanied by the introduction of the horse to the Nez Perce between ca. AD 1700 and 1730 and the appearance of European or Euroamerican trade materials such as glass beads or metal artifacts of copper, brass and iron at sites which were occupied before the arrival of nonaborigines into the region. The initiating factor for this period, however, is the devastating effect of European diseases which is considered to have reached the Northwest as early as the 16th century (Campbell 1989, cited by Sappington 1994:331, 337). Rapid depopulation in the Plateau, estimated at nearly 50% by 1802, had undoubtedly resulted in severe social and political alterations to aboriginal societies by the time of the first meeting between Lewis and Clark and the Nez Perce in 1805 (Campbell 1989:25, cited by Sappington 1994:332). In addition, the observations made by the expedition of European trade items, such as glass beads and metal ornaments among the Nez Perce indicate that these materials had reached the Plateau long before 1805 (Sappington 1994:333). While the protohistoric Kooskia period encompasses a time of turbulence and distress for not only Plateau peoples, but all American Indian groups, the aboriginal archaeological record of protohistoric occupations in the Clearwater River region parallels that of the previous late prehistoric period. The frequent occurrence of

small side- and corner-notched projectile points, mortars, pestles, and net weights indicates that hunting, fishing, and vegetable gathering and processing continued to function as important activities. Pit houses seem to have been generally replaced with more portable above-ground structures supported by posts while settlement patterns were focused on more concentrated locations where conditions would have provided ideal grazing for horses (Sappington 1994:369-372).

Review of Archaeology in the North Fork Basin

The majority of sites investigated archaeologically in the Clearwater River region have been situated along the major river courses of the Lochsa and Selway rivers, and the Middle and South Forks of the Clearwater River. This is in part a sampling bias which has inevitably corresponded with the locations of construction and development projects. However, the significance of riverine settings as sources for subsistence and travel is demonstrated by historic records and ethnographic studies among the Nez Perce, an indication that the sampling of such locations should provide a fairly reliable account of the region (Sappington 1994:391; Schwede 1966; Slickpoo and Walker 1973; Spinden 1908:175-176; Walker 1998). As many investigations in the Clearwater River region have been conducted along major river routes at lower elevations, fewer sites demonstrating intensive prehistoric occupation have been identified in upland settings. However, extensive investigations at the mouth of the North Fork of the Clearwater River, initiated by the construction of the Dworshak Dam and Reservoir, along with additional findings further upstream have provided evidence which indicates that the area along the North Fork was utilized from the early prehistoric period into historic times (Figure 45).

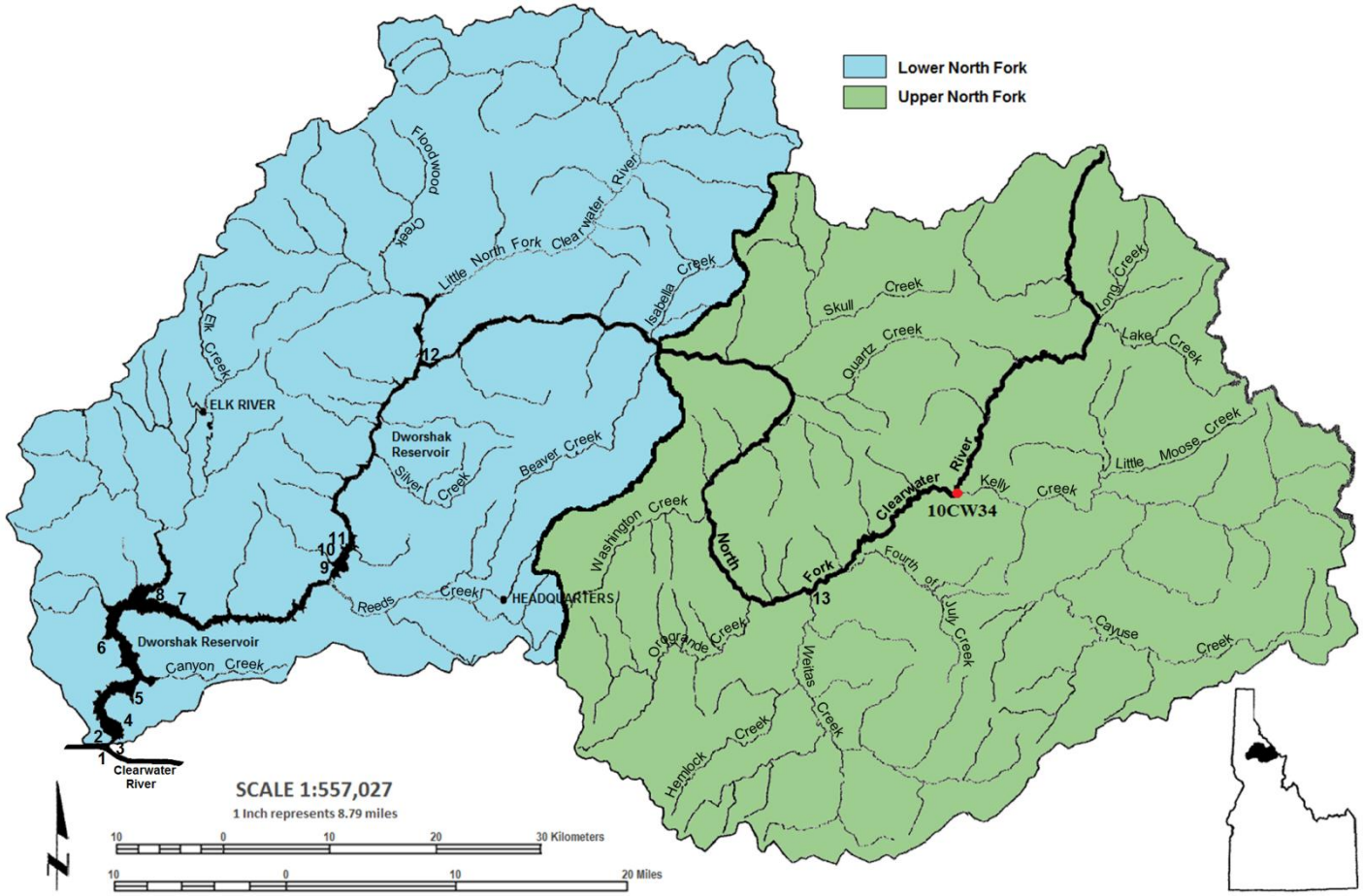


Figure 45. Locations of 10CW34 and key archaeological sites along the North Fork. (1) Canoe Camp (10CW25); (2) Clearwater Fish Hatchery (10CW4); (3) Ahsahka Sportsman's Access (10CW5); (4) Bruces Eddy (10CW1); (5) Indian Creek (10CW38); (6) Ash Site (10CW39); (7) Big Springs (10CW43); (8) Elk Creek (10CW41); (9) Swamp Creek (10CW225); (10) Big Island (10CW45); (11) Upper Terrace (10CW226); (12) Little North Fork (10CW20); (13) Weitas Creek (10CW30) (adapted from IWRB 1996:vii, Figure 1; Mattson et al. 1983; Sappington 1994:105, 148, 195, 338).

A series of investigations from 1961 through the early 1990s was conducted in the vicinity of Ahsahka, the location of a major ethnographic village described by *Kew-kew'-lu-yah*, or Billy Williams, a Nez Perce informant for Alice Fletcher (Chalfant 1974:92; Curtis 1911:159; Osmundson and Hulse 1962:12-13; Sappington et al. 1995:203; Schwede 1966:32; Spinden 1908:174). Excavations at the Clearwater Fish Hatchery site (10CW4), Ahsahka Sportsmen's Access (10CW5) and Canoe Camp (10CW25) documented the existence of late prehistoric houses, hearths, and high concentrations of faunal remains. Artifacts such as projectile points, pestles, mortars, and net weights were recovered from these sites, representing a range of activities including hunting, fishing, plant processing, and tool manufacture (Brauner and Stricker 1990; Gaarder 1986; Osmundson and Hulse 1962; Sappington 1990; Sappington and Wegars 1988; Sappington et al. 1987a, 1987b; Sappington et al. 1990; Sappington et al. 1991). Survey and testing investigations conducted before and after the inundation of approximately 53 miles of the lower North Fork by the Dworshak Reservoir in 1973 identified hundreds of additional sites and occupations from the early prehistoric period to the historic period (Corliss and Gallagher 1972; Draper and Olson 1990; Lynch et al. 1964; Mattson et al. 1983; Osmundson and Hulse 1962; Sappington 1985, 1988). Individual stemmed points similar to Windust and Cascade phase tools as well as numerous edge-ground cobbles, net weights, and a variety of cobble tools were recovered from lower North Fork sites such as Indian Creek (10CW38), Swamp Creek (10CW225), and the Ash site (10CW39) (Corliss and Gallagher 1972:26, 51, 10; Draper and Olson 1993:133, Figure 33b, Table 23; Mattson et al. 1983:56, 111, Table 16).

Two houses, one dating to the late prehistoric period, were reported at the Big

Spring site (10CW43), the only location along the North Fork or in an upland setting where houses have been encountered. Associated artifacts included grinding stones, flat cobbles, choppers, and bifaces (Corliss and Gallagher 1972:14-18). Excavations at Bruces Eddy (10CW1) and Weippe (no site number), an important ethnographic camas ground, documented several burials containing numerous glass, copper, and brass artifacts which dated to the protohistoric period (Lynch et al. 1964:6-7; Sprague and Birkby 1970:22-23, cited by Sappington 1994:348; Stapp 1984:25-28, 142). Minimal testing at Elk Creek (10CW41), Upper Terrace (10CW226), Big Island (10CW45), and Little North Fork (10CW20) resulted in tools and radiocarbon dates that suggested middle to late period occupations (Corliss and Gallagher 1972:10, 27, Figures 23b, 26; Mattson et al. 1983:75,122-130, 158, Figures 25-27, Table 5, Table 21; Sheppard and Chatters 1976:142).

Archaeology at Weitas Creek

Of particular importance for the evaluation of 10CW34 within the upper North Fork setting is the investigation conducted in 1972 at the Weitas Creek (10CW30) site, located just 15 miles downstream of 10CW34 (Keeler 1973). Based on temporal indicators comparable to sequences developed for sites within the Clearwater River drainage, the lower Snake River region, and specific areas in the southeast Plateau, artifacts at Weitas Creek were organized into four units of occupation (Keeler 1973:63-80, Figure 5) (Figure 46).

The recovery of stemmed, straight-, and concave-based lanceolate points comparable to Windust phase tools, oval and lanceolate knives, and numerous large side-notched and leaf-shaped Cascade points from Occupations I and II indicated that

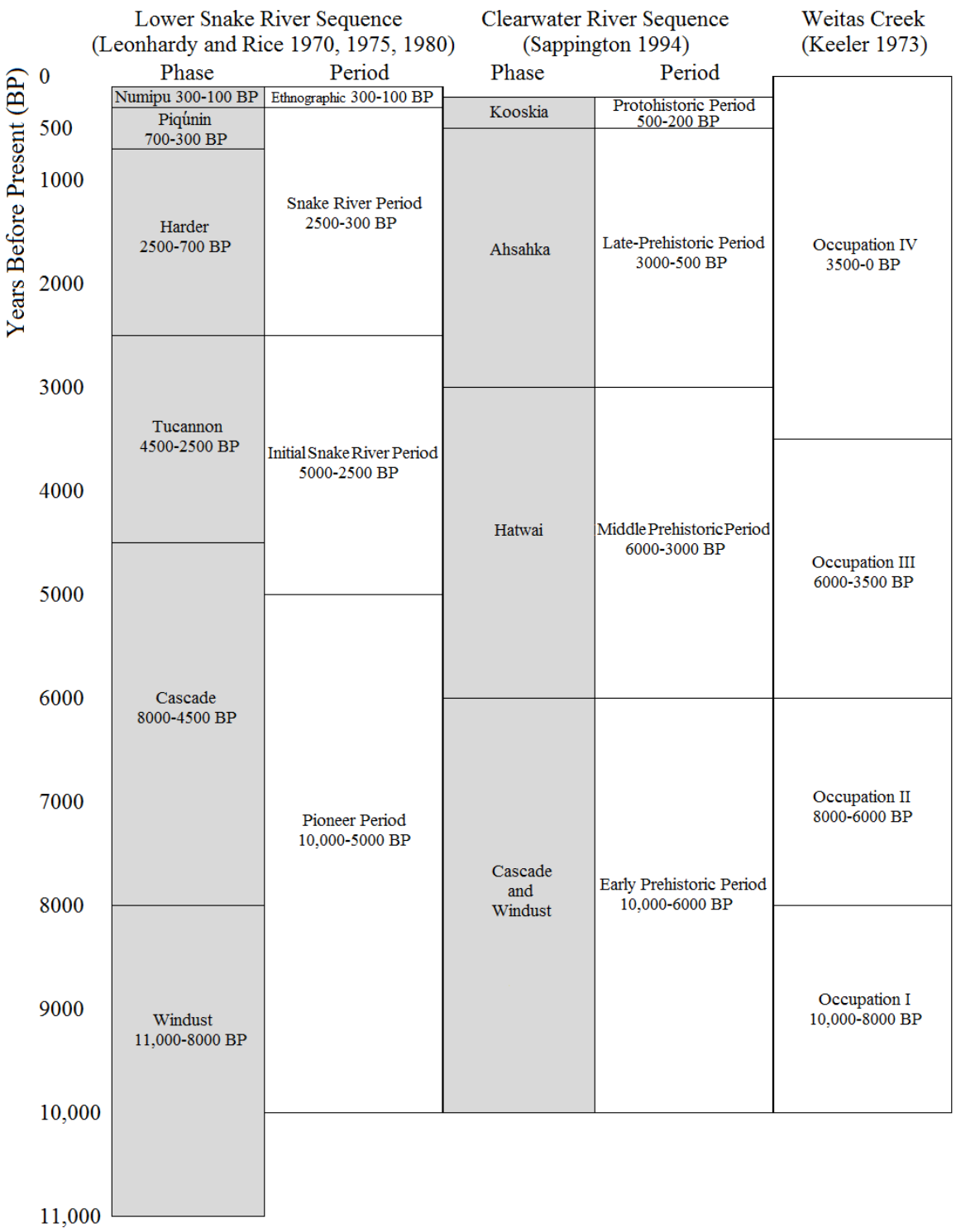


Figure 46. Comparison of the lower Snake River and Clearwater River region chronologies with the Weitas Creek (10CW30) Occupations I-IV (Leonhardy and Rice 1970, 1975, 1980; Keeler 1973; Sappington 1994).

occupation of the site began at approximately 10,000 BP and remained constant throughout the early prehistoric period (Keeler 1973:69). Occupation III, corresponding with all but the termination of the middle prehistoric period of the Clearwater River region, was considered to be the most intensive at the site due to increased concentrations of cobble tools, knives, and bifaces, and the appearance of netweights, pestles, and a tubular stone pipe (Keeler 1973:74, 78-79). The uppermost ten centimeter stratum represented the final Occupation IV, in which late prehistoric artifact types such as cobble and flaked tools were similar to the previous occupation, but decreased abruptly in frequency. This was attributed to a decline in site use after 3500 BP and perhaps a shift in the regional pattern of resource exploitation (Keeler 1973:79-80). While radiocarbon dates were not obtained from Weitas Creek, the presence of tools associated with the Windust and Cascade phases establishes it as the only Upper North Fork site, in addition to 10CW34, to have demonstrated a significant early prehistoric occupation.

5. METHODS

Introduction

The recent UI investigations at 10CW34 were initiated in 2009 by Forest Service proposals to build a new water distribution system, bunkhouses, and a small parking area at the Work Center. Since its recordation in 1969, the continual recording and recovery of both prehistoric and historic cultural deposits demonstrated the archaeological significance of 10CW34, however, the nature, extent, and boundaries of the site remained unclear. It was determined that the proposed constructions would have an adverse effect on 10CW34 and a geophysical survey, consisting of total field magnetometry and ground penetrating radar, was conducted in six areas of the site to identify anomalies and any potential features with archaeological significance (Carlson and Sheriff 2009) (Figure 47) (see Appendix 2). Many features identified in the survey exhibited geological characteristics, or were identified with known sources, such as fire hydrants and existing structures. However, two areas of the site, Grid #1 and Grid #3, showed anomalous concentrations which were not associated with identifiable sources (Figure 48). In June, 2010, the UI testing plan commenced with three primary objectives: 1) examine anomalies in Grids #1 and #3; 2) evaluate, by test excavations, the potential effect the proposed activities would have on cultural resources; 3) improve understanding of the natural and cultural history of the terrace by investigating previously untested areas to determine the nature, extent, and boundaries of cultural deposits at 10CW34. From 2010 to 2012, a total of one hundred and eleven 1 x 1 m test units and two 1 x 0.5 m test units were excavated, amounting to a total volume of 128.151 m^3.

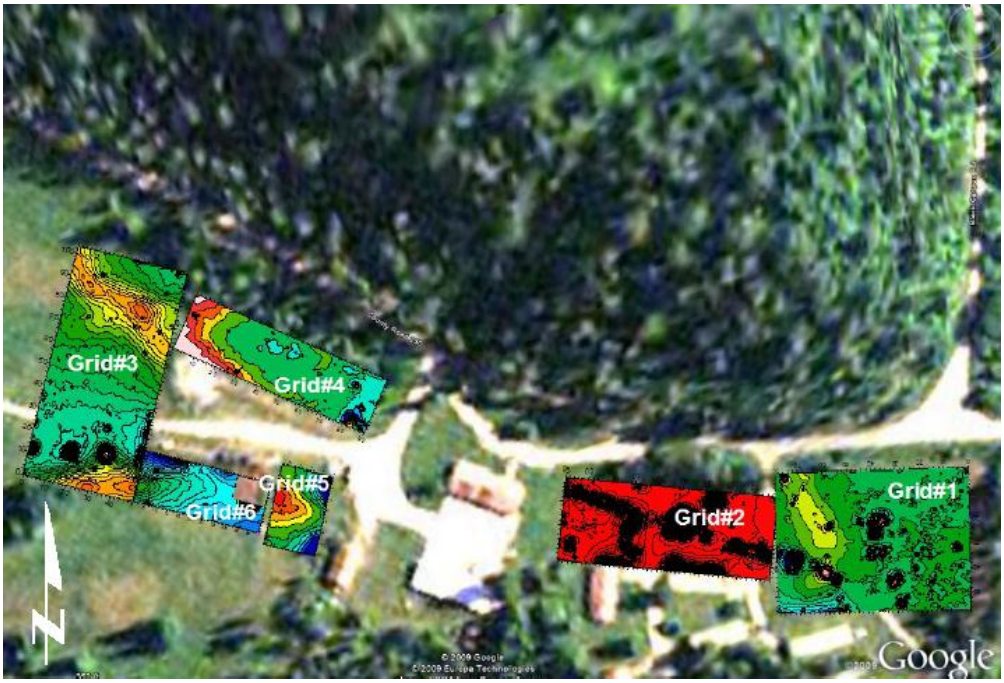


Figure 47. Composite overlay map showing the locations of the areas (Grids #1-6) investigated with total field magnetometry and ground penetrating radar in 2009 (Carlson and Sheriff 2009:4, Plate 1).

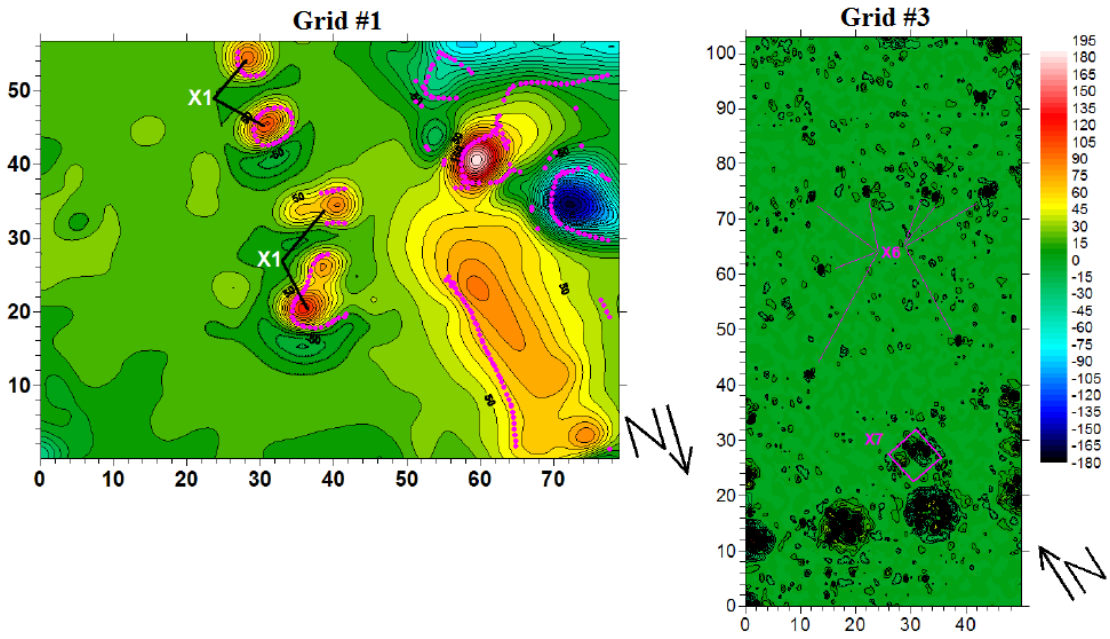


Figure 48. Total magnetic field anomalies identified in Grids #1 and #3. At left, X1 and X2 mark the optimal locations in Grid #1 for excavation of the subsurface features indicated. In Grid #3, at right, X6 indicates locations of isolated anomalies near the surface and X7 marks a possible rectangular feature. The dimensions are given in meters (adapted from Carlson and Sheriff 2009:9, Figure 3, 17, Figure 10.)

Area Designations

Four areas at 10CW34, designated from east to west as Areas A, B, C, and E, were investigated by UI in 2010 (Figure 49). Area E was the sole focus of UI excavations during the 2011 and 2012 seasons. Area A includes Grid #1, surveyed by Carlson and Sheriff (2009) and is restricted to the northeastern corner of the terrace below Forest Road 250 and east of the work center road running northwest and southeast where no surface structures or facilities of the work center are present. Area B covers the area immediately west and south of Area A and contains many of the modern work center structures and associated facilities, such as subsurface plumbing and buried electrical lines. The historic log cabin or the "Old Guard Station," built in 1936, is also located in the southern portion of Area B (see Chapter 6). Area C is located just west of the helipad and contains a portion of Grid #3 surveyed in 2009. Area D covers the southeastern and central portions of the pasture, and Area E comprises the southwestern edge of the pasture near the stockpile. Area E is subdivided further into four primary subareas and this is explained below in *Sampling Methods and Volume in Area E*. Previous investigations at 10CW34, conducted in 1979, 1981, 1987, 1991, and 1996, were located in Areas A, B, and D, and are discussed in Chapter 6.

Field Methods

Sampling Methods in Area B

In order to better define site boundaries and areas of prior disturbance, the 2010 excavations began in Area B, where five trenches, each approximately 4 m long and 2.5 m wide, were excavated by backhoe to depths reaching a maximum of 1.2 m below datum (BD) (Figure 50). A level datum was established at the highest surface corner

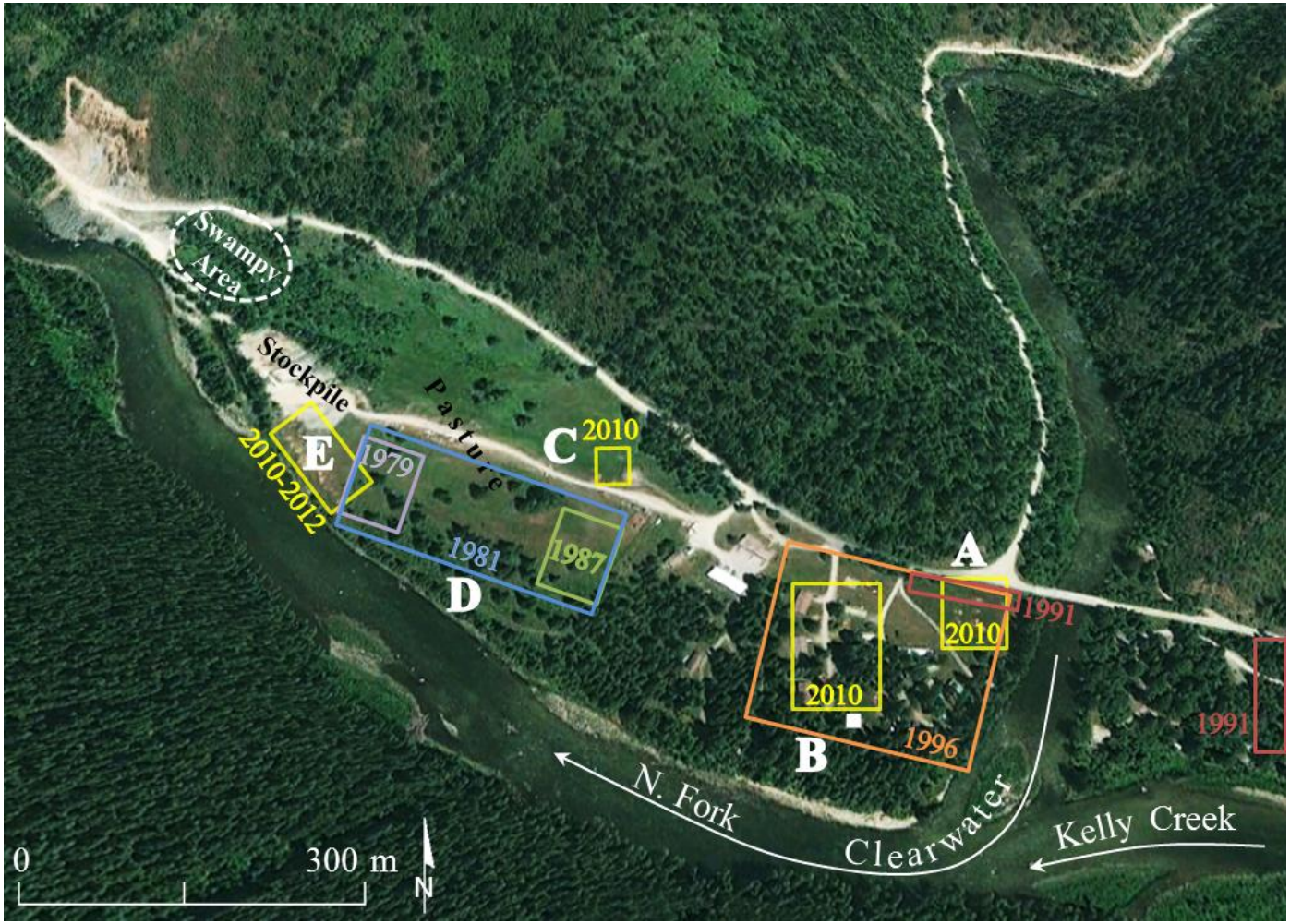


Figure 49. Google Earth aerial image of the Kelly Forks Work Center site (10CW34) showing the designated Areas A, B, C, D, and E where archaeological testing has been conducted since 1979, and more recently during the 2010-2012 investigations. The location of the historic log cabin is indicated by the solid white square near the southern edge of Area B.

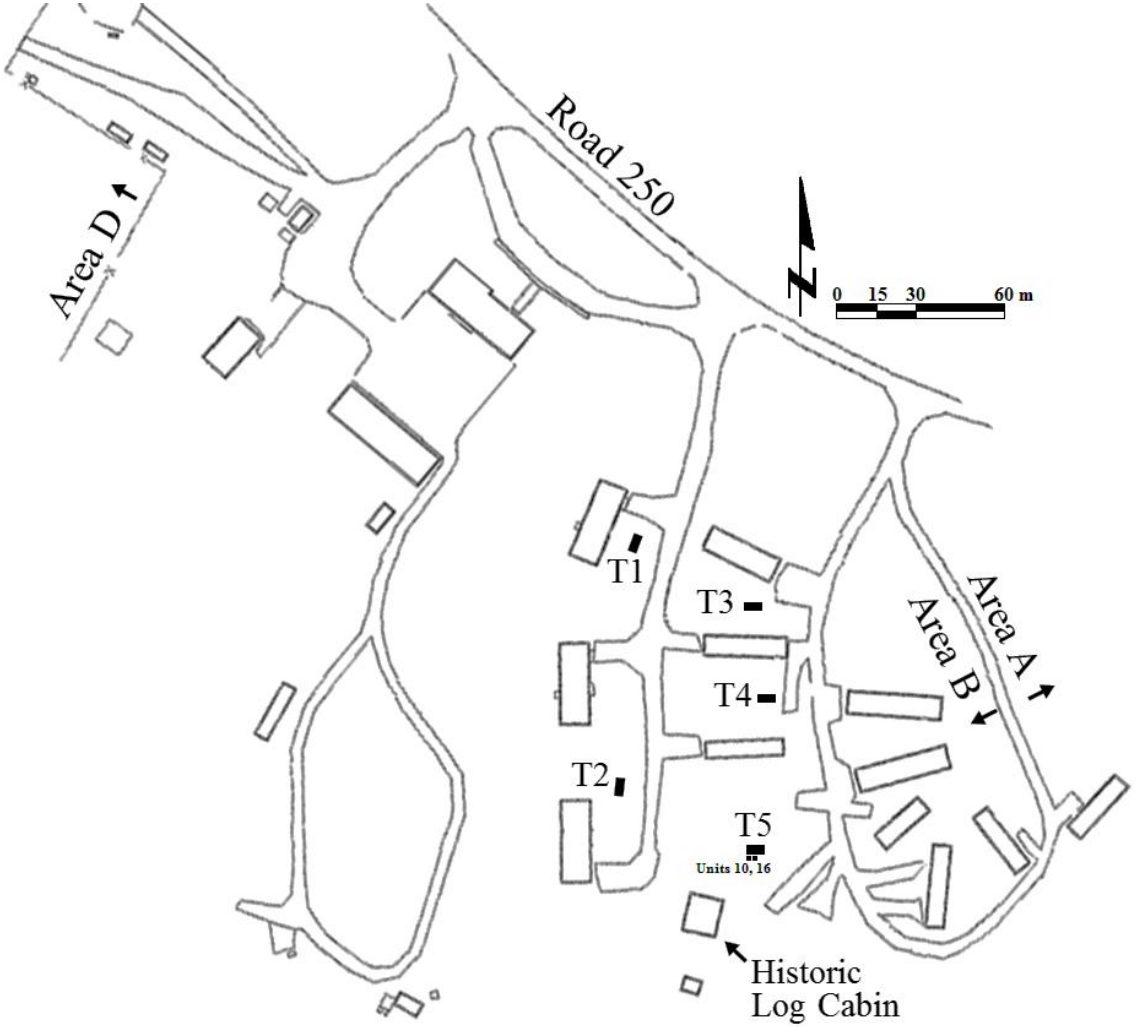


Figure 50. Map showing the locations of Trenches 1-5 and Units 10 and 16 in Area B. Trench and unit sizes are enlarged to show locations (adapted from USDA, FS 2010:sheet 2).

of each trench wall and trowel-excavation proceeded 10 cm horizontally into the walls with 30 cm arbitrary levels recorded from the datum (Figures 51-52). From corner to corner, the Trench 1 wall extended to 2 m, while the Trench 2-5 walls were 1 m. Excavation ended between 90 and 103 cm BD in Trenches 1-4 with a coarse gravel layer containing large cobbles and boulders. A gravel layer was not encountered in Trench 5 until 150 cm BD, and for this reason, Units 10 and 16 were opened adjacent to the south wall of Trench 5. The maximum depth of 170 cm BD was reached in Unit 10 and a total volume of 3.451 m^3 was excavated in Area B, representing 2% of the total UI excavations at 10CW34 (Table 1).

Table 1. Area B excavation depths and volume.

Unit	Ending Depth (cm BD)	10 cm Levels (1 m x 1 m)	10 cm Levels (1 m x 10 cm)
Trench 1 (2 m south wall)	90	-	18
Trench 2 (1 m south wall)	103	-	10.3
Trench 3 (1 m west wall)	90	-	9
Trench 4 (1 m east wall)	90	-	9
Trench 5 (1 m west wall)	150	-	15
10	170	17	-
16	130	13	-
Subtotal		30	4.51
Volume (m^3)		3	.451
Total Area B Volume (m^3)			**3.451**
Total UI Excavated Volume (m^3)			**128.151**
Area B Percentage of Total UI Excavated Volume			**2%**

Sampling Methods in Area A

The sampling plan employed for Area A in 2010 included an examination of four anomalous sources identified in the total field magnetometry survey (Carlson and Sheriff 2009) as optimal locations for feature excavation. Following a foot survey and surface



Figure 51. Photograph of the south wall of Trench 2, prior to beginning excavation. Photo by author, 8 June 2010.



Figure 52. Photograph showing the excavation of the first 30 cm of the east wall in Trench 4. Photo by author, 9 June 2010.

inspection of Area A, a 10 m quadrant grid was established with a magnetic north baseline designated as W100 (Figures 53-54). From this baseline, smaller quadrants were extended and Units 1, 2, 3, and 5 were positioned over the defined contour areas of highest magnetic intensity. Additional test units were placed throughout the grid to test the distribution of cultural material densities and define the site boundaries in Area A (Figure 55). Where features and concentrations of artifacts were encountered, contiguous units were added to continue exploration. The 2 m^2 block, composed of Units 8, 13, 18, and 23, reached the greatest depth in Area A at 160 cm BD, while boulders resulted in the early termination of Units 1, 4, and 6. Fourteen 1 x 1 m test units were excavated in Area A within an area of approximately 160 m^2 amounting to a total volume of 13.3 m^3, and accounting for 10% of the total UI excavations at 10CW34 (Table 2).

Sampling Methods in Area C

In 2010, four 1 x 1 m test units were excavated in Area C at the locations of high-amplitude anomalous sources identified by the geophysical survey in Grid #3 (Carlson and Sheriff 2009). As in Area A, a 10 m quadrant grid was laid out using magnetic north and the flagged anomalies were then plotted and units were opened to investigate the sources (Figures 56-57). Aside from one bimarginally modified cobble flake in the uppermost level of Unit 15, cultural material was absent and sediments were high in clay content. Excavations in Area C were therefore terminated at 50 cm BD in each unit, amounting to a total volume of 2 m^2 and comprising 2% of the total UI excavations at 10CW34 (Table 3).



Figure 53. Google Earth aerial image of Area A. The grid baselines, W100, and N140 are indicated by white lines. This photograph was produced in 2010, two weeks after the completion of UI excavations in Area A. The general locations of test units are visible, though backdirt mounds near some of the units are somewhat distorting (Google Earth 2010).

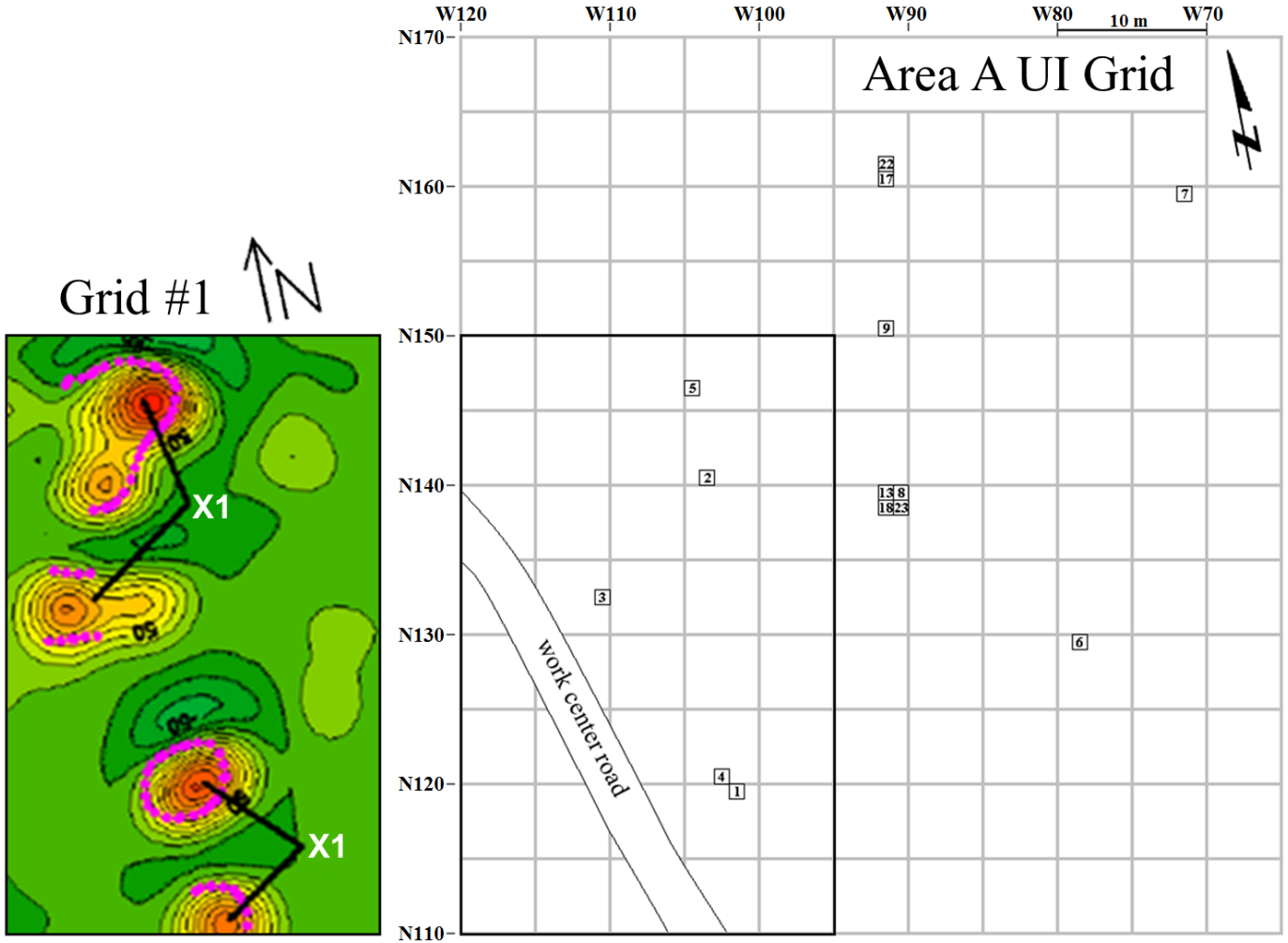


Figure 54. Grid map showing the locations of the test units excavated by UI in Area A. The black rectangle within the grid corresponds with the locations of the total magnetic field anomalies identified in Area A (Grid #1) by Carlson and Sheriff (2009). Units 1, 2, 3, and 5 were positioned over the areas of highest intensity, as indicated by X1 in the image at left.



Figure 55. Photograph of excavations in Area A during the second week of fieldwork in 2010. Excavation is in progress in Units 1-8. Unit 7 is in the foreground and Unit 5 is the farthest toward the right. Trenches 3 and 4, in Area B, can be seen among the work center residential trailers, enclosed by the bright orange netting in the distant background at right and center, respectively. View is to the southwest. Photo by author, 14 June, 2010.

Table 2. Area A excavation depths and volume.

Unit	Ending Depth (cm BD)	10 cm Levels (1 m x 1 m)	
1	40	4	
2	80	8	
3	60	6	
4	40	4	
5	100	10	
6	30	3	
7	110	11	
8	160	16	
9	70	7	
13	160	16	
17	80	8	
18	160	16	
22	80	8	
23	160	16	
Subtotal		133	
Total Area A Units / Volume (m^3)			**14 / 13.3**
Total UI Excavated Volume (m^3)			**128.151**
Area A Percentage of Total UI Excavated Volume			**11%**

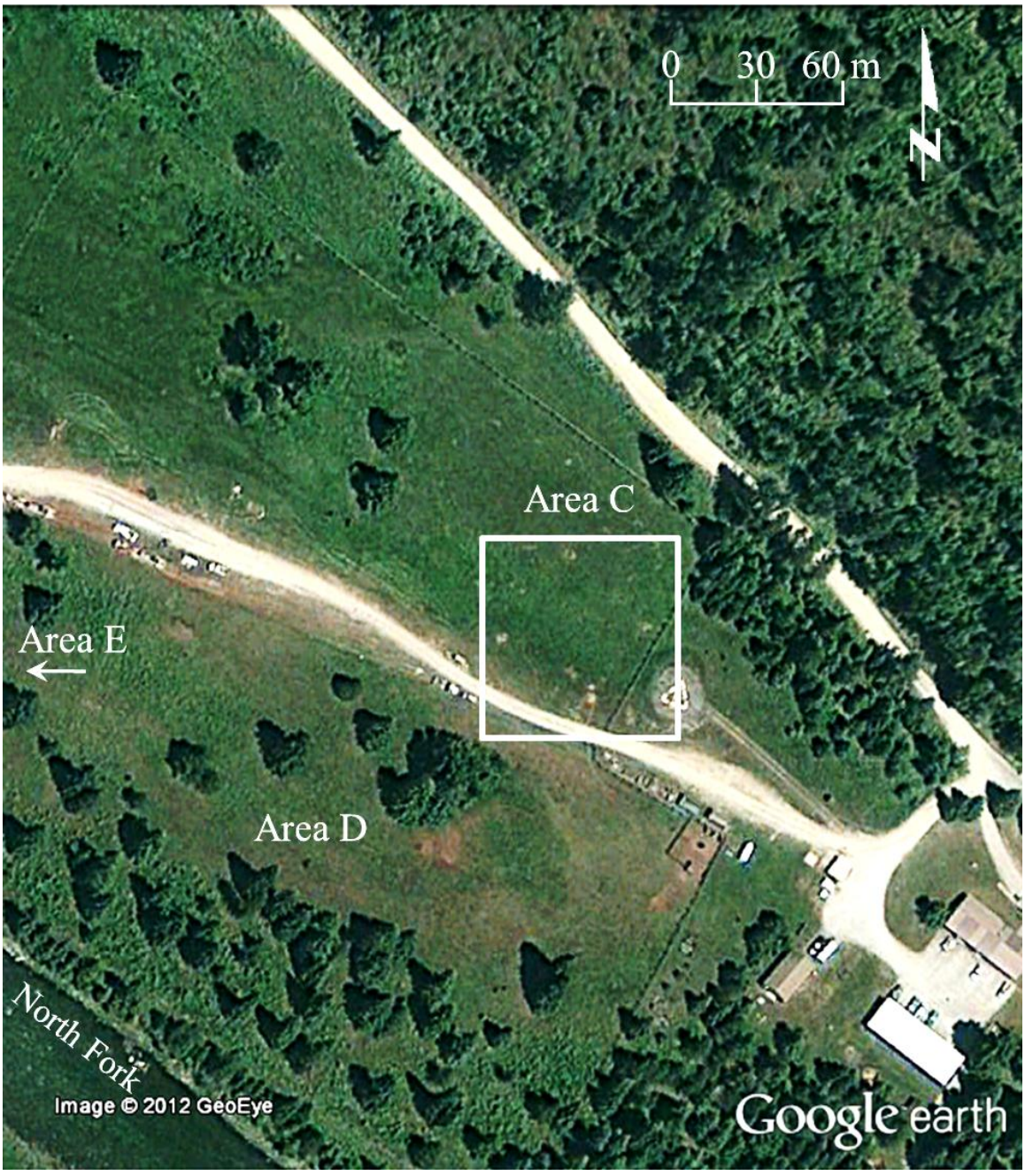


Figure 56. Google Earth aerial image centered on Area C. The locations of the four test units excavated in 2010 are visible in this image, produced one week after completion of excavation in Area C. Area D is to the south of Area C, and Area E is located outside of the photo, roughly 200 m to the west. The North Fork of the Clearwater River, flowing westward, can be seen in the bottom right corner. (Google Earth 2010).

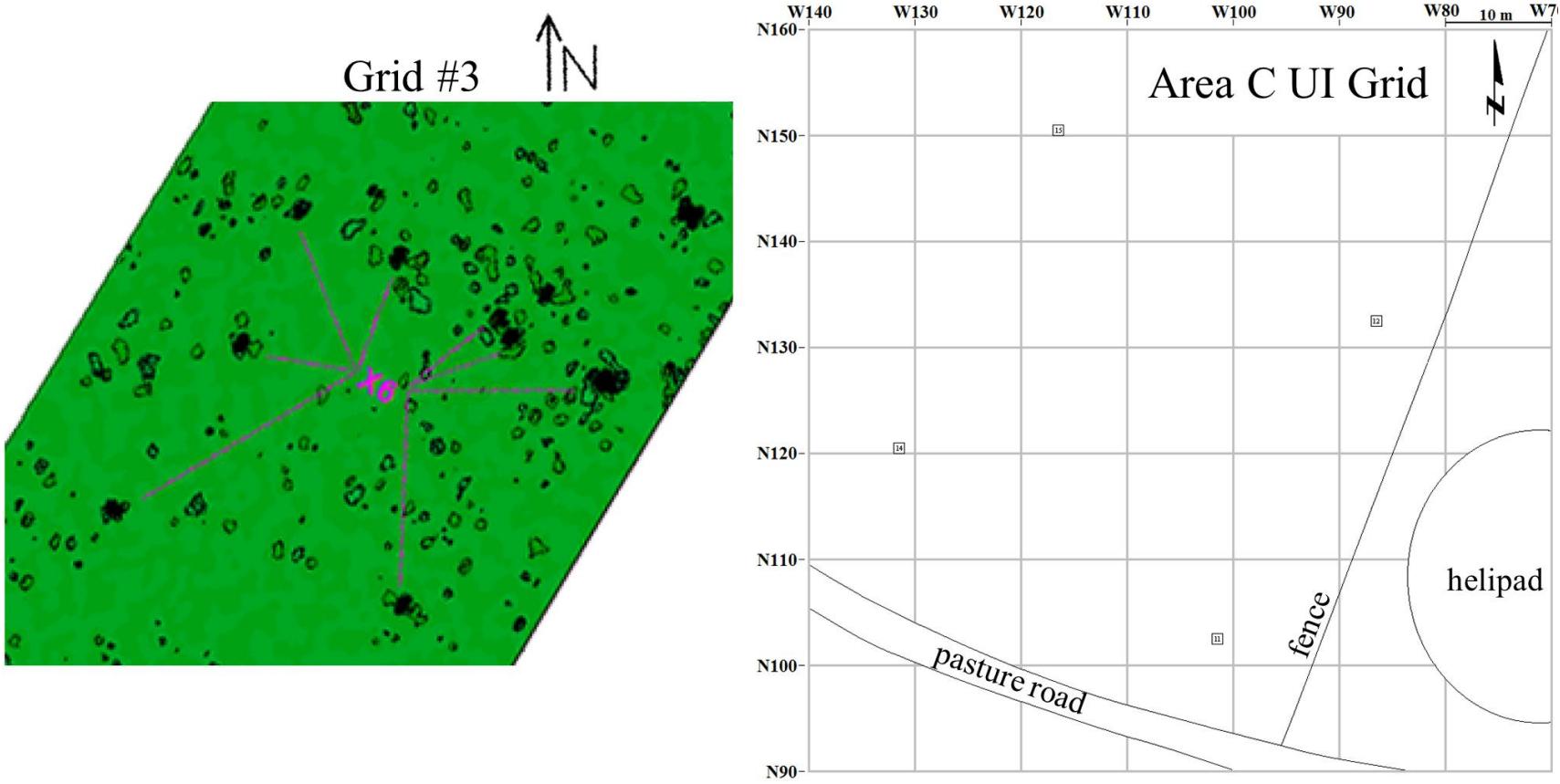


Figure 57. Grid map showing the locations of the test units excavated by UI in Area C. Test units were placed according to the locations of magnetic anomalies identified by Carlson and Sheriff (2009), and indicated in the left image as X6.

Table 3. Area C excavation depths and volume.

Unit	Ending Depth (cm BD)	10 cm Levels (1 m x 1 m)
11	50	5
12	50	5
14	50	5
15	50	5
Subtotal		20
Total Area C Units / Volume (m^3)		**4 / 2**
Total UI Excavated Volume (m^3)		**128.151**
Area C Percentage of Total UI Excavated Volume		**2%**

Sampling Methods in Area E

Prior to 2010, Area E was not tested archaeologically, though previous investigations at 10CW34 had demonstrated the presence of cultural material in the central and southeast portions of the pasture (Area D). In order to evaluate the nature and extent of cultural deposits in the southwest pasture, Area E was selected as part of the 2010 testing plan for 10CW34. Due to the significance and density of the cultural materials encountered at this location, the original testing plan was extended and UI returned in 2011 and 2012 to continue investigations in this portion of the site. The UI excavations were distributed over approximately 4400 m^2 of Area E in four primary zones, designated as the Stockpile, West, Central, and East zones (Figures 58-63). The Central zone includes a number of isolated units as well as nine blocks of contiguous test units which have been designated as C1-C9.

Prior to beginning excavation in 2010, a 10 m quadrant grid was established and a baseline was assigned to the N100 grid line which ran roughly parallel with the North Fork from northwest to southeast. Beginning in the West zone, 1 x 1 m test units were placed at 10 m intervals along this line from W150 to W50 to sample the area along the

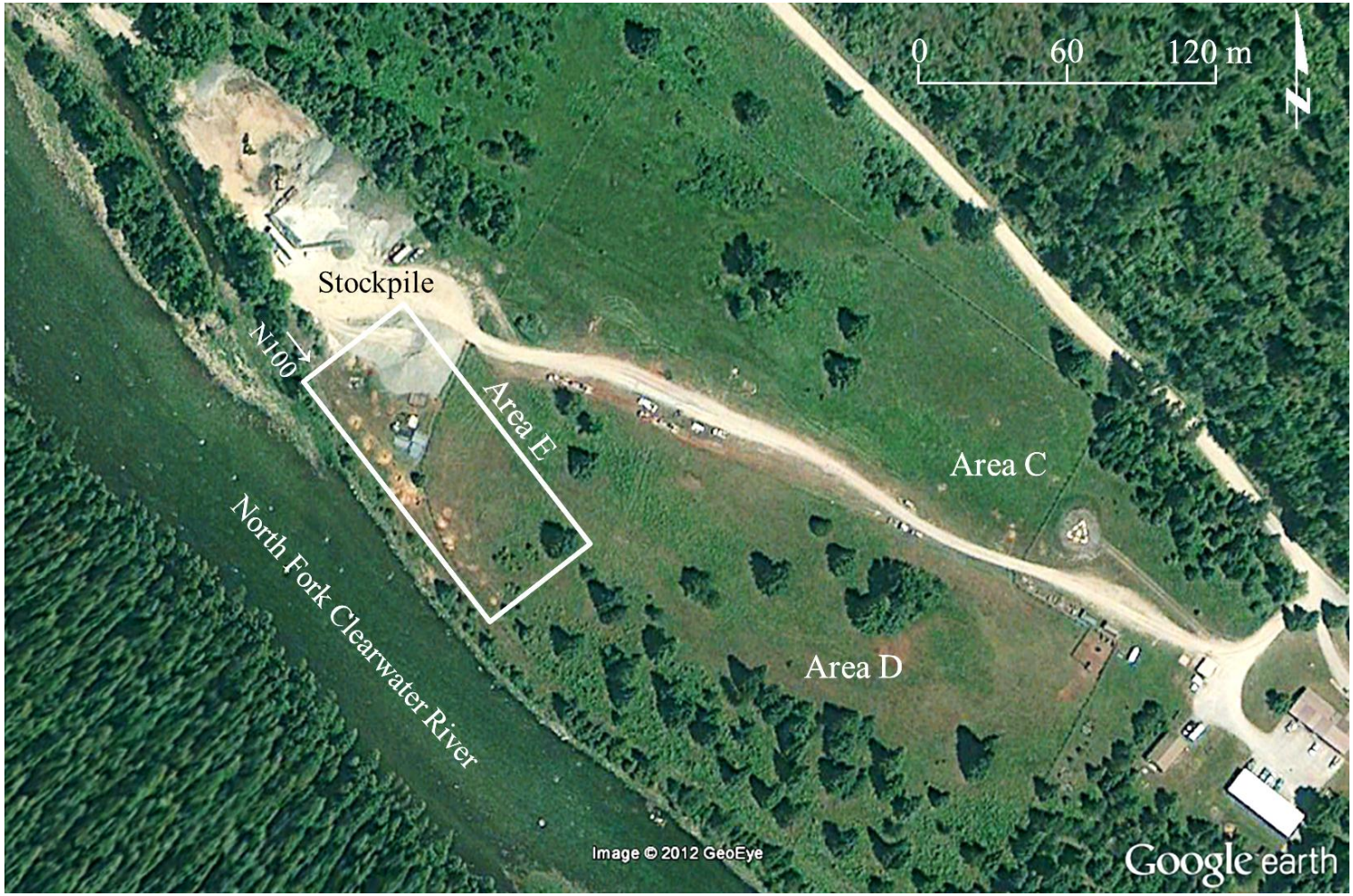


Figure 58. Google Earth aerial image centered on the western portion of 10CW34, showing the locations of Areas C, D, and E. The image was produced following the sixth week of the 2010 fieldwork, and the general locations of the 2010 test units along the N100 grid line are visible, though backdirt mounds near the units are somewhat distorting (Google Earth 2010).

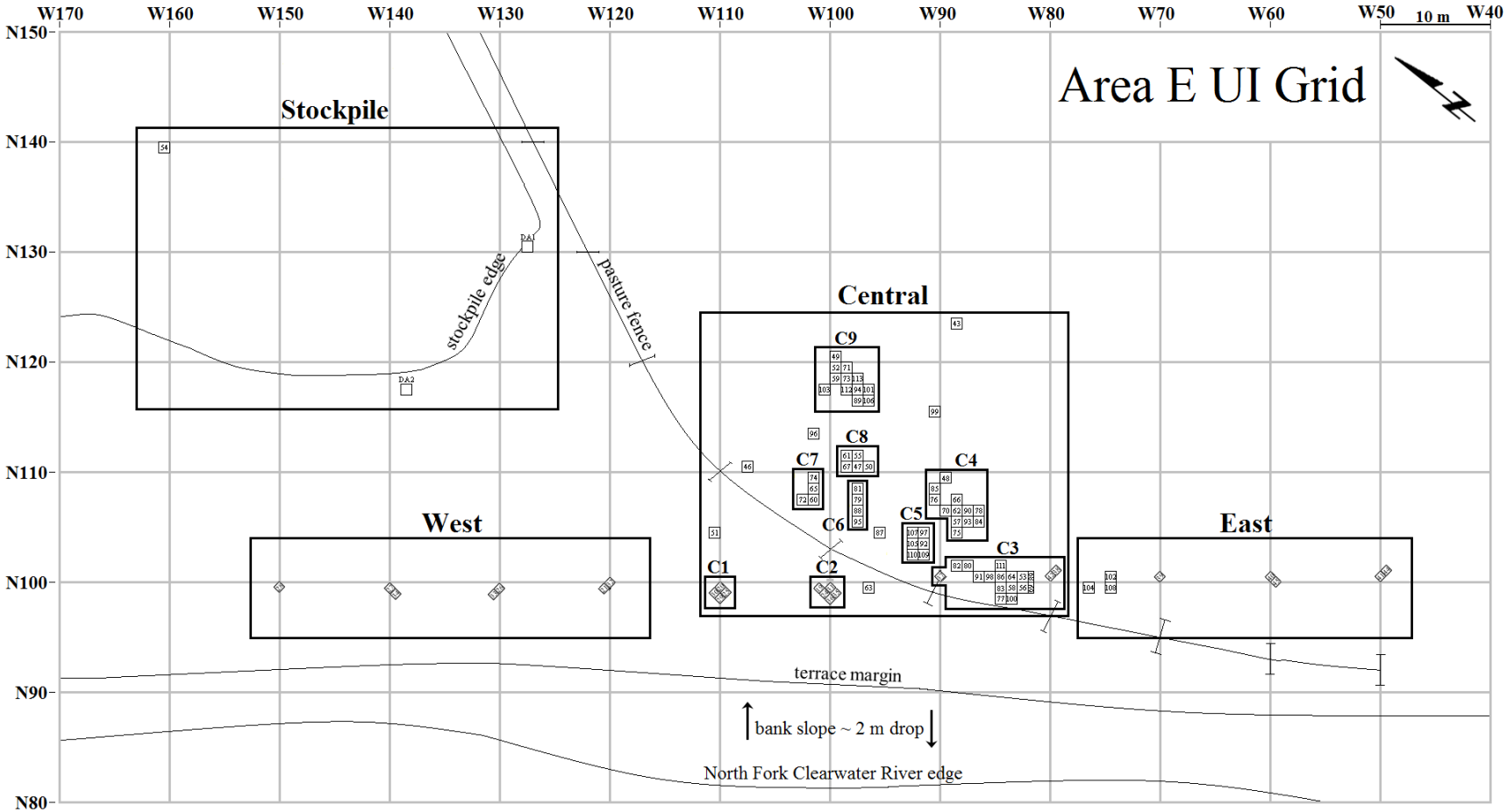


Figure 59. Grid map showing the locations of the test units excavated by UI in the Stockpile, West, Central, and East zones of Area E. In 2010, test units were first placed along N 100 from the West zone, through the Central zone and to the East zone. In 2011 and 2012, the Central zone was expanded toward the northeast. The locations of test units along the N100 line ranged between roughly 8 and 12 m north of the bank of the North Fork of the Clearwater River which dropped approximately 2 m in elevation toward the edge of the river.

Stockpile zone – Area E

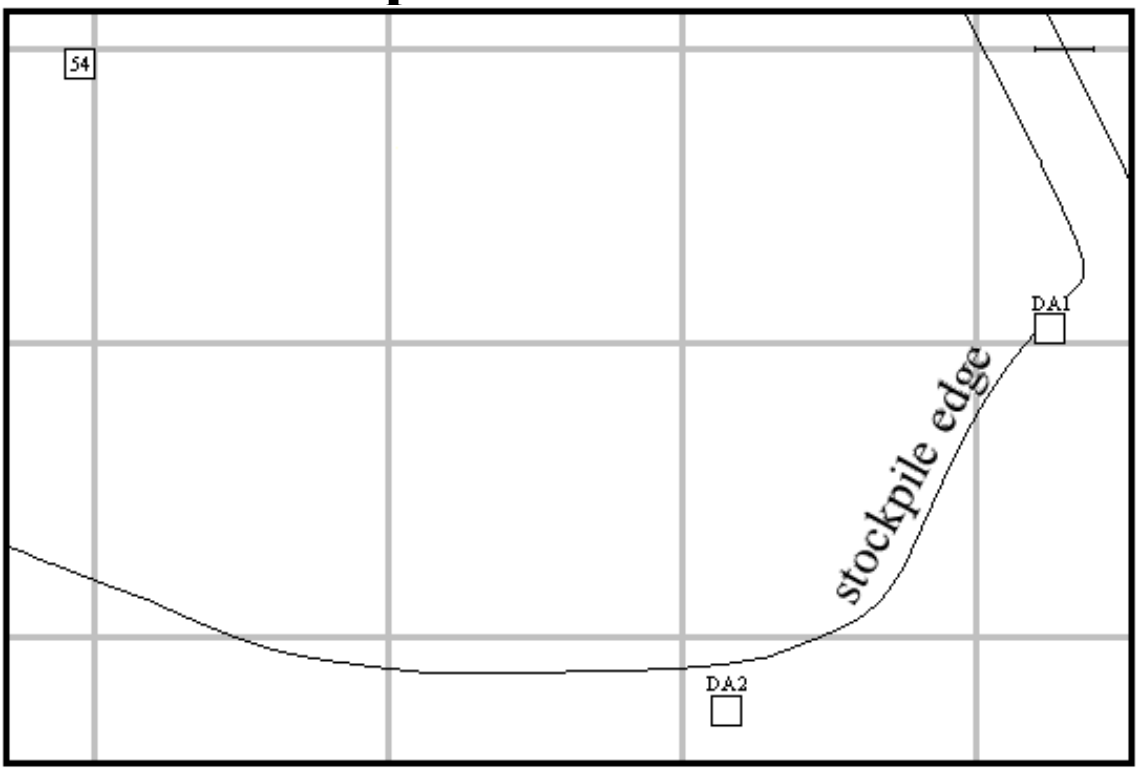


Figure 60. Close-up image of the Stockpile zone of the Area E grid, enlarged to show unit numbers clearly.

West zone – Area E

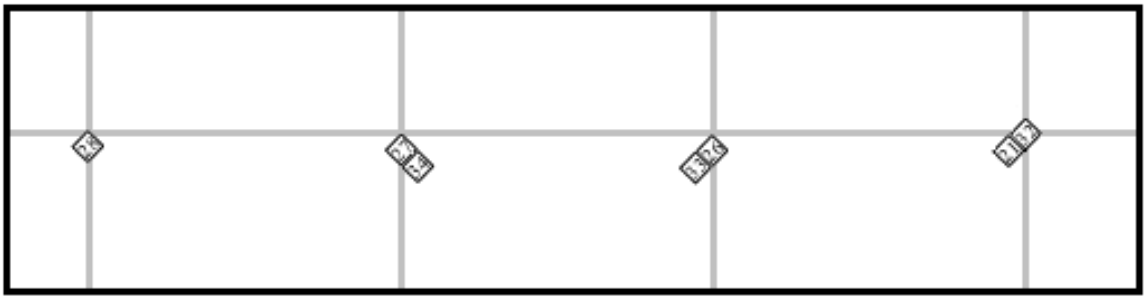


Figure 61. Close-up image of the West zone of the Area E grid, enlarged to show unit numbers clearly.

Central zone – Area E

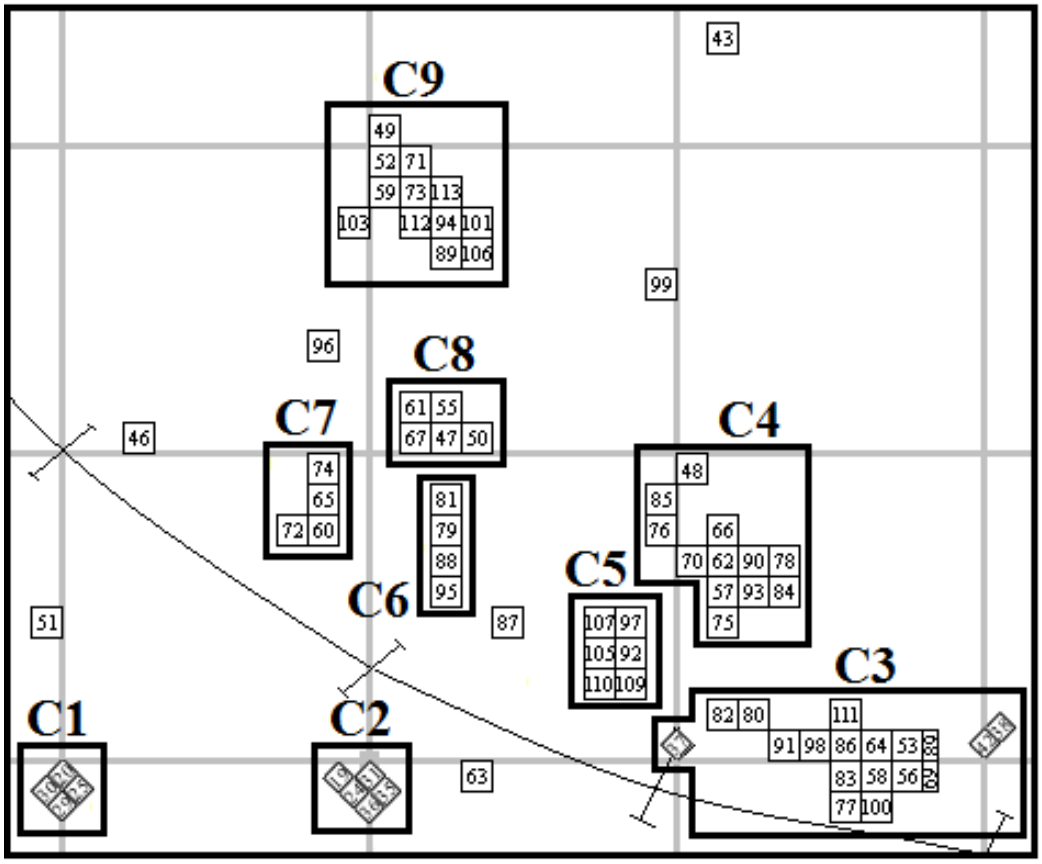


Figure 62. Close-up image of the Central zone of the Area E grid, enlarged to show unit numbers clearly.

East zone – Area E

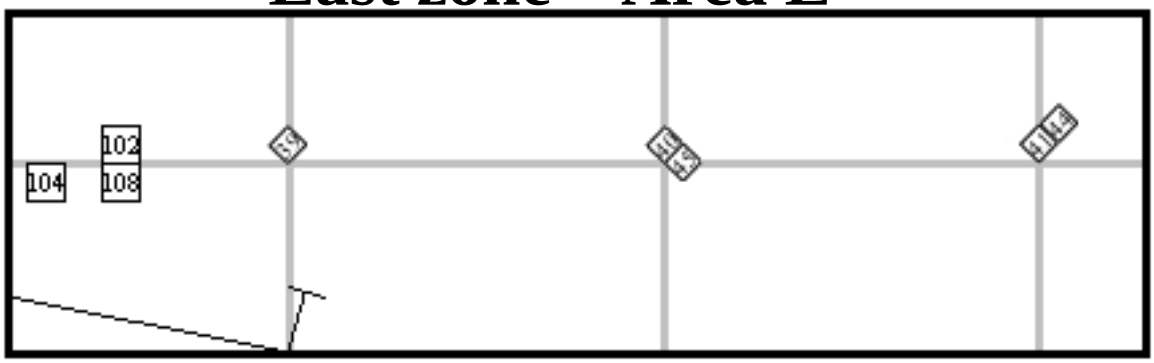


Figure 63. Close-up image of the East zone of the Area E grid, enlarged to show unit numbers clearly.

river's edge, and contiguous units were added as artifact concentrations or features were encountered (Figure 64). Testing was conducted in the Stockpile zone to examine the extent of cultural material and evaluate the effect that the stockpile activities may have had on the deposits there. In 2010, two 1 x 1 m test units, DA1 and DA2, were excavated along the edge of the gravel stockpile floor (Figures 65-66). A mound of backdirt which contained sediments removed from the surface of the stockpile floor prior to 2010 was also examined. Buckets were numbered according to specific locations distributed over the backdirt mound and soil was then removed and screened (Figure 67). In 2011, an additional 1 x 1 m test unit, Unit 54 was excavated in 2011 to augment evaluation (Figure 68).

In 2010, the highest densities of cultural material were recovered in blocks C1-C2, while Unit 42 reached a depth of 2.1 m BD before encountering river gravel and boulders. In addition, three radiocarbon dates among the set obtained in 2010, yielded dates from the early Windust and mid-Cascade phases in Units 42 and 37, and block C1 (see Chapter 9). The Central zone was therefore the primary focus of the 2011 fieldwork , and sampling shifted to the north of the 2010 units (Figure 69). The recovery of multiple Windust and Cascade phase tools, as well as the examination of two anvil features, resulted in the excavation of blocks of adjoining units, and in the following 2012 season, fieldwork was focused on further expansion of many of these blocks (Figure 70). Single units that remained isolated in the Central zone are those in which cultural material occurred infrequently, and after their completion excavations moved elsewhere. Unit 42 reached the greatest depth in Area E at 2.1 m BD, and this depth was also the greatest reached by the UI investigations at 10CW34. From 2010 to 2012, a total volume of 109.4



Figure 64. Photograph of excavations in 2010 along the N100 grid line in Area E. Units 27 and 34 are in the foreground at right, where sediments are being loaded into a screen. Beyond, from right-center to far left, students are excavating Units 26 and 33, Units 21 and 32, and blocks C1 and C2. View is to the south. Photo by author, 12 July 2010.



Figure 65. Photograph showing measurements being taken for Unit DA1 at the southwestern edge of the stockpile. The mound of gravel behind the unit was removed by the end of field work in 2010. View is to the northeast. Photo by Caroline Carley, 13 July 2010.



Figure 66. Photograph showing the excavation of DA2 in 2010 at the southern edge of the stockpile floor. View is to the northeast. Photo by Lee Sappington, 29 July 2010.



Figure 67. Photograph showing the examination of the backdirt mound in the stockpile in 2010. Sediments are being removed and screened in order to determine the approximate density of cultural material. View is to the north. Photo by Lee Sappington, 13 July 2010.



Figure 68. Photograph showing the excavation of Unit 54 in 2011 in the Stockpile zone of Area E. Excavations in the Central zone can be seen in the background beyond the fence. Units DA1 and DA2, excavated in 2010, were located on the left and right sides of the stacked wooden poles at the edge of the gravel stockpile floor in the lower center portion of the photograph. View is to the south and slightly west. Photo by author 20 June 2011.



Figure 69. Photograph of excavations in the Central zone in 2011. The person under the canopy in the foreground is standing in Unit 56. In the background, excavations are taking place in blocks C4, C7, and C8. At far left and on the other side of the pasture fence, preparations are being made to begin excavation of Unit 63. View is to the west. Photo by author, 27 June 2011.



Figure 70. Photograph of excavations in the Central zone in 2012. In the left foreground, excavation is taking place in Units 102 and 108. Block C3 is being excavated in the immediate background, followed by blocks C5 and C6. Block C9 is located under the second canopy from the right in the distance. View is to the west and slightly south. Photo by author, 3 July 2012.

Table 4. Area E excavation depths and volume.

Zone	Unit	Ending Depth (cm BD)	10 cm Levels (1 m x 1 m)
Stockpile	DA1	60	6
	DA2	50	5
	54	70	7
Stockpile Subtotal			**18**
West	21	80	8
	26	70	7
	27	50	5
	28	50	5
	32	90	9
	33	70	7
	34	60	6
West Subtotal			**47**
Central-C1	20	110	11
	25	120	12
	29	130	13
	30	110	11
Central – C1 Subtotal			**47**
Central-C2	19	100	10
	24	100	10
	31	100	10
	35	120	12
	36	120	12
Central – C2 Subtotal			**54**
Central-C3	37	110	11
	38	160	16
	42	210	21
	53	200	20
	56	200	20
	58	200	20
	64	200	20
	68	100	5*
	69	100	5*
	77	170	17
	80	120	12
	82	110	11
	83	160	16
	86	120	12
	91	120	12
	98	120	12
	100	190	19
	111	120	12
* Units 68 and 69 were 1 x 0.5 m test units			
Central-C3 Subtotal			**261**
Central-C4	48	110	11
	57	110	11
	62	110	11
	66	110	11
	70	100	10

Table 4. *Continued.*

Zone	Unit	Ending Depth (cm BD)	10 cm Levels (1 m x 1 m)
Central-C4 *continued*	75	110	11
	76	120	12
	78	120	12
	84	120	12
	85	120	12
	90	120	12
	93	120	12
Central-C4 Subtotal			**137**
Central-C5	92	120	12
	97	120	12
	105	120	12
	107	120	12
	109	120	12
	110	120	12
Central-C5 Subtotal			**72**
Central-C6	79	110	11
	81	110	11
	88	110	11
	95	110	11
Central-C6 Subtotal			**44**
Central-C7	60	120	12
	65	120	12
	72	120	12
	74	120	12
Central-C7 Subtotal			**48**
Central-C8	47	110	11
	50	110	11
	55	110	11
	61	110	11
	67	110	11
Central-C8 Subtotal			**55**
Central-C9	49	120	12
	52	120	12
	59	120	12
	71	120	12
	73	120	12
	89	110	11
	94	110	11
	101	110	11
	103	110	11
	106	100	10
	112	110	11
	113	120	12
Central-C9 Subtotal			**137**
Central-Isolated Units	43	90	9
	46	90	9
	51	110	11
	63	100	10

Table 4. *Continued.*

Zone	Unit	Ending Depth (cm BD)	10 cm Levels (1 m x 1 m)	
Central-Isolated Units	87	110	11	
continued	96	80	8	
	99	110	11	
Central-Isolated Subtotal			**69**	
East	39	160	16	
	40	130	13	
	41	120	12	
	44	60	6	
	45	50	5	
	102	180	18	
	104	180	18	
	108	170	17	
East Subtotal			**105**	
Total Stockpile Volume (m^3)			**1.8**	
Total West Volume (m^3)			**4.7**	
				% of Central
C1 Volume (m^3)			4.7	5%
C2 Volume (m^3)			5.4	6%
C3 Volume (m^3)			26.1	28%
C4 Volume (m^3)			13.7	15%
C5 Volume (m^3)			7.2	8%
C6 Volume (m^3)			4.4	5%
C7 Volume (m^3)			4.8	5%
C8 Volume (m^3)			5.5	6%
C9 Volume (m^3)			13.7	15%
C-Isolated Volume (m^3)			6.9	7%
Total Central Volume (m^3)			**92.4**	
Total East Volume (m^3)			**10.5**	
Total Area E Units / Volume (m^3)			**95 / 109.4**	
Total UI Excavated Volume (m^3)			**128.151**	
Area E Percentage of Total UI Excavated Volume			**85%**	

m^3 was excavated from ninety-three 1 x 1 m test units and two 1 x .5 m test units in Area E, accounting for 85% of the UI excavations (Table 4).

Excavation Methods

All excavation was conducted by hand, using skim-shovels and trowels; an auger was used in sterile levels in Trench 5 to examine the sediments below 120 cm BD. All soils and sediments removed were dry screened through 1/8 in. (3 mm) mesh wire (Figures 71-73). Units were excavated in arbitrary 10 cm levels which were designated by greatest 10 cm depth, so that level 1 extended from 0 (surface) to 10 cm BD, level 2 extended from 10 to 20 cm BD, and so on. In Area B, 30 cm levels were employed for the excavation of Trenches 1-5 and these were recorded as levels 1 through 5, measuring from 0 to 30 cm BD, 30 to 60 cm BD, 60 to 90 cm BD, and 90 to 120 cm BD, respectively. Depths were recorded as being below datum (BD) with reference to unit datums positioned at the highest elevated corner, and the initial datum established in a block of contiguous units served as the reference point for all subsequent units added to the block (Figure 74). In 2010, units were numbered sequentially from 1 to 45 as excavations progressed in Areas A, B, C, and E. The sequence was continued in 2011 in Area E and units were numbered 46 to 75. When fieldwork resumed in 2012, Units 75 through 113 were excavated in Area E.

Levels were described on specific unit level record forms where information was documented on the presence of cultural materials, predominant soil matrix, provenience of all mapped in items, and the nature of disturbances, such as krotovina. During excavation and following completion of levels, sketched unit level maps were drawn, noting the locations of artifacts and natural features such as cobbles, bioturbation, concentrations of charcoal and contrasting sediments. On every occasion possible, diagnostic artifacts were photographed and mapped in-place and given coordinates from



Figure 71. Photograph showing the excavation and screening of the surface level of Unit 79 in block C6 of Area E in 2012. View is to the northeast. Photo by author, 12 June 2012.



Figure 72. Photograph showing the exposure of a bifacial knife (58.15.e2, see Chapter 8) in block C3 of Area E in 2011. This tool was later submitted for protein residue analysis and tested positive for rabbit. Photo by Lee Sappington, 28 July 2011.



Figure 73. Photograph showing excavations in the Central zone of Area E in 2012. Work has just begun in Unit 89 at bottom-center, and blocks C6, C5, C4, and C3 are being excavated in the background. View is to the south. Photo by Lee Sappington, 25 June 2012.



Figure 74. Photograph showing the depth being measured using a line level attached to the unit datum at the northeast corner of Unit 78 in block C4 of Area E. Photo by author, 13 June 2012.

north, south, west, and east reference points within units (Figure 75). Features and associated artifact concentrations were excavated in arbitrary 10 cm levels, and were mapped, screened, and recorded on specific feature forms as separate entities. All units in Areas A, B, and E were excavated to impenetrable river gravels containing large cobbles and boulders (Figures 76-77), and units in Area C were terminated in sterile deposits. Following termination, unit floors were photographed and soil profiles were photographed and drawn to scale. After the completion of each field season, the northeast corners of units and blocks were marked with rebar for future identification, and all units and blocks were backfilled at the end of each field season. Prior to backfilling, the 2011 and 2012 units were lined with black plastic sheeting.

Field Collection and Storage

All samples, artifacts, and items of contextual significance encountered were collected in the field during excavation and placed into plastic bags labeled with multiple references including the site number, unit number, depth level, the date, excavators initials, and any other pertinent information. Items that were provenienced within units to specific coordinates were bagged separately with labels that recorded their mapped coordinates, as well as the above information. All items considered to retain potential protein residues, such as all bifaces, both unmodified and modified flakes, and cobbles which were either modified or exhibited the potential to have been used as a tool, were collected immediately upon their excavation and placed in specific plastic bags with coordinate information and labeled as protein residue analysis candidates (PRAC). Following completion of 10 cm levels, all bagged items recovered from each separate level were placed into larger primary level bags that were labeled with data pertaining to



Figure 75. Photograph showing a net weight (88.8.7, see Chapter 8) being mapped in situ from the north wall of Unit 88 in Area E. Photo by Lee Sappington, 25 June 2012.



Figure 76. Photograph of the floor of Unit 2 in Area A. Large boulders and cobbles prevented further excavation and this unit was terminated at 80 cm BD. Photo by Lee Sappington, 15 June 2010.



Figure 77. Photograph showing the large cobbles and boulders encountered at 2 m BD in Units 53, 56, 58, and 64 in block C3 of Area E. Units 68 and 69 are visible at right and have been excavated to 1 m BD. Photo by Lee Sappington, 8 July 2011.

that level. Charcoal was encountered frequently and all concentrations in significant contexts were mapped in situ, collected for future radiocarbon dating, and distinguished in the same manner as PRAC items. All bone materials, which occurred very rarely and consisted exclusively of naturally deposited rodent skeletal fragments, were collected and placed into separately labeled plastic bags. All items collected in the field were transported from the site to the University of Idaho where they were processed and stored during the 2010-2012 field seasons.

Laboratory Methods

Processing Procedures

Following the transport of field collections to the laboratory, all materials were sorted, inventoried, and weighed to the nearest .01 or .1 g, and most were washed. Materials that were not washed consisted of items distinguished as protein residue

analysis candidates, charcoal samples, and bone, while sediments were removed from metal historic artifacts with a brush so as not to cause further corrosion by contact with water. Debitage was counted, weighed, and catalogued in groups according to lithic material, while all diagnostic tools and modified cobbles were assigned separate catalogue numbers, and measured to the nearest .1 mm in length, width, maximum thickness, and where relevant, neck width. Tools that were labeled as PRAC items were transferred quickly to new plastic bags and measurements were taken from outside the bag so as to avoid contamination. All fire-modified rock was sorted by material, weighed, and catalogued in lots, unless further modification was identified, in which case, the item was assigned a separate catalogue number and the nature of modification was noted. All charcoal samples, sediment samples, and bone collected from the same provenience were assigned separate catalogue numbers. Historic artifacts were classified according to functional type, dominant material, and/or color in the case of unidentifiable fragments, while nails were sorted by mm length.

Cataloguing Procedures

All materials recovered from 10CW34 that were not discarded were assigned a catalogue number. For the majority of items, a standard trinomial system was used in which three numbers separated by decimal points correspond to the unit number, the 10 cm level from which the catalogued item or lot was recovered, and the differentiation of the catalogued item or lot from others in the same level. For example, the catalogue number 85.9.5 indicates that this item was recovered in Unit 85, from level 9 (80-90 cm BD), and that it was the fifth item catalogued in level 9. If further distinction was needed for catalogue numbers containing more than one item, such as debitage, a lowercase letter

was assigned after the third number. Feature items were catalogued using the same three-digit system and their inclusion within a feature was noted in the catalogue entry. The trinomial system was the predominant cataloguing notation used, however, some adjustment was required for specific situations.

Divergences from Standard Cataloguing Procedures

Tools selected for protein residue analysis in 2011 were the first items to be catalogued following the 2011 fieldwork. To prevent the future confusion resulting from reassignment of catalogue entries of these items, the letters a, b, c, d, e, and f replaced the third component of the trinomial system, while the standard unit and level designation were used. In 2010, sediments from the stockpile backdirt mound were removed in numbered buckets and screened (see Figure 67). Because cultural materials collected from the backdirt could not be provenienced to a specific location, these items were catalogued as SB and assigned numbers according to the numbered bucket from which they were recovered. For example, SB.46-50.3 was recovered from buckets 46-50 and it was the third item catalogued from those buckets.

Miscellaneous Cataloguing Procedures

A number of artifacts collected during the 2010-2012 field work are catalogued as miscellaneous and these are denoted by two components separated by one decimal point, designating the year of collection and the order in which it was catalogued. The catalogue entry 2010misc.32 indicates that this item was collected in 2010 and was the thirty-second item catalogued in the miscellaneous section. Items were catalogued as miscellaneous when sufficient provenience data was unavailable to associate them with a specific test unit or depth level. This occurred as a result of wall collapses, test unit wall

cleanings during which 10 cm levels were not recorded, and instances when excavation of artifact concentrations took place in multiple adjacent units and/or in depth levels larger than 10 cm. Items encountered on the surface were also catalogued as miscellaneous and whenever possible provenience information pertaining to either their location within a grid or on the terrace was included in the item's catalogue entry.

Previous Investigations Cataloguing Procedures

Cultural materials collected during many of the previous surveys and investigations conducted at 10CW34 were located in 2010, and these items were assigned entries within the catalogue used for the 2010-2012 assemblage. A three-component system partitioned with decimal points was used to first identify the year of excavation or collection, the unit designation and unit number, followed by the level within the unit from which the item was recovered, and the finally a number indicating the order in which the item was catalogued. For instance, 1981TP-2.8.2 specifies that this item was collected in 1981 and was recovered from level 8 in test pit-2 (TP-2), and it was the second item catalogued for level 8. The original unit designations employed for each project were retained in the catalogue assignments. For example, test units excavated in 1981, 1991, and 1996 were referred to respectively as TP-1 and TP-2, TU-A and TU-B, and 96A. Items which were collected from the surface during foot surveys were designated by two figures indicating the year of collection and a notation of "Sur," followed by a number signifying the order in which they were catalogued, so that an item catalogued 1982Sur.2 was collected from the surface in 1982 and was the second item catalogued from that collection. When available, grid coordinates or provenience references were included with the catalogue entries for these surface collections.

6. PREVIOUS ARCHAEOLOGICAL WORK AT 10CW34

Introduction

Intermittent archaeological projects have been conducted at 10CW34 since 1979, consisting of limited surveys, monitoring, and test excavations associated with the development of facilities and improvements to infrastructure at the work center. Both prehistoric and historic artifacts were consistently encountered and collected between 1979 and 1996 and many of the items from these collections were located in 2010. The information provided by all investigations known to the author has been incorporated into this report along with the assemblage recovered by the UI field schools during the 2010-2012 seasons. Prior to 2010, archaeological work at 10CW34 was focused in areas of the terrace where development of the work center took place (see Figure 49). Following the recordation of the site in 1969, the initial investigations were conducted in 1979, 1981, and 1987 in Area D. Area A was tested in 1991, and both Areas A and B were tested in 1996. Where possible, specific maps, grids, and testing locations are included in the discussion below.

1969 Site Recordation

The Kelly Forks Work Center was recorded as an archaeological site and designated 10CW34 by Forest Service archaeologist Thomas N. Schenarts on December 12, 1969, citing the presence of the Guard Station cabin and "a stone mortar, scrapers, few points, fire cracked stones and numerous chips." The site was described as an "aboriginal camp," the area was sketched to include the terrace containing the administration buildings of the work center as well as the smaller terrace on the east side of the North Fork containing the Kelly Forks Campground (Figure 78). Though it was not

IDAHO STATE UNIVERSITY MUSEUM

ARCHAEOLOGICAL SURVEY

Site no. 10-CW-34 County Clearwater Date December 12, 1969

Site Description (AB N-13) Kelly Forks. Area is a large flat adjacent to the River.

Site of contemporary Kelly Cr. Ranger District Administration buildings and residences.

Relation to Surroundings North of River below junction of Kelly Creek and N Fork Clearwater River.

Map Reference Junction Mtn. 7.5' 1965/E633040 N5174960

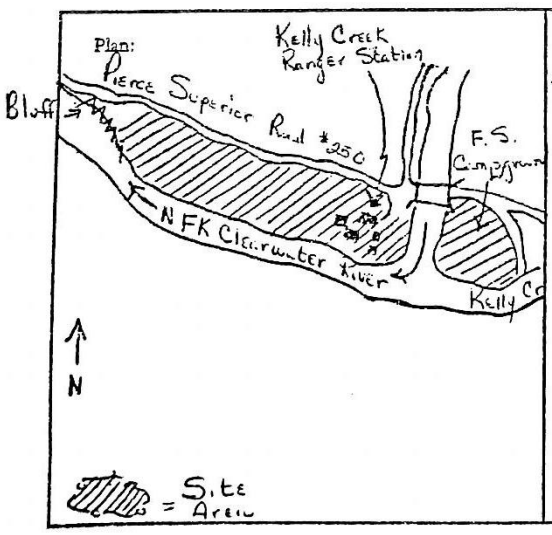
*Sec. SESE 13 T 39 N R 9 E W Aerial Photo

Owner or Tenant United States Forest Service (Kelly Cr. R.D.)

COMMENTS: Part of site is Kelly Creek Ranger Station.* Stone mortar, scrapers, few points, fire cracked stones and numerous chips picked up.

Site 10-CW-34 County Clearwater

Plan:



Section:

NOTE: Class I, includes Kelly Forks Guard Station, (2/19/80, HW) and contemporary Kelly Cr. Ranger Dist. Admin. Offices and residences.

Site Info check w. Atlas 4/30/80 HW

Reported by: THOMAS N. SCHENARTS

Figure 78. The original site recordation form for 10CW34 recorded by Thomas N. Schenarts on December 12, 1969.

stated whether any of the reported artifacts were collected during the recordation, none have been located.

1979 Testing

Archaeological testing at the work center began in May, 1979 with surface surveys for a proposed gravel pit in the west end of the pasture (Bryan 1979a). References to the swampy area in the discussions of the survey indicate that an initial reconnaissance survey may have taken place in the vicinity of the present stockpile. While no artifacts or features were encountered during the initial survey, a surface collection consisting of "1 reworked projectile point, 1 broken knife or point broken during manufacture, 2 thinning flakes, 1 large cortex flake from gabbro river cobble, and 1 small suspected mortar" was reported for a survey conducted within a 400 m^2 area 20 m north of the North fork (Figures 79-80). In June 1979 at least two 1 x 1 m test units and five 3 inch diameter auger tests were excavated in this area to a depth of 70 cm where a cobble bar was encountered. The recovery of over a hundred flakes, a scraper, and the presence of a potential hearth feature containing fire-cracked rock at 60 cm below surface (bs) led to the recordation of a site in the pasture as 10CW139 but that site number was later vacated and the area is now included as part of 10CW34.

A narrow channel of the North Fork which has formed an elongated island at the southwest edge of the terrace was thought to be an ideal location for a fishing station and a willow weir (Bryan 1979a). The sketch map (Figure 79) included with the cultural site record form shows the location of the excavation area as being south of the swampy area and near the river channel and the possible fishing station. However, a distance of 220 m is given from a snow gauge, drawn approximately 50 m southeast of the corral and near

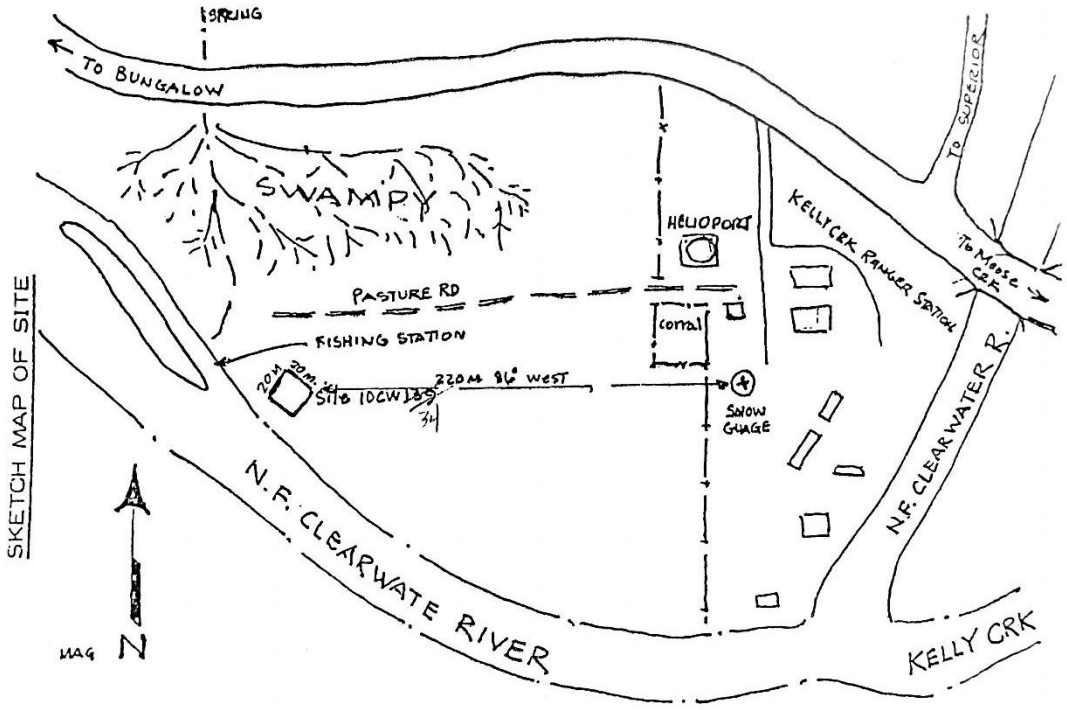


Figure 79. Sketch map depicting the location of a 400 m^2 area in which a ground survey and test excavations were conducted during the summer of 1979. This area was initially given a separate number (10CW139) but this number was later canceled and the area was included as part of 10CW34. Note the distance of 220 m from the snow gauge, located east of the pasture fence and corral (Bryan 1979a).

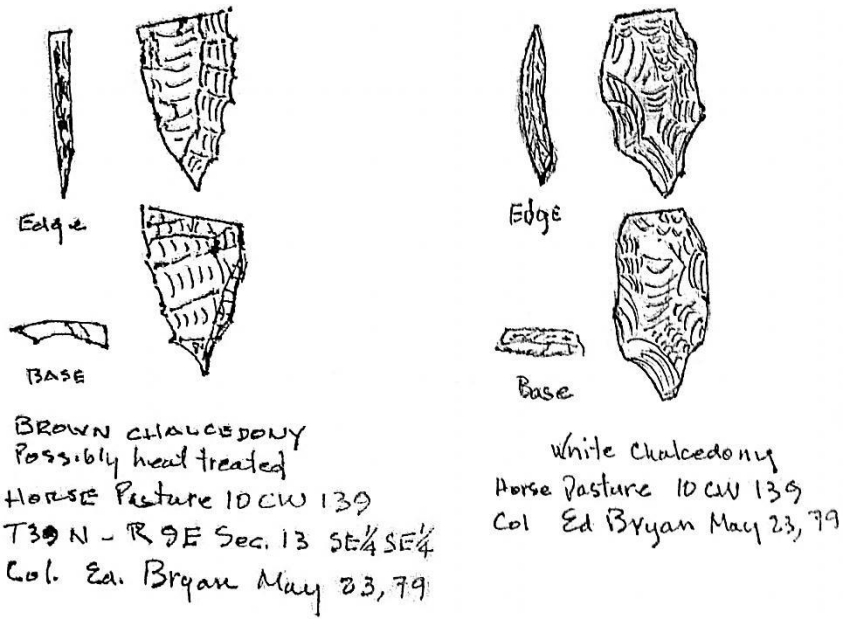


Figure 80. Drawing of two artifacts encountered during a ground survey at 10CW34 in May, 1979. These are most likely the items referred to in the cultural site record form as a "reworked projectile point" and a "broken knife or point broken during manufacture" (adapted from Bryan 1979a).

the work center administrative buildings in the central area of the terrace. Because of this given distance the 1979 excavations are considered to be within Area D of the pasture. Additional maps provided in the 1981 testing reports at 10CW34 support this deduction, as the possible locations of the 1979 test units are indicated on the grids used in Area D (Willig 1981a, 1981b). The excavations conducted in 1979 demonstrated the presence of significant cultural deposits at 10CW34. Investigators described the site as "a suspected fishing, hunting, and berrying camp" and recommended preservation or mitigation, emphasizing the site's potential in "furthering knowledge about prehistoric use in the clearwater drainage" (Bryan 1979a). Unfortunately the artifacts reported to have been recovered have not been located. One edge-battered cobble labeled as "10CW34, 1979" was included in the collections that were located in 2010. This was likely a surface collection, though information about the location or collector was not provided.

The "Old Guard Station"

The historic log cabin (Figure 81) at 10CW34, referred to as the Old Guard Station or the Kelly Creek Cabin, is located in the eastern area of the terrace among the modern residential structures of the work center (see Figure 50). It is the oldest building at the site and was investigated in August, 1979 during an inventory of Forest Service buildings and structures with potential historic or architectural significance (Bryan 1979b). The original site report filed for 10CW34 in 1969 was amended to include the cabin as the historic component of the site and in 1990 the building was nominated to the National Register of Historic Places (United States Department of the Interior, National Park Service [USDI, NPS] 1990). As part of the investigation conducted in 1979, a description was provided by a former Forest Service dispatcher who lived in the cabin



Figure 81. Photograph of the historic log cabin at 10CW34, built between 1935 and 1936. This building is the oldest structure at 10CW34 (http:// www.recreation.gov, accessed November 4, 2011).

from the winter of 1965 to the spring of 1970 while performing maintenance work on Kelly Creek and at the Cold Springs station.

According to an account by Al Langfield, the cabin was the second at Kelly Forks, built in 1935 and 1936 by a Civilian Conservation Corps (CCC) crew with logs of "cedar and larch from the flat at Kelly Forks," an indication that the construction took place on-site. The first cabin is likely the structure shown in the 1926 U.S.G.S. map (see Figure 38) and photographed in the early 1930s (see Figure 39). Both cabins served as a waypoint for packers traveling between the Bungalow Ranger Station and stations over Hoodoo Pass and further up Kelly Creek such as the Kelly Creek Ranger Station at the mouth of Moose Creek. The construction of the second cabin coincided with the use of

the area as an Emergency Relief Administration (ERA) camp during the mid-1930s and the three-room design, which includes "chopper cut" log ends, closely followed the standard plan published in a 1935 Handbook for the Forest Service (Fickes and Groben 1935). In the 1950s, after the dispersal of the ERA camp, a woodshed and outhouse were added to the property and the cabin continued to function as an important field station. Various improvements including the addition of electricity and plumbing were added to the cabin in the 1960s and 1970s when the Forest Service began developing the terrace for the relocation of the Kelly Creek Ranger District administration to Kelly Forks (Bryan 1979b; USDI, NPS 1990). The cabin has been maintained in excellent condition and remains in use as popular summer recreational lodging.

August 1981 Testing

Subsurface testing was conducted in August 1981 at the location of the gravel source proposed in 1979 to better determine the extent, significance, and boundaries of the previously recorded prehistoric site (Willig 1981a). Following a surface survey, two 2 x 2 m test units and eleven shovel tests were excavated within an area covering approximately 27,870 m^2 from the fence at the east edge of the pasture to the west end of the pasture (Figures 82-83). Cultural material, consisting of debitage and fire-modified flakes, was encountered in both test units and all but four shovel tests. Most units ended with a sterile gravel layer at approximately 85 cm bs, however, two units reached a depth of 1 m where cultural deposits continued but were not excavated. Surface collections consisted of debitage, two unifacially and bifacially modified flakes, a biface fragment, a projectile point, fire- modified rock, cobble tools, and flaked cobbles. The only disturbance noted was the presence of heavy charcoal staining limited to the upper 10 cm

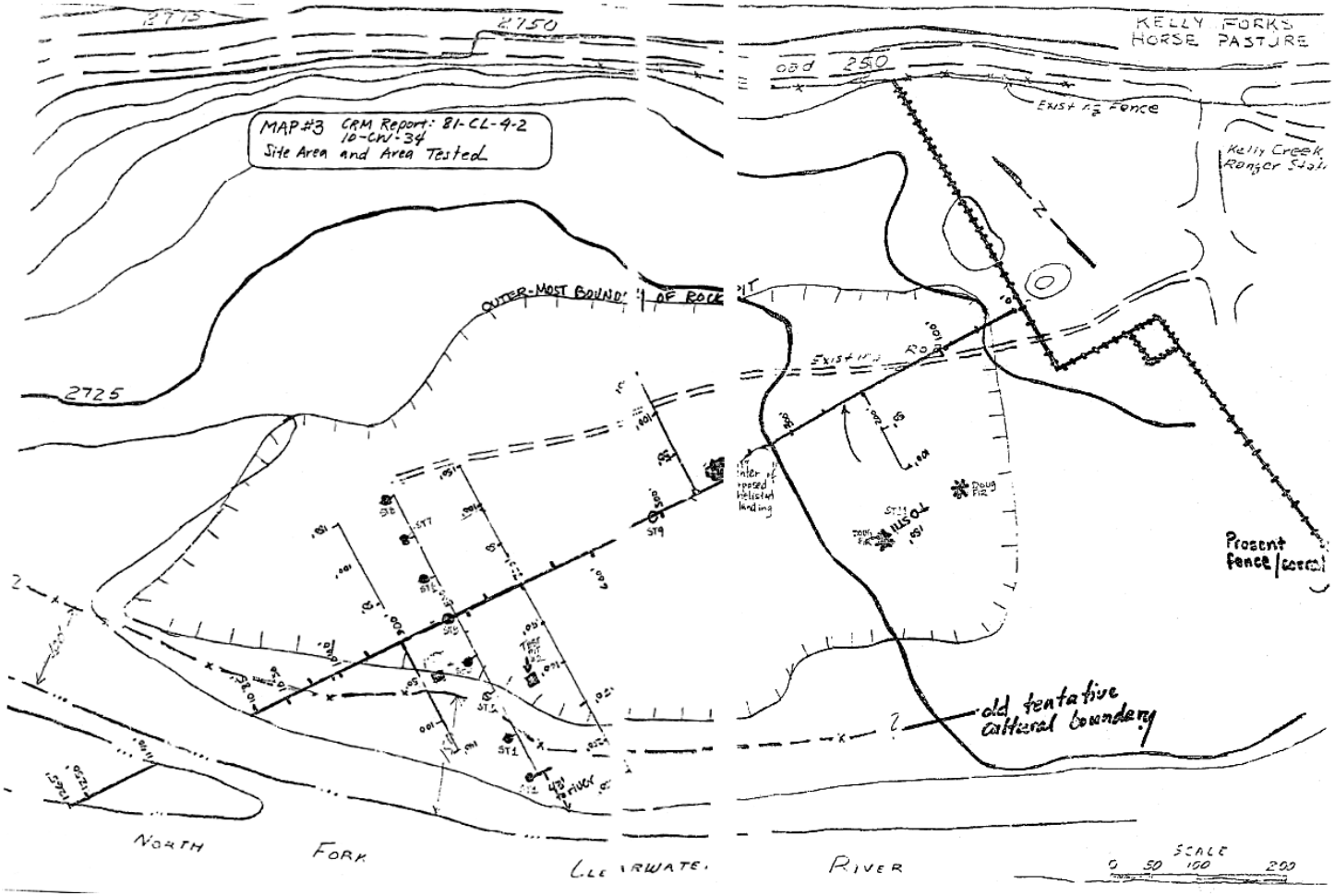


Figure 82. Sketch map depicting the 1981 grid system and the locations of test units and shovel tests excavated at 10CW34 in August and September, 1981. A distance of roughly 1000 ft. (300 m) is given for the grid baseline from the east pasture fence to the southwest pasture fence. The August shovel tests extend north and south from the western end of the baseline and the center of the September helistat testing is indicated at center (adapted from Willig 1981b).

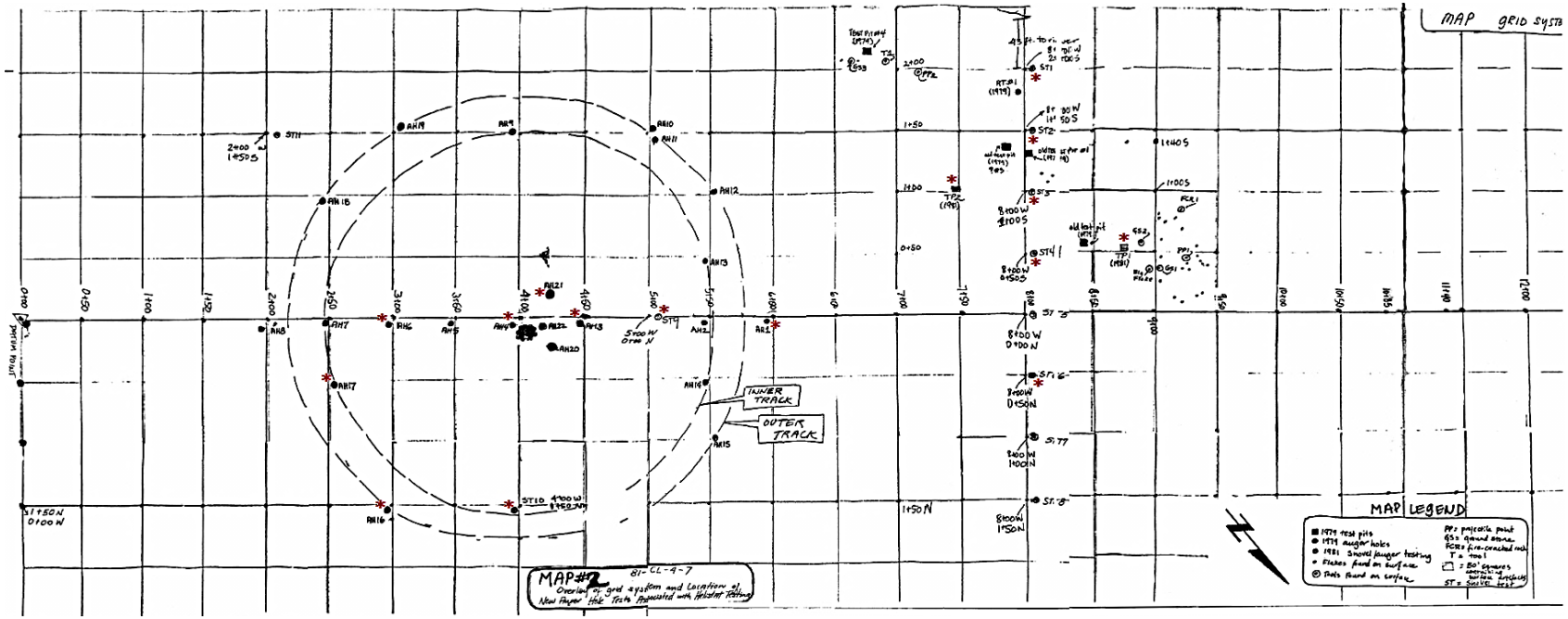


Figure 83. Sketch map of the auger test units excavated at 10CW34 in September, 1981 for the proposed helistat landing. A portion of the August shovel tests are also indicated to the west. Red stars indicate the units where cultural material was encountered. Note that north is toward the bottom as opposed to Figure 82 where it is toward the top (adapted from Willig 1981b).

and this was attributed to recent intentional burning of the pasture to reduce brush and stimulate grass growth. Additionally, no historic items were reported.

The work conducted in August 1981 demonstrated that cultural material in the pasture was present in greater densities and extended farther north of the river than what had previously been detected in 1979. Two occupational levels were assigned to cultural deposits above 70 cm bs and were tentatively associated with the Piqúnin cultural phase (AD 1400-1700) of the Lower Snake River sequence (Leonhardy and Rice 1970). A third and "much earlier" occupation below 70 cm bs was also suggested to directly overlay the river gravel layer. The investigators concluded that 10CW34 contained "more valuable information concerning prehistoric and historic aboriginal lifeways along the upper North Fork of the Clearwater River than any site known to date." Further testing was recommended and it was emphasized that any activity involving subsurface disturbance in this portion of the pasture would require extensive salvage excavations. A total of 91 items recovered during this project were located in 2010 and these are included in the discussion of results in Chapter 8.

September 1981 Testing

The proposal for placement of a helistat landing in the south and east portion of the pasture prompted testing in September 1981 to determine the extent to which the boundaries of 10CW34, as delineated by the August 1981 testing, extended into the area to be impacted (Willig 1981b). Using the same grid system that was created in the pasture in August, twenty-two auger test units were placed to surround the 180-ft. circular perimeter of the proposed construction, within an area of approximately 11,148 m^2 (Figures 82-83). This center of this area was located between 60 and 180 m farther east

than that of the August shovel tests. Cultural material, consisting of nine pieces of debitage and two modified flakes, was encountered in seven auger units at various depths ranging from the top 20 cm to 1 m bs. Most auger units ended with large rocks between 50 and 80 cm bs, however, five reached 1 m bs where excavations were terminated due to the limited length of the auger. Historic artifacts were not encountered and the charcoal stained soils noted in the August testing were observed at greater depths of up to 40 cm bs.

In addition to adding further support to the interpretations and conclusions made in August, the September testing revealed that the boundaries of 10CW34 extended farther into the east portion of the pasture, though cultural deposits were observed to decrease in density toward the east. With emphasis on the limited and preliminary nature of the helistat testing, it was advised that more extensive testing be conducted prior to any of the proposed helistat activities in order to obtain the needed information regarding the site's significance. Eleven items, recovered in September 1981, were located in 2010 and are included in the discussion of results in Chapter 8.

1987 Testing

Archaeological testing was conducted in July and August of 1987 for the construction of two new drainfields, located approximately 30 m apart in the southeast margin of the pasture (Frahm 1987) (Figure 84). Eighteen shovel and auger test units were placed at roughly 7.6 m intervals along trench lines which bordered each drainfield and extended 30 m from north to south and 18 m from east to west (Figures 85-86). Nine units ended at 90 cm bs where large cobbles prevented further excavation while the remaining units were terminated at 120 cm bs at the limit of the auger length. The only

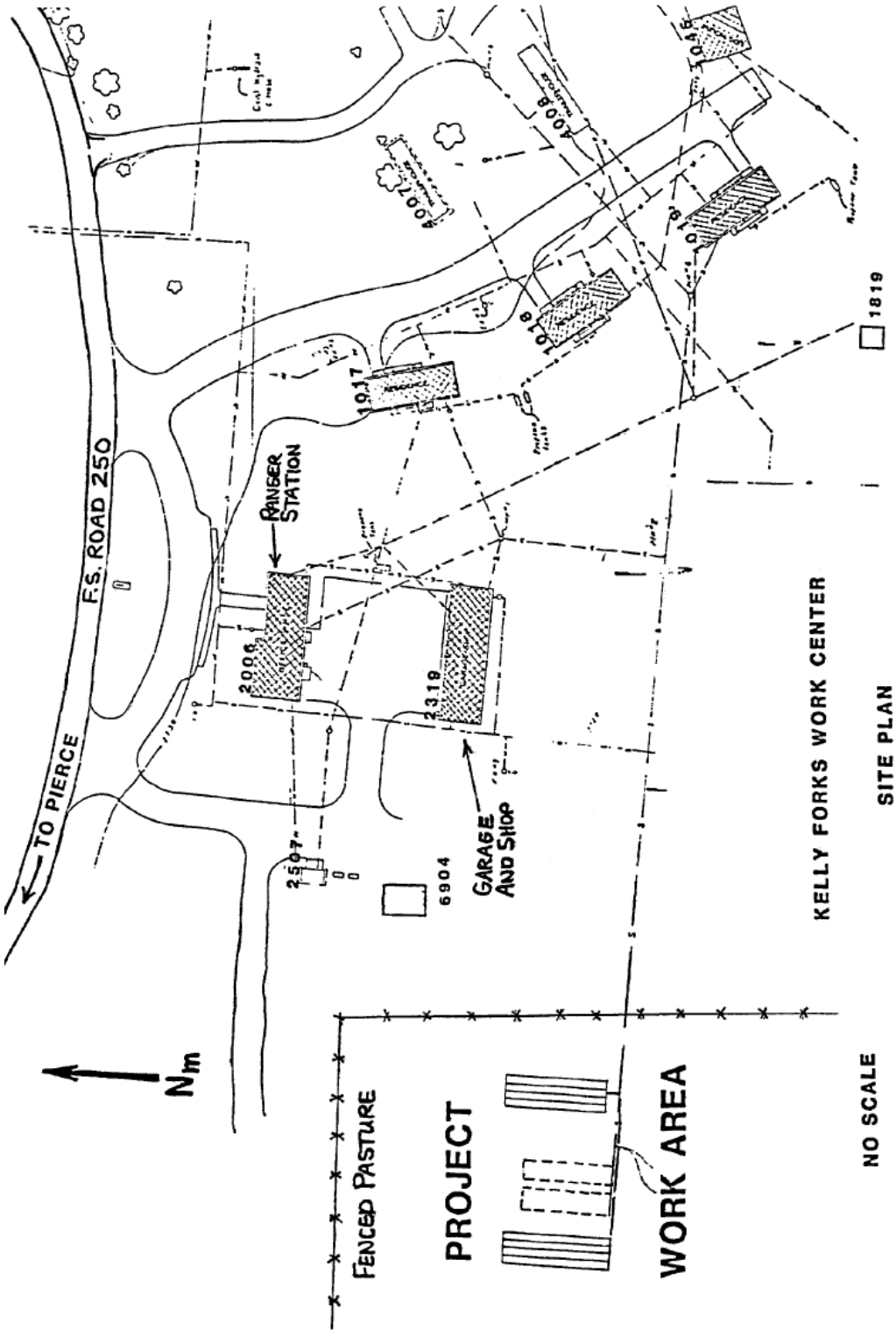


Figure 84. Project map for the archaeological testing conducted in 1987 showing the location of two drainfields to be constructed in the southeast pasture (bottom left corner) (adapted from Frahm 1987).

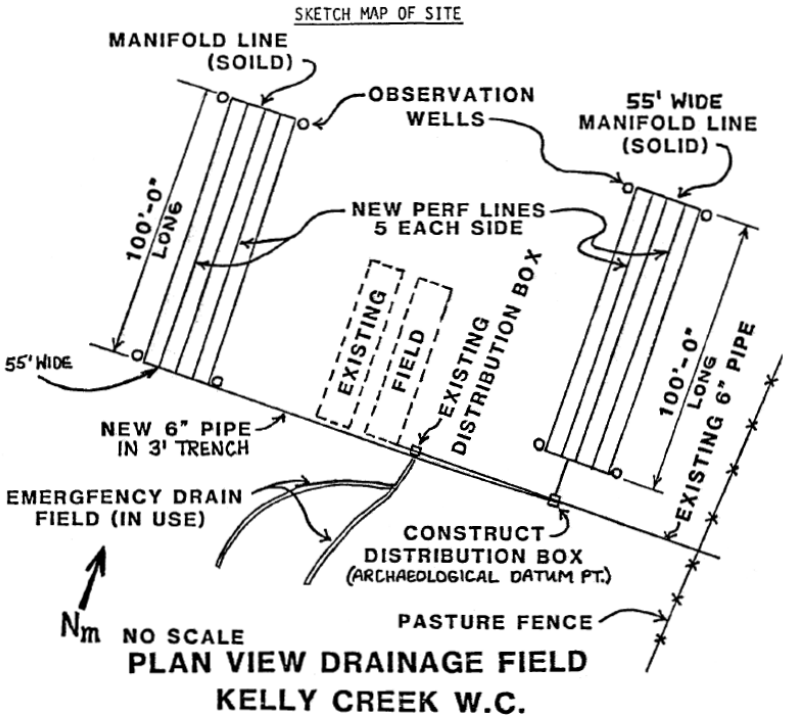


Figure 85. Sketch map of the drainage field plan showing the locations and features of the drainfields to be constructed following archaeological testing in 1987 (adapted from Frahm 1987).

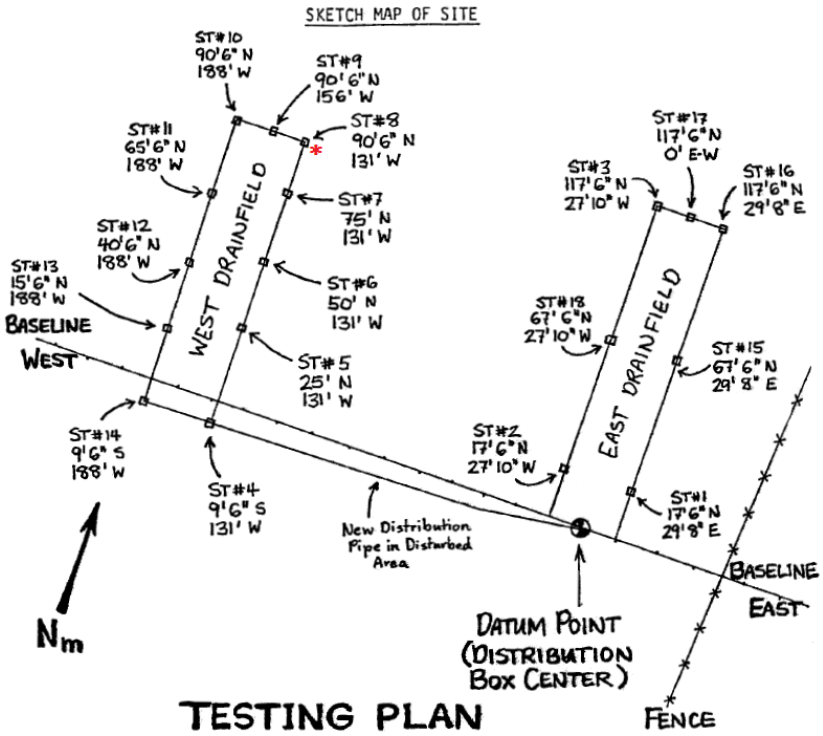


Figure 86. Sketch map of the 1987 testing plan showing the locations of the shovel and auger tests placed along the edges of each new drainfield. The red star indicates the presence of cultural material. (adapted from Frahm 1987).

cultural material encountered consisted of one chert flake and a bifacially modified flake recovered from 80 cm bs in shovel test 8. Following the completion of testing, backhoe excavation of the trenches for the drainfields commenced and the process was continuously monitored with no additional cultural material reported.

The 1987 testing project demonstrated that cultural deposits existed farther east in the pasture than what had been found previously, though it was noted that the density appeared to decrease from west to east, as earlier investigators had observed. The depth of the deposits, at 80 cm bs indicated "considerable antiquity" and the importance of 10CW34 to the archaeological record was emphasized, along with the need for continued testing and monitoring for future projects. It was suggested that a comprehensive archaeological investigation, such as a summer field school, be conducted to obtain a better understanding of the occupations at 10CW34 and ultimately help to mitigate any future development activities on the terrace. Both items recovered during the 1987 testing were located in 2010 and are included in the discussion of results in Chapter 8.

1991 Testing

The proposed construction of a new water line from the water system at the work center to the Kelly Forks Campground in 1991 prompted archaeological testing in Area A and on the small terrace east of the North Fork where the campground is located (Tracy and Sappington 1992). Nineteen auger test units and two 1 x 1 m test units were excavated to 1 m bs in locations offset from the road and trail fill following the route of the pipe line which in total length, extended approximately 200 m (Figures 87-88). Cultural material encountered to the west of the North Fork included debitage, a unifacially modified flake, a lanceolate midsection, and recent historic items concentrated

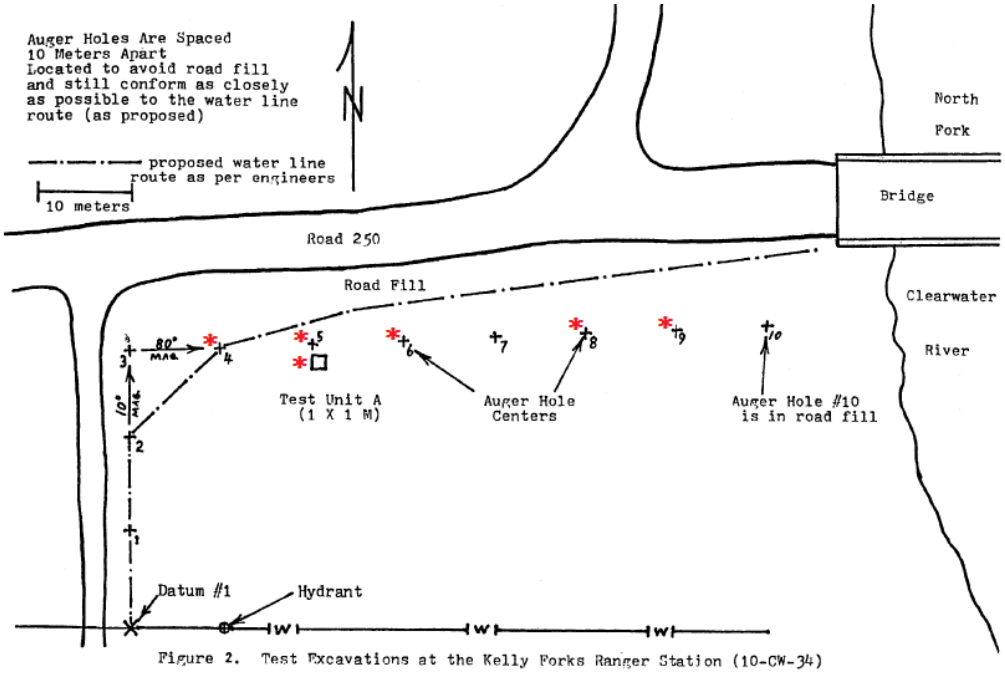


Figure 87. Sketch map of the 1991 testing locations along the proposed water line route in the northeastern corner of the 10CW34 terrace and on the west side of the North Fork of the Clearwater River. Red stars indicate units where cultural material was encountered (adapted from Tracy and Sappington 1992, Figure 2).

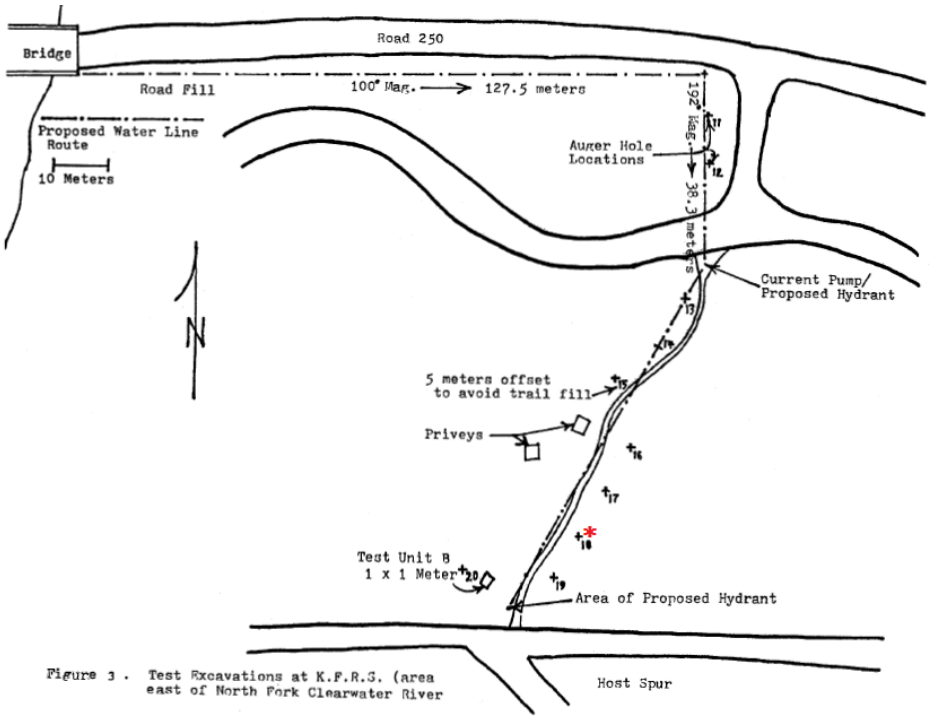


Figure 88. Map of the 1991 testing locations on the east side of the North Fork of the Clearwater River along the proposed water line route. A red star indicates the presence of cultural material in shovel test 18 (adapted from Tracy and Sappington 1992, Figure 3).

in five of the ten auger test units and Test Unit A. One granitic cobble core was recovered east of the North Fork from between 30 and 40 cm bs in an auger test unit near the southern extent of the pipe line route (Figure 89). Historic items, consisting of glass fragments, a wire nail, and a .38 short cartridge case, were limited to the upper 10 cm and prehistoric material was encountered to depths of 70 cm bs.

While the 1991 testing encountered fewer artifacts than previous investigations, the material recovered was considered to be representative of "an intact and undisturbed prehistoric occupation," associated with the use of 10CW34 as a hunting and fishing camp during the prehistoric period. The construction of Forest Road 250 and the bridge over the North Fork and the development of the Kelly Forks Campground facilities were noted as probable sources of disturbance near the testing locations. Based on the presence of the lanceolate dart fragment, an occupation range of 3500-5000 years BP was suggested. All 34 artifacts recovered during the 1991 testing were located in 2010 and are included in the discussion of results in Chapter 8.

1996 Testing

Preliminary testing in the eastern portion of the terrace was conducted in July 1996 for the proposed relocation of gas tanks and the installment of a subsurface power line and new gas lines around the existing bunkhouses of the work center (McFarland 1996). Eleven shovel test units were excavated to 50 cm bs within the project area and surrounding vicinity, which in total covered approximately 820 m^2 (Figure 90). The recovery of debitage and fire-cracked rock from seven units led to the recommendation that more extensive testing be conducted prior to commencement of the proposed activities. In August, an additional thirty-seven shovel test units and a 1 x 1 m test unit

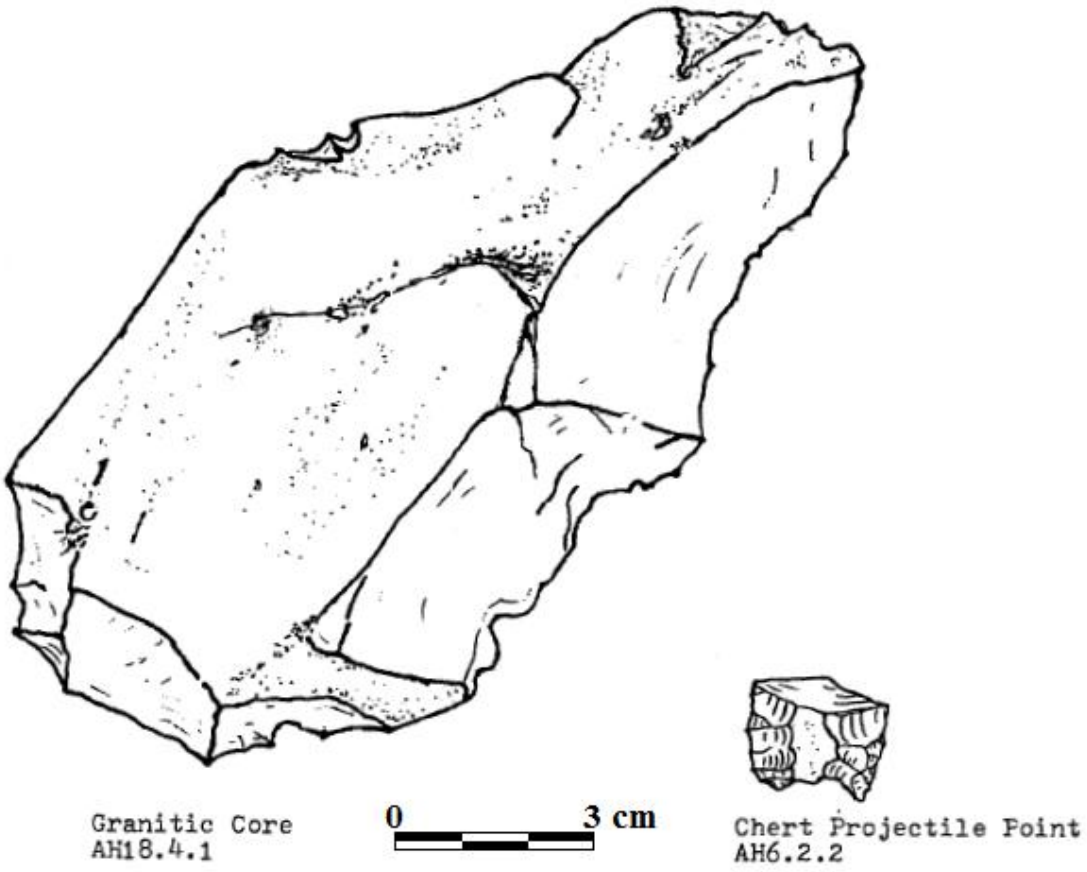


Figure 89. Drawing of lithic tools recovered during the 1991 test excavations (adapted from Tracy and Sappington 1992, Figure 4).

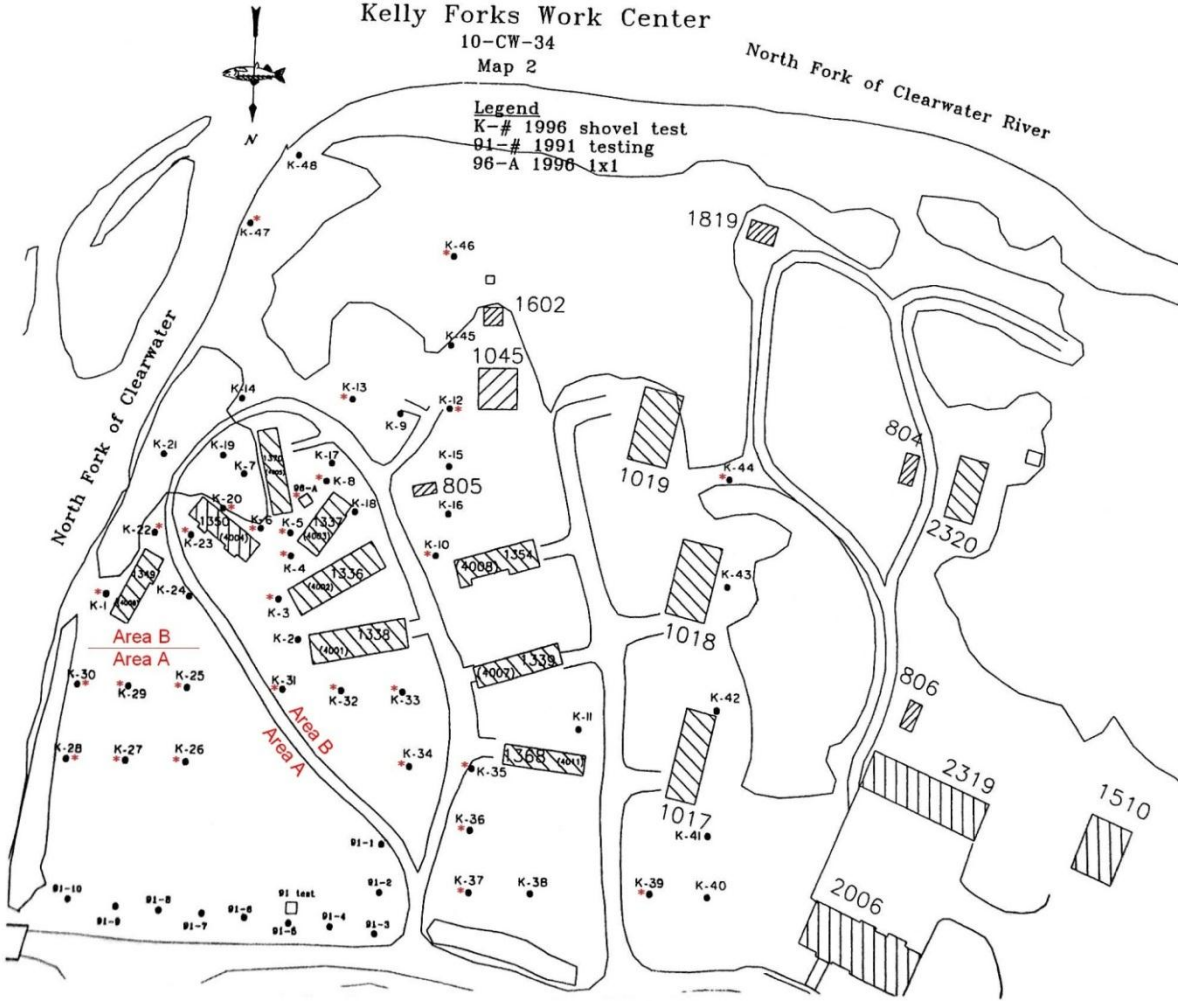


Figure 90. Map of the 1996 testing locations in Areas A and B at 10CW34. The 1991 testing locations are also shown south of Forest Road 250 (bottom left corner). Red stars indicate units where cultural material was encountered (adapted from McFarland 1996, Map 2).

were placed throughout the project area as well as in the east corner of the terrace approximately 30 m south of the 1991 testing locations. Prehistoric cultural material was encountered in twenty of the August shovel tests and consisted of a unifacially modified flake from the uppermost level and debitage, which was present to a depth of 50 cm where the shovel tests were terminated; eighteen flakes were recovered from 30 to 90 cm bs in the 1 x 1 m test unit. Historic items were common in the upper 50 cm and included a variety of items such as clear and brown glass fragments, nails, unidentifiable metal fragments, aluminum bottle caps, and a fragmented bone button.

The testing conducted in July and August of 1996 demonstrated that cultural material was present at considerable depths in a large portion of the eastern area of 10CW34, which added support to the findings of the investigation conducted in 1991. It was determined that the proposed developments would have little adverse effect on the cultural deposits within the project area due to extensive disturbances which had occurred previously leaving the area "very mottled with no integrity and sparse lithics." In the following May the excavation of three trench lines was monitored and the sediments were periodically screened with no additional cultural material encountered (Davis 1997). A total of 120 items recovered during the July and August excavations were located in 2010 and are included in the discussion of results in Chapter 8.

Miscellaneous Projects and Surface Collections

Various activities involving maintenance and improvements to small areas of 10CW34 have occurred in the last two decades. In 1999, the collapse of a power line near a maintenance building during heavy winter snows led to the excavation of a 15 m long trench in which a power line was buried to prevent future damage (Fee 1999) (Figure 91).

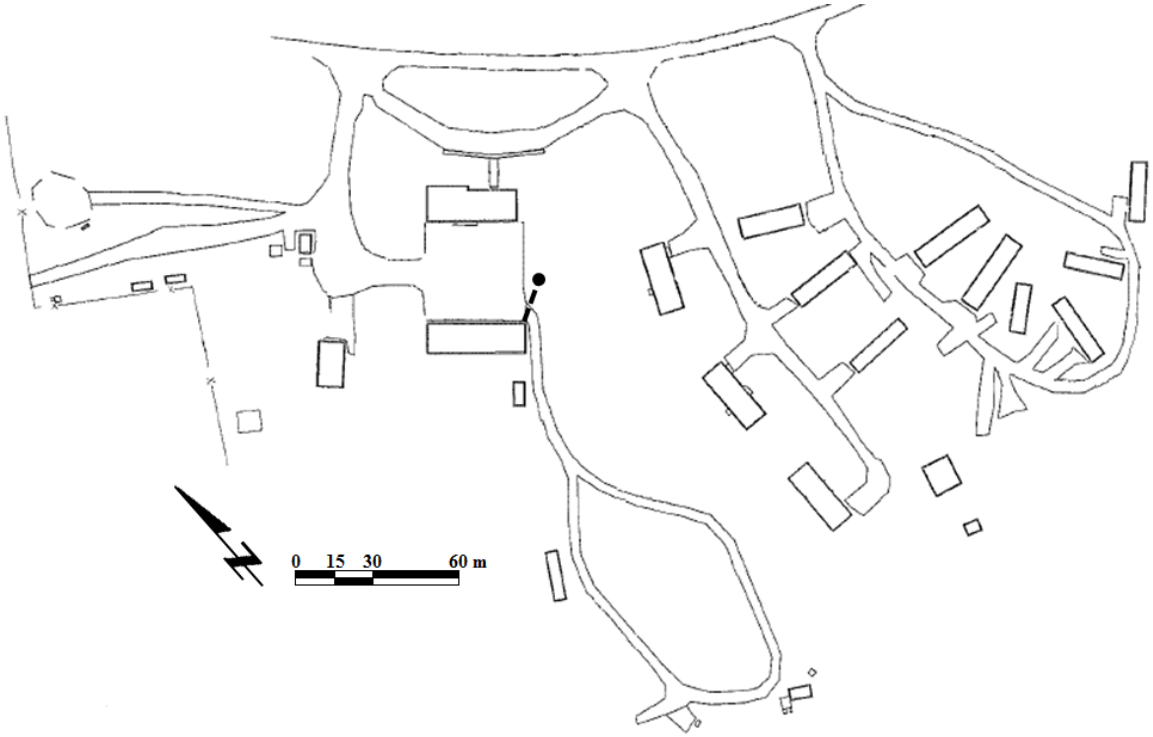


Figure 91. Map showing the locations of a 15 m long trench and power line pole (line and dot) where eight shovel probes were excavated in 1999. Investigators encountered only disturbed deposits and recent historic items (adapted from Fee 1999; USDA, FS 2010:sheet 2).

Eight shovel probes were placed at two meter intervals along the path of the trench and ranged in depths of 16 and 60 cm bs. The presence of a concrete slab at 10 cm bs and asphalt fragments at 60 cm bs, as well as recently deposited items such as a plastic phone line and a corroded nut within discolored, heavily mottled soils, indicated that much ground disturbance had already taken place. No historic or prehistoric cultural materials were recovered during this testing. In 2004, a 9 m portion of an underground water line was replaced to provide a more reliable water supply to the Kelly Creek Cabin (Johnston 2004). Because ground disturbance was confined to a previously excavated trench the area was not archaeologically tested. The excavation process was monitored and no cultural material was reported.

The collections located in 2010 contained eight items that were recovered from 10CW34 at various times and for which limited provenience or collector information was provided. These items are included in the Chapter 8 inventories and consist of two flake tools (Prevmisc.2; 1987Sur.1), 2 debitage (Prevmisc.3; 1982Sur.1), two battered cobbles (1979Sur.1 [edge-battered cobble labeled with "1979"; Prevmisc.1), and 2 unmodified cobbles.

7. NATURAL STRATIGRAPHY AND SEDIMENTS

Introduction

Following excavations during the 2010-2012 investigations, soils and sediments were examined in Areas A, B, C, and E and a total of ninety-three 1-m stratigraphic profiles were photographed and drawn to scale. These drawings were then duplicated using imaging software on a scaled computerized grid, and representative 20 cm, 10 cm, and 2 cm pickets were extracted from the duplicated profiles to produce many of the images used in this chapter. Profiles were described using methods defined in the USDA Soil Survey Manual (Soil Survey Division Staff 1993) in order to record soil texture, grain sizes and shapes, type and amount of gravels and rock fragments, and distribution of plant roots and bioturbation. Soil colors were recorded using Munsell notation, and additional features, such as the presence of charcoal and mottling were also noted. All soil analyses were performed in the field using hand samples selected from each strata during the profiling process, and larger strata samples were collected and stored with the 10CW34 artifact assemblage. The frequency percentages and grain and aggregate sizes provided in the descriptions that follow are close approximations derived from the notes made during the in-field analyses. Strata depths are given in the descriptions as a range between the highest and deepest points that the strata occurred in both single and combined units.

Much of the upper strata in Area B and the Stockpile zone in Area E were discontinuous and showed signs of having been rearranged or interspersed. This also occurred in Area A, however, several horizons were present in each of the profiled units, indicating that natural deposits were somewhat intact. In Areas C and the southern

portion of Area E, the stratigraphy was comparatively uniform so that descriptions could be assembled into a more accurate depiction of deposition at 10CW34, though horizontal distributions in these areas showed variability from unit to unit and fluctuated considerably throughout. Area D soils are not discussed, as information pertaining to stratigraphy was not provided by previous investigations conducted in this portion of 10CW34. The extensive forest fires recorded in the Clearwater Forest in the last century, as well as an apparent frequency of previous fires were reflected in the prevalence of charcoal fragments, root burns, and charcoal staining in each strata (Space 1964:Chapter 16). It has also been noted that the site supported an old growth cedar stand (McFarland 1996), and a forest of conifers and deciduous trees can be seen covering the terrace in early photographs (see Figures 40-41). Dense forest vegetation coupled with the seasonal, high energy flow of the North Fork and periodic erosion events from nearby peaks were likely factors that played a role in forming the fluctuating strata depths observed throughout the site.

Area A

Area A was investigated in 2010, and in terms of intact prehistoric cultural material, was the second most productive after Area E. Fourteen 1 x 1 m units were distributed separately over an area of roughly 160 m^2 (see Figure 54). Exceptions are Units 1 and 4, the 2 m^2 block composed of Units 8, 13, 18, and 23, and Units 17 and 22 (for which profiles were not examined). All units were excavated to a sterile, impenetrable cobble and boulder layer which occurred at various depths, ranging from 30 cm BD to the maximum depth reached in Area A at 160 cm BD. The strata observed in the profiles of Area A are discontinuous, while even in those units that were contiguous,

notable variations were present. Following excavation, profiles for twelve of the fourteen test units in Area A were examined. Two walls in Units 1 and 4 each were profiled in order to compare the deposits which contained the historic mortar fill in the west and east walls of Units 1 and 4 respectively, with the deposits where the fill was absent. Overall, five major stratigraphic zones were observed to occur in a general sequence (Figures 92-95), while the sporadic arrangement of strata in each unit is considered to be representative of substantial subsurface disturbances which have undoubtedly resulted from historic activity focused at this locale of 10CW34 in the early part of the last century. A composite description of these strata has been assembled below.

Stratum I – between 0 and 19 cm BD; brown to dark brown (10YR 4/3 to 10YR 3/3, moist) silt loam; common (15% to 20%) subangular and rounded gravels composed of small (4 to 8 mm) well-sorted pebbles; friable, slightly sticky, and nonplastic; clear wavy boundary; frequent (> 50) small (2 to 4 mm) flecks and large pockets of charcoal stained soil; many medium (2 to 5 mm) diameter roots; frequent krotovina, active burrows, and insects. Stratum I was not preceded by any other strata and occurred in eight unit profiles.

Historic Fill – between 6 and 18 cm BD; white (10YR 8/1, moist) sandy mortar, containing many (> 50%) angular and subangular medium (8 mm to 1.6 cm) poorly-sorted pebbles bonded within a fine-grained cement or plaster matrix. The fill layer is probably related to the use of 10CW34 by the Civilian Conservation Corps as an Emergency Relief Administration camp in the mid-1930s. Concentrations of historic items including nails, glass, and can fragments were associated with this layer which was observed in the west wall of Unit 1, the east wall of Unit 4, and the north wall of Unit 5 (see Figures 214-215).

Stratum II – between 5 and 33 cm BD; very dark brown to very dark grayish brown (10YR 2/2 to 10YR3/2, moist) silt loam; common (15% to 30%) subangular and rounded gravels composed of small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; firm, sticky, and slightly plastic; clear irregular boundary; frequent (>50%) very small (2 to 4 mm) charcoal flecks, medium (8 mm to 1.6 cm) charcoal fragments, and large pockets of charcoal stained soil; common, fine (1 to 2 mm) diameter roots; common krotovina, active burrows, and insects. Stratum II occurred between 0 and 21 cm BD as the initial stratum in west profile of Unit 1, the east and south profiles of Unit 4, and the south profile of Unit 9. In the south profile of Unit 2, the north profile of Unit 5, the north profile of Unit 7, and the east profiles of Units 8 and 23

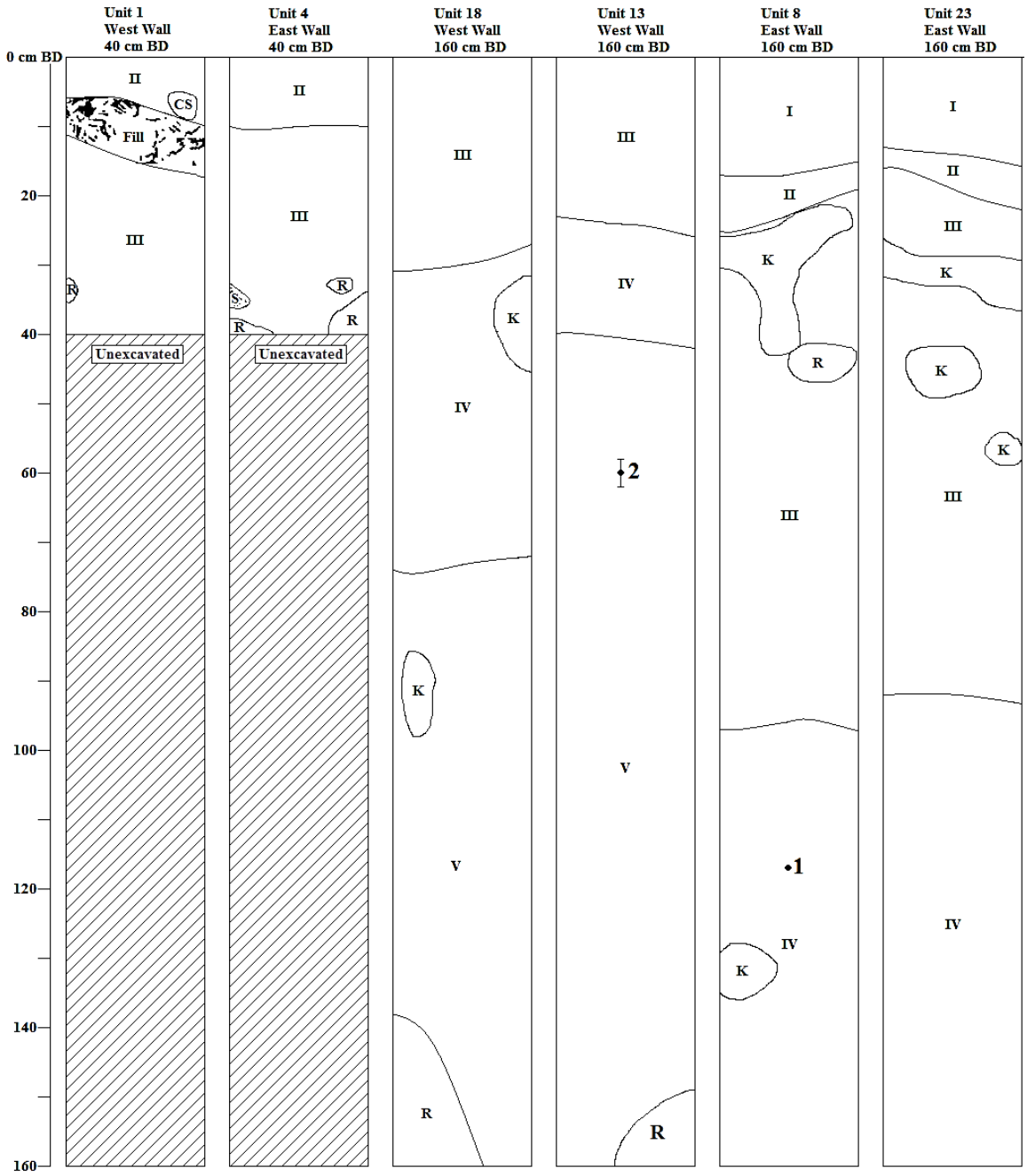


Figure 92. Picket graphics extracted from the center 20 cm of the east and west wall profiles drawn in Area A. Units are in order from left to right according to their location in Area A from south to north. Strata are indicated by roman numerals. R = rock; K = krotovina; CS = charcoal staining; S = sandy inclusion. Numbers indicate the depths of radiocarbon dated charcoal samples from the profiled units (see Table 35), given as conventional radiocarbon age (BP) / 2σ calibrated age (BP): (1) Beta-288077, 5690 ± 40 / 6560 – 6400 BP; (2) Beta-288076, 1060 ± 40 / 1060 – 920 BP.

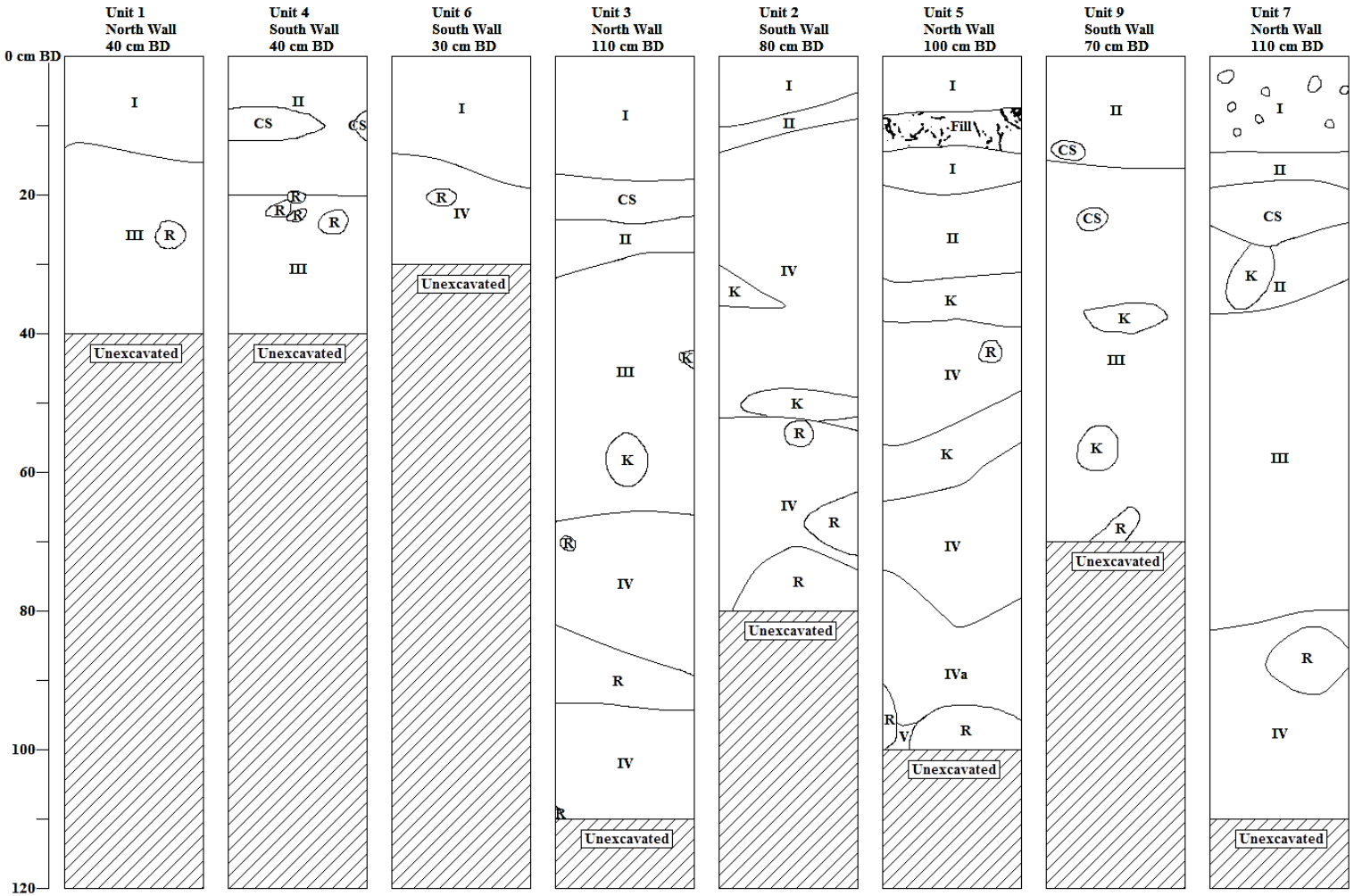


Figure 93. Picket graphics extracted from the center 20 cm of the south and north wall profiles drawn in Area A. Units are ordered left to right according to their location in Area from south to north. Strata are indicated by roman numerals. R = rock; K = krotovina; CS = charcoal staining.



Figure 94. Photograph of the 2 m east wall of Units 8 (left) and 23 (right) in Area A. Excavation is complete in both units at 160 cm BD. Photo by Lee Sappington, July 14 2010.

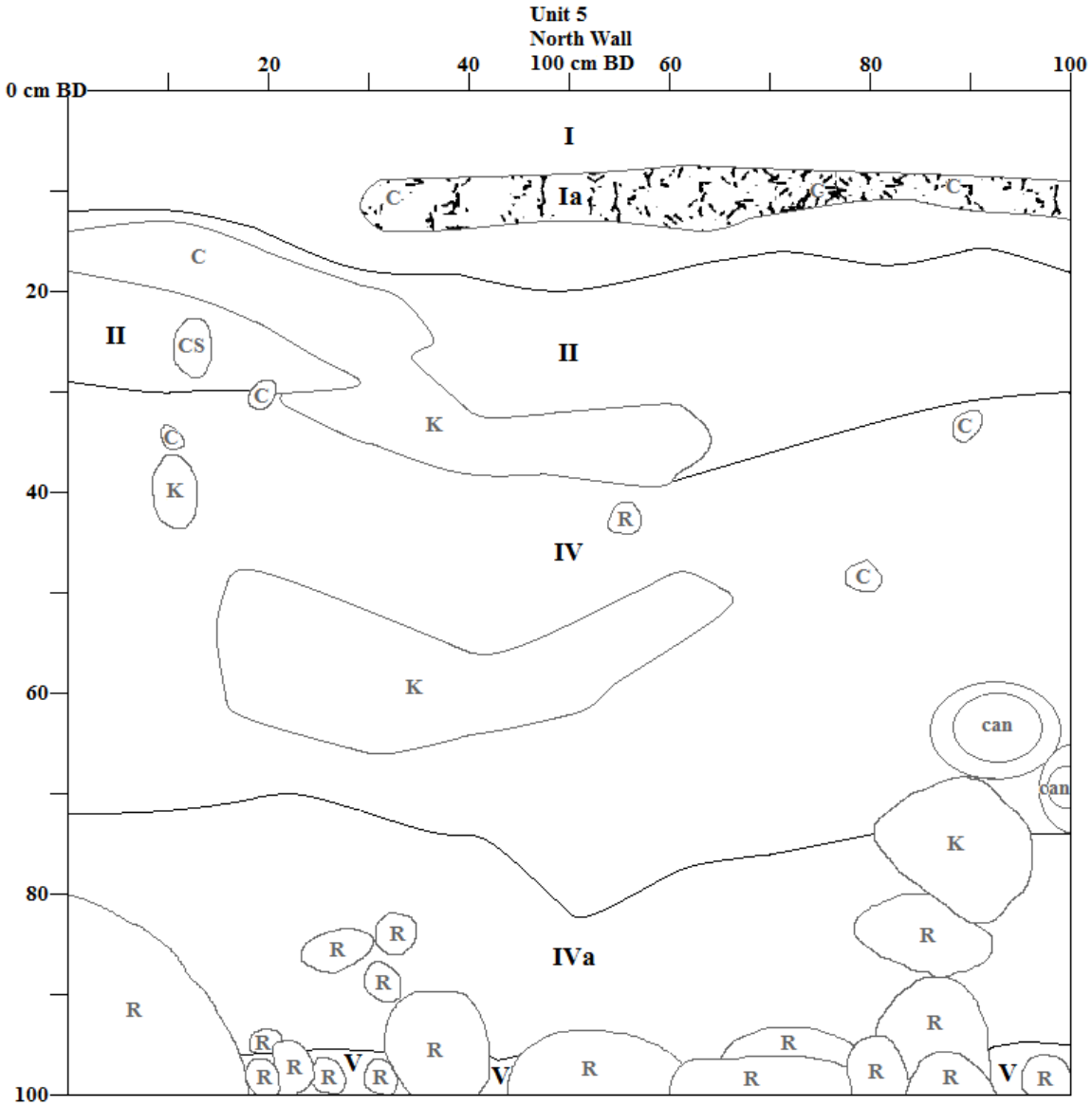


Figure 95. Graphic profile drawn from the 1 m north wall of Unit 5 in Area A. Strata are indicated by roman numerals. R = rock; K = krotovina; CS = charcoal staining; C = charcoal fragment; two oxidized tin cans were exposed at the east edge of the profile from 59 to 74 cm BD.

it was preceded by Stratum I. Where Stratum II occurred below Stratum I it formed a relatively narrow and distinctively darker band.

Stratum III – between 0 and 98 cm BD; dark yellowish brown (10YR 3/4 to 10YR3/6 and 10YR 4/4 to 10YR4/6, moist) silt loam; very few (< 5%), subrounded gravels consisting of small (4 to 8 mm), well-sorted pebbles; few (5% to 15%) sand inclusions consisting of fine (0.1 to 0.25 mm) diameter, subangular to angular quartz and mica grains; isolated small (6.4 to 12.8 mm), subangular and subrounded cobbles; common (2% to 20% surface area) medium (5 to 15 mm) diameter faint dark yellowish brown (10YR 3/4 to 10YR 4/6, dry) mottles; friable, nonsticky and nonplastic; gradual wavy boundary; common (15% to 30%) small (4 to 8 mm) charcoal flecks; few to common, fine (1 to 2 mm) and very fine (0.075 to 1 mm) diameter roots. Active burrows and krotovina containing soils from Strata I and II increased sharply in Stratum III, while other signs of bioturbation were less common than in previous strata. In the west profiles of Units 18 and 13, where Strata I and II were absent, Strata III occurred as the uppermost zone from 0 to 31 cm BD. Stratum III formed the final stratum in Units 1 and 4 to a depth of 40 cm BD, and Unit 9 to a depth of 70 cm BD, where the presence of large boulders prevented further excavation. In the units where Strata III did not comprise the final stratum, it was consistently followed by Stratum IV

Stratum IV – between 9 and 160 cm BD (floor); dark yellowish brown (10YR 3/4 and 10YR 4/4 to 4/6, moist) sandy loam; fine (0.1 – 0.25 mm) to medium (0.25 to 0.5 mm), angular and subangular moderately-sorted quartz and mica sand grains; isolated small (6.4 to 12.8 mm) cobbles; common (2% to 20% surface area) fine (<5 mm) diameter prominent gray (10YR 6/1, dry) mottles; friable, nonsticky, and nonplastic; gradual wavy boundary; few (5% to 15%) very small (2 to 4 mm) charcoal flecks; none to very few micro (> 0.075 mm) and very fine (0.075 to 1 mm) diameter roots; few krotovina containing preceding strata soils. Stratum IV was present in nine profiles and in all but three it comprised the terminating stratum where large boulders prevented further excavation. It occurred as early as 9 cm BD in the south profile of Unit 2 and continued to a depth of 160 cm BD in the east profiles of Units 8 and 23. In the west profiles of Units 18 and 13, Stratum IV was superseded by Stratum V, while in the north profile of Unit 5, Stratum IVa separated Stratum IV from the final Stratum V.

Stratum IVa – 47 to 98 cm BD; dark yellowish brown (10YR 3/6, moist) sandy clay loam; fine (0.1 – 0.25 mm) angular and subangular well-sorted quartz and mica sand grains; many (<20% surface area) medium (5 to 15 mm) diameter prominent grey (10YR 6/1, dry) mottles; firm, sticky and plastic; abrupt irregular boundary. Stratum IVa occurred only in the north profile of Unit 5 and was distinguished by its higher clay content and increased mottling. Large boulders at the termination of Unit 5 emerged within this stratum, while only a few centimeters of Stratum V were visible among the boulders.

Stratum V – between 40 and 160 cm BD (floor); yellowish brown to brownish yellow (10YR 5/6 to 10YR 6/6, moist) loamy sand; medium (0.25 to 0.5 mm) to coarse (0.5 to 1.0 mm), angular and subangular, poorly-sorted quartz and mica grains; frequent

large (12.8 to 25.6 cm) cobbles and large (> 25.6 cm) boulders; loose, nonsticky, and nonplastic; very few micro (> 0.075 mm) diameter roots were present in Unit 5, and to a maximum depth of roughly 115 cm BD in Units 18 and 13. Krotovina containing soils from Strata III and IV were also present in Units 18 and 13 to a maximum depth of 96 cm BD. Stratum V was observed only in three Units and it comprised the terminating stratum in each profile. In the west profiles of Units 18 and 13, the upper horizon boundary of Stratum V was irregular and ranged from 40 cm BD to 160 cm BD where excavation ended.

Area B

The 2010 UI investigations in Area B consisted of the excavation of two 1 x 1 m units and the examination of five backhoe trenches which were located separately throughout an area of approximately 6500 m^2 (70,000 $ft.^2$) (see Figure 50). Cultural material associated with prehistoric occupations was sparse while historic items were encountered frequently. Profiles were examined in each of the trenches and in Units 10 and 16, which were located adjacent to the south wall of Trench 5. Excavations in Unit 10 reached the greatest depth in Area B at 170 cm BD. The majority of developments to the Work Center have been concentrated in Area B and this is reflected in the apparent fluctuations of the horizons, especially in Trenches 1 through 4. Due to sufficient differences between the stratigraphy and soil descriptions near Trench 5 and those of Trenches 1-4, two separate composite descriptions have been assembled (Figure 96). Strata T5 correspond to the contiguous Trench 5, Unit 10, and Unit 16 profiles (Figures 97-98). Strata T1-T4 are those observed in the profiles of Trenches 1-4, which were dispersed throughout Area B (Figures 99-102). The T1-T4 soils varied in color and texture, and contained a higher clay content than did the soils in the Trench 5 area. A general sequence of increasing sandiness with depth was discerned in the T5 strata, while sand was the dominant component in each of the T1-T4 horizons and clay content increased with depth.

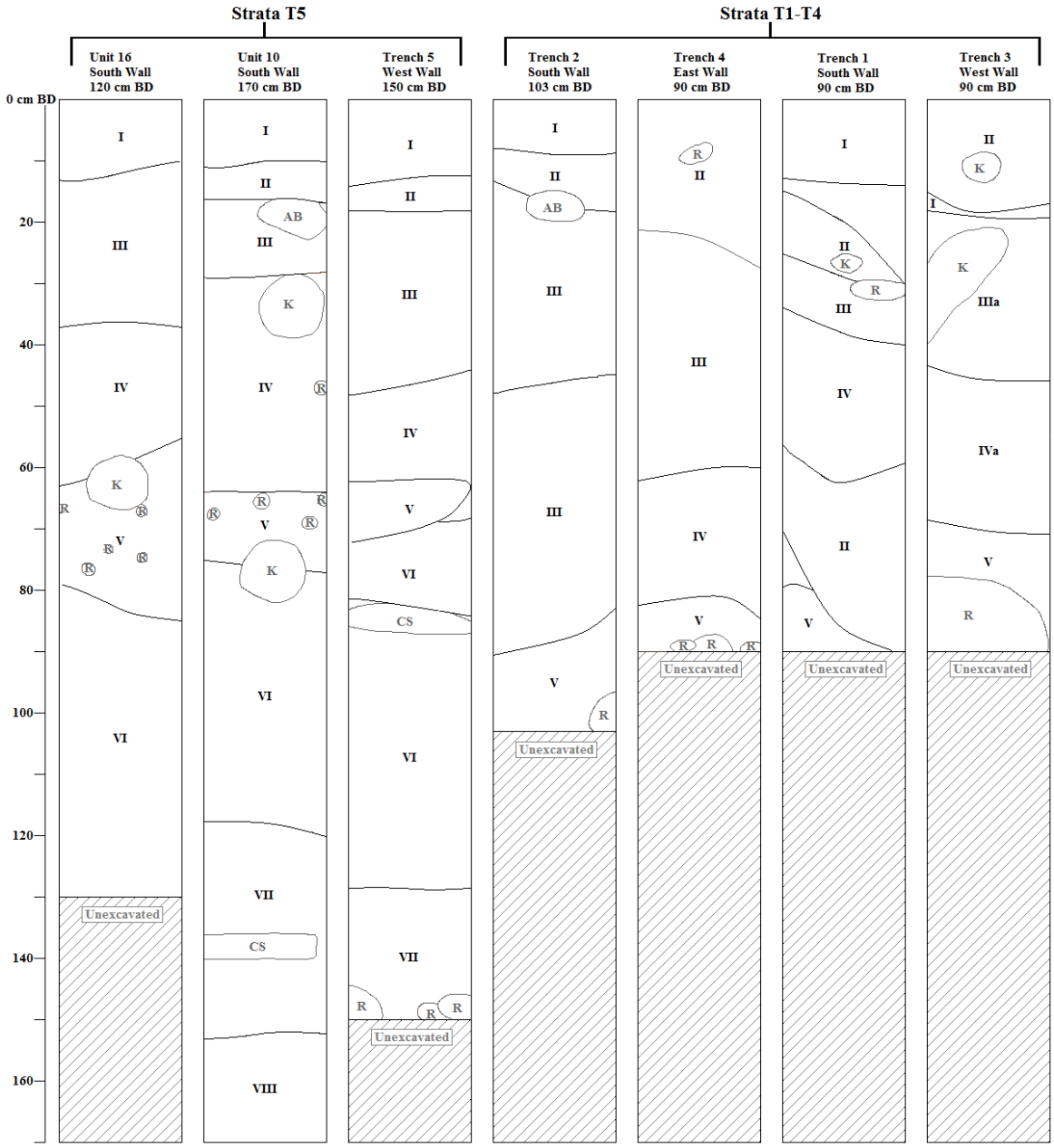


Figure 96. Picket graphics extracted from representative 20 cm segments of the profiles drawn in Area B. Trenches and Units are in order from left to right according to their location in Area B from south to north. Composite Strata T5 and T1-T4 are differentiated by brackets and indicated by roman numerals. R = rock; K = krotovina; CS = charcoal staining; AB = active rodent burrow.



Figure 97. Photograph of the 1 m west wall of Trench 5 in Area B. Hand-excavation has ended at 120 cm BD and an auger probe in the floor extended to 150 cm BD. Photo by Lee Sappington, 21 June 2010.



Figure 98. Photograph of the 2 m south wall of Units 16 (left) and 10 (right) in Area B. Excavation has ended at 130 cm BD in Unit 16 and 170 cm BD in Unit 10. Photo by Alyson Kral, 30 June 2010.



Figure 99. Photograph of the 2 m south wall of Trench 1 in Area B. Excavation has ended at 90 cm BD. Photo by author, 8 June 2010.



Figure 100. Photograph of the 1 m south wall of Trench 2 in Area B. Excavation has ended at 103 cm BD. Photo by Lee Sappington, 8 June 2010.



Figure 101. Photograph of the 1 m west wall of Trench 3 in Area B. Excavation has ended at 90 cm BD. Photo by Lee Sappington, 8 June 2010.



Figure 102. Photograph of the 1 m east wall of Trench 4 in Area B. Excavation has ended at 90 cm BD. Photo by Lee Sappington, 9 June 2010.

Strata T5 (Figures 97-98)

Stratum T5 I – between 0 and 18 cm BD; dark brown (10YR 3/3, moist) silt loam; very few (< 5%), subrounded gravels consisting of very small (2 to 4 mm) well-sorted granules; friable, sticky, and slightly plastic; clear wavy boundary; common (15% to 30%) very small (2 to 4 mm) charcoal flecks; common medium (2 to 5 mm) diameter roots; frequent krotovina, active burrows, and insects.

Stratum T5 II – between 18 and 26 cm BD; very dark brown (10YR 2/2, moist) silt loam; very few (< 5%), subrounded gravels consisting of very small (2 to 4 mm) well-sorted granules; friable, slightly sticky, and slightly plastic; clear wavy boundary; frequent (> 50%) small (4 to 8 mm) and medium (8 to 1.6 cm) charcoal flecks; very few fine (1 to 2 mm) and micro (< 0 .075 mm) diameter roots; frequent krotovina containing Stratum T5 I soils, and active burrows. Stratum T5 II was absent in Unit 16 and occurred in Unit 10 and Trench 5 as a dark, relatively thin horizon, comparable to Stratum II in Area A.

Stratum T5 III – between 15 and 48 cm BD; dark yellowish brown (10YR 3/6, moist) silt loam; common (15% to 30%), subrounded gravels consisting of small (4 to 8 mm) well-sorted pebbles; isolated small (6.4 to 12.8 cm), subrounded cobbles; common (2% to 20% surface area) fine (<5 mm) diameter distinct brown (10YR 5/3, dry) mottles; friable, sticky, and slightly plastic; gradual irregular boundary; few krotovina containing Strata T5 I and II soils. Stratum T5 III was present from 15 cm BD in Unit 16, to 48 cm BD in Trench 5.

Stratum T5 IV – between 29 and 70 cm BD; dark yellowish brown (10YR 4/6, moist) sandy loam; fine (0.1 – 0.25 mm) angular and subangular well-sorted quartz and mica grains; few (5% to 15%) subangular and subrounded gravels consisting of very small (2 to 4 mm) granules and small (4 to 8 mm) moderately sorted pebbles; isolated small (6.4 to 12.8 cm) subrounded cobbles; friable, slightly sticky, and slightly plastic; abrupt wavy boundary; few micro (< 0.075 mm) diameter roots; few krotovina containing Stratum T5 III soils. Stratum T5 IV occurred from 29 cm BD in Unit 10, to 70 cm BD in Trench 5.

Stratum T5 V – between 57 and 70 cm BD; yellowish brown (10YR 5/8, moist) sandy ashy loam; medium (0.25 to 0.5 mm) angular and subangular well-sorted quartz and mica grains; common (15% to 30%) subangular and subrounded gravels consisting of small (4 to 8 mm) well sorted pebbles; common small (6.4 to 12.8 cm) and large (12.8 to 3.2 cm) subrounded cobbles; friable, sticky, and plastic; abrupt irregular boundary; very few (< 5%) very small (2 to 4 mm) charcoal flecks; very few coarse (> 5 mm) diameter tree roots; few krotovina containing Strata T5 III and IV soils. Stratum T5 V ranged from 57 to 84 cm BD in Unit 16, and exhibited a fine and powdery texture, which was attributed to a significant ash content.

Stratum T5 VI – between 67 and 130 cm BD; dark brown to brown (10YR 3/3 to 10YR 4/3, moist) sandy loam; medium (0.25 to 0.5 mm) angular and subangular well-

sorted quartz and mica sand grains; isolated small (6.4 to 12.8 cm) subangular cobbles; many (> 20% surface area) medium (5 to 15 mm) diameter prominent gray (10YR 6/1, dry) mottles; firm, slightly sticky, and slightly plastic; clear wavy boundary; very few (< 5%) very small (2 to 4 mm) charcoal flecks and large pockets of charcoal stained soil. A few krotovina were present in the uppermost portion of Stratum T5 VI, but were not observed below 84 cm BD. Stratum T5 VI occurred from 67 cm BD in Trench 5, to 123 cm BD in Unit 10, and comprised the final horizon in Unit 16 where excavations were terminated at 130 cm BD.

Stratum T5 VII – between 118 and 154 cm BD; dark grayish brown to very dark brown (10YR 4/2 to 10YR 2/2, moist) sandy loam; coarse (0.5 to 1 mm) angular and subangular moderately-sorted quartz and mica grains; common small (6.4 to 12.8 cm) and large (12.8 to 25.6 cm) rounded and subrounded cobbles; friable, slightly sticky, and nonplastic; abrupt wavy boundary; large concentration of charcoal stained soil at 136 cm BD in Unit 10. Stratum VII ended with the emergence of small boulders and water seepage in Trench 5 at 150 cm BD and was replaced with Stratum T5 VIII at 154 cm BD in Unit 10.

Stratum T5 VIII – between 154 and 170 cm BD (floor); grayish brown (10YR 5/2, moist) sand; coarse (0.5 to 1 mm) subangular well-sorted quartz and mica grains; loose, nonsticky, and nonplastic. The visible moisture content observed in the preceding stratum increased in Stratum T5 VIII and continued to the end of excavation in Unit 10 at 170 cm BD.

Strata *T1-T4* (Figures 99-102)

Stratum T1-T4 I – between 0 and 21 cm BD; brown to dark brown (10YR 4/3 to 10YR 3/3, moist) sandy loam; fine (0.1 to 0.25 mm) subangular and subrounded well-sorted quartz and mica grains; many (30% to 50%) subangular and subrounded gravels consisting of medium (8 mm to 1.6 cm) moderately-sorted pebbles; common small (6.4 to 12.8 cm) subangular cobbles; friable, slightly sticky, and slightly plastic; clear wavy boundary; common (15% to 30%) very small (2 to 4 mm) charcoal flecks; many medium (2 to 5 mm) and coarse (> 5 mm) diameter roots; frequent krotovina, active rodent burrows, and insects. Stratum T1-T4 I was the uppermost stratum in Trench 2 and 1, while it was preceded by Stratum T1-T4 II in Trench 3, and absent in Trench 4.

Stratum T1-T4 II – between 0 and 90 cm BD (floor); very dark grayish brown (10YR 3/2, moist) sandy loam; fine (0.1 to 0.25 mm) subangular and subrounded well-sorted quartz and mica grains; common (15% to 30%) subangular and subrounded gravels consisting of small (4 to 8 mm) well-sorted pebbles; friable; sticky; and slightly plastic; abrupt irregular boundary; frequent (>50%) very small (2 to 4 mm) charcoal flecks, small (4 mm to 8 mm) charcoal fragments, and large pockets of charcoal stained soil; common medium (3 to 5 mm) diameter roots; common krotovina containing Stratum T1-T4 I soils and active rodent burrows. Stratum T1-T4 II formed a distinctively darker horizon in each of the T1-T4 profiles but occurred at the greatest depth in Trench 1 from 57 cm BD to the floor at 90 cm BD.

Stratum T1-T4 III – between 13 and 91 cm BD; yellowish brown (10YR 5/6, moist) sandy clay loam; fine (0.1 to 0.25 mm) subangular and subrounded well-sorted quartz and mica grains; common (15% to 30%) subangular and subrounded gravels consisting of very small (2 to 4 mm) well-sorted granules; isolated very large (3.2 to 6.4 cm) rounded and subrounded pebbles; common (2% to 20% surface area) fine (< 5 mm) diameter distinct pale brown (10YR 6/3, dry) mottles; firm, sticky, and plastic; gradual wavy boundary; common small (4 to 8 mm) charcoal flecks and small pockets of charcoal stained soil; common medium (3 to 5 mm) diameter roots; few krotovina containing Strata T1-T4 I and II soils. Stratum T1-T4 III comprised the uppermost horizon with a significant proportion of clay and was present at varying depths from 13 cm BD in Trench 1 to 91 cm BD in Trench 2.

Stratum T1-T4 IIIa – between 17 and 45 cm BD; yellowish brown (10YR 5/4, moist) sandy loam; fine (0.1 to 0.25 mm) to medium (0.25 to 0.5 mm) subangular moderately-sorted quartz and mica grains; common (15% to 30%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; isolated very large (3.2 to 6.4 cm) subrounded pebbles; few (< 2% surface area) fine (<5 mm) diameter distinct pale brown (10YR 6/3) mottles; friable, slightly sticky, and slightly plastic; gradual smooth boundary; common (15% to 30%) small (4 to 8 mm) charcoal flecks and small pockets of charcoal stained soil; common medium (3 to 5 mm) diameter roots; few krotovina containing Strata T1-T4 II and IV soils. Stratum T1-T4 IIIa occurred only in the Trench 3 profile and was distinguished from Stratum T1-T4 III by its reduced clay content and smaller amount of mottling.

Stratum T1-T4 IV – between 32 and 84 cm BD; dark yellowish brown (10YR 3/4 to 10YR 3/6, moist) sandy clay loam; medium (0.25 to 0.5 mm) subangular well-sorted quartz and mica grains; few (5% to 15%) subrounded gravels consisting of very small (2 to 4 mm) well-sorted granules; many very large (3.2 to 6.4 cm) rounded and subrounded pebbles and small (6.4 to 12.8 cm) subrounded cobbles; common (2% to 20% surface area) medium (5 to 15 mm) diameter distinct dark brown (10YR 3/3, dry) mottles; firm, slightly sticky, and slightly plastic; clear wavy boundary; few (5 to 15%) very small (2 to 4 mm) charcoal flecks, small (4 to 8 mm) charcoal fragments, and small pockets of charcoal stained soil; few fine (1 to 2 mm) diameter roots. Stratum T1-T4 IV was present in Trenches 1 and 4, forming a darker horizon above Stratum T1-T4 V.

Stratum T1-T4 IVa – between 45 and 70 cm BD; grayish brown (10YR 5/2, moist) sandy clay loam; fine (0.1 to 0.25) subangular well-sorted quartz and mica grains; few (5% to 15%) subrounded gravels consisting of very small (2 to 4 mm) well-sorted granules; isolated medium (8 mm to 1.6 cm) rounded and subrounded pebbles; few (<2% surface area) medium (5 to 15 mm) diameter distinct dark gray (10YR 4/1, dry) mottles; firm, sticky, and plastic; gradual smooth boundary; very few (> 5%) very small (2 to 4 mm) charcoal flecks; few fine (1 to 2 mm) and medium (2 to 5 mm) diameter roots. Stratum T1-T4 IVa was observed only in Trench 3 and was similar to Stratum T1-T4 IV, though it was lighter in color and contained a higher clay component.

Stratum T1-T4 V – between 70 and 103 cm BD (floor); light yellowish brown to yellowish brown to brownish yellow (10YR 6/4 to 10YR 5/4 to 10YR 6/8, moist) loamy sand; fine (0.1 to 0.25 mm) to medium (0.25 to 0.5 mm) angular and subangular moderately-sorted quartz and mica grains; many medium (8 mm to 1.6 cm) to very large (3.2 cm to 6.4 cm) rounded pebbles and small (6.4 to 12.8 cm) subrounded cobbles; loose, slightly sticky; and nonplastic; few fine (1 to 2 mm) diameter roots. Stratum T1-T4 V comprised the final stratum in each of the T1-T4 profiles. Variations in color were observed in each profile, though textures and grain sizes remained consistent.

Area C

Four units were excavated in Area C in 2010 in order to investigate anomalies detected by ground penetrating radar in 2009 (Carlson and Sheriff 2009) (Appendix 2). Units 11, 12, 14, and 15 were located west of the helipad and extended over an area of approximately 750 m^2 (see Figure 57). Other than one bimarginally modified cobble flake recovered from the surface level in Unit 15, the deposits encountered in Area C were sterile and consisted of a moist, silt loam that contained a significant clay component. Due to the scarcity of cultural material excavations were terminated at 50 cm BD in Area C. Following excavation, four profiles were drawn to scale and three primary strata were identified. The composite description below corresponds with all units (Figures 103-107).

Stratum I – between 0 and 27 cm BD; dark brown to very dark brown (10YR 3/2 to 10YR 2/2, moist) silt loam; friable, sticky, and slightly plastic; clear wavy boundary; very few (< 5%) very small (2 to 4 mm) charcoal flecks and large pockets of charcoals stained soil; many fine (1 to 2 mm) diameter roots; common krotovina, active rodent burrows, and insects. Stratum I comprised the surface horizon in all Area C units and extended to varying depths. In Units 12, 14, and 15 concentrations of charcoal stained soils were present at the transition to the next strata.

Stratum II – between 3 and 50 cm BD (floor); dark yellowish brown (10YR 3/4, moist) clay loam; isolated large (1.6 to 3.2 cm) subrounded pebbles; many large (12.8 to 15.6 cm) subrounded boulders in Unit 15; few (< 2% surface area) medium (5 to 15 mm) diameter faint (10YR 5/6, dry) mottles; firm, sticky, and plastic; diffuse irregular boundary; common (15% to 30%) very small (2 to 4 mm) charcoal flecks and large pockets of charcoal stained soil; common very fine (0.75 to 1 mm) and fine (1 to 2 mm) diameter roots; few krotovina containing Stratum I soils. Stratum II merged gradually

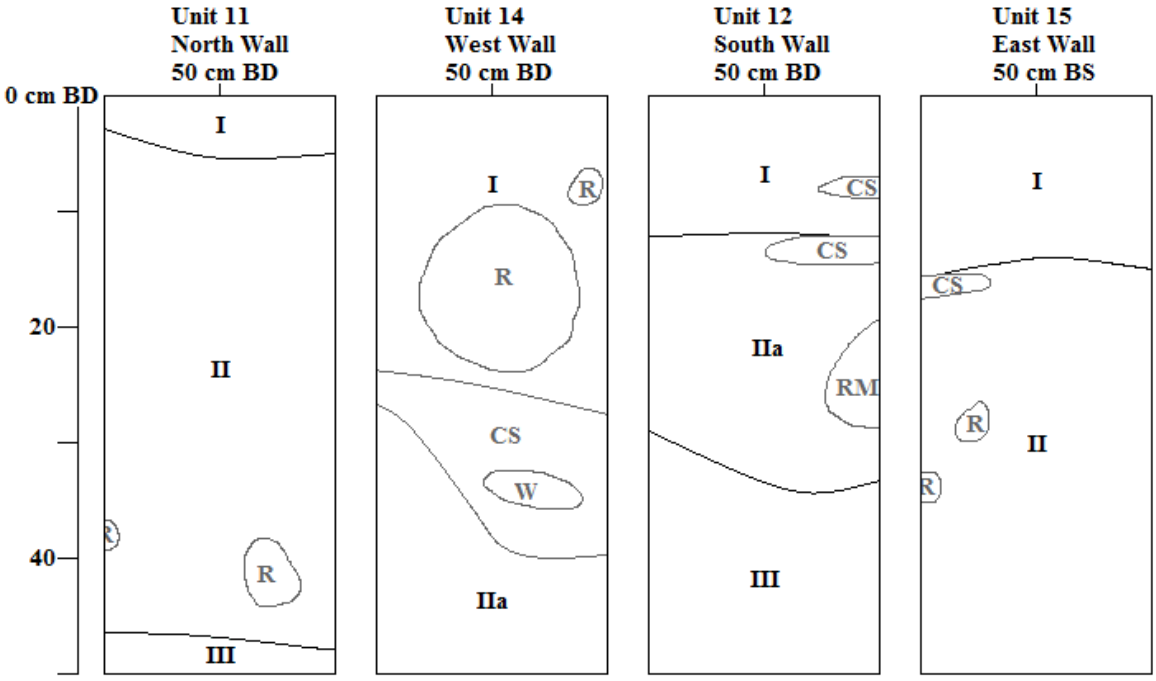


Figure 103. Picket graphics extracted from the center 20 cm segments of the profiles drawn in Area C. Units are in order from left to right according to their location in Area C from south to north. Strata are indicated by roman numerals. R = rock; CS = charcoal staining; RM = root mass; W = charred wood fragment.



Figure 104. Photograph of the 1 m north wall of Unit 11 in Area C. Excavation is complete at 50 cm BD. Photo by Lee Sappington, 28 June 2010.



Figure 105. Photograph of the 1 m south wall of Unit 12 in Area C. Excavation is complete at 50 cm BD. Photo by Lee Sappington, 28 June 2010.



Figure 106. Photograph of the 1 m west wall of Unit 14 in Area C. Excavation is complete at 50 cm BD. Photo by Lee Sappington, 28 June 2010.



Figure 107. Photograph of the 1 m east wall of Unit 15 in Area C. Excavation is complete at 50 cm BD. Photo by Lee Sappington, 28 June 2010.

with Strata I and IV in Unit 11 and formed the final stratum in Unit 15 with the appearance of large boulders.

Stratum IIa – between 13 and 50 cm BD (floor); yellowish brown (10YR 5/6, moist) clay loam; common (2% to 20% surface area) fine (< 5 mm) and medium (5 to 15 mm) diameter prominent light brownish gray (10YR 6/2, dry) mottles; firm, sticky, and very plastic; diffuse wavy boundary in Unit 12; common (15% to 30%) small (4 to 8 mm) charcoal flecks and small pockets of charcoal stained soil; few very fine (0.75 to 1 mm) diameter roots; few krotovina containing Stratum I soil. Stratum IIa was lighter in color than Stratum II and was differentiated by its higher clay content and the presence of a higher number of prominent concretion mottles.

Stratum III – between 28 and 50 cm BD (floor); brown (10YR 4/3, moist) clay loam; few (5% to 15%) subangular gravels consisting of very small (2 to 4 mm) well-sorted granules; common very large (3.2 to 6.4 cm) rounded pebbles and large (12.8 to 25.6 cm) subrounded cobbles in Unit 11; firm, sticky, and very plastic; very few (< 5%) very small (2 to 4 mm) charcoal flecks; very few very fine (1 to 2 mm) diameter (0.57 to 1 mm) roots. One krotovina, containing charcoal stained soil and an active burrow were present in the Unit 12 profile. Stratum IV was absent in Units 14 and 15, while it formed the final horizon in Units 11 and 12, emerging just a few centimeters above the floor in Unit 11.

Area E Introduction

The oldest and most concentrated cultural deposits at 10CW34 were encountered in Area E, and this area was the most extensively tested by UI. From 2010 to 2012, ninety-three 1 x 1 m units and two 1 x .5 m units were excavated in the west pasture and the stockpile area (see Figure 59). The majority of units were located to the south and east of the stockpile, along the north bank of the North Fork of the Clearwater River. Area E demonstrated the most uniformity in strata and also exhibited the fewest signs of historic disturbance, as Euroamerican artifacts were rarely encountered. Sixty-eight profiles were examined and drawn to scale in Area E and strata descriptions are divided into sections based on the four Area E zones defined in Chapter 5 (see Figures 59-63). Area E Central is also sectioned according to the Chapter 5 outline, and isolated units have been included with the appropriate Central block which they are spatially closest to. The order in which the strata of each zone is described below begins at the northern extent of excavations in the Stockpile and moves south to the West zone, then eastward through the Central zone, and finally to the East zone.

Apart from the units in the Stockpile, the stratigraphy examined in Area E conformed to six strata which were consistently observed throughout with significant variation only in depth fluctuation and minor color differences (see below). A dark loam with a high organic content and varying amounts of sand from east to west comprised Strata I and II. Signs of bioturbation, such as krotovina, active rodent burrows, and insect nests and casts occurred most frequently in these horizons. Strata III was a sandy loam that contained varying amounts of dark mottling, and ranged in color from yellowish brown to light yellowish brown. Stratum IV was the most distinctive horizon, composed

of a brownish yellow sandy clay loam, and easily identified by its consipicuous color and abrupt transition. This stratum fluctuated most irregularly in depth and thickness, and was noticeably absent in several locations such as in the entire West zone, and in the C1 and C9 units. A sample, taken from Stratum IV in Unit 42, was submitted to Dr. Nick Foit at Washington State University for geochemical analysis and was found to contain tephra which matched the climactic eruption of Mazama, dated 6730 ± 40 ^{14}C BP (Appendix 7) (see Chapter 10). Stratum V consisted of a loamy sand that was prominently darker in color and contained a higher proportion of sand than the preceding two strata. For the units in the West zone and many in Central zone, Stratum V was the final stratum where gravel and pebble sizes increased and large cobbles and boulders prevented further excavation. Stratum VI consisted of a dark yellowish brown, coarse sand and was only observed as the final stratum in the C3 units in the Central zone and in three of the East units.

Area E Stockpile

Three 1 x 1 m units were excavated in the Stockpile in Area E to investigate site boundaries at the far west end of the pasture and to determine what effect the activities associated with the stockpile may have had on cultural deposits. A profile in each unit was examined (Figure 108) and sufficient variations were observed at each location to warrant separate descriptions below. Cultural material was infrequent in the stockpile and excavations were terminated at a cobble layer. One consistency noted was the presence of a pale brown sandy loam containing dark concretion mottles in Strata DA1 II, DA2 II, and U54 III. An additional correlation was observed between Units 54 and DA1 and consisted of extensive deposits of reddish yellow soil and prominent yellowish red

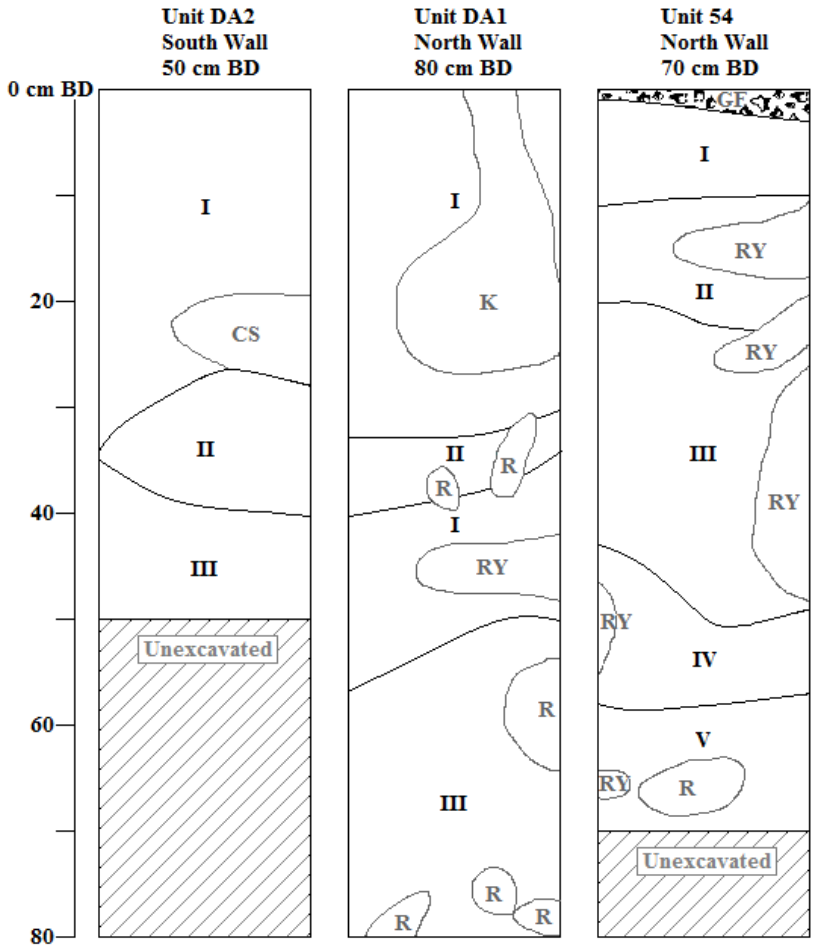


Figure 108. Picket graphics extracted from the center 20 cm segments of the profiles drawn in the Stockpile zone in Area E. Units are in order from left to right according to their location in the Stockpile from south to north. Strata are indicated by roman numerals. R = rock; CS = charcoal staining; GF = gravel fill; RY = reddish yellow sandy loam deposit.

mottling which began at about 10 cm BD and continued to the final depth of 70 cm BD in Unit 54. It was apparent that the recent activities in the center of the stockpile area, as demonstrated by Unit 54, had modified the soil arrangements considerably, while Units DA1 and DA2 at the south edge of the stockpile displayed slightly less disturbance at lower depths.

DA1 (Figure 109)

Stratum DA1 I – 0 to 57 cm BD; dark yellowish brown (10YR 3/6, moist) sandy loam; fine (0.1 to 0.25) to medium (0.25 to 0.5 mm) angular moderately-sorted quartz and mica grains; many (30% to 50%) angular and subangular gravels consisting of small (4 to 8 mm) well-sorted pebbles; isolated medium (8 mm to 1.6 cm) subrounded pebbles; friable, slightly sticky, and slightly plastic; clear wavy boundary; common small (4 to 8 mm) charcoal flecks and small pockets of charcoal stained soil; common fine (1 to 2 mm) diameter roots; common krotovina. Large deposits of reddish yellow (7.5YR 7/8, moist) sandy loam were present from 44 to 49 cm BD.

Stratum DA1 II – 34 to 41 cm BD; pale brown (10YR 6/3, moist) sandy loam; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) angular moderately-sorted quartz and mica grains; few (5% to 15%) angular and subangular gravels consisting of small (4 to 8 mm) well-sorted pebbles; isolated large (1.6 to 3.2 cm) subangular pebbles; few (<2% surface area) fine (<5 mm) diameter distinct dark grayish brown (10YR 4/2, dry) mottles; friable, slightly sticky, and slightly plastic; clear wavy boundary; many (30% to 50%) small (4 to 8 mm) charcoal flecks; few fine (1 to 2 mm) diameter roots.

Stratum DA1 III – 50 to 80 cm BD (floor); dark brown (10YR 3/3, moist) sandy clay loam; fine (0.1 to 0.25 mm) angular well-sorted quartz and mica grains; few (5% to 15%) subangular gravels consisting of very small (2 to 4 mm) well-sorted granules; common very large (1.6 to 3.2 cm) rounded pebbles and small (6.4 to 12.8 cm) subrounded cobbles; few (< 2% surface area) medium (5 to 15 mm) diameter faint brown (10YR 4/3, dry) mottles; firm, sticky, and plastic; many (30% to 50%) small (4 to 8 mm) charcoal flecks; few fine (1 to 2 mm) diameter roots.

DA2 (Figure 110)

Stratum DA2 I – 0 to 35 cm BD; brown (10YR 4/3, moist) sandy loam; fine (0.1 to 0.25 mm) angular well-sorted quartz and mica grains; common (15% to 30%) angular, subangular, and subrounded gravels consisting of small (4 to 8 mm) and medium (8 to 1.6 mm) poorly-sorted pebbles; friable, slightly sticky, and slightly plastic; clear wavy boundary; common very small (2 to 4 mm) charcoal flecks and large pockets of charcoal stained soil; many fine (1 to 2 mm) and medium (2 to 5 mm) roots; frequent krotovina and insects.

Stratum DA2 II – 0 to 42 cm BD; pale brown (10YR 6/3, moist) sandy loam; fine (0.1 to 0.25 mm) angular well-sorted quartz and mica grains; few (5% to 15%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 to 1.6 mm) moderately-sorted pebbles; isolated large (1.6 to 3.2 cm) subangular pebbles; few (<2% surface area) fine (<5 mm) diameter distinct dark brown (10YR 3/3, dry) mottles; friable, slightly sticky, and slightly plastic; clear wavy boundary; many (30% to 50%) small (4 to 8 mm) charcoal flecks; common fine (1 to 2 mm) diameter roots; few krotovina containing Strata II soil.



Figure 109. Photograph of the floor and 1 m north wall of Unit DA1, excavated to 80 cm BD in the Stockpile in Area E. Photo by Lee Sappington, 15 July 2010.



Figure 110. Photograph of the 1 m south wall of Unit DA2 in the Stockpile in Area E. Excavation is complete at 50 cm BD. Photo by Alyson Kral, 30 July 2010.

Stratum DA2 III – 35 to 50 cm BD (floor); yellowish brown (10YR 5/6, moist) sandy loam; medium (0.25 to 0.5 mm) angular well-sorted quartz and mica grains; few (5% to 15%) subangular and subrounded gravels consisting of very small (2 to 4 mm) granules and small (4 to 8 mm) moderately-sorted pebbles; common very large (1.6 to 3.2 cm) subrounded pebbles and small (6.4 to 12.8 cm) and large (12.8 to 25.6 cm) subrounded cobbles; friable, slightly sticky, and slightly plastic; few (5 to 15%) small (4 to 8 mm) charcoal flecks; very few micro (< 0.075 to 1 mm) diameter roots.

Unit 54 (U54) (Figure 111)

Stratum U54 I – 0 to 11 cm BD; dark yellowish brown (10YR 3/4, moist) sandy loam; fine (0.1 to 0.25) to coarse (0.5 to 1 mm) angular poorly-sorted quartz and mica grains; frequent (> 50%) angular gravels consisting of small (4 to 8 mm) well-sorted pebbles; friable, slightly sticky, and slightly plastic; gradual wavy boundary; common (15% to 30%) small (4 to 8 mm) charcoal flecks and large pockets of charcoal stained soil.

Stratum U54 II – 11 to 22 cm BD; dark grayish brown (10YR 4/2, moist) sandy loam; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) angular moderately-sorted quartz and mica grains; common (15% to 30%) angular gravels consisting of small (4 to 8 mm) well-sorted pebbles; isolated small (4 to 8 mm) subangular pebbles; friable, slightly sticky, and slightly plastic; clear smooth boundary; many (30% to 50%) very small (2 to 4 mm) charcoal flecks.

Stratum U54 III – 22 to 51 cm BD; pale brown (10YR 6/3, moist) sandy loam; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) angular moderately-sorted quartz and mica grains; few (5% to 15%) angular and subangular gravels consisting of small (4 to 8 mm) well-sorted pebbles; few (< 2% surface area) fine (< 5 mm) diameter distinct dark grayish brown (10YR 4/2, dry) mottles; many (> 20% surface area) coarse (> 15 mm) diameter prominent yellowish red (5YR 5/8, moist) mottles; friable, slightly sticky, and slightly plastic; clear wavy boundary; few (5% to 15%) very small (2 to 4 mm) charcoal flecks; large deposits of reddish yellow (7.5YR 7/8, moist) sandy loam.

Stratum U54 IV – 44 to 57 cm BD; brownish yellow (10YR 6/8, moist) sandy loam; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) angular moderately-sorted quartz and mica grains; few (5% to 15%) subangular and subrounded gravels consisting of small (4 to 8 mm) moderately-sorted pebbles; common (2% to 20% surface area) coarse (>15 mm) diameter prominent yellowish red (5YR 5/8, moist) mottles; friable, slightly sticky, and slightly plastic; few (5 to 15%) small (4 to 8 mm) charcoal flecks.

Stratum U54 V – 57 to 70 cm BD (floor); dark brown (10YR 3/3, moist) sandy loam; fine (0.1 to 0.25 mm) and coarse (0.5 to 1 mm) angular poorly-sorted quartz and mica grains; few (5% to 15%) subangular gravels consisting of very small (2 to 4 mm) well-sorted granules; isolated very large (1.6 to 3.2 cm) rounded pebbles and small (6.4 to 12.8 cm) subrounded cobbles; few (< 2% surface area) medium (5 to 15 mm) diameter faint brown (10YR 4/3, dry) mottles; few (<2% surface area) medium (5 to 15 mm)



Figure 111. Photograph of the 1 m north wall of Unit 54 in the Stockpile in Area E. Excavation has ended at 70 cm BD. Photo by Daniel Carlini, 6 July 2011.

diameter prominent yellowish red (5YR 5/8, moist) mottles; firm, sticky, and plastic; many (30% to 50%) small (4 to 8 mm) charcoal flecks.

Area E West

One 1 x 1 m test unit and three contiguous 1 x 2 m unit pairs were excavated in Area E West in 2010, and were placed at 10 m intervals along the bank of the North Fork of the Clearwater River from west to east. The West units were excavated to an impenetrable large cobble and boulder layer which occurred at higher depths than in the rest of Area E, though the presence of boulders increased in depth toward the east. The highest terminating depth occurred at 30 cm BD and the maximum depth reached was 90

cm BD in Unit 32, which was contiguous with Unit 21. A profile in Unit 28 and one in each of the three contiguous pairs was examined. While the sand and coarse gravel content was high in the West soils, the observed textures, color, and mottling conformed to the sequence of six strata identified in the Central and East zones. Stratum IV was absent, however, and Stratum V occurred below Stratum III instead. Stratum VI was also absent, as the depths at which it was typically encountered in the Central and East were not reached in the West. The composite description below corresponds with all West profiles (Figures 112-113).

Stratum West I – between 0 and 12 cm BD; brown (10RY 5/3, moist) silt loam; many (30% to 50%) subangular and subrounded gravels consisting of very small (2 to 4 mm) granules and small (4 to 8 mm) moderately sorted pebbles; common medium (8 mm to 1.6 cm) and large (1.6 to 3.2 cm) subrounded pebbles; friable, sticky, and slightly plastic; clear smooth boundary; common (15% to 30%) small (4 to 8 mm) charcoal flecks, small (4 to 8 mm) charcoal fragments, and small pockets of charcoal stained soil; many fine (1 to 2 mm) and medium (2 to 5 mm) diameter roots; frequent active burrows, insects, and krotovina.

Stratum West II – between 1 and 35 cm BD; dark yellowish brown (10YR 4/4, moist) sandy loam; fine (0.1 to 0.25 mm) subangular well-sorted quartz and mica grains; many (30% to 50%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; common large (1.6 to 3.2 cm) subrounded pebbles; friable, slightly sticky, and slightly plastic; gradual wavy boundary; common (15% to 30%) very small (2 to 4 mm) and small (4 to 8 mm) charcoal flecks; many fine (1 to 2 mm) and medium (2 to 5 mm) diameter roots; frequent active burrows, insects, and krotovina containing Stratum West I soils.

Stratum West III – between 17 and 51 cm BD; yellowish brown (10YR 5/6 to 10YR 5/8, moist) sandy loam; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) subangular moderately-sorted quartz and mica grains; common (15% to 30%) subangular gravels consisting of very small (2 to 5 mm) granules and small (4 to 8 mm) moderately-sorted pebbles; isolated very large (3.2 to 6.4 cm) subrounded pebbles and small (6.4 to 12.8 cm) subangular and subrounded cobbles; few (< 2% surface area) fine (<5 mm) diameter distinct brown (10YR 4/3, dry) mottles; friable, sticky, and slightly plastic; gradual wavy boundary; few (5% to 15%) very small (2 to 4 mm) charcoal flecks and small pockets of charcoal stained soil; common fine (1 to 2 mm) diameter roots; common active burrows, insects, and krotovina containing preceding strata soils.

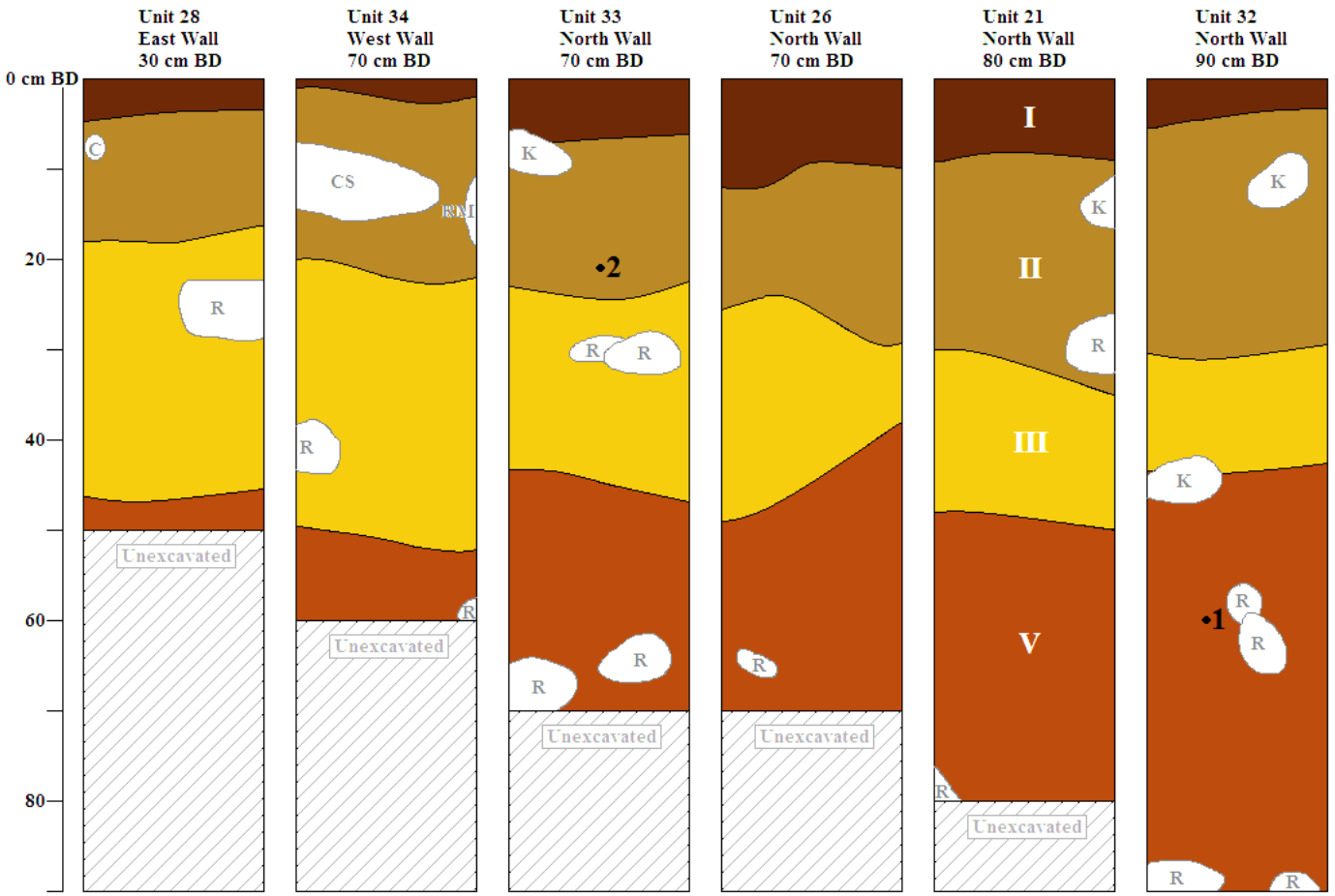


Figure 112. Picket graphics extracted from the center 20 cm segments of the profiles drawn in the West zone in Area E. Units are ordered form left to right according to their location from west to east. Strata are indicated by the roman numerals. R = rock; CS = charcoal staining; K = krotovina; RM = root mass. Numbers indicate the depths of radiocarbon dated charcoal samples from profiled units (see Table 35), given as conventional radiocarbon age (BP) / 2σ calibrated age (BP): (1) Beta-288080, 7390 ± 40 / 8330 – 8160 BP; (2) Beta-288081, 120 ± 40 / 280 – 0 BP.



Figure 113. Photograph of the floor and 1 m north wall of Unit 21. Excavation is complete at 80 cm BD. Photo by Lee Sappington, 6 July 2010.

Stratum West IV – absent.

Stratum West V – between 38 and 80 cm BD (floor); dark yellowish brown (10YR 4/6, moist) sandy loam; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) angular and subangular moderately-sorted quartz and mica grains; many (30% to 50%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; common large (1.6 to 3.2 cm) subrounded pebbles and small (6.4 to 12.8 cm) and large (12.8 to 25.6 cm) subangular and subrounded cobbles; common large (> 25.6 cm) boulders; few (< 2% surface area) medium (5 to 15 mm) diameter distinct dark brown (10YR 3/3, dry) mottles; friable, slightly sticky, and

slightly plastic; common fine (1 to 2 mm) diameter roots; few krotovina containing preceding strata soils.

Stratum West VI – absent.

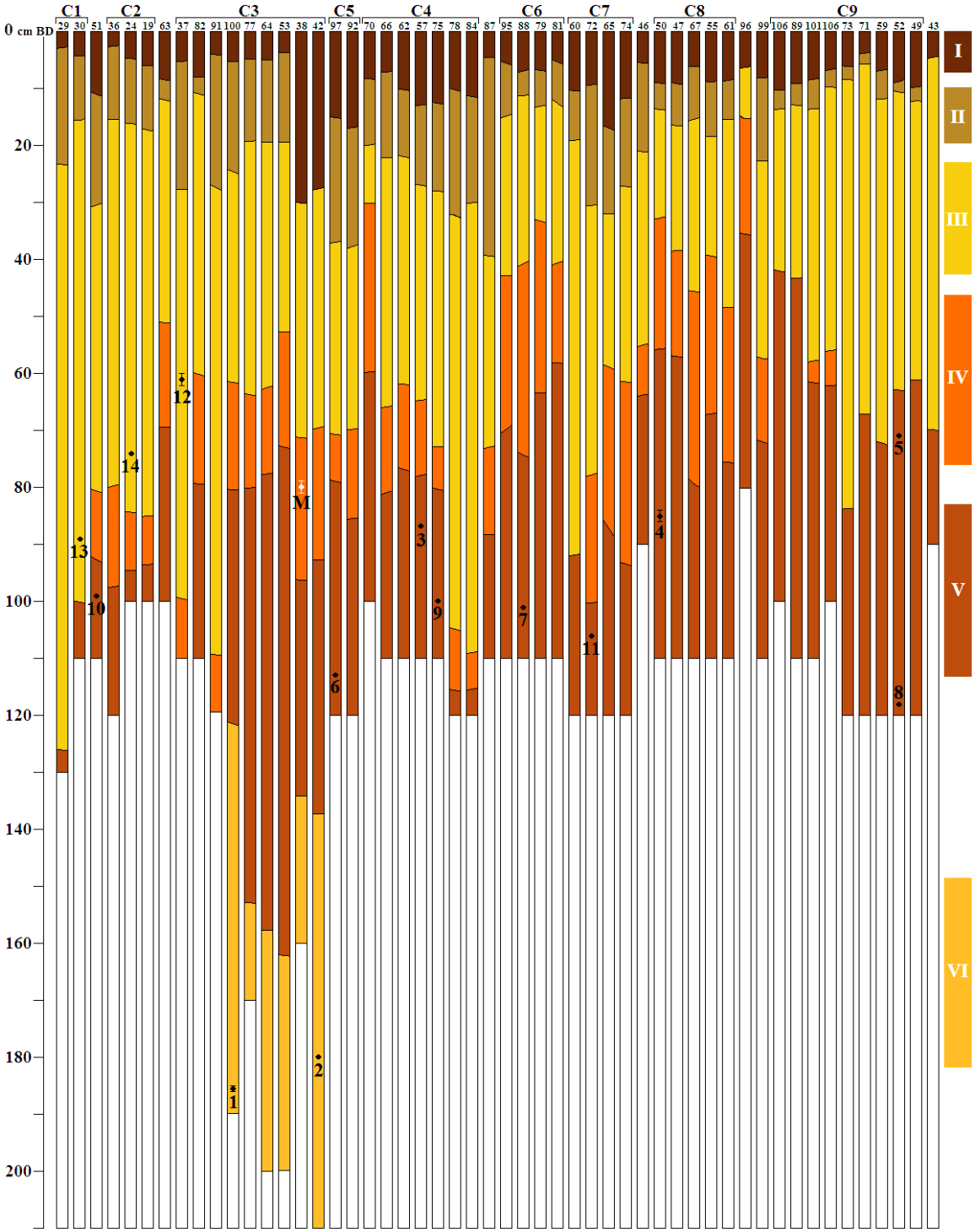
Area E Central

Seventy-seven units were excavated in Area E Central and fifty-three profiles were examined and drawn to scale. Excavations were terminated at a sterile cobble and boulder layer which occurred consistently between 110 and 120 cm BD in nearly all locations. The C3 block was an exception where impenetrable boulders were not encountered above 170 cm BD. In Unit 42, where excavations reached the greatest depth, boulders did not begin to appear until 210 cm BD. An additional distinction between the C3 units and the rest of the Central zone was the presence of Stratum VI which consisted of a coarse, dark yellowish brown sand. Stratum VI emerged just above 120 cm BD in block C3 and at 91 cm BD in the East zone, though it was not observed at these depths in any other locations. Due to the distribution of test units over the Central zone, a continuous profile is not available, however it is evident that the horizontal shifting of the depths and thickness of strata was considerable within small areas, and abrupt fluctuations were observed even in units that were contiguous (Figure 114). The profiles for the Central zone are sectioned by spatial groups containing proximate unit blocks and isolated units for which composite descriptions were assembled.

Area E Central C1-C2 (Units 51 and 63 included) (Figures 115-117)

Stratum C1-C2 I – between 0 and 13 cm BD; brown (10YR 4/3, moist) silt loam; many (30% to 50%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; friable, sticky, and slightly plastic; clear smooth boundary; common (15% to 30%) small (4 to 8 mm) charcoal flecks; many fine (1 to 2 mm) and medium (2 to 5 mm) diameter roots; frequent active burrows, insects, and krotovina.

Figure 114 (following page). Picket graphics showing the strata distribution over the Central zone in Area E. Pickets are extracted from the center 2 cm segments of all profiles drawn in the Central zone. Units are ordered from left to right according to their location in the corresponding block. Blocks are indicated by the brackets at top. Strata are indicated by the roman numerals in the corresponding color boxes at right. Numbers indicate depths of radiocarbon dated charcoal samples from profiled units (see Table 35), given as conventional radiocarbon age (BP) / 2σ calibrated age (BP): (1) Beta-336973, 11,780 ± 40 / 13,740 – 13,490 BP; (2) Beta-288085, 10,680 ± 50 / 12,650 – 12,560 BP; (3) Beta-313690, 8120 ± 40 / 9130 – 9000 BP; (4) Beta-313686, 7940 ± 40 / 8990 – 8610 BP; (5) Beta-313688, 7900 ± 40 / 8980 – 8600 BP; (6) Beta-336972, 7730 ± 40 / 8590 – 8420 BP; (7) Beta-336970, 7660 ± 30 / 8540 – 8400 BP; (8) Beta-313689, 7200 ± 40 / 8150 – 7950 BP; (9) Beta-313695, 7030 ± 40 / 7950 – 7790 BP; (10) Beta-313687, 6980 ± 40 / 7930 – 7700 BP; (11) Beta-313694, 6870 ± 40 / 7790 – 7620 BP; (12) Beta-288082, 5200 ± 40 / 6000 – 5910 BP; (13) Beta-288079, 5150 ± 40 / 5990 – 5760 BP; (14) Beta-288078, 1420 ± 40 / 1380 – 1290 BP. Five radiocarbon dated charcoal samples are not included in this image, as the specific units from which they were recovered were not profiled. The capital letter (M) signifies the location of a sample taken from Unit 42, Stratum IV (80 cm BD) (Appendix 7) which was identified with the climactic eruption of Mazama, dated 6730 ± 40 ^{14}C BP and calibrated to 7509-7669 BP by Power et al. (2011:2524) with CALIB 5 using the Stuiver et al. (1998) data set.


C1
C2
C3
C5
C4
C6
C7
C8
C9
0 cm BD
20
40
60
80
100
120
140
160
180
200
I
II
III
IV
V
VI
M
1
2
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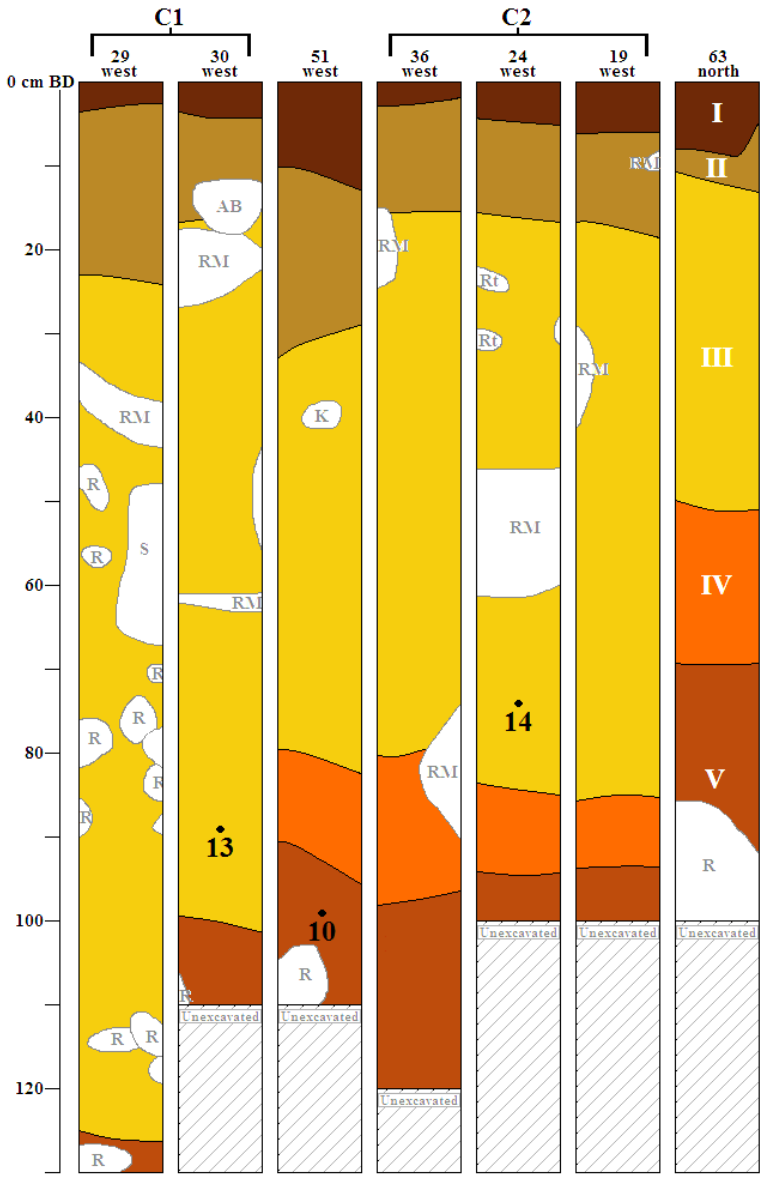


Figure 115. Picket graphics extracted from the center 10 cm segments of the profiles drawn in Units 51 and 63, and in blocks C1 and C2 of the Central zone in Area E. Units and blocks are ordered from left to right according to their location from west to east. Strata are indicated by roman numerals. R = rock; K = krotovina; AB = active burrow; RM = root mass; Rt = root; S = sandy inclusion. Numbers indicate depths of radiocarbon dated charcoal samples from profiled units (see Table 35), given as conventional radiocarbon age (BP) / 2σ calibrated age (BP): (10) Beta-313687, 6980 ± 40 / 7930 – 7700 BP; (13) Beta-288079, 5150 ± 40 / 5990 – 5760 BP; (14) Beta-288078, 1420 ± 40 / 1380 – 1290 BP.



Figure 116. Photograph of the 2 m west wall of Units 29 (left) and 30 (right) in block C1. Excavation is complete at 130 cm BD in Unit 29 and at 110 cm BD in Unit 30. Photo by author, 27 July 2010.



Figure 117. Photograph of the 3 m west wall of Units 36 (left), 24 (center), and 19 (right) in block C2. Excavation is complete at 120 cm BD in Unit 36 and at 100 cm BD in Units 24 and 19. Units 31 and 35 are located just below the photograph. Photo by author, 28 July 2010.

Stratum C1-C2 II – between 2 and 32 cm BD; dark yellowish brown (10YR 3/6, moist) silt loam; many (30% to 50%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; isolated large (1.6 to 3.2 cm) subrounded pebbles; friable, sticky, and slightly plastic; gradual wavy boundary; common (15% to 30% very small (2 to 4 mm) and small (4 to 8 mm) charcoal flecks, medium (8mm to 1.6 cm) charcoal fragments, and small pockets of charcoal stained soil; many fine (1 to 2 mm) and medium (2 to 5 mm) roots; frequent active burrows, insects, and krotovina containing Stratum C1-C2 I soils.

Stratum C1-C2 III – between 11 and 128 cm BD; yellowish brown to light yellowish brown (10YR 5/4 to 10YR 6/4, moist) sandy loam; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) subangular moderately-sorted quartz and mica grains; common (15% to 30%) subangular gravels consisting of small (4 to 8 mm) moderately sorted pebbles; few (< 2 % surface area) fine (<5 mm) diameter distinct brown (10YR 4/3, dry) mottles; friable, slightly sticky, and slightly plastic; gradual wavy boundary; few (5% to 15%) very small (2 to 4 mm) charcoal flecks and small (4 to 8 mm) charcoal fragments; common (fine (1 to 2 mm) diameter roots; common active burrows, insects, and krotovina containing Strata C1-C2 I and II soils.

Stratum C1-C2 IV – between 48 and 99 cm BD; brownish yellow (10YR 6/8, moist) sandy clay loam; fine (0.1 to 0.25 mm) subangular well-sorted quartz and mica grains; (few 5% to 15%) subangular gravels consisting of small (4 to 8 mm) well-sorted pebbles; isolated large (1.6 to 3.2 cm) and very large (3.2 to 6.4 cm) subrounded pebbles; many (> 20% surface area) medium (5 to 15 mm) diameter distinct dark gray (10YR 4/1, dry) mottles; firm, sticky, and plastic; abrupt wavy boundary; few (5% to 15%) small (4 to 8 mm) charcoal flecks and small (4 to 8 mm) charcoal fragments; very few micro (0.75 mm) diameter roots; few krotovina containing Strata C1-C2 II and III soils. Stratum C1-C2 IV was not observed in the Unit 29 and 30 profiles where sandy inclusions and concentrations of large pebbles and cobbles were common throughout.

Stratum C1-C2 V – between 58 and 130 cm BD (floor); dark yellowish brown (10YR 4/6, moist) loamy sand; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) subangular and angular moderately-sorted quartz and mica grains; few (5% to 15%) subangular and subrounded gravels consisting of very small (2 to 4 mm) and small (4 to 8 mm) moderately sorted pebbles; common large (1.6 to 3.2 cm) and very large (3.2 to 6.4 cm) subrounded pebbles, small (6.4 to 12.8 cm) and large (12.8 to 25.6 cm) subangular and subrounded cobbles, and common large (> 25.6 cm) boulders; friable, slightly sticky, and nonplastic; very few (< 5%) very small (2 to 4 mm) charcoal flecks. Stratum C1-C2 V comprised the final stratum in the C1-C2 units as well as in Units 51 and 63.

Stratum C1-C2 VI – absent.

Area E Central C3 (Figures 118-121)

Stratum C3 I – between 0 and 5 cm BD; brown (10YR 4/3, moist) silt loam; many (30% to 50%) subangular and subrounded gravels consisting of small (4 to 8 mm) and

Figure 118 (following page). Picket graphics extracted from the center 10 cm segments of the profiles drawn in block C3 of the Central zone in Area E. Units are ordered from left to right according to their location from west to east. Strata are indicated by roman numerals. R = rock; K = krotovina; RM = root mass. Numbers indicate depths of radiocarbon dated charcoal samples from profiled units (see Table 35), given as conventional radiocarbon age (BP) / 2σ calibrated age (BP): (1) Beta-336973, 11,780 ± 40 / 13,740 – 13,490 BP; (2) Beta-288085, 10,680 ± 50 / 12,650 – 12,560 BP; (12) Beta-288082, 5200 ± 40 / 6000 – 5910 BP. The capital letter (M) signifies the location of a sample taken from Unit 42, Stratum IV (80 cm BD) (Appendix 7) which was identified with the climactic eruption of Mazama, dated 6730 ± 40 ^{14}C BP and calibrated to 7509-7669 BP by Power et al. (2011:2524) with CALIB 5 using the Stuiver et al. (1998) data set.

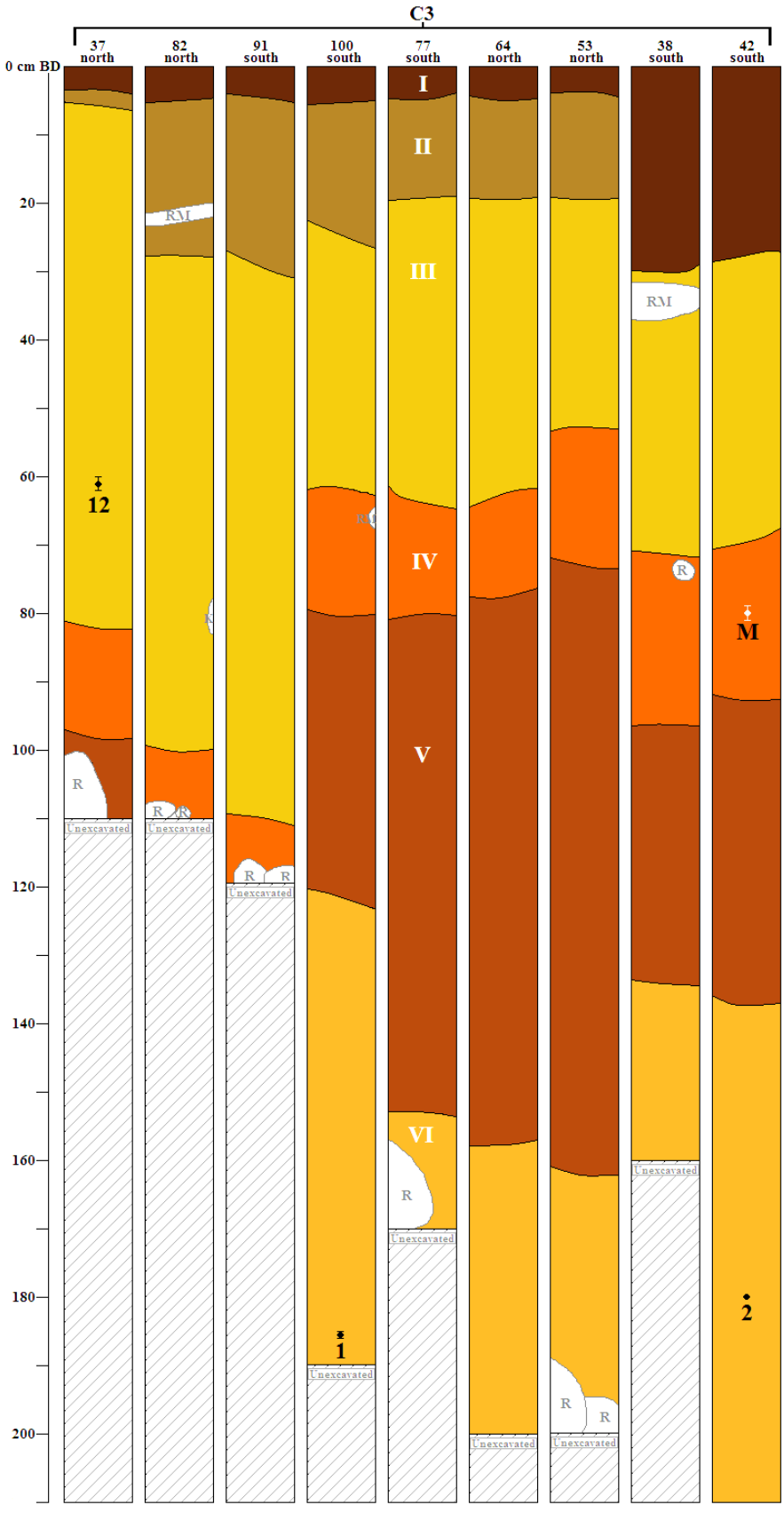

C3
37 north
82 north
91 south
100 south
77 south
64 north
53 north
38 south
42 south
0 cm BD
20
40
60
80
100
120
140
160
180
200
I
II
III
IV
V
VI
RM
R
Unexcavated
12
1
M
2



Figure 119. Photograph of the 1 m north wall of Unit 37 in block C3. Excavation is complete at 110 cm BD. Photo by author, 27 July 2010.



Figure 120. Photograph of the 2 m south wall of Units 100 (left) and 77 (right) in block C3. Excavation is complete at 190 cm BD in Unit 100 and at 170 cm BD in Unit 77. Photo by Lee Sappington, 11 July 2012



Figure 121. Photograph of the 2 m south wall of Units 38 (left) and 42 (right) in block C3. Excavation is complete at 160 cm BD in Unit 38 and at 210 cm BD in Unit 42. Photo by Alyson Kral, 2 August 2010.

medium (8 mm to 1.6 cm) moderately sorted pebbles; isolated very large (3.2 to 6.4 cm) subrounded pebbles; friable, sticky, and slightly plastic; clear smooth boundary; common (15% to 30%) small (4 to 8 mm) charcoal flecks and small pockets of charcoal stained soil; many (fine (1 to 2 mm) and medium (2 to 5 mm) diameter roots; frequent active burrows, insects, and krotovina.

Stratum C3 II – between 3 and 31 cm BD; dark yellowish brown (10YR 4/6, moist) silt loam; common (15% to 30 %) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; isolated large (1.6 to 3.2 cm) subrounded pebbles; friable, sticky, and slightly plastic; gradual wavy boundary; common (15% to 30%) very small (2 to 4 mm) and small (4 to 8 mm) charcoal flecks, medium (8 mm to 1.6 cm) charcoal fragments, and small pockets of charcoal stained soil; many fine (1 to 2 mm) and medium (2 to 5 mm) diameter roots; frequent active burrows, insects, and krotovina.

Stratum C3 III – between 5 and 111 cm BD; yellowish brown (10YR 5/8, moist) sandy loam; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) subangular moderately-sorted quartz and mica grains; common (15% to 30%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 to 1.6 cm) moderately-sorted pebbles; common (2% to 20% surface area) fine (< 5mm) diameter distinct brown (10YR 5/3, dry) mottles; friable, slightly sticky, and slightly plastic; gradual wavy boundary; few (5% to 15%) very small (2 to 4 mm) charcoal flecks, small (4 to 8 mm) charcoal fragments and small pockets of charcoal stained soil; common fine (1 to 2 mm) diameter roots; common active burrows, insects, and krotovina containing Strata C3 I and II soils.

Stratum C3 IV – between 27 and 120 cm BD; brownish yellow (10YR 6/8, moist) sandy clay loam; fine (0.1 to 0.25 mm) subangular well-sorted quartz and mica grains; few (5% to 15%) subangular gravels consisting of small (4 to 8 mm) well-sorted pebbles; isolated large (1.6 to 3.2 cm) and very large (3.2 to 6.4 cm) subrounded pebbles; many (> 20% surface area) medium (5 to 15 mm) diameter distinct dark gray (10YR 4/1, dry) mottles; firm, sticky, and plastic; abrupt wavy boundary; few (5% to 15%) small (4 to 8 mm) charcoal flecks and small (4 to 8 mm) charcoal fragments; very few micro (< 0.75 mm) diameter roots; few krotovina containing preceding strata soils.

Stratum C3 V – between 43 and 162 cm BD; dark yellowish brown (10YR 4/4, moist) loamy sand; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) angular and subangular moderately-sorted quartz and mica grains; few (5% to 15%) subangular and subrounded gravels consisting of very small (2 to 4 mm) and small (4 to 8 mm) moderately-sorted pebbles; isolated large (1.6 to 3.2 cm) subrounded pebbles, and small (6.4 to 12.8 cm) and large (12.8 to 25.6 cm) subangular and subrounded cobbles; friable, slightly sticky, and nonplastic; clear wavy boundary; common (15% to 30%) very small (2 to 4 mm) charcoal flecks and large pockets of charcoal stained soil.

Stratum C3 VI – between 119 and 210 cm BD (floor); dark yellowish brown (10YR 3/6, moist) sand; medium (0.25 to 0.5 mm) and coarse (0.5 to 1 mm) angular and subangular poorly-sorted quartz and mica grains; common (15% to 30%) subangular and

subrounded small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; common small (6.4 to 12.8 cm) and large (12.8 to 25.6 cm) subrounded cobbles, and large (> 25.6 cm) boulders; loose, nonsticky, and nonplastic; few (5% to 15%) very small (2 to 4 mm) charcoal flecks. Stratum C3 VI was the final stratum observed in Area E and was only encountered in C3 in those units that reached the greatest depths.

Area E Central C4-C5 (Figures 122-124)

Stratum C4-C5 I – between 0 and 19 cm BD; brown (10YR 5/3, moist) silt loam; many (30% to 50%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; isolated very large (3.2 to 6.4 cm) subrounded pebbles; friable, sticky, and slightly plastic; clear smooth boundary; common (15% to 30%) small (4 to 8 mm) charcoal flecks, small (4 to 8 mm) charcoal fragments, and small and large pockets of charcoal stained soil; many fine (1 to 2 mm) and medium (2 to 5 mm) diameter roots; frequent active burrows, insects, and krotovina.

Stratum C4-C5 II – between 7 and 48 cm BD; dark yellowish brown (10YR 4/4, moist) silt loam; many (30% to 50%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; isolated large (1.6 to 3.2 cm) subrounded pebbles; friable, sticky, and slightly plastic; clear wavy boundary; common (15% to 30%) very small (2 to 4 mm) and small (4 to 8 mm) charcoal flecks, medium (8 mm to 1.6 cm) fragments, and small and large pockets of charcoal stained soil; many fine (1 to 2 mm) and medium (2 to 5 mm) diameter roots; frequent active burrows, insects, and krotovina containing Stratum C4-C5 I soils.

Stratum C4-C5 III – between 19 and 109 cm BD; yellowish brown to pale brown (10YR 5/4 to 10YR 6/3, moist) sandy loam; fine (0.1 to 0.25 mm) subangular moderately-sorted quartz and mica grains; common (15% to 30%) subangular gravels consisting of small (4 to 8 mm) moderately-sorted pebbles; friable, slightly sticky, and slightly plastic; gradual wavy boundary; few (5% to 15%) very small (2 to 4 mm) charcoal flecks and small (4 to 8 mm) charcoal fragments; common fine (1 to 2 mm) diameter roots; common active burrows, insects, and krotovina containing Strata C4-C5 I and II soils.

Stratum C4-C5 IV – between 30 and 117 cm BD; brownish yellow (10YR 6/6, moist) sandy clay loam; fine (0.1 to 0.25 mm) subangular well-sorted quartz and mica grains; few (5% to 15%) subangular gravels consisting of small (4 to 8 mm) well-sorted pebbles; isolated large (1.6 to 3.2 cm) and very large (3.2 to 6.4 cm) subrounded pebbles; many (> 20% surface area) medium (5 to 15 mm) diameter distinct dark gray (10YR 4/1, dry) mottles; firm, sticky, and plastic; abrupt wavy boundary; common (15% to 30%) small (4 to 8 mm) charcoal flecks and small (4 to 8 mm) charcoal fragments; very few micro (< 0.75 mm) diameter roots; few krotovina containing preceding strata soils.

Stratum C4-C5 V – between 60 and 120 cm BD (floor); dark yellowish brown (10YR 3/6, moist) loamy sand; fine (0.1 to 0.25 mm) angular and subangular moderately-sorted quartz and mica grains; few (5% to 15%) subangular and subrounded gravels

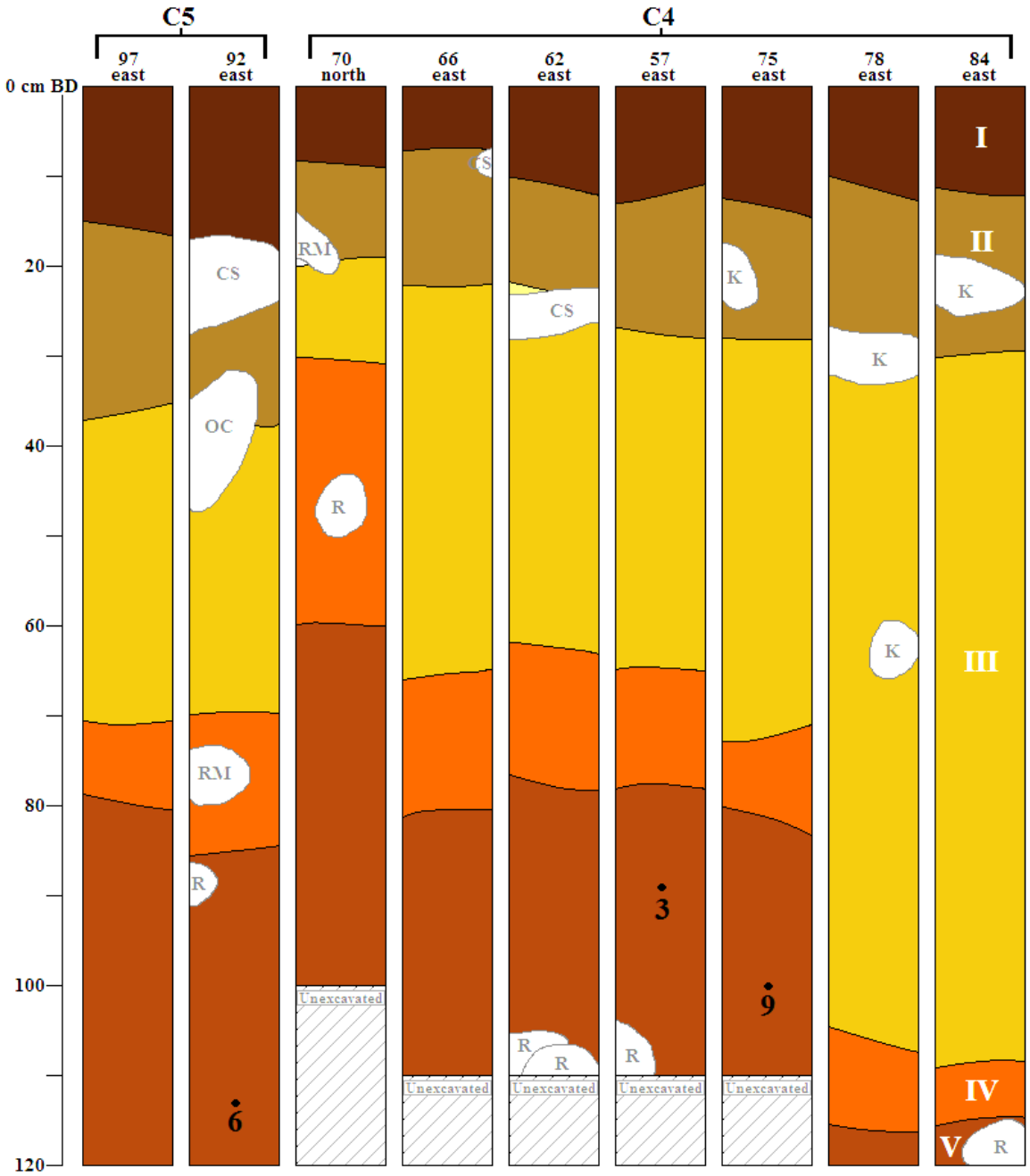


Figure 122. Picket graphics extracted from the center 10 cm segments of the profiles drawn in blocks C4 and C5 of the Central zone in Area E. Strata are indicated by roman numerals. R = rock; K = krotovina; CS = charcoal staining; RM = root mass; OC = oxide concretion. Numbers indicate depths of radiocarbon dated charcoal samples from profiled units (see Table 35), given as conventional radiocarbon age (BP) / 2σ calibrated age (BP): (3) Beta-313690, 8120 ± 40 / 9130 – 9000 BP; (6) Beta-336972, 7730 ± 40 / 8590 – 8420 BP; (9) Beta-313695, 7030 ± 40 / 7950 – 7790 BP.



Figure 123. Photograph of the 1 m east wall of Unit 97 (left) and 80 cm of the east wall of Unit 92 (right) in block C5. Excavation is complete at 120 cm BD in both units. Photo by Lee Sappington, 12 July 2012.



Figure 124. Photograph of the 2 m east wall of Units 78 (left) and 84 (right) in block C4. Excavation is complete in both units at 120 cm BD. Photo by Lee Sappington, 10 July 2012.

consisting of very small (2 to 4 mm) and small (4 to 8 mm) moderately sorted pebbles; common large (1.6 to 3.2 cm) subrounded pebbles; many small (6.4 to 12.8 cm) and large (12.8 to 25.6 cm) subangular and subrounded cobbles, and large (> 25.6 cm) boulders; friable, slightly sticky, and nonplastic; common (15% to 30%) very small (2 to 4 mm) charcoal flecks; very few micro (< 0.75 mm) diameter roots.

Stratum C4-C5 VI – absent.

Area E Central C6-C8 (Units 46, 87, and 96 included) (Figures 125-129)

Stratum C6-C8 I – between 0 and 19 cm BD; brown (10YR 4/3, moist) silt loam; many (30% to 50%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; isolated very large (3.2 to 6.4 cm) subrounded pebbles; friable, sticky, and slightly plastic; clear smooth boundary; common (15% to 30%) small (4 to 8 mm) charcoal flecks and large pockets of charcoal stained soil; many fine (1 to 2 mm) and medium (2 to 5 mm) diameter roots; frequent active burrows, insects, and krotovina.

Stratum C6-C8 II – between 5 and 40 cm BD; dark yellowish brown (10YR 3/6, moist), silt loam; many (30% to 50%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; isolated large (1.6 to 3.2 cm) subrounded pebbles; friable, sticky, and slightly plastic; gradual wavy boundary; many (30% to 50%) very small (2 to 4 mm) and small (4 to 8 mm) charcoal flecks, medium (8 mm to 1.6 cm) charcoal fragments, and small and large pockets of charcoal stained soil; many fine (1 to 2 mm) and medium (2 to 5 mm) diameter roots; frequent active burrows, insects, and krotovina containing Strata C6-C8 I soils.

Stratum C6-C8 III – between 7 and 92 cm BD; yellowish brown (10YR 5/6, moist) sandy loam; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) subangular moderately-sorted quartz and mica grains; common (15% to 30%) subangular gravels consisting of small (4 to 8 mm) moderately-sorted pebbles; common (2% to 20% surface area) medium (5 to 15 mm) diameter distinct dark brown (10YR 3/3, dry) mottles; friable, slightly sticky, and slightly plastic; gradual wavy boundary; few (5% to 15%) very small (2 to 4 mm) charcoal flecks, small (4 to 8 mm) charcoal fragments, and small and large pockets of charcoal stained soil; many fine (1 to 2 mm) diameter roots; few insects and krotovina containing Strata C6-C8 I and II soils.

Stratum C6-C8 IV – between 12 and 89 cm BD; brownish yellow (10YR 6/6, moist) sandy clay loam; fine (0.1 to 0.25 mm) subangular well-sorted quartz and mica grains; few (5% to 15%) subangular gravels consisting of small (4 to 8 mm) well-sorted pebbles; isolated large (1.6 to 3.2 cm) and very large (3.2 to 6.4 cm) subrounded pebbles; many (> 20% surface area) medium (5 to 15 mm) diameter distinct dark gray (10YR 4/1, dry) mottles; firm, sticky, and plastic; gradual irregular boundary; common (15% to 30%) small (4 to 8 mm) charcoal flecks and small (4 to 8 mm) charcoal fragments; common fine (1 to 2 mm) diameter roots; few krotovina containing preceding strata soils.

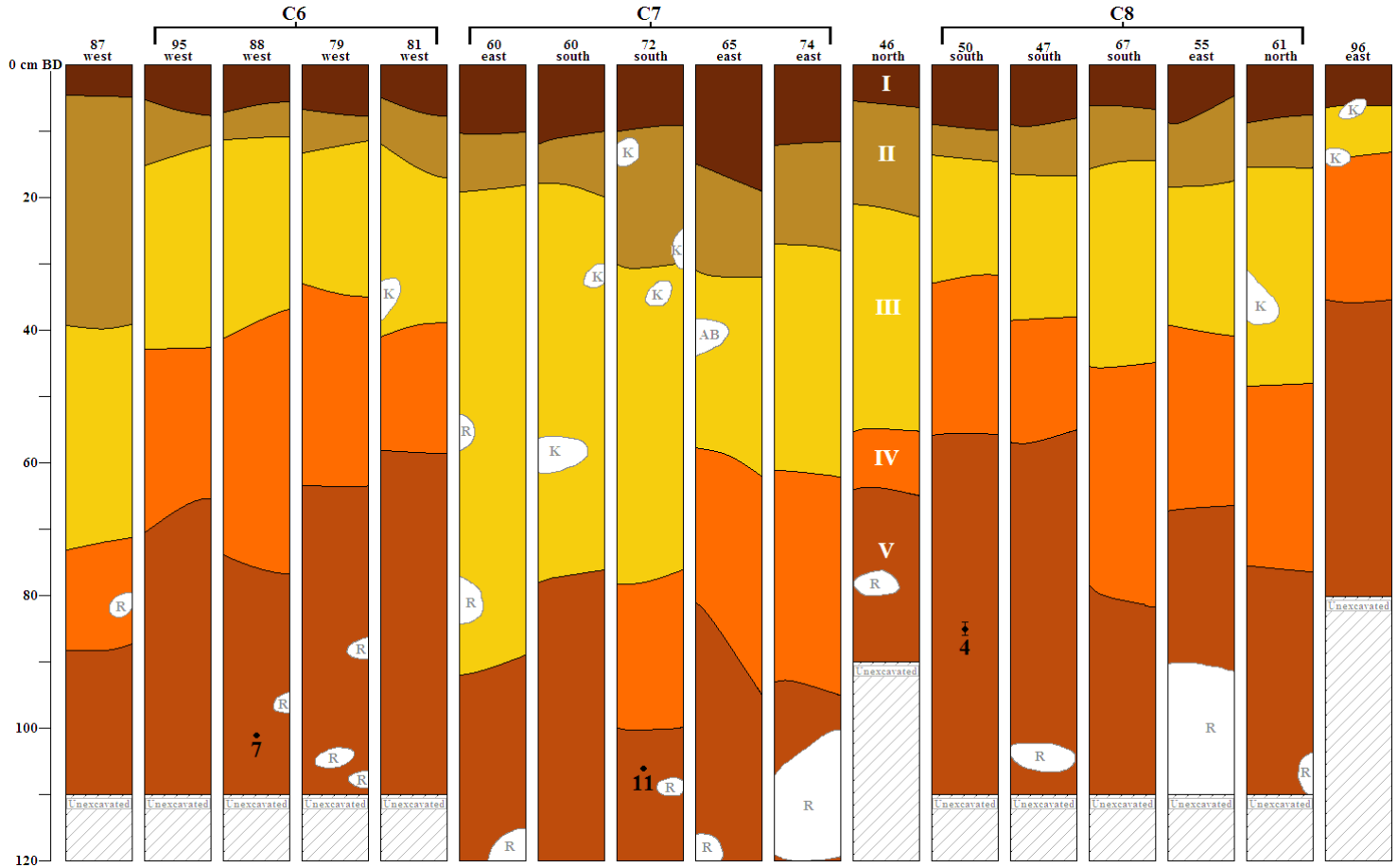


Figure 125. Picket graphics extracted from the center 10 cm segments of the profiles drawn in Units 87 and 46, and in blocks C6, C7, and C8 of the Central zone in Area E. Strata are indicated by roman numerals. R = rock; K = krotovina; AB = active burrow. Numbers indicate depths of radiocarbon dated charcoal samples from profiled units (see Table 35), given as conventional radiocarbon age (BP) / 2σ calibrated age (BP): (4) Beta-313686, 7940 ± 40 / 8990 – 8610 BP; (7) Beta-336970, 7660 ± 30 / 8540 – 8400 BP; (11) Beta-313694, 6870 ± 40 / 7790 – 7620 BP.



Figure 126. Photograph of the 2 m west wall of Units 95 (left) and 88 (right) in block C6. Excavation is complete in both units at 110 cm BD. Photo by Lee Sappington, 10 July 2012.



Figure 127. Photograph of the 2 m south wall of Units 60 (left) and 72 (right) in block C7. Excavation is complete at 120 cm BD in both units. Photo by Daniel Carlini, 7 July 2011.



Figure 128. Photograph of the 3 m south wall of Units 50 (left), 47 (center), and 67 (right) in block C8. Excavation is complete in each unit at 110 cm BD. Photo by Daniel Carlini, 6 July 2011.



Figure 129. Photograph of the 1 m east wall of Unit 96 in the Central zone in Area E. Excavation is complete at 80 cm BD. Photo by Lee Sappington, 10 July 2011.

Stratum C6-C8 V – between 36 and 120 cm BD (floor); dark yellowish brown (10YR 3/4, moist) loamy sand; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) angular and subangular moderately-sorted quartz and mica grains; few (5% to 15%) subangular and subrounded gravels consisting of very small (2 to 4 mm) and small (4 to 8 mm) moderately-sorted pebbles; isolated large (1.6 to 3.2 cm) subrounded pebbles; common small (6.4 to 12.8 cm) and large (12.8 to 25.6 cm) subangular and subrounded cobbles, and large (> 25.6 cm) boulders; friable, slightly sticky, and nonplastic; common (15% to 30%) very small (2 to 4 mm) charcoal flecks.

Stratum C6-C8 VI – absent.

Area E Central C9 (Units 43 and 99 included) (Figures 130-132)

Stratum C9 I – between 0 and 10 cm BD; dark brown (10YR 5/3, moist) silt loam; many (30% to 50%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 mm and 1.6 cm) moderately-sorted pebbles; isolated very large (3.2 to 6.4 cm) subrounded pebbles; friable, sticky, and slightly plastic; clear smooth boundary; few (5% to 15%) small (4 to 8 mm) charcoal flecks; many fine (1 to 2 mm) and medium (2 to 5 mm) diameter roots; frequent, active burrows, insects, and krotovina.

Stratum C9 II – between 1 and 22 cm BD; dark yellowish brown (10YR 3/4, moist) silt loam; many (30% to 50%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; isolated large (1.6 to 3.2 cm) subrounded pebbles; friable, sticky, and plastic; gradual irregular boundary; common (15% to 30%) small (4 to 8 mm) charcoal flecks, medium (8 mm to 1.6 cm) charcoal fragments, and small and large pockets of charcoal staining; many fine (1 to 2 mm) and medium (2 to 5 mm) diameter roots; frequent active burrows, insects, and krotovina containing Stratum C9 I soils.

Stratum C9 III – between 3 and 83 cm BD; yellowish brown to brownish yellow (10YR 5/6 to 10YR 6/6, moist) sandy loam; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) subangular moderately-sorted quartz and mica grains; common (15% to 30%) subangular gravels consisting of small (4 to 8 mm) moderately-sorted pebbles; common (2% to 20% surface area) fine (<5 mm) diameter distinct dark grayish brown (10YR 4/2, dry) mottles; friable, slightly sticky, slightly plastic; gradual irregular boundary; few (5% to 15%) very small (2 to 4 mm) charcoal flecks, small (4 to 8 mm) charcoal fragments, and large pockets of charcoal stained soil; common micro (0.75 mm) and fine (1 to 2 mm) diameter roots; common active burrows, insects, and krotovina containing preceding strata soils.

Stratum C9 IV – between 61 and 79 cm BD; brownish yellow (10YR 6/8, moist) sandy clay loam; fine (0.1 to 0.25 mm) subangular well-sorted quartz and mica grains; common (15% to 30% subangular gravels consisting of small (4 to 8 mm) well-sorted pebbles; isolated large (1.6 to 3.2 cm) and very large (3.2 to 6.4 cm) subrounded pebbles; many (> 20% surface area) medium (5 to 15 mm) diameter prominent gray (10YR 6/1, dry) mottles; firm, sticky, and plastic; diffuse irregular boundary; few (5% to 15%) small

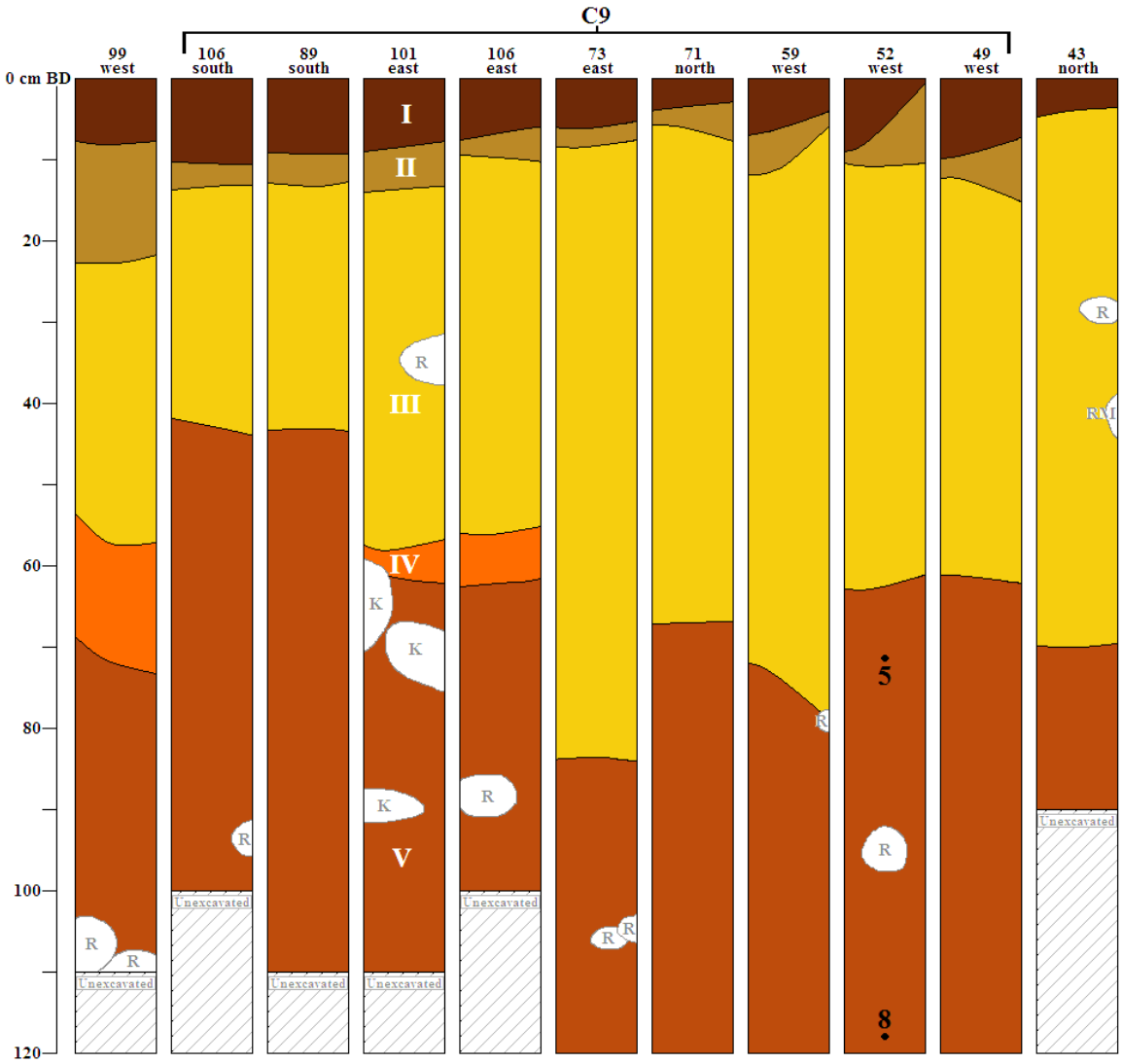


Figure 130. Picket graphics extracted from the center 10 cm segments of the profiles drawn in block C9 of the Central zone in Area E. Strata are indicated by roman numerals. R = rock; K = krotovina; RM = root mass. Numbers indicate depths of radiocarbon dated charcoal samples from profiled units (see Table 35), given as conventional radiocarbon age (BP) / 2σ calibrated age (BP): (5) Beta-313688, 7900 ± 40 / 8980 – 8600 BP; (8) Beta-313689, 7200 ± 40 / 8150 – 7950 BP.



Figure 131. Photograph of the 2 m east wall of Units 101 (left) and 106 (right) in block C9. Excavation is complete at 110 cm BD in Unit 101 and at 100 cm BD in unit 106. Photo by Lee Sappington, 12 July 2012.



Figure 132. Photograph of the 3 m west wall of Units 59 (left), 52 (center), and 49 (right) in block C9. Excavation is complete in each unit at 120 cm BD. Photo by Daniel Carlini, 7 July 2011.

(4 to 8 mm) charcoal flecks and small (4 to 8 mm) charcoal fragments; very few micro (< 0.75 mm) diameter roots; few krotovina containing preceding strata soils.

Stratum C9 V – between 42 and 120 cm BD (floor); dark yellowish brown (10YR 4/6, moist) loamy sand; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) angular and subangular moderately-sorted quartz and mica grains; few (5% to 15%) subrounded gravels consisting of very small (2 to 4 mm) and small (4 to 8 mm) moderately-sorted pebbles; few large (1.6 to 3.2 cm) subrounded pebbles, and small (6.4 to 12.8 cm) and large (12.8 to 25.6 cm) subangular and subrounded cobbles; common large (> 25.6 cm) boulders; friable, slightly sticky, nonplastic; few (5% to 15%) very small (2 to 4 mm) charcoal flecks.

Stratum C9 VI – absent.

Area E East

One 1 x 1 m test unit and two contiguous 1 x 2 m units pairs were placed at 10 m intervals in Area E East in 2010. In 2012, an additional 1 x 2 m pair and 1 x 1 m unit were excavated nearer to the C3 block in Area E Central. A maximum depth of 180 cm BD was reached in Unit 102 while Unit 45 ended in sterile deposits at 50 cm BD. Profiles were examined in each of the 1 x 2 m pairs and in Unit 39. As in Area E Central, the strata fluctuated noticeably between each of the profile locations, while coarse gravels and sand content increased toward the east. The distinctive Stratum IV was present in each unit, though Stratum III occurred below Stratum IV in Units 102, 39, and 40. Stratum VI was present as a coarse, dark yellowish brown sand in the final levels of Units 102 and 39, while in Unit 41 Stratum VI was a light yellowish brown. The soils and sediments in the East were nearly identical to that observed in the West and Central zones of Area E, so that the Strata I-VI sequence applies to the East as well. The composite descriptions below correspond with each profile in the East zone (Figures 133-135).

Stratum East I – between 0 and 11 cm BD; brown (10YR 5/3, moist) silt loam; many (20% to 50%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; isolated large (1.6 to 3.2 cm)

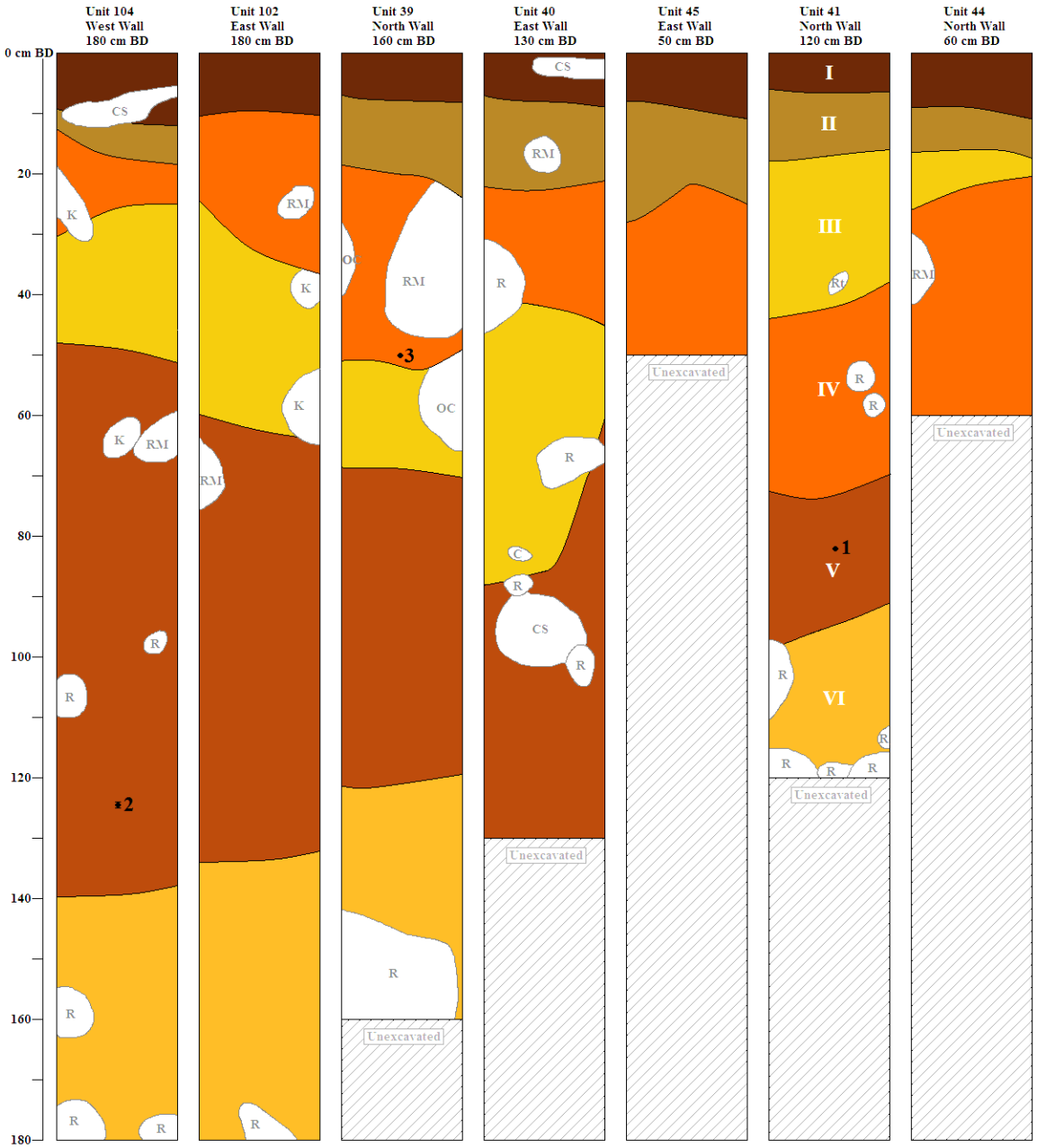


Figure 133. Picket graphics extracted from the center 10 cm segments of the profiles drawn in the East zone in Area E. Strata are indicated by roman numerals. Units are ordered from left to right according to their location from west to east. R = rock; K = krotovina; RM = root mass; Rt = root; C = charcoal; CS = charcoal staining; OC = oxide concretion. Numbers indicate the depths of radiocarbon dated charcoal samples from profiled units (see Table 35), given as conventional radiocarbon age (BP) / 2 σ calibrated age (BP): (1) Beta-288084, 7790 ± 40 / 8630 – 8460 BP; (2) Beta-336974, 7480 ± 40 / 8380-8190 BP; (3) Beta-288083, 140 ± 40 / 290 – 0 BP.



Figure 134. Photograph of the 2 m east wall of Units 102 (left) and 108 (right) in the East zone in Area E. Excavation is complete at 180 cm BD in Unit 102 and at 170 cm BD in unit 108. Photo by Lee Sappington, 11 July 2012.



Figure 135. Photograph of the 2 m north wall of Units 41 (left) and 44 (right) in the East zone in Area E. Excavation is complete at 120 cm BD in Unit 41 and at 60 cm BD in Unit 44. Photo by author, 22 July 2010.

subrounded pebbles; friable, sticky, and slightly plastic; clear smooth boundary; few (5% to 15%) small (4 to 8 mm) charcoal flecks and small pockets of charcoal stained soil; many fine (1 to 2 mm) and medium (2 to 5 mm) diameter roots; frequent active burrows, insects, and krotovina.

Stratum East II – between 8 and 29 cm BD; dark yellowish brown (10YR 4/4, moist) sandy loam; very fine (0.05 to 0.1 mm) subangular well-sorted quartz and mica grains; many (20% to 50%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; isolated (large 1.6 to 3.2 cm) subrounded pebbles; friable, slightly sticky, and slightly plastic; gradual wavy boundary; common (15% to 30%) very small (2 to 4 mm) and small (4 to 8 mm) charcoal flecks, medium (8 mm to 1.6 cm) charcoal fragments, and small pockets of charcoal stained soil; many fine (1 to 2 mm) and medium (2 to 5 mm) diameter roots; frequent active burrows, insects, and krotovina containing Stratum East I soils.

Stratum East III – between 17 and 89 cm BD; pale brown to yellowish brown (10YR 6/3 to 10YR 5/4, moist) sandy loam; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) subangular moderately-sorted quartz and mica grains; common (15% to 30%) subangular and subrounded gravels consisting of small (4 to 8 mm) moderately-sorted pebbles; common (2% to 20% surface area) fine (< 5mm) diameter distinct brown (10YR 5/3, dry) mottles; friable, slightly sticky, and slightly plastic; gradual wavy boundary; many (30% to 50%) very small (2 to 4 mm) charcoal flecks and small (4 to 8 mm) charcoal fragments; common micro (< 0.75 mm) and fine (1 to 2 mm) diameter roots; common insects and krotovina containing preceding strata soils.

Stratum East IV – between 10 and 72 cm BD; brownish yellow (10YR 6/8, moist) sandy clay loam; fine (0.1 to 0.25 mm) subangular well-sorted quartz and mica grains; common (15% to 30%) subangular gravels consisting of small (4 to 8 mm) well-sorted pebbles; isolated (large 1.6 to 3.2 cm) and very large (3.2 to 6.4 cm) subrounded pebbles; many (> 20% surface area) medium (5 to 15 mm) distinct dark gray (10YR 4/1, dry) mottles; firm, sticky, and plastic; abrupt irregular boundary; few (5% to 15%) small (4 to 8 mm) charcoal flecks and small (4 to 8 mm) charcoal fragments; very few micro (< 0.75 mm) diameter roots; few krotovina containing preceding strata soils.

Stratum East V – between 61 and 135 cm BD; dark yellowish brown (10YR 4/6, moist) loamy sand; fine (0.1 to 0.25 mm) and medium (0.25 to 0.5 mm) subangular moderately-sorted quartz and mica grains; common (15% to 30%) subangular and subrounded gravels consisting of very small (2 to 4 mm) and small (4 to 8 mm) moderately-sorted pebbles; many medium (8 mm to 1.6 cm) subrounded pebbles; isolated small (6.4 to 12.8 cm) and large (12.8 to 25.6 cm) subangular and subrounded cobbles, and large (> 25.6 cm) boulders; friable, slightly sticky, and nonplastic; clear wavy boundary; common (15% to 30%) very small (2 to 4 mm) charcoal flecks and large pockets of charcoal stained soil; very few micro (0.75 mm) diameter roots.

Stratum East VI – between 91 and 180 cm BD (floor); dark yellowish brown to yellowish brown (10YR 3/6 to 10YR 5/4, moist) sand; medium (0.25 to 0.5 mm) and

coarse (0.5 to 1 mm) angular and subangular poorly-sorted quartz and mica grains; common (15% to 30%) subangular and subrounded gravels consisting of small (4 to 8 mm) and medium (8 mm to 1.6 cm) moderately-sorted pebbles; common small (6.4 to 12.8 cm) and large (12.8 to 25.6 cm) subrounded cobbles; loose, nonsticky, and nonplastic; few (5% to 15%) very small (2 to 4 mm) charcoal flecks.

8. CULTURAL MATERIAL ASSEMBLAGE

Introduction

The following descriptions apply to the cultural material recovered during the 2010-2012 UI investigations, as well as the materials collected during investigations conducted previously, between 1979 and 1996 (see Chapter 6). Prehistoric cultural materials recovered from 10CW34 have been placed in six basic categories, several of which comprise a number of subcategories, pertaining to both temporal and functional characteristics. Lithic tools and debitage are predominate in the assemblage, demonstrating a continuity in material culture with that of the Clearwater River region and the surrounding Plateau region (Figure 136).

The Prehistoric Component

Lithic Materials

The entire cultural assemblage recovered at 10CW34 consists of lithic materials (Figure 137). Though a number of bones, wood fragments, and floral samples were collected during excavation, many of these items are too fragmentary to determine whether they were deposited naturally or as a result of cultural activities (Appendix 8). A variety of lithic materials were utilized and many were brought to the site from both regional and distant locations. Raw material was likely procured both directly from known or encountered sources in nearby areas, and indirectly, by local and interregional trade.

Chert (C) is the most frequent material and was encountered primarily as debitage and flaked tools, though five exhausted chert cores were also recovered (Figure 138*a*). This category includes all materials referred to as chalcedony, jasper, agate, and opal,

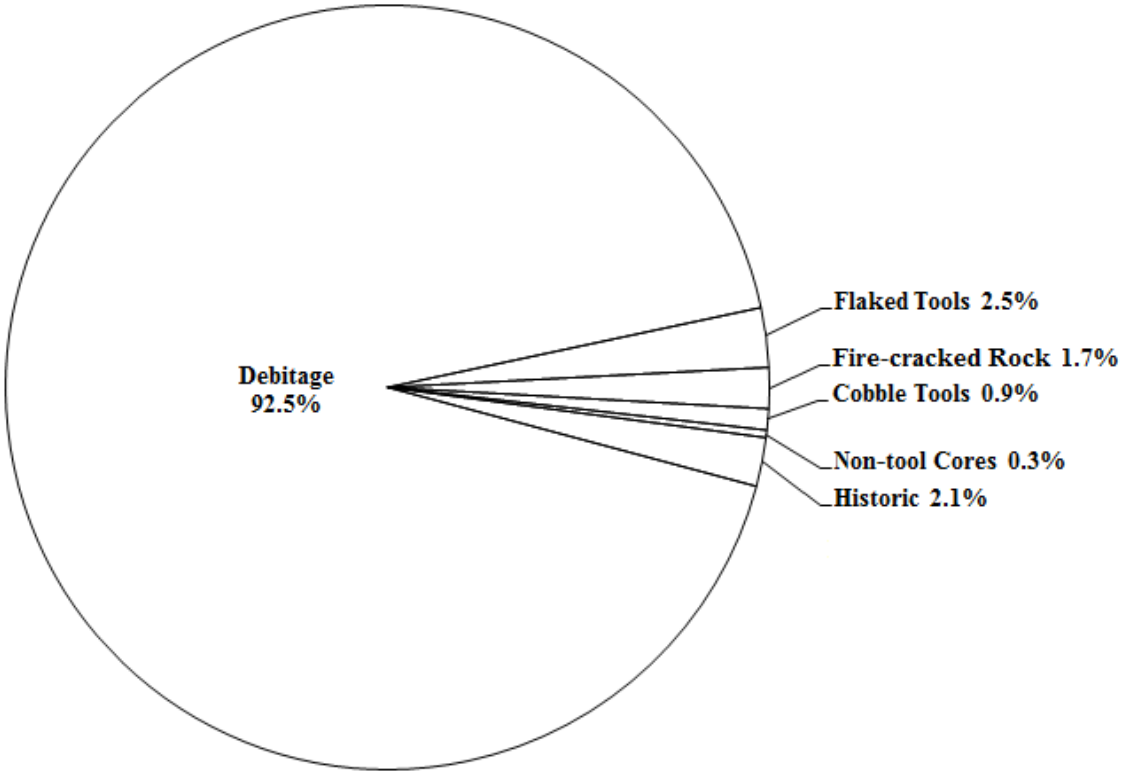
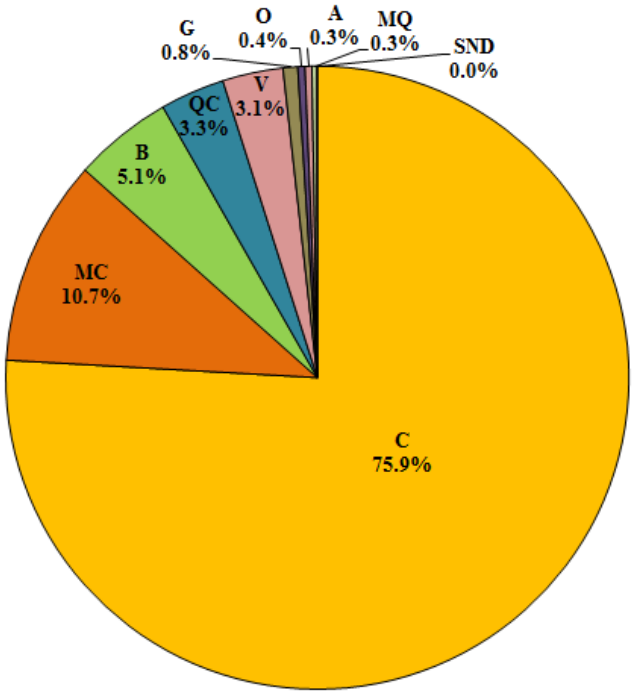


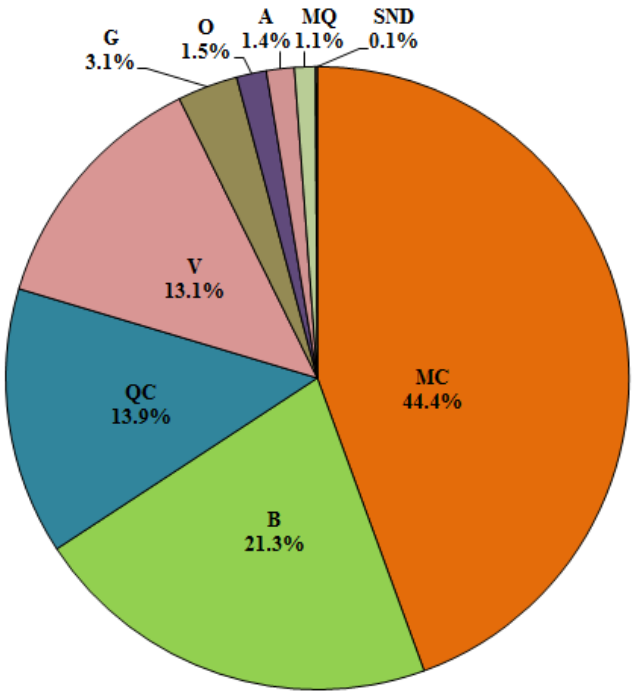
Figure 136. Pie chart showing percentages of artifact types recovered at 10CW34.

which are macroscopically identified as micro- and crypto-crystalline quartz and which consist predominantly of silica (SiO_2) (Luedtke 1992:6-7). Cherts can be found throughout the Plateau, commonly as precipitated nodules within basalt vesicles or cooled joints between basalt columns. Also common in the southern Plateau, as well as in the Northwest Plains, are sedimentary, or interbed cherts, formed from buried silicified organics which accumulated between successive basalt flows (Hess 1996:52; Miller 1991:459-472).

Fine-grained metamorphic cobble (MC) material containing a high amount of quartz with metamorphosed quartzite and rhyolitic properties is the second most abundant. This material was represented by the most variety of artifact types and was

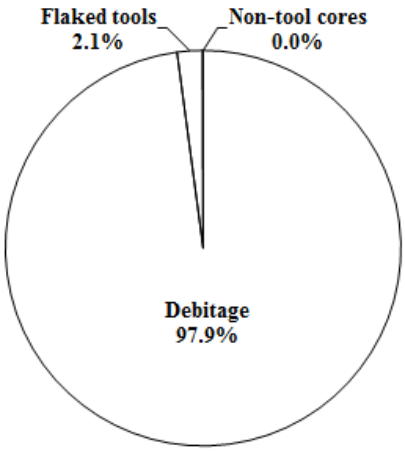


Total 10CW34 Artifact Materials (n=17,210)

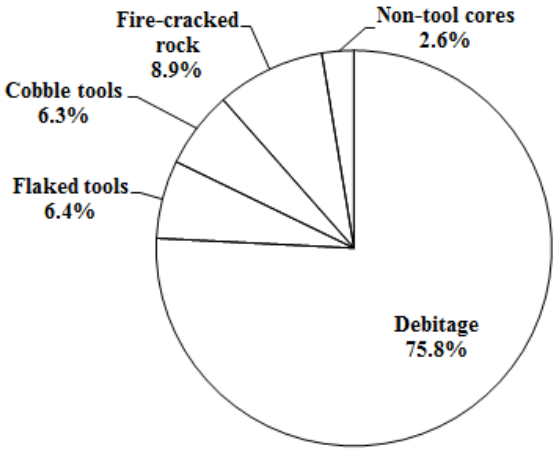


10CW34 Non-Chert Artifact Materials (n=4148)

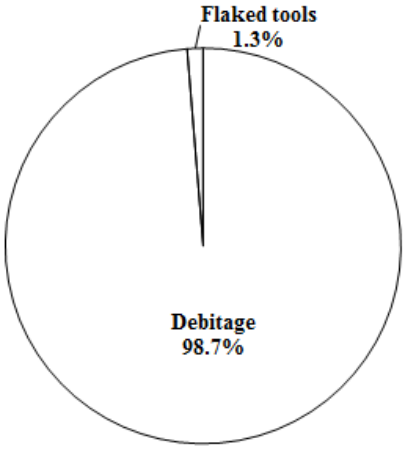
Figure 137. Pie charts showing overall frequencies of raw materials utilized at 10CW34. Cherts (n=12,666) are excluded in the bottom chart. C=cherts; MC = metamorphic cobble; B=basalt; QC=quartz crystal; V=vitrophyre; G=granite; O=obsidian; A= argillite; MQ=metamorphic quartzite; SND=sandstone



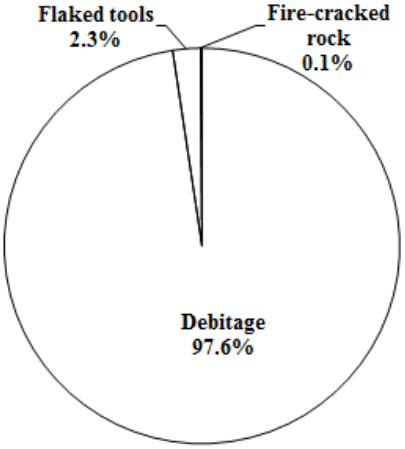
(a) Cherts



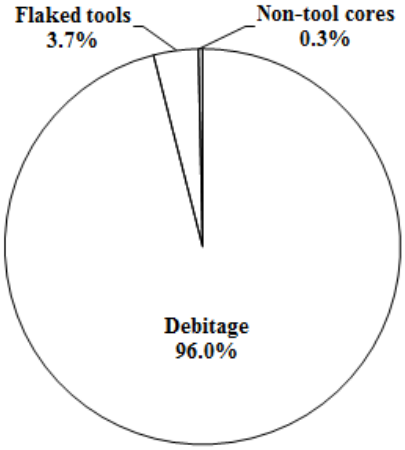
(b) Metamorphic Cobble



(c) Vitrophyre



(d) Basalt



(e) Quartz Crystal

Figure 138. Pie charts showing frequencies of 10CW34 artifact types produced from cherts (n=13,062), metamorphic cobble (n=1843), vitrophyre (n=542), basalt (n=885), and quartz crystal (n=575). Fire-cracked rock is counted by quantity and not weight.

utilized extensively at 10CW34 for tool production. Metamorphic cobble also appears to have been important for activities involving fire (Figure 138*b*). Metamorphic cobbles are readily available at the margins of the site where it is transported by the North Fork and they can also be procured at any point along the river. Coarse-grained metamorphic quartzite (MQ) and granitic (G) cobbles are also locally available near the riverbed and these materials were present predominantly as fire-cracked rock, though a number of flaked and battered cobble tools were produced from these materials (Figure 139*c*-*d*).

Vitrophyre (V) can be obtained near Fish Creek and along the Lochsa and Selway rivers (Sappington et al. 1991:39; Sappington et al. 1997:34). While seven vitrophyre flaked tools were encountered, debitage was the most frequent artifact type recovered for this material (Figure 138*c*). Several vitrophyre flakes were identified with a nearby source north at Montana Creek approximately 25 miles from the site (see Chapter 10.) Basalt (B) outcrops are common along the main Clearwater River and in the lower North Fork, while argillite (A) and quartz crystal (QC) occur along the North Fork and in the Selway and Lochsa river areas (Sappington et al. 1991:39). While debitage comprised a large proportion of the artifacts produced from these materials, flaked tools and non-tool cores were also common (Figure 138*d*-*e*; Figure 139*b*).

Obsidian (O) was encountered infrequently at 10CW34, and occurred predominantly in the form of small (< 6 mm) flakes, however, one obsidian stemmed point base (49.9.a; see Figure 143*l*) was recovered (Figure 139*a*). The closest known obsidian sources to the Clearwater River drainage are located in southern Idaho, southwestern Montana and northeast Oregon (Sappington 1981). All obsidian was submitted for source identification to Northwest Research Obsidian Studies Laboratory

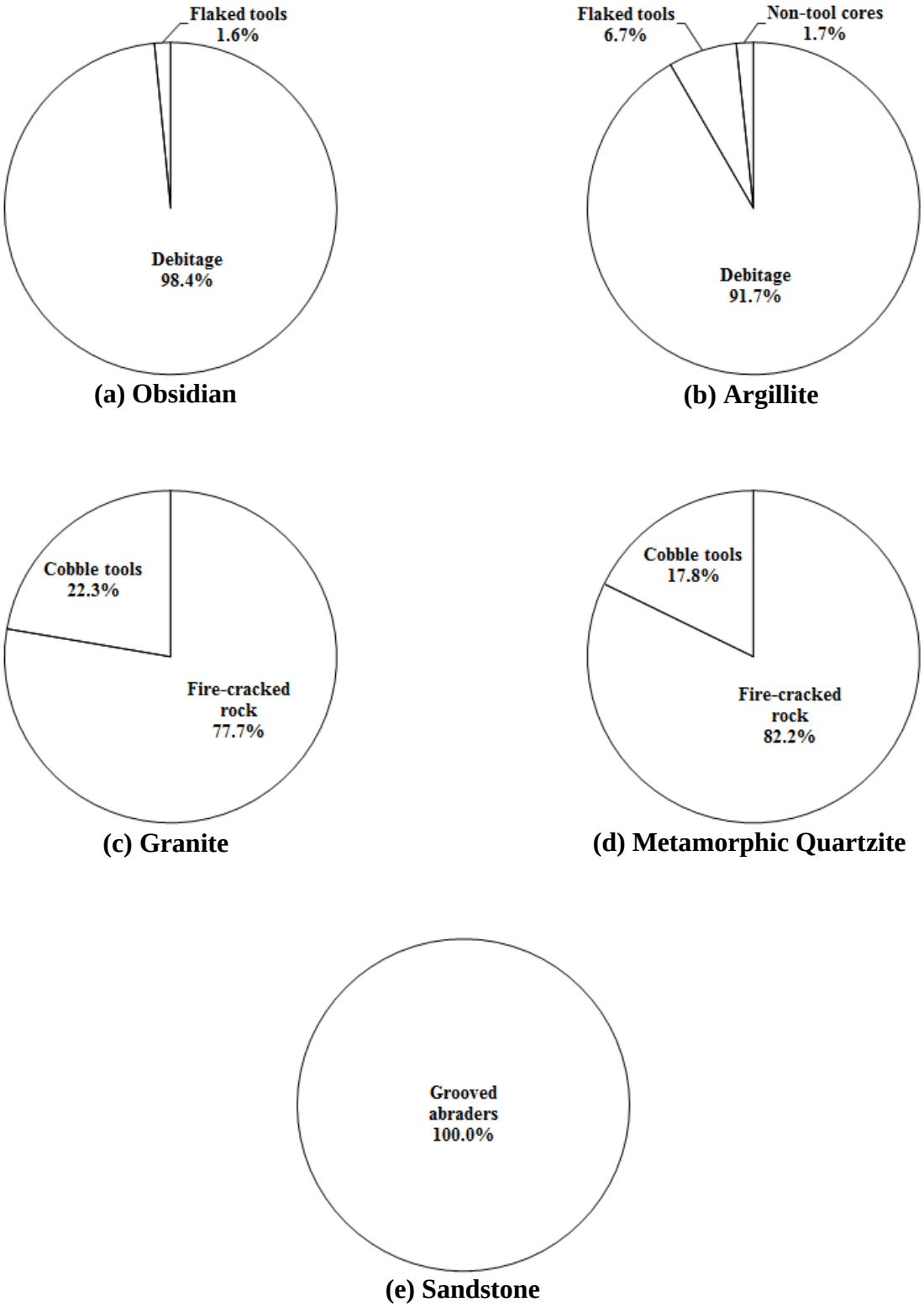


Figure 139. Pie charts showing frequencies of 10CW34 artifact types produced from obsidian (n=64), argillite (n=60), granite (n=130), metamorphic quartzite (n=45), and sandstone (n=4). Fire-cracked rock is included by item count and not weight.

and fifty-seven items were identified with seven sources in southern Idaho, and central and northeastern Oregon (see Chapter 10). Artifacts made from coarse-grained, yellowish brown sandstone (SND) consist of four grooved abraders (Figure 139*e*). This material, preferred for its abrasive quality, is abundant throughout the Plains and can also be found in northeastern Montana and southern Idaho (Flenniken and Ozbun 1988:39).

Flaked Tools

Flaked tools are produced through a sequence of flake detachments from an objective piece for the purpose of designing an implement for specific tasks or general utility. These artifacts are differentiated from other items such as flaked cobbles by their reduced size and weight, higher portability, and reduced presence of cortex. A total of 442 flaked tools were recovered at 10CW34 and have been divided into eight typological and morphological categories, representing a range of activities which include hunting, game processing, and the maintenance and manufacture of tools and gear (Figure 140, Table 5). The most frequent implements recovered from 10CW34 are flake tools (n=276) which include utilized and deliberately modified flakes. Biface and point fragments together (n=79) are next in frequency, and while both of these categories may include unidentifiable preform fragments, a number of classifiable preforms (n=25) were recovered. Hafted tools, or points (n=43), are represented by an assortment of styles which can be associated with temporal periods of occupation in the Clearwater River Region spanning from the early prehistoric to the late prehistoric period. Large bifaces (n=4), comprising either hafted or hand held knives, perforators (n=4), and core tools (n=6) were infrequent. A ninth category is established for flaked artifacts (n=5) which do not correlate with the specific technological characteristics delineated by the above eight

categories, and these are discussed in the Other Flaked Items section. Flaked tools are largely produced from cherts and metamorphic cobble. Vitrophyre, basalt, quartz crystal, argillite are also important materials for flake tools, bifaces, and preforms (Figures 141-142). Only one obsidian flaked tool was recovered (49.9.a, see Figure 143*l*).

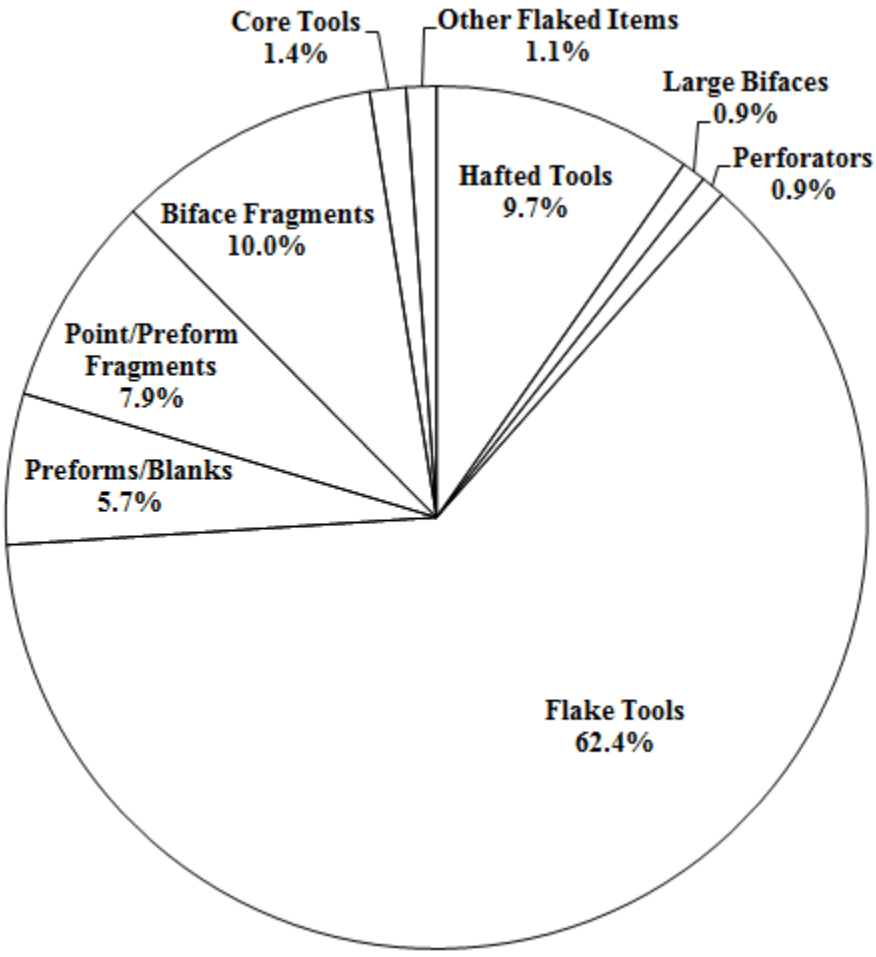


Figure 140. Pie chart showing flaked tool type percentages recovered at 10CW34.

Table 5. 10CW34 flaked tool category quantities by material and recovery area.

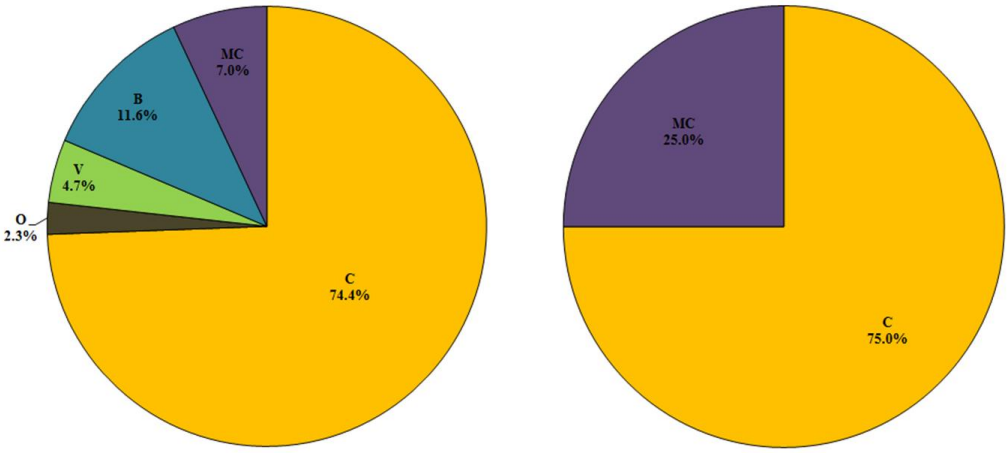
Flaked Tool Category	Material	Recovery Area						Total
		A	B	C	D	E	np[1]	
Hafted Tools	C	1			2	29		**32**
	O					1		**1**
	V					2		**2**
	B	2				3		**5**
	QC							
	A							
	MC					3		**3**
Hafted Tools Total		**3**			**2**	**38**		**43**
Large Bifaces	C					3		**3**
	O							
	V							
	B							
	QC							
	A							
	MC					1		**1**
Large Bifaces Total						**4**		**4**
Perforators	C					4		**4**
	O							
	V							
	B							
	QC							
	A							
	MC							
Perforators Total						**4**		**4**
Flake Tools	C	12	2		2	132		**148**
	O							
	V	2				1		**3**
	B					11		**11**
	QC	1				9	1	**11**
	A	1				2		**3**
	MC	13	2	1	1	83		**100**
Flake Tools Total		**29**	**4**	**1**	**3**	**238**	**1**	**276**
Preforms	C	1	1		1	15		**18**
	O							
	V	1						**1**
	B					1		**1**
	QC					1		**1**
	A							
	MC				1	3		**4**
Preforms Total		**2**	**1**		**2**	**20**		**25**

[1]np = non-provenienced item.

Table 5. *Continued.*

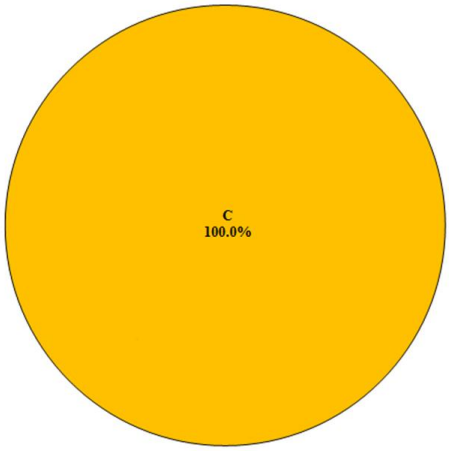
Flaked Tool Category	Material	Recovery Area						Total
		A	B	C	D	E	np[1]	
Point/Preform Fragments	C	2			1	26		**29**
	O							
	V							
	B					3		**3**
	QC					1		**1**
	A					1		**1**
	MC					1		**1**
Point/Preform Fragments Total		**2**			**1**	**32**		**35**
Biface Fragments	C	2				33		**35**
	O							
	V					1		**1**
	B							
	QC					4		**4**
	A							
	MC					4		**4**
Biface Fragments Total		**2**				**42**		**44**
Core Tools	C		1					**1**
	O							
	V							
	B							
	QC							
	A							
	MC				1	4		**5**
Core Tools Total			**1**		**1**	**4**		**6**
Other Flaked Items	C					1		**1**
	O							
	V							
	B							
	QC		1			3		**4**
	A							
	MC							
Other Flaked Items Total			**1**			**4**		**5**
10CW34 Flaked Tools Material Totals	**C**	**18**	**4**		**6**	**243**		**271**
	O					**1**		**1**
	V	**3**				**4**		**7**
	B	**2**				**18**		**20**
	QC	**1**	**1**			**18**	**1**	**21**
	A	**1**				**3**		**4**
	MC	**13**	**2**	**1**	**3**	**99**		**118**
10CW34 Flaked Tools Total		**38**	**7**	**1**	**9**	**386**	**1**	**442**

[1]np = non-provenienced item.

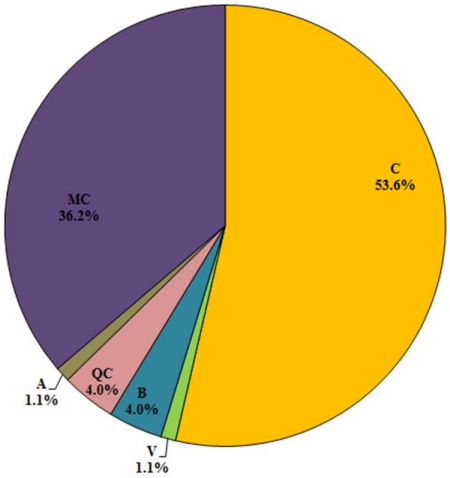


Hafted Tools Materials (n=43)

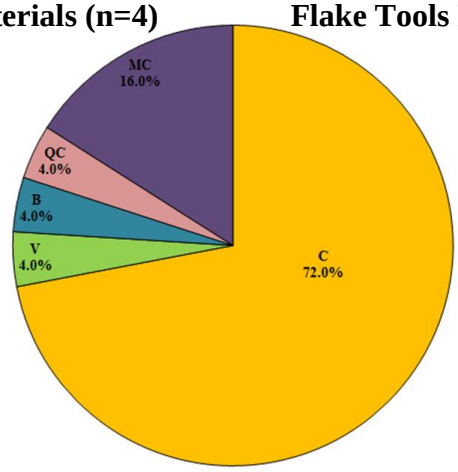
Large Bifaces Materials (n=4)



Perforators Materials (n=4)



Flake Tools Materials (n=276)



Preforms Materials (n=25)

Figure 141. Pie charts showing flaked tool material percentages for hafted tools, large bifaces, perforators, flake tools, and preforms recovered at 10CW34.

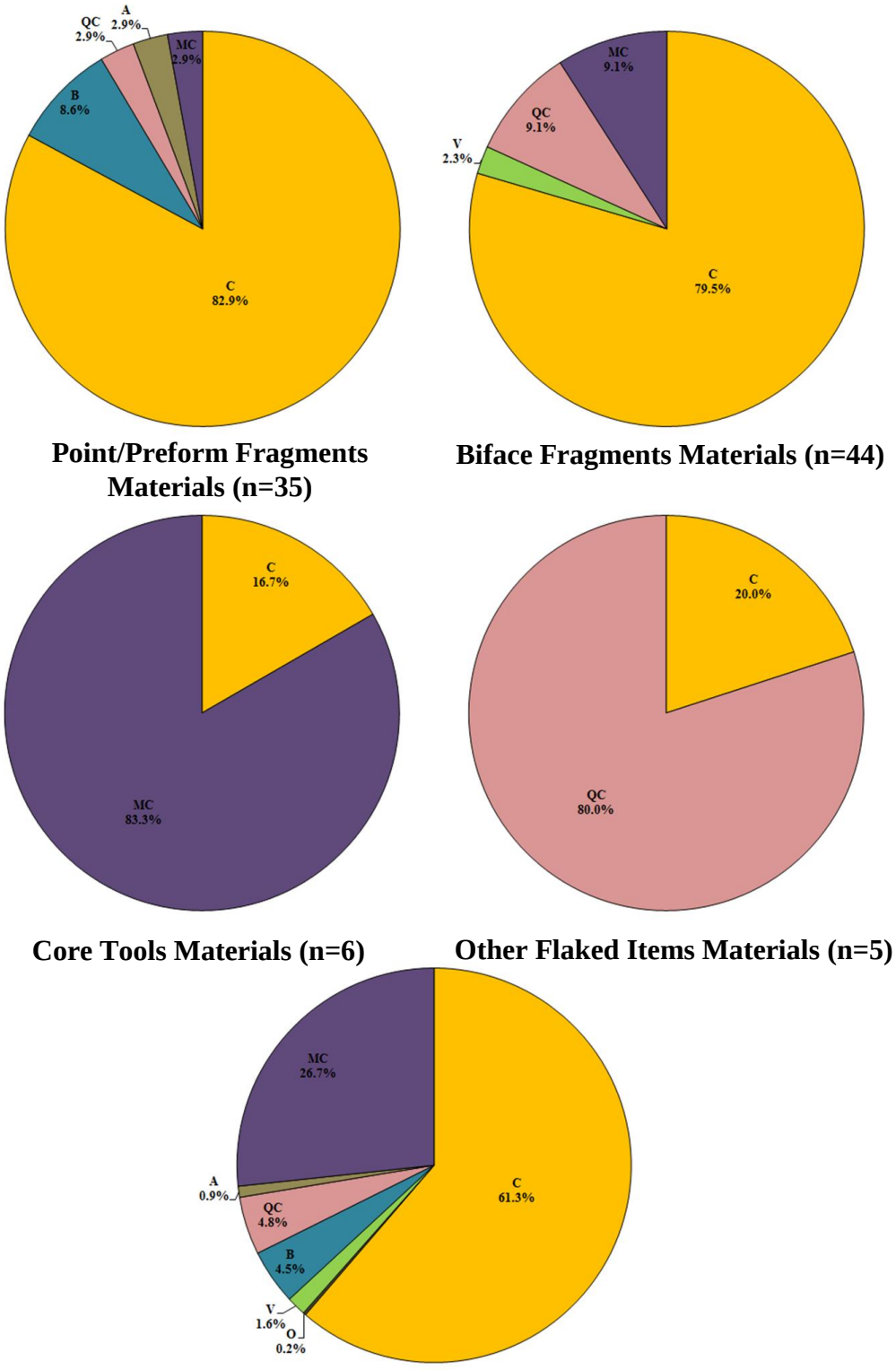


Figure 142. Pie charts showing flaked tool material percentages for point/preform fragments, biface fragments, core tools, and other flaked items recovered at 10CW34. Overall flaked tool material percentages for 10CW34 are shown in the bottom chart.

Hafted Tools

Hafted tools are those which contain modifications, such as notching, basal stems, or grinding, for attachment to a handle or shaft. Many of these items are technologically and stylistically comparable to familiar tool types found in the Plateau and surrounding regions. The typological designations employed here provide a useful framework in which to organize the assortment of morphological characteristics encountered, though typologies alone cannot reflect the specific temporal or cultural context in which a tool was deposited (Andrefsky 2005:30). Customary terms such as "point" and "lanceolate" are also used, while these items may have been designed for use as projectiles and/or functioned as hand-held implements in other tasks such as slicing or scraping (Andrefsky 1997:129-130, 136). Most of the hafted tools from 10CW34 are thin, largely decorticated bifaces, though several uniface points were recovered. A total of 43 hafted tools were recovered in Areas A (n=3), D (n=2), and E (n=38), and five technological categories are distinguished as follows.

Stemmed and Windust Points. Fifteen stemmed point basal fragments and four reworked stemmed points were recovered in Area E (Tables 6-8, Figure 143). Large stemmed and shouldered points of the Western Stemmed Tradition and the regionally defined Windust Phase (ca. 11,000-8000 B.P.) are associated with the earliest human occupations in the Clearwater River Region and at many locations in the southern Plateau (Rice 1972; Sappington 1994:106; Willig and Aikens 1988:3). Stemmed points are the most common hafted tool type at 10CW34 and are made predominantly of chert (n=14). Metamorphic cobble (n=2) and basalt (n=2) were also used, and one stem fragment

(49.9.a, Figure 143*l*) was produced from obsidian which originated at Timber Butte in southwestern Idaho (see Chapter 10).

The most frequent basal form is concave (n=11) (Figure 143*a-g*, *p-s*), two of which are basally notched (62.7.d, Figure 143*r*; 58.14.e, Figure 143*s*), and two which exhibit slight indentation (64.2.3, Figure 143*b*; 97.3.2, Figure 143*p*). Additional styles consist of straight based (n=5) (Figure 143*h-l*), convex based (n=2) (52.8.11, Figure 143*m*; 83.9.7, Figure 143*n*), and one small round based stem (67.8.6, Figure 143*o*). Both well-defined and weak shoulders are discernable on three basal fragments (47.9.c, Figure 143*j*; 52.8.11, Figure 143*m*; 83.9.7, Figure 143*n*), while three of the reworked points are shouldered (97.3.2, Figure 143*p*; 62.7.d, Figure 143*r*; 97.11.8, Figure 143*q*). Basal edge and lateral margin grinding is common (n=14, 74%) and either bifacial and unifacial basal thinning is evident on nine (47%) points. Transverse cross-sections on all stemmed tools are lenticular, while one basal fragment (74.9.b, Figure 143*d*) is faintly biconcave due to basal thinning scars which cover a relatively large surface area on both faces. With the exception of 83.9.7, fracturing on all basal fragments occurred at the base/blade transition near the maximum extent of hafting, while bending (n=11) and impaction (n=4) appear to have been the principal causes. Two of the reworked points are retouched extensively and both have been broken at the base on one side (97.3.2, Figure 143*p*; 62.7.d, Figure 143*r*). The remaining two have been modified into perforators at the distal ends and the tips on both are shattered (97.11.8, Figure 143*q*; 58.14.e, Figure 143*s*). Fourteen stemmed points were submitted for protein residue analysis and none reacted positively with the antisera used in the analysis (see Chapter 10).

Table 6. 10CW34 stemmed and Windust point inventory and descriptions.

Recovery Area	Cat. No.*		Form	Material	L (mm)	WD (mm)	TH (mm)	WT (g)	Grinding	Basal Thinning
E Central	64.2.3		concave based, slightly indented	C	15	21.4	4.3	1.49	one lateral edge	bifacial
E Central	97.3.2	(PRA–)	concave based, slightly indented, shouldered, reworked	C	33.5	14.9	4.2	2.08	none	none
E Central	78.5.2	(PRA–)	straight-based	C	14.5	18	4.7	1.71	none	none
E Central	101.6.4	(PRA–)	straight-based	B	13	17.4	4.3	1.24	both lateral edges, proximal base	unifacial
E Central	62.7.d	(PRA–)	concave based, basal notched, weak shouldered, reworked	C	30.5	16.4	4.4	2.37	both lateral edges	none
E Central	67.7.6		concave based, short stemmed	C	9	12.2	3.5	0.41	both lateral edges, proximal base	none
E Central	62.8.d	(PRA–)	concave based	C	16.3	14.6	5	1.55	one lateral edge	bifacial
E Central	67.8.6		small round based	C	14.8	15.4	5.3	1.24	proximal base	none
E Central	76.8.4	(PRA–)	concave based	C	18.2	18.1	4.2	1.76	none	none
E Central	52.8.11		convex based, weak shouldered	MC	16.9	15.4	4.3	1.17	both lateral edges, proximal base	none
E Central	47.9.c	(PRA–)	straight based, elongated stem, weak shouldered	MC	26.7	16	4.9	3.06	both lateral edges	unifacial
E Central	49.9.a	(PRA–)	straight based	O	15.6	15	4.9	1.56	both lateral edges	bifacial
E Central	74.9.b	(PRA–)	concave based	C	14	19.7	5.4	1.98	both lateral edges, proximal base	bifacial

*Items are listed in order of increasing level depth.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result.

Table 6. *Continued*.

Recovery Area	Cat. No.*		Form	Material	L (mm)	WD (mm)	TH (mm)	WT (g)	Grinding	Basal Thinning
E Central	83.9.7	(PRA–)	convex based, shouldered	C	16.4	16.6	4	0.56	proximal base	none
E Central	59.11.4		straight based, elongated stem	C	33.9	18.2	6.4	4.37	both lateral edges, proximal base	none
E Central	97.11.8	(PRA–)	concave based, shouldered, reworked, modified distal end	B	32.9	15.1	4.4	2.73	none	bifacial
E Central	38.12.5	(PRA–)	concave based	C	17.3	19.4	4.2	1.88	both lateral edges	bifacial
E Central	100.13.4	(PRA–)	concave based	C	10.3	15	3.8	0.57	both lateral edges	bifacial
E Central	58.14.e	(PRA–)	concave based, basal notched, reworked, modified distal end	C	31.3	13.5	4.4	1.86	none	none

*Items are listed in order of increasing level depth.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result.

Table 7. 10CW34 stemmed and Windust point summary.

Description	Range	Average	Standard Deviation
Length*	9-33.9 mm	20 mm	8.19
Width	12.2-21.4 mm	16.5 mm	2.21
Thickness	3.5-6.4 mm	4.6 mm	0.64
Weight	0.41-4.37 g	1.8 g	0.91

*All items are included in length summary.

Table 8. Resemblance of 10CW34 stemmed points to Rice's types (1972).

Cat. No.	Rice's Category 1 Group Types	
64.2.3	concave based lanceolate projectile points	Group 7 (pp. 57, 59, Figure 12)
97.3.2	reworked shouldered lanceolate projectile points	Group 5 (pp. 50, 52, Figure 9)
78.5.2	short, shouldered lanceolate projectile points	Group 12 (pp. 64, 66, Figure 15)
101.6.4	lanceolate projectile points with straight base	Group 13 (pp. 67, 69, Figure 16)
62.7.d	reworked shouldered lanceolate projectile points	Group 5 (pp. 50, 52, Figure 9)
67.7.6	concave based lanceolate projectile points	Group 7 (pp. 57, 59, Figure 12)
62.8.d	concave based lanceolate projectile points	Group 7 (pp. 57, 59, Figure 12)
67.8.6	shouldered lanceolate projectile points small lanceolate projectile points	Group 20 (pp.77, 79, Figure 20) Group 22 (pp. 82, 81 Figure 21)
76.8.4	concave based lanceolate projectile points	Group 7 (pp. 57, 59, Figure 12)
52.8.11	lanceolate projectile points	Group 9 (pp. 57, 61, Figure 13)
47.9.c	lanceolate projectile points	Group 9 (pp. 57, 61, Figure 13)
49.9.a	lanceolate projectile points with straight base	Group 13 (pp. 67, 69, Figure 16)
74.9.b	concave based lanceolate projectile points	Group 7 (pp. 57, 59, Figure 12)
83.9.7	shouldered lanceolate projectile points	Group 2 (36, 40, Figure 4)
59.11.4	shouldered lanceolate projectile points	Group 8 (pp. 57, 63, Figure 14)
97.11.8	reworked shouldered lanceolate projectile points	Group 5 (pp. 50, 52, Figure 9)
38.12.5	concave based lanceolate projectile points	Group 7 (pp. 57, 59, Figure 12)
100.13.4	concave based lanceolate projectile points	Group 7 (pp. 57, 59, Figure 12)
58.14.e	basal notched lanceolate projectile points	Group 6 (pp. 50, 54, Figure 10)



Figure 143. **Stemmed points, Area E, 10CW34**: (*a-g*, **concave based**) *a*, 76.8.4; *b*, 64.2.3*; *c*, 38.12.5; *d*, 74.9.b; *e*, 62.8.d; *f*, 100.13.4; *g*, 67.7.6*; (*h-l*, **straight based**) *h*, 101.6.4; *i*, 78.5.2; *j*, 47.9.c; *k*, 59.11.4*; *l*, 49.9.a; (*m-n*, **convex based**) *m*, 52.8.11*; *n*, 83.9.7; (*o*, 67.8.6*, **small round based**); (*p-s*, **reworked concave based**) *p*, 97.3.2[1]; *q*, 97.11.8; *r*, 62.7.d; *s*, 58.14.e.
*Item has not been washed in order to preserve protein residues for future analysis.
[1]Two images of 97.3.2 are shown: left, unwashed and intact; right, washed and damaged.

Cascade Points. Eight Cascade points were recovered in Areas A (n=1) and E (n=7) (Table 9, Figure 144). Cascade Phase occupations (ca. 8000-4500 B.P.) are viewed as a continuation of the Windust Phase and the Cascade laurel-leaf, or bi-pointed points often occur at the same locations (Leonhardy and Rice 1970:6-11; Ozbun and Fagan 2010:1; Sappington 1994:100-103). Three of the Cascade points are midsection fragments (1991AH6.2.2, Figure 144*g*; 57.7.d, Figure 144*h*; 60.7.5, Figure 144*f*) and appear to have been broken as a result of bending and impact fractures. Of the remaining five intact points, two have shattered tips (57.4.d, Figure 144*d*; 60.9.b, Figure 144*b*), and one (57.11.d, Figure 144*e*) has been reworked into a perforator, the tip of which has also been shattered and retouched afterwards. All are produced from chert and five are bifacially worked, while one of the midsection fragments (57.7.d, Figure 144*h*) and an intact point (92.12.2, Figure 144*c*) are uniface and plano-convex in cross-section; 92.12.2 is the only item to retain cortex on its dorsal surface. The distinctive foliate-shape, typical of Cascade lanceolates, is apparent on all five of the intact points and each is basally faceted. Edge-serration ranges from slight (n=4) to pervasive (n=4) and all items are bimarginally retouched, while four exhibit retouch on both the blade and base. Six Cascade points were submitted for protein residue analysis and all returned negative results (see Chapter 10).

Goshen-Plainview Point. A single intact lanceolate conforming to the late Paleoindian Goshen-Plainview style (94.9.6, Figure 145*a*,) was recovered in Area E in the vicinity of Feature 2011B (see Chapter 9), within a stratum containing a number of retouched flakes, battered and broken cobbles, and cobble spalls. This tool is produced from a fine-grained dark chert. The concave base bears two minor unifacial thinning

Table 9. 10CW34 Cascade point inventory and summary.

Recovery Area	Cat. No.*	Material	L (mm)	WD (mm)	TH (mm)	WT (g)
A	1991AH6.2.2 (m)	C	15.9	22.1	6.7	2.92
E Central	57.4.d (PRA–)	C	30.5	12	3.8	1.23
E Central	31.7.5 (PRA–)	C	41	19.2	6.1	4.8
E Central	57.7.d (m) (PRA–)	C	25.3	20.5	5	3.24
E Central	60.7.5 (m)	C	27.3	14.4	5.2	2.38
E Central	60.9.b (PRA–)	C	36.8	14.5	4.5	2.65
E Central	57.11.d (PRA–)	C	30.2	14.9	5.2	1.93
E Central	92.12.2 (PRA–)	C	42.8	17.8	4.7	3.56
	Range		30.2-42.8**	12-22.1	3.8-6.7	1.23-4.8
	Average		36.3	16.9	5.2	2.8
	Standard Deviation		5.2	3.28	0.85	1

*Items are listed in order of increasing level depth.
(m) = midsection fragment.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result.
**Midsection fragments (n=3) are not included in length summary.

scars, and has been ground at the proximal end and on the lateral edges up to the point where it contracts toward the tip. Flaking is predominantly collateral with slight irregularities at the longitudinal axis. It exhibits a slender vertical cross section and a lenticular transverse cross section, while a very small portion of the tip, perhaps one millimeter or less, appears to have been snapped off. Reworking has been focused at the distal end of the blade. The measurements of 94.9.6 are as follows: length, 56.4 mm; width, 24 mm; thickness, 5.4 mm; weight, 9.2 g. A calibrated radiocarbon date of 8990-8600 BP was obtained from an associated charcoal sample (see Chapter 9). This tool was submitted for protein residue analysis and produced negative results (see Chapter 10).

The Goshen designation has been applied at sites such as the Mill Iron site and Hell Gap in the northern and central Plains where associated radiocarbon dates are

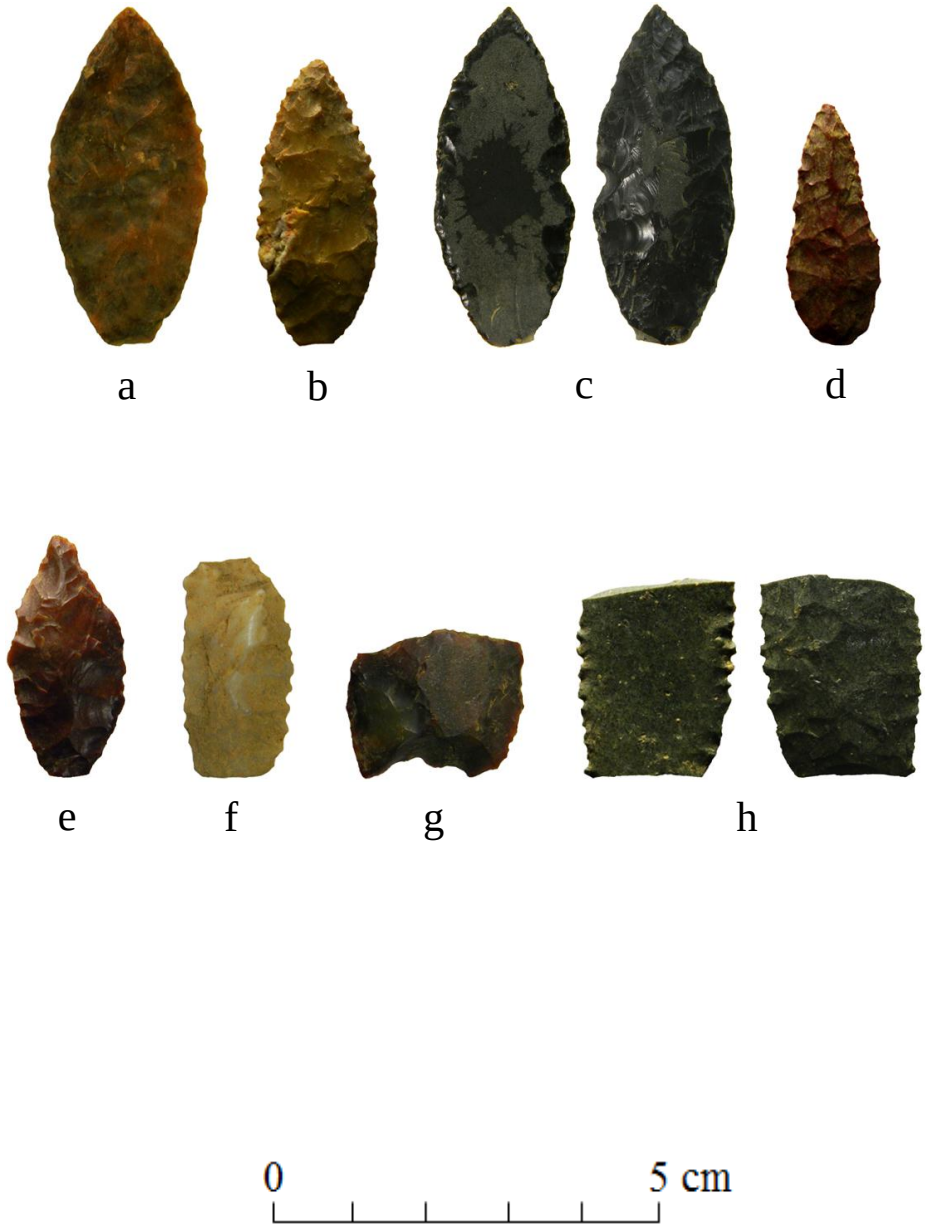


Figure 144. **Cascade points, Areas A and E, 10CW34**: *a*, 31.7.5; *b*, 60.9.b; *c*, 92.12.2; *d*, 57.4.d; *e*, 57.11.d; *f*, 60.7.5*; *g*, 1991AH6.2.2; *h*, 57.7.d.
*Item has not been washed in order to preserve protein residues for future analysis.

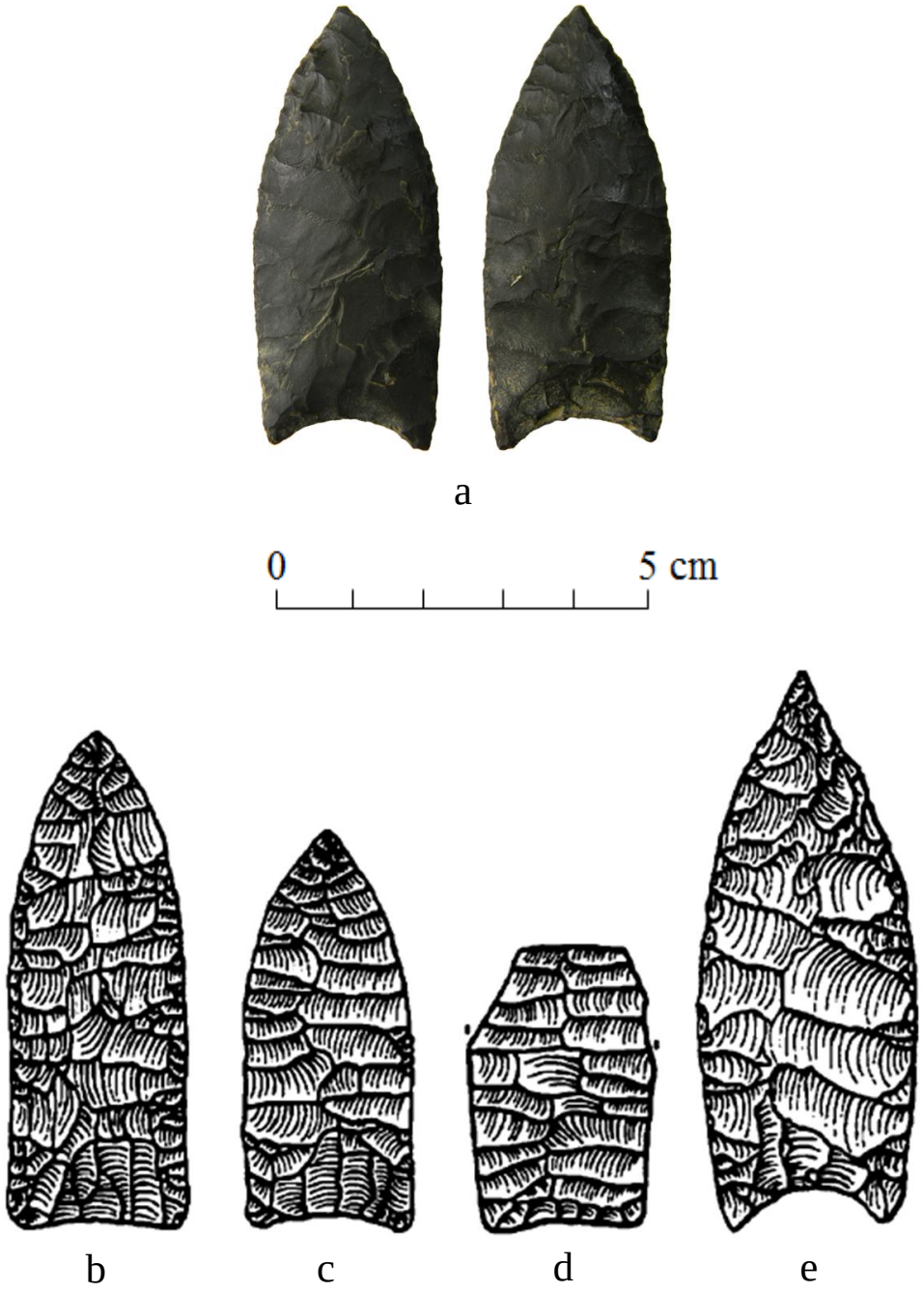


Figure 145. **Goshen point (94.9.6) from 10CW34, Area E, and Goshen/Plainview point examples from the Plains and Great Basin (adapted from Pitblado 1999:171, Figure 4.23)**: *a*, 10CW34 Goshen point (94.9.6); *b*, Plainview (Plainview site, TX [Knudson 1983:45]); *c*, Goshen (Mill Iron site, MT [Bradley and Frison 1996:48]); *d*, Belen (Rio Grande Valley, NM [Judge 1973:87]); *e*, Black Rock Concave Base (NV Hu 17, NV [Heizer and Hester 1978:39]).

typically between 10,700 and 11,300 B.P. (Frison 1996; Irwin-Williams et al. 1973). Lanceolates of this style recovered in northern and central Texas, known as Plainview, are associated with somewhat later dates ranging from 9800 and 10,300 B.P.; dates as late as 6700 and 7100 B.P. were also obtained at Texas sites, though these were considered unreliable (Pitblado 1999:173-176; Sellards et al. 1947; Taylor 2006:156-161). Technological similarities between Goshen and Plainview lanceolates are frequently noted and include an overall triangular shape, concave to almost straight base, parallel to slightly concave basal sides, stem and basal grinding, well-controlled collateral to irregular flaking, and variable basal thinning (Bradley 1991:381-382; Knudson 1973:14-15; Pitblado 1999:171) (Figure 145*b-e)*. Due to the temporal disagreement between the northern and southern Plains, however, the exact relationship between Goshen and Plainview remains in dispute, and a co-designation that retains both complex names is generally acknowledged (Frison et al. 1996:206).

Large side-notched points. Four large side-notched points were recovered in Area E (Table 10, Figure 146). Two of these are mostly intact and measure 44.2 mm and 54.3 mm in length, while the remaining two fragmented points included in this size group are estimated to have measured above 40 mm in length prior to being broken. Of the two mostly intact large side-notched points, one exhibits a small fracture at the tip (39.6.4 Figure 146*c*), and the other has a broken base (95.2.6, Figure 146*b*). The two fragmented items are missing the distal end as a result of bending (105.1.5, Figure 146*h*) and impact (2012misc.27, Figure 146*i*) fractures, while 105.1.5 is partially serrated along one blade edge and reworked at the point of fracture. Materials consist of chert (n=3) and metamorphic cobble (n=1). Known variously as Cold Springs, Northern, and Bitterroot

Table 10. 10CW34 large side-notched point inventory and summary.

Recovery Area	Cat. No.*	Material	L (mm)	WD (mm)	TH (mm)	NW (mm)	WT (g)
E Central	2012misc.27 (s) (f)[1]	C	30	21.9	7.2	13.9	4.4
E Central	105.1.5 (f) (PRA–)	MC	34.9	20	6	11.5	5.12
E Central	95.2.6	C	44.2	19.1	6.1	10	4.91
E East	39.6.4 (PRA–)	C	54.3	18.2	11.8	12.2	6.28
	Range		44.2-54.3**	18.2-21.9	6-11.8	10-13.9	4.4-6.28
	Average		49.3	19.8	7.8	11.9	5.2
	Standard Deviation		5.05	1.37	2.4	1.4	0.69

*Items are listed in order of increasing level depth; surface items (s) are listed first.
(f) = fragmented item.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result.
**Fragmented items (n=2) are not included in length summary.
[1]Area E surface collection at the southeast corner of Unit 70 (N106/W90).



Figure 146. **Side-notched points and corner-notched point, Areas A, D, and E, 10CW34**: *a*, 1981Sur.3; *b*, 95.2.6*; *c*, 39.6.4; *d*, 1981Sur.2; *e*, 17.3.3; *f*, 113.1.3*; *g*, 76.3.3; *h*, 105.1.5; *i*, 2012misc.27; *j*, 95.2.7; *k*, 21.1.4; *l*, 33.2.2; *m*, 48.2.f; *n*, 54.2.4*; *o*, 5.2.2.
*Item has not been washed in order to preserve protein residues for future analysis.

side-notched, large side-notched points begin to appear in the Plateau during the late-Cascade subphase and they have served as a horizon marker that separates the early and late Cascade subphases (Leonhardy and Rice 1970:6; Sappington 1994:100, 166). Two large side-notched points (105.1.5, 39.6.4) were submitted for protein residue analysis and both returned negative results (see Chapter 10).

Small side-notched points. Small side-notched points are associated with the late prehistoric period (ca. 3000-500 B.P.) in the Clearwater River region and the late Harder phase (2500-700 B.P.) on the Lower Snake River, when bow and arrow technology became increasingly important (Ames 2010:288; Leonhardy and Rice 1970:14-17; Sappington 1994:322). Ten small side-notched points were recovered in Areas A (n=2), D (n=2), and E (n=6), and range in lengths between 15.8 and 35.4 mm (Table 11, Figure 146). Seven are intact and four of these are minimally fractured at the base (21.1.4, Figure 146*k*) or tip (1981Sur.2, Figure 146*d*; 33.2.2, Figure 146*l*; 48.2.f, Figure 146*m*). One (54.2.4, (Figure 146*n*) has been refurbished following a possible impact fracture along one blade side. The smallest (48.2.f, Figure 146*m*) has a fractured tip and may have been reworked from a larger point. Of the three fragmented small side-notched points, one of these has a broken base (95.2.7, Figure 146*j*), and another (76.3.3, Figure 146*g*) has a broken tip. The basal fragment (113.1.3, Figure 146*f*) is broken at one side of the base, while the missing neck and blade may have been retained for further use. All are bifaces with the exception of 1981Sur.2 (Figure 146*d*). This item was produced from a thin, unimarginally retouched blade which was partially flaked on both faces. The intact Avonlea point (17.3.3, Figure 146*e*) was recovered in Area A and this style is considered to have accompanied the introduction of the bow and arrow during the late prehistoric

Table 11. 10CW34 small side-notched point inventory and summary.

Recovery Area	Cat. No.*	Material	L (mm)	WD (mm)	TH (mm)	NW (mm)	WT (g)
D	1981Sur.2 (s)[1]	C	35.4	16.6	3.6	9.8	2.03
D	1981Sur.3 (s)[2]	C	32.8	19.1	3.9	11.1	2.01
E West	21.1.4 (PRA+)	V	23.1	19.2	6.1	12.1	1.9
E Central	113.1.3 (f)	C	15.8	25.4	5.3	14	2.77
E West	33.2.2 (PRA–)	C	24.7	16.1	5	11.9	1.77
E Central	48.2.f (PRA–)	C	18.5	13.5	12.8	11.1	1.19
E Stockpile	54.2.4	V	25.8	14.1	5.3	12.3	1.41
E Central	95.2.7 (f) (PRA–)	C	29.9	15	4	12.1	1.46
A	17.3.3 (PRA–)	B	31.7	16.7	3.8	13.2	2.4
E Central	76.3.3 (f) (PRA–)	B	29	20.02	7.03	11.13	3.88
Range			15.8-35.4	13.5-25.4	3.6-12.8	9.8-14	1.19-3.88
Average			26.7	17.6	5.7	11.9	2.1
Standard Deviation			6	3.3	2.6	1.1	0.7

*Items are listed in order of increasing level depth.
(f) = fragmented item.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result; + = positive result.
[1]Area D surface collection coordinates (September, 1981 grid system, see Figure 82): 9+00-9+50 W/0+00-0+50 S.
[2]Area D surface collection coordinates (September, 1981 grid system, see Figure 82): 7+00-7+50 W/1+50-2+00 S.

period (ca. 1500-300 B.P.) on the Plains (Frison 1991:111-113, 122). Materials consist of chert (n=6), vitrophyre (n=2), and basalt (n=2). Six small side-notched points, including the Avonlea, were submitted for protein residue analysis; one (21.1.4) reacted positively with bovine and guinea-pig antisera (see Chapter 10).

Corner-notched point. Corner-notched points are common in the Clearwater River region and they are often abundant in late prehistoric assemblages (Sappington 1994:252; Sappington et al. 1991:44). One fragmented, basalt corner-notched point was recovered in Area A (5.2.2, Figure 146*o*). The distal end and tip are absent, and the base is also fractured at one side. Bifacial retouch is evident along the portions of the blade which are present above the hafting element, and though the point is well-made, it appears to have been produced from an irregular fragment of basalt. The dimensions of 5.2.2 are as follows: length, 13.2 mm; width, 18.9 mm; neck width, 9.2 mm; thickness, 4.4 mm; weight, 0.87 g. This tool, which is the only corner-notched point recovered at 10CW34, was submitted for protein residue analysis and positive reactions were registered for human and rabbit antisera (see Chapter 10).

Large Bifaces

Four intact and fragmented large bifaces, comparable to tools commonly designated as knives, were recovered in and nearby Area E (Table 12, Figure 147-148). Elongated, ovate and bipointed knives are included in Windust and Cascade phase assemblages on the lower and main Clearwater River and on the Upper North Fork at Weitas Creek, while large, well-made lanceolate knives are also typical in Cascade phase occupations (Ames et al. 1981: 79, Figure 9; Leonhardy and Rice 1970:9; Sanders 1982:60, 74-75; Sappington 1994:118-120). Three of the large bifaces recovered are

Table 12. 10CW34 large biface inventory.

Recovery Area	Cat. No.*	Material	L (mm)	WD (mm)	TH (mm)	WT (g)
-	2010misc.32 (s)[1]	MC	150	52	20	152.73
E East	102.7.3 (f)	C	51.5	42.7	7.5	21.82
E Central	65.12.b (f) (PRA–)	C	77.2	50.6	8.9	44.95
E Central	58.15.e2 (PRA+)	C	112.3	51.4	9.4	69.32

*Items are listed in order of increasing level depth; surface items (s) are listed first.
(f) = fragmented item.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result; + = positive result.
[1]Non-Area surface collection: North of Area E near pasture road, no coordinates.

produced from chert and one from metamorphic cobble. Two are intact, two are broken or in fragmentary condition, and all are well-made with broad, horizontal flaking patterns. Unifacial (58.15.e2, Figure 147*b*) and bifacial retouch (2010misc.32, Figure 147*a*) is extensive along the entire margins of both intact bifaces, while 58.15.e2 has been resharpened along one midsection blade edge and on one distal tip margin on the opposite side. Both of the broken bifaces are fragmented at the midsection and show less retouch. One of these is a basal fragment which has a concave base (102.7.3, Figure 148*b*) and the other may be an unfinished distal end (65.12.b, Figure 148*a*). Both 65.12.b and 58.15.e2 retain approximately 15% cortex. Two large bifaces were submitted for protein residue analysis; 58.15.e2 tested positive for rabbit and 65.12.b was negative (see Chapter 10).

Perforators

In addition to two reworked stemmed points (97.11.8, Figure 143*q*; 58.14.e, Figure 143*s*) and one reworked Cascade point (57.11.d, Figure 144*e*) discussed above, four chert tools considered to have functioned as perforators or possible drills were recovered in Area E (Table 13, Figure 149). Perforators are associated with hide and bone



Figure 147. **Large Bifaces, Area E, 10CW34**: *a*, 2010misc.32; *b*, 58.15.e2

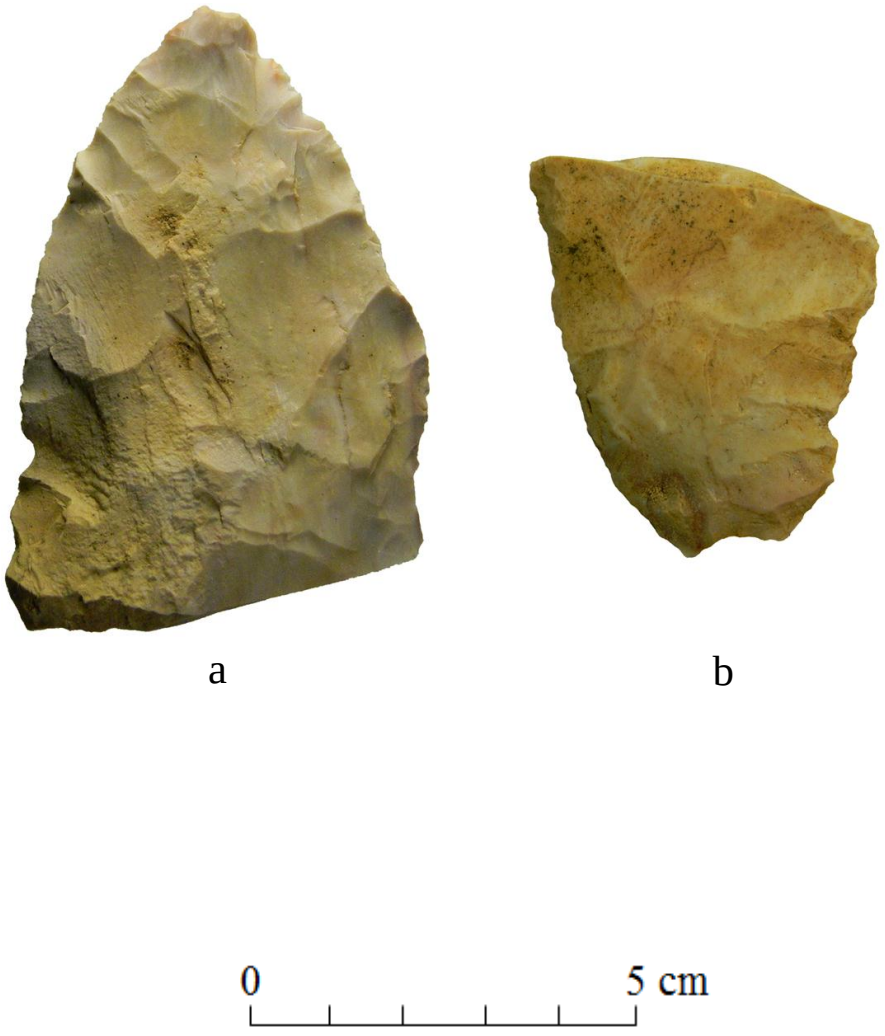


Figure 148. **Large Bifaces, Area E, 10CW34**: *a*, 65.12.b; *b*, 102.7.3.

Table 13. 10CW34 perforator inventory.

Recovery Area	Cat. No.*	Material	L (mm)	WD (mm)	TH (mm)	WT (g)
E Central	2012misc.26 (f) (s)[1]	C	24.1	9.4	3.5	0.97
E East	102.8.6 (f)	C	18.2	7	2.9	0.34
E Central	111.8.6 (PRA–)	C	71.8	23.1	5.5	10.61
E Central	56.9.4	C	48.5	19.9	2.6	3.04

*Items are listed in order of increasing level depth; surface items (s) are listed first.
(f) = fragmented item.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result.
[1]Area E surface collection coordinates: N110/W86.



Figure 149. **Perforators, Area E, 10CW34**: *a*, 111.8.6; *b*, 56.9.4*; *c*, 102.8.6; *d*, 2012misc.26.
*Item has not been washed in order to preserve protein residues for future analysis.

working and have been found in assemblages dating to the early, late, and proto-historic occupation periods in the Clearwater River region (Sappington 1994:94-369). One of these items is a bifacially flaked midsection fragment and was encountered on the surface near Block C4 in the Central zone of Area E (2012misc.26, Figure 149*d*). Another is made from a thin, unifacially worked flake (56.9.4, Figure 149*b*). The largest item (111.8.6, Figure 149*a*) is a uniface and the distal tip is fractured. This tool may have also functioned as a hafted knife. The smallest of the perforators (102.8.6, Figure 149*c*) is bifacially flaked with a rounded proximal end and a broken elongated tip. It is one of the smallest flaked tools recovered at 10CW34 and is similar in shape and size to 51.7.7 (see Figure 162*f*), which is comparable to micropoint preforms recovered at the Clearwater Fish Hatchery Site (10CW4) at Ahsahka (Sappington et al. 1991:46-48) (see Other Flaked Items section below). One perforator (111.8.6) was submitted for protein residue analysis and produced negative results (see Chapter 10).

Flake Tools

Flake tools (n=276) are the most common implement and this category includes all deliberately modified or retouched flakes as well as utilized flakes that exhibit marginal damage scars resulting from usewear in tasks such as slicing or scraping (Tables 14-15, Figures 150-156). Flake tools were recovered in Areas A (n=29), B (n=4), C (n=1), D (n=3), and E (n=238). One (Prevmisc.2) was included with the items collected prior to 2010 but was not labeled with coordinates or a date. The majority (n=186, 67%) of flake tools are minimally modified on one margin side only, an indication that flake tools were frequently selected for immediate use and discarded. Bimarginal modification on two sides of one or more margins is fairly common (n=43, 16%) and indicates an

Table 14. 10CW34 flake tool inventory.

Recovery Area	Cat. No.*	Modification Category**	Material	L (mm)	WD (mm)	TH (mm)	WT (g)
-	Prevmisc.2 (np)	1	QC	26	28.5	5	4.27
E Stockpile	SB.11-15.3 (np)	2	B	21.2	21.3	3.5	1.33
D	1987Sur.1 (s)[1]	3	MC	37.1	27.4	2.5	12.25
E Central	2010misc.26 (s)[2]	1	B	44.8	33.5	11.2	20.24
E	2010misc.30 (s)[3]	1	B	48.6	26.8	4.7	5.81
E Central	2011misc.1[4]	2	C	23.4	12.9	4.5	1.48
E Central	2011misc.15 (s)[5]	1	MC	83	59	26.4	181.55
B	T5.1.1	1	C	19.3	38.1	5	3.58
A	6.1.3	1	C	19.4	26.5	4.8	2.46
A	8.1.3	1	C	19.3	24.5	6.3	3.5
B	10.1.2	1	C	32.6	27	4.9	4.01
C	15.1.1	2	MC	20.1	11.9	5.7	1.32
A	17.1.2	1	C	27.7	21.6	4.1	2.67
E Central	66.1.2	1	C	25.2	21.3	6	2.67
E Central	73.1.5 (TF)	1	MC	65.5	48.2	7.8	24.16
E Central	100.1.2	1	MC	81.6	56.3	11.8	69.52
E Central	101.1.4	2	C	20.9	22.4	4.4	2.58
E Central	105.1.4	1	C	27.5	20.3	3.4	1.95
E Central	111.1.3	2	C	30.4	35.8	19	5.54
B	T4.2.2	1	MC	86	4.4	3.1	47.93
A	3.2.2	1	V	35	18.4	5.2	4.3
A	8.2.3	2	C	16.4	32.1	4.2	2.45
A	22.2.5 (PRA+)	1	C	55.4	20	4	20.57
E West	34.2.5 (PRA–)	1	C	21.1	17	3.2	1.2
E Central	38.2.3 (PRA–)	1	MC	37.4	28.6	4.1	4.2
E Central	65.2.4	1	C	21.3	19.6	2.2	0.81
E Central	71.2.6	1	C	12.6	16.2	4.3	0.78
E Central	81.2.5	1	C	19.8	26.9	4	1.88
E Central	94.2.5	2	C	38	22.5	4.5	4.06
E Central	96.2.6	1	C	19	9.4	2.3	0.53
E Central	101.2.4	1	C	37.8	20.1	3	2.29
E Central	107.2.3	1	MC	22.8	17.6	5	1.82

*Items are listed in order of increasing level depth; non-provenienced items (np) are listed first, followed by surface items (s).

(TF) = thermally fractured.

(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result; + = positive result.

**modification categories: (1) unimarginal; (2) bimarginal; (3) uniface-unimarginal; (4) uniface-bimarginal; (5) biface bimarginal.

[1]Area D surface collection coordinates (September, 1981 grid system, see Figure 82): 6+50-7+00 W/2+00-2+50 S.

[2]Surface collection at the southwest corner of Unit 43 (N123/W89).

[3]Area E surface collection coordinates: N129/W109.

[4]Recovered in Unit 48 during a 4-wall clean from 0 to 40 cm BD.

[5]Area E surface collection coordinates: N116/W99.

Table 14. *Continued*.

Recovery Area	Cat. No.*	Modification Category**	Material	L (mm)	WD (mm)	TH (mm)	WT (g)
E Central	107.2.4 (PRA–)	1	MC	72.4	52.9	23.5	94.91
D	1981HelAH21.3.1	1	C	22.4	22.5	6.2	2.84
A	1991TU-A.3.1	1	C	22.5	27.2	6.2	3.37
B	T2.3.2	2	MC	67	20.5	2.3	17.88
A	4.3.2	1	MC	84.3	49.2	29	117.37
A	5.3.2	4	C	15.5	25.2	4.8	1.69
A	17.3.2	1	MC	37.6	47.7	8.4	19.58
E Central	19.3.3	2	C	4.4	19.1	6.4	1.65
A	22.3.3	1	C	23.6	22.9	3.1	1.24
E Central	24.3.6	2	C	43.8	25.8	6.7	10.95
E Central	31.3.5 (PRA–)	1	B	38.2	34.2	7.6	11.77
E East	40.3.3	1	B	48.6	29.6	12.9	13.48
E Central	48.3.4	1	MC	40.8	29.6	10.9	11.87
E Central	48.3.5	1	C	21.5	16.3	3.4	1.41
E Central	57.3.5	1	C	45.2	27	6.7	9.86
E Central	61.3.2	1	C	19.9	30.2	3.8	1.86
E Central	61.3.3	2	MC	29.8	39.7	5.7	7.47
E Central	66.3.2	1	MC	36.6	38	12.5	12.06
E Central	70.3.3	1	C	16.6	15.4	2.6	0.53
E Central	79.3.5	3	MC	73.1	39.3	16.4	65.61
E Central	95.3.5	1	C	30.4	22.9	3.2	2.07
E Central	110.3.4	2	C	26.4	27	19.1	7.62
E Central	110.3.5	1	C	16.8	17	4.3	1.2
A	8.4.4	1	C	24.6	11	6	1.07
A	8.4.2	1	MC	46.2	38.3	12	29.04
A	8.4.3	1	MC	87	69.5	13.4	94.44
A	8.4.5	1	MC	80.8	60.6	15.5	89.84
A	13.4.2	1	MC	131.2	50.6	27.9	263
A	13.4.3	1	MC	87.2	33.1	14.4	42.67
A	13.4.4	1	MC	84.9	48.7	1.6	75.5
E Central	20.4.3	5	C	34.8	33.9	9.1	13.1
E West	21.4.3	1	C	21.8	16.1	6.3	2.39
E West	21.4.4	1	C	27.2	17.7	3.4	1.71
A	23.4.2 (PRA+)	1	C	55.6	15.5	3.2	4.03
E Central	46.4.f (PRA–)	2	C	42.3	17.6	6.6	3.55
E Central	48.4.4	1	C	24.5	35.1	4.1	3.87
E Central	66.4.2	4	B	24.1	14.5	4.2	1.83
E Central	58.4.2	2	MC	64.3	42.3	19.6	67.06
E Central	59.4.6	1	MC	31.3	34	6.2	5.34
E Central	62.4.3	1	MC	31.4	45.1	11.1	12.18
E Central	71.4.4	3	MC	70	68.2	32.2	97.57
E Central	73.4.5 (TF)	1	MC	91.8	62.1	14	84.65

*Items are listed in order of increasing level depth.

(TF) = thermally fractured.

(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result; + = positive result.

**modification categories: (1) unimarginal; (2) bimarginal; (3) uniface-unimarginal; (4) uniface-bimarginal; (5) biface bimarginal.

Table 14. *Continued*.

Recovery Area	Cat. No.*	Modification Category**	Material	L (mm)	WD (mm)	TH (mm)	WT (g)
E Central	101.4.5	5	MC	49.9	22	9.8	9.17
E Central	106.4.3	2	C	20.4	29.3	3.7	2.74
E Stockpile	DA1.4.3	2	V	28.3	25.1	6.2	4.11
A	8.5.2	1	MC	72.2	40.5	11.8	31.39
A	8.5.3	1	MC	60.3	30.9	17.9	33.82
A	13.5.5	1	MC	39.5	83.9	19.7	81.8
A	22.5.4 (PRA+)	1	C	34	29	6.2	3.55
E East	39.5.4 (PRA–)	2	C	59	32.4	13	16.29
E Central	50.5.c (PRA–)	1	C	35.8	30.9	3.4	3.33
E Central	59.5.a (PRA–)	1	C	20.5	19.5	2	0.73
E Central	64.5.2	4	MC	36.5	27.5	12.5	9.3
E Central	106.5.4	1	C	21.1	16.5	3	0.96
E Central	109.5.2	1	C	17.1	19.8	5.9	2.7
E Central	112.5.3	1	C	37.4	40	3.3	5.27
E Central	113.5.4 (PRA–)	1	C	30.6	30.8	18.9	9.97
E Central	111.5.3 (PRA–)	2	QC	43.7	32	7.3	10.4
A	7.6.2	1	MC	43.8	61.6	14.1	20.1
E West	26.6.4	1	C	24.1	13.7	2.5	0.85
E Central	50.6.c (PRA+)	2	C	36.9	22	4.5	3.42
E Central	63.6.3	2	C	22.1	15	15.5	1.9
E Central	70.6.6	5	C	46.9	14.2	5.2	4.34
E Central	71.6.5	2	B	21.3	17	5.4	1.35
E Central	72.6.7	1	C	26.6	14.1	13.6	0.88
E Central	74.6.5	1	MC	22.6	26.5	1.8	4.04
E Central	75.6.3	2	C	16.1	23.2	5.3	1.83
E Central	99.6.4	1	C	19.1	26	5.1	3.4
E East	104.6.4	1	C	22.9	23	5.1	2.21
A	2.7.2	2	A	31.8	18.8	7.8	5.53
E Central	19.7.4	1	C	10.6	27	5	1.29
A	22.7.2	1	QC	31.2	18.7	18.3	5.01
E Central	46.7.5	5	MC	81.3	37.5	12.4	37.53
E Central	51.7.5	1	C	22.2	12.5	2	0.89
E Central	52.7.5	1	C	17	12.1	3.3	0.65
E Central	53.7.4	1	A	38	35.5	4.1	6.6
E Stockpile	54.7.3	1	C	24.1	26.2	3	1.98
E Stockpile	54.7.4	1	C	27	13.1	2.8	1.35
E Central	58.7.2	2	MC	30.8	19.5	8.9	3.89
E Central	62.7.5	1	C	27.4	26.7	2.6	1.58
E Central	62.7.6	1	C	25.3	28.2	7.5	5.07
E Central	70.7.9	2	MC	76.9	42.2	12.2	51.28
E Central	85.7.4	1	MC	49.6	34.4	12.6	23.25
E Central	88.7.5 (PRA+)	1	MC	31	25.8	5.5	4.88

*Items are listed in order of increasing level depth.

(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result; + = positive result.

**modification categories: (1) unimarginal; (2) bimarginal; (3) uniface-unimarginal; (4) uniface-bimarginal; (5) biface bimarginal.

Table 14. *Continued*.

Recovery Area	Cat. No.*	Modification Category**	Material	L (mm)	WD (mm)	TH (mm)	WT (g)
E Central	89.7.5	1	QC	24.2	14.9	6.5	2.28
E Central	94.7.4 (PRA+)	5	MC	75.4	42.5	15.5	51.47
E Central	97.7.4	5	QC	14.3	7.3	2.8	0.32
E Central	97.7.5	1	MC	41	27.1	7.1	10.37
E Central	101.7.5	1	MC	54	35	7.4	12.03
E East	104.7.3	1	C	26.1	21.6	1.8	2.05
E East	108.7.2 (TF)	2	MC	83.4	72.1	31	255.98
E Central	111.7.3	1	C	22.3	17.4	3.8	1.27
E Central	112.7.4 (PRA–)	3	MC	110	55.5	18.3	94.59
D	1987ST8.8.2	1	C	58.2	33	17.5	18.69
E Central	19.8.7	1	C	14.5	12.3	4.1	1.61
E West	21.8.5 (PRA+)	1	MC	23.9	18.5	4.5	2.25
E Central	24.8.6 (PRA–)	1	C	33.1	19.6	4.6	2.67
E Central	29.8.5 (PRA–)	1	C	30.8	27.1	7.6	7.82
E Central	38.8.4	1	C	41.7	23.3	12.7	9.61
E Central	38.8.5	3	B	18.2	18.7	2.2	0.73
E East	39.8.5 (PRA+)	1	MC	75.4	46	14.2	56.09
E Central	47.8.5	1	C	30.5	8.4	2.1	0.62
E Central	49.8.6	3	QC	35.7	23.3	11	8.82
E Central	49.8.7	1	MC	36.2	21.9	11.1	12.33
E Central	52.8.13	3	MC	48.1	27.6	9.1	12.09
E Central	52.8.14 (TF)	1	MC	42.9	36.5	19.6	35.87
E Central	52.8.15 (TF)	1	MC	48	34.4	21.4	30.65
E Central	52.8.16	1	MC	30.2	29.1	4.6	3.91
E Central	52.8.17	1	MC	30.1	29.7	5.6	4.52
E Central	52.8.18	1	MC	27.4	30.6	4	2.93
E Central	52.8.a (PRA–)	4	C	23.5	17.8	3	1.42
E Central	53.8.4	2	MC	49.8	55.6	11.5	32.17
E Central	57.8.5	1	MC	52.9	94.4	6.1	83.43
E Central	57.8.8 (TF)	1	MC	66.3	54.1	6.1	87.95
E Central	58.8.4 (TF)	3	MC	46.7	35.5	9.9	13.38
E Central	59.8.7	1	C	41.6	24.5	5.8	5.58
E Central	60.8.6	1	C	36.8	22.5	4.4	3.9
E Central	60.8.7	1	MC	31.7	49.2	8	11.06
E Central	60.8.8	1	MC	31.3	44.2	8.8	9.47
E Central	61.8.4	5	MC	48	37	21.5	39.34
E Central	62.8.7	3	C	31.8	23	7.2	2.94
E Central	66.8.d (PRA+)	3	MC	34.9	75	15.9	43.21
E Central	67.8.c (PRA–)	1	C	29.8	14	5	2.39
E Central	70.8.5	1	MC	34.2	32.5	11.2	10.13
E Central	71.8.9	1	MC	28.3	32.5	4.5	3.68
E Central	72.8.7	2	MC	48.1	32.4	8.2	12.67

*Items are listed in order of increasing level depth.

(TF) = thermally fractured.

(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result; + = positive result.

**modification categories: (1) unimarginal; (2) bimarginal; (3) uniface-unimarginal; (4) uniface-bimarginal; (5) biface bimarginal.

Table 14. *Continued*.

Recovery Area	Cat. No.*	Modification Category**	Material	L (mm)	WD (mm)	TH (mm)	WT (g)
E Central	73.8.10 (TF)	1	MC	58.6	51.2	7	26.9
E Central	73.8.11	1	MC	40.3	35.2	11.3	14.94
E Central	73.8.12	4	MC	62.6	46.2	8.7	26.63
E Central	73.8.13	1	C	29.4	22.5	3	2.18
E Central	86.8.9 (TF)	3	MC	86.1	61.8	17.9	124.13
E Central	88.8.5 (PRA–)	1	C	12.4	18.5	2.1	0.65
E Central	88.8.6	1	C	17	18.7	4.5	1.88
E Central	92.8.4 (PRA+)	1	MC	25.8	19.8	4.8	2.21
E Central	94.8.4	1	C	22	13.5	3.4	1.19
E Central	103.8.4 (PRA+)	3	C	26.5	29.1	7.5	6.38
E Central	105.8.5	1	MC	52.4	44.4	10.9	22.46
E East	108.8.5	4	C	14.3	18.9	3.4	1.19
E Central	111.8.7	1	C	20.3	17	3.8	1.23
E Central	113.8.6 (PRA+)	1	C	45.4	23.4	3.7	4.5
A	8.9.2 (PRA–)	1	MC	48.8	34.3	11.6	13.57
E Central	20.9.7	1	C	15	21.5	6.4	2.12
E Central	31.9.4	1	C	14.8	15.2	1.4	0.39
E Central	42.9.3 (PRA–)	1	MC	61.5	61.4	22.1	99.69
E Central	42.9.4 (PRA–)	1	MC	64.4	69.4	2.8	35.8
E Central	49.9.5	2	C	19	14.9	7	1.3
E Central	49.9.6	1	MC	83.9	51.2	26.2	111.26
E Central	50.9.7	1	QC	27.5	9.6	6.6	2.56
E Central	51.9.5	1	C	25.6	17.4	5.1	1.64
E Central	53.9.e (PRA–)	4	C	36.1	25.3	5.1	6.49
E Central	57.9.11	1	MC	54.6	29.2	12.3	15.58
E Central	59.9.5	2	C	23.5	25.1	9.2	8.01
E Central	59.9.7	4	MC	83.6	68.2	15.5	96.15
E Central	59.9.8	1	MC	65.1	38.2	8.4	19.05
E Central	59.9.9	1	MC	139.6	64.1	25.6	294.37
E Central	60.9.3	1	C	32.5	16.2	2.6	1.22
E Central	62.9.d (PRA–)	1	C	41.5	23.8	4.5	2.69
E Central	63.9.f (PRA+)	4	C	35.5	28.3	3.7	4.4
E Central	63.9.3	1	MC	43.4	42.1	14.2	27.05
E Central	64.9.4	2	C	33.9	24.9	6.4	5.13
E Central	64.9.6	4	C	45.6	14.4	5.2	3.04
E Central	65.9.5	1	B	36.5	16.6	2.4	1.3
E Central	67.9.6 (TF)	1	MC	78.4	41.6	16	48.73
E Central	70.9.7	1	C	23	13.2	5.1	1.33
E Central	70.9.8	2	QC	25.7	31	4.7	4.46
E Central	71.9.10	1	MC	27.3	36.2	7.3	7.97
E Central	73.9.8	3	MC	73.9	39.9	4.3	36.59
E Central	73.9.9	1	MC	53.6	35.8	15	28.11

*Items are listed in order of increasing level depth.

(TF) = thermally fractured.

(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result; + = positive result.

**modification categories: (1) unimarginal; (2) bimarginal; (3) uniface-unimarginal; (4) uniface-bimarginal; (5) biface bimarginal.

Table 14. *Continued*.

Recovery Area	Cat. No.*	Modification Category**	Material	L (mm)	WD (mm)	TH (mm)	WT (g)
E Central	74.9.5	1	C	23.1	23.6	3.2	1.65
E Central	83.9.4	1	C	23.2	14.5	4.2	1.92
E Central	83.9.5 (PRA–)	1	C	34.8	19.5	9.2	8.33
E Central	94.9.5	1	C	20.7	13.8	3.7	0.95
E Central	100.9.6	3	MC	42.2	33.5	1.3	18.93
E Central	100.9.7	2	MC	24.8	13.9	4.3	1.27
E Central	113.9.5	3	MC	74.9	33.3	19.8	35.03
A	18.10.3 (PRA–)	1	C	42.2	21.3	5.3	3.65
E Central	29.10.4	1	C	3.8	27.8	4.9	1.73
E Central	29.10.5	2	C	23.4	14.1	4.1	1.56
E Central	30.10.5 (PRA–)	1	MC	126.6	92.2	12.6	172.7
E Central	37.10.6 (PRA–)	1	C	16.2	40	7.9	4.05
E East	39.10.5 (PRA–)	1	C	46.5	35.4	3.5	3.88
E Central	49.10.4	4	MC	50	36.2	13.9	24.93
E Central	49.10.6	4	MC	13	21.9	4.3	1.77
E Central	53.10.14	1	C	36.3	26.1	6.9	6.12
E Central	62.10.8	1	C	14	25.8	2.6	0.82
E Central	62.10.9 (TF)	1	MC	105.9	65.4	9.7	70.19
E Central	67.10.5	1	MC	17.5	16.2	3.8	1.37
E Central	68.10.7	2	MC	72.1	62.4	27	130.31
E Central	71.10.5	1	MC	57.4	41.9	7	17.78
E Central	73.10.5	1	MC	59.1	59.3	14	46.09
E Central	79.10.5	3	C	26.4	27	11.8	5.52
E Central	79.10.6	3	QC	18.3	18.2	6.3	2.62
E Central	80.10.5	3	C	16.2	18.2	2.4	0.36
E Central	80.10.6	1	C	18.3	12.2	4.2	0.64
E Central	98.10.4	2	C	25	20	3	1.54
E Central	98.10.5 (PRA–)	1	C	30.2	25	3.5	2.45
E Central	106.10.5	1	C	26.3	32	4.7	4.64
E Central	30.11.6	3	A	16.5	13.7	2.4	0.64
E Central	35.11.7	1	MC	47	51.5	10.7	26.51
E Central	37.11.5 (PRA–)	1	QC	41.2	13.1	4.7	2.54
E East	40.11.2 (PRA–)	1	C	20.2	12.8	1.6	0.33
E Central	48.11.3	1	C	39.8	44.3	3.9	6.32
E Central	65.11.5	1	C	22	19.2	3.7	1.34
E Central	65.11.6	1	C	21.9	18	5	1.95
E Central	71.11.a (PRA–)	1	C	51.7	21	7.5	8.7
E Central	72.11.5	1	C	35.2	19.1	4	2
E Central	74.11.5	1	C	50.5	31.2	4.6	4.35
E Central	74.11.6	1	C	23.1	25.7	7.5	3.65
E Central	80.11.8	1	B	36.8	10.3	2.7	0.94
E Central	82.11.8	1	C	24.8	22.2	3	1.5

*Items are listed in order of increasing level depth.

(TF) = thermally fractured.

(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result.

**modification categories: (1) unimarginal; (2) bimarginal; (3) uniface-unimarginal; (4) uniface-bimarginal; (5) biface bimarginal.

Table 14. *Continued*.

Recovery Area	Cat. No.*	Modification Category**	Material	L (mm)	WD (mm)	TH (mm)	WT (g)
E Central	82.11.14	1	C	15.4	18.5	5.6	1.39
E Central	91.11.4	1	C	18	15.4	3.3	1.08
E Central	92.11.3	5	C	24.3	30.6	9.2	7.41
E Central	98.11.4 (PRA–)	1	C	21.1	35	4.5	2.85
E Central	99.11.3 (PRA–)	4	C	48.4	24.5	5.4	6.68
E East	102.11.4	1	C	29.4	24.5	4.4	2.52
E Central	35.12.2	1	C	21.4	20.2	1.9	1.27
E Central	38.12.6	3	C	20.7	17.5	1.9	0.93
E Central	38.12.7 (PRA+)	1	C	21.6	32.3	5	3.46
E Central	53.12.3	1	MC	29.9	28.3	11.4	14.82
E Central	64.12.5	1	C	44.2	21.6	8	8.64
E Central	77.12.7	2	C	38	34.2	4.9	7.8
E Central	100.12.3	1	C	26.7	8.9	4.4	0.83
E Central	113.12.3	2	C	8.7	22.4	6.6	0.1
A	18.13.2	4	V	14.4	8.8	2.1	0.26
E Central	53.13.4	4	C	46.9	21.3	7.6	6.66
E Central	56.13.4	1	MC	76.1	75.7	23.3	114.98
E Central	64.13.5	1	C	17	23.9	2	0.75
E East	102.13.2 (PRA–)	3	C	19.3	14.9	5.4	1.76
E East	104.13.3 (PRA–)	2	B	41.2	37.9	8.1	13.81
E Central	38.14.3 (PRA+)	1	C	29.4	25.4	5.7	4.08
E Central	56.14.4	2	C	29.8	19.1	8.5	5.39
E Central	77.14.5	1	C	15.4	12.6	3.1	0.72
E East	104.14.2	1	C	10.5	4.9	3	0.17
E Central	64.15.7	3	QC	30.1	16.5	4.7	2.36
E Central	77.15.2 (PRA–)	1	C	23.7	29.8	3.6	3.12
E Central	77.16.2	1	C	24	18	4.4	2.34
E Central	53.17.2	2	C	57.9	29.4	3.6	5.5
E Central	56.17.2	2	MC	118.5	48.2	20.3	75.28
E Central	64.17.3	4	C	16	12.5	1.8	0.45
E Central	77.17.2 (PRA–)	2	C	51.8	41.1	5.9	11.88
E Central	77.17.3	1	C	41.9	37	9.1	10.14
E Central	100.17.2	3	MC	68.5	61	17	73.24
E Central	58.19.e (PRA+)	1	MC	35	48.2	13.2	17.93

*Items are listed in order of increasing level depth.

(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result; + = positive result.

**modification categories: (1) unimarginal; (2) bimarginal; (3) uniface-unimarginal; (4) uniface-bimarginal; (5) biface bimarginal.

Table 15. 10CW34 flake tool modification category, materials, and cortex frequency.

Modification Category	Material												Total Modification Category	Total Cortex
	C cortex		MC cortex		B cortex		QC cortex		A cortex		V cortex			
	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes		
1 Unimarginal	90	16 (15%)	28	39 (58%)	3	3 (50%)	4	1 (20%)	1			1 (100%)	**186 (67%)**	**60 (32%)**
2 Bimarginal	20	4 (17%)	6	6 (50%)	2	1 (33%)	2		1		1		**43 (16%)**	**11 (26%)**
3 Uniface-Unimarginal	5	1 (17%)	9	3 (25%)	1		2	1 (33%)	1				**23 (8%)**	**5 (22%)**
4 Uniface-Bimarginal	9		3	2 (40%)	1						1		**16 (6%)**	**2 (12%)**
5 Biface-Bimarginal	3		2	2 (50%)			1						**8 (3%)**	**2 (25%)**
Material Subtotal	**127**	**21 (14%)**	**48**	**52 (52%)**	**7**	**4 (36%)**	**9**	**2 (18%)**	**3**		**2**	**1 (33%)**		
Material Total	**148**		**100**		**11**		**11**		**3**		**3**		**276**	**80 (29%)**
Material Percentage	**54%**		**36%**		**4%**		**4%**		**1%**		**1%**			

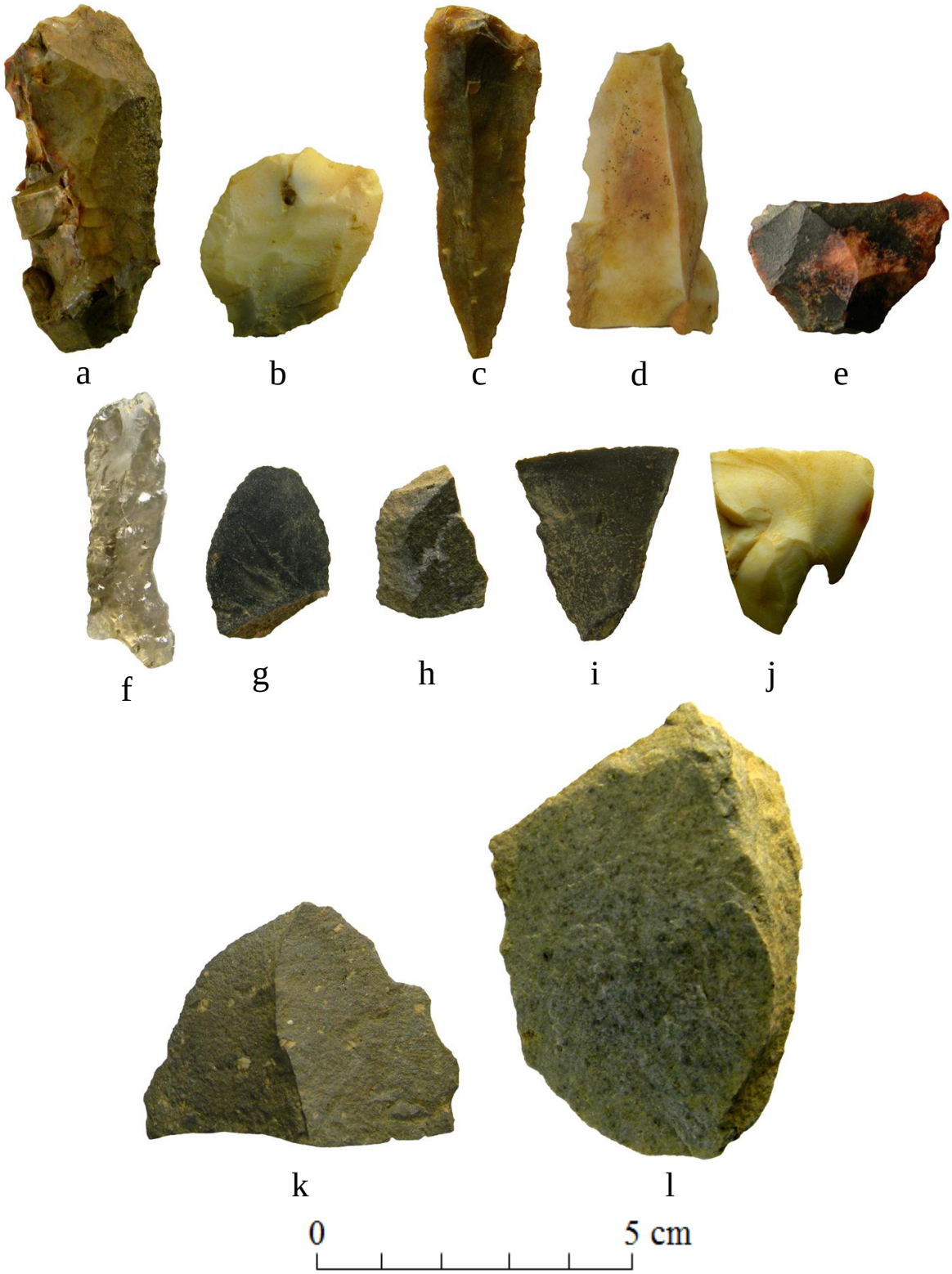


Figure 150. **Unimarginally modified flake tools, Areas A and E, 10CW34**: *a*, 22.2.5; *b*, 22.5.4; *c*, 23.4.2; *d*, 113.8.6; *e*, 38.12.7; *f*, 37.11.5; *g*, 92.8.4; *h*, 21.8.5; *i*, 88.7.5; *j*, 38.14.3; *k*, 58.19.e; *l*, 39.8.5.

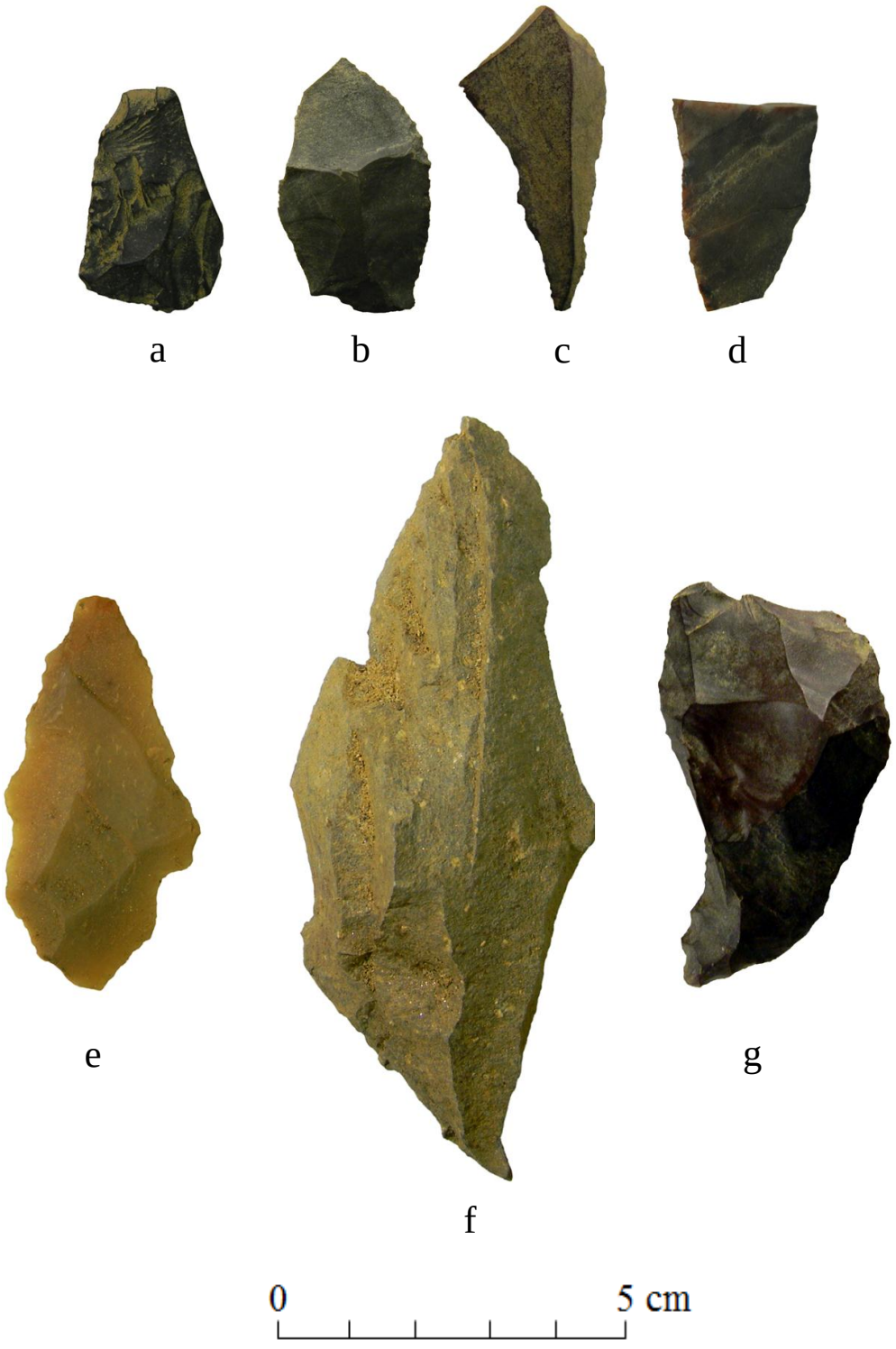


Figure 151. **Bimarginally modified flake tools, Areas A and E, 10CW34**: *a*, 2.7.2*; *b*,50.6.c; *c*, 46.4.f; *d*,56.14.4*; *e*, 53.17.2*; *f*, 56.17.2*; *g*, 39.5.4.
*Item has not been washed in order to preserve protein residues for future analysis.

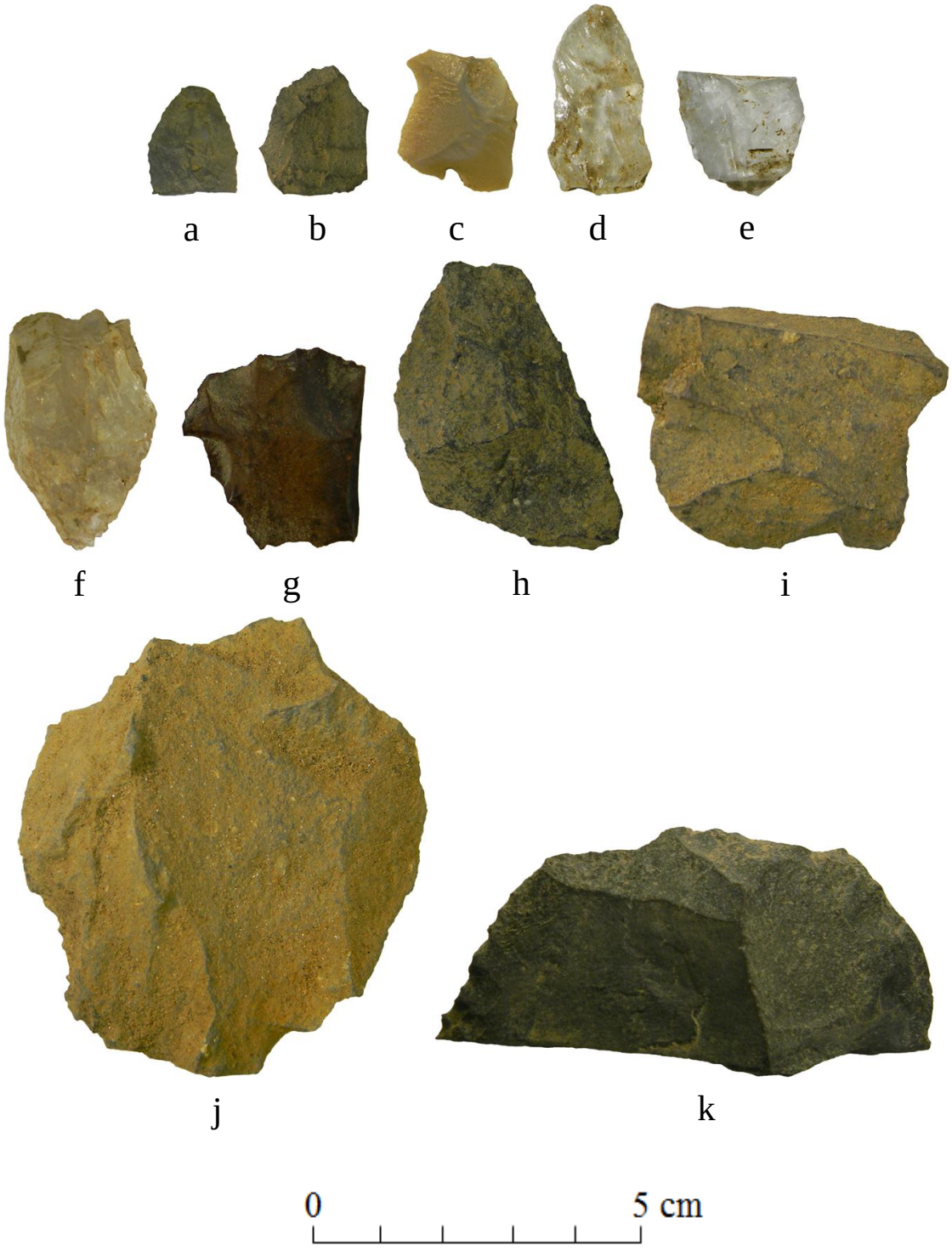


Figure 152. **Uniface-unimarginally modified flake tools, Area E, 10CW34**: *a*, 30.11.6*; *b*, 38.8.5*; *c*, 38.12.6*; *d*, 64.15.7*; *e*,79.10.6*; *f*, 49.8.6*; *g*, 103.8.4; *h*, 52.8.13*; *i*, 100.9.6*; *j*, 100.17.2*; *k*, 66.8.d.
*Item has not been washed in order to preserve protein residues for future analysis.

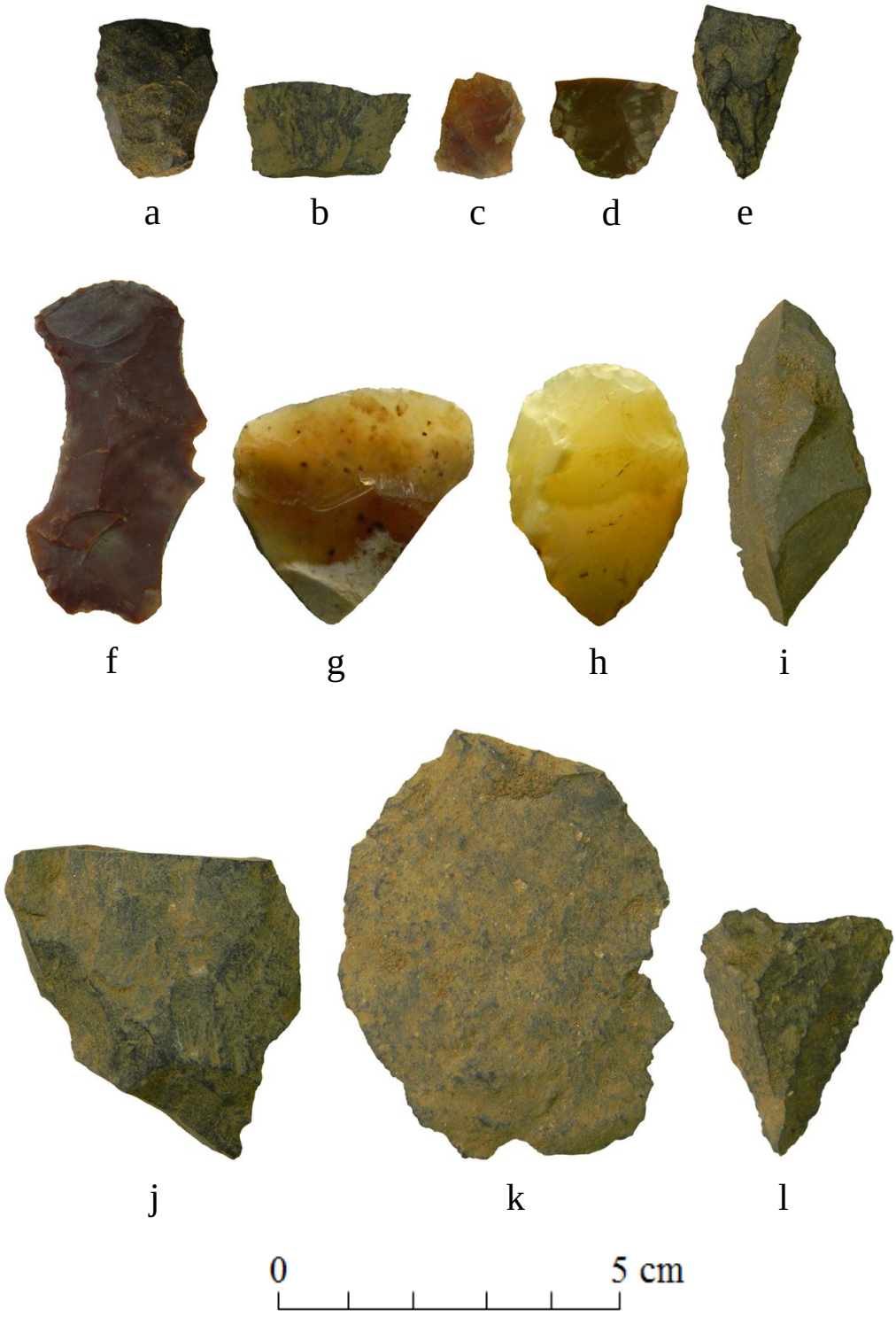


Figure 153. **Uniface-bimarginally modified flake tools, Area E, 10CW34**: *a*, 52.8.a; *b*, 49.10.6*; *c*,64.17.3*; *d*, 108.8.5*; *e*,66.4.2*; *f*, 99.11.3; *g*, 63.9.f; *h*, 53.9.e; *i*, 53.13.4*; *j*, 49.10.4*; *k*, 73.8.12*; *l*, 64.5.2*.
*Item has not been washed in order to preserve protein residues for future analysis.

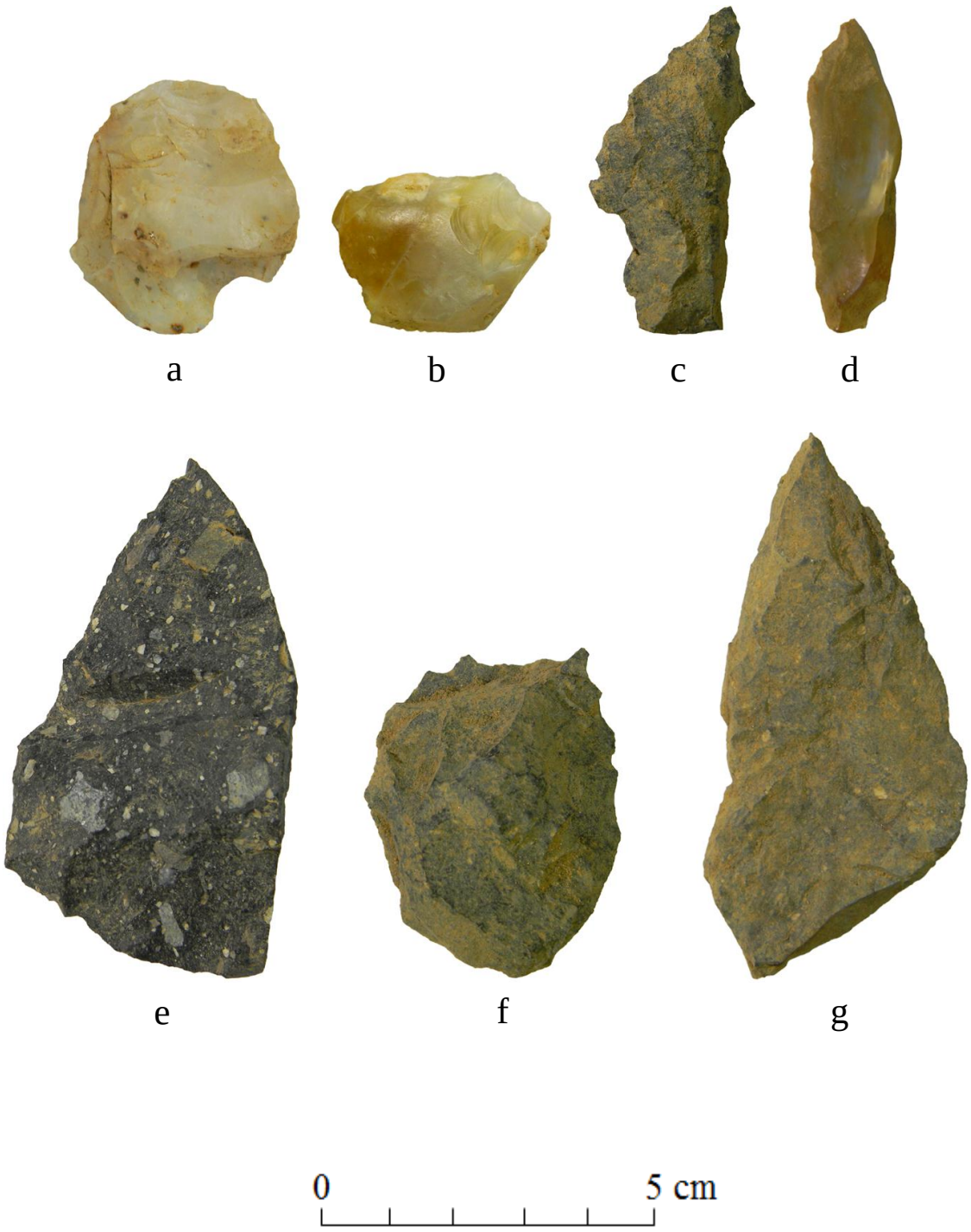


Figure 154. **Biface-bimarginally modified flake tools, Area E, 10CW34**: *a*, 20.4.3*; *b*, 92.11.3*; *c*, 101.4.5*; *d*, 70.6.6*; *e*, 94.7.4; *f*, 61.8.4*; *g*, 46.7.5*.
*Item has not been washed in order to preserve protein residues for future analysis.

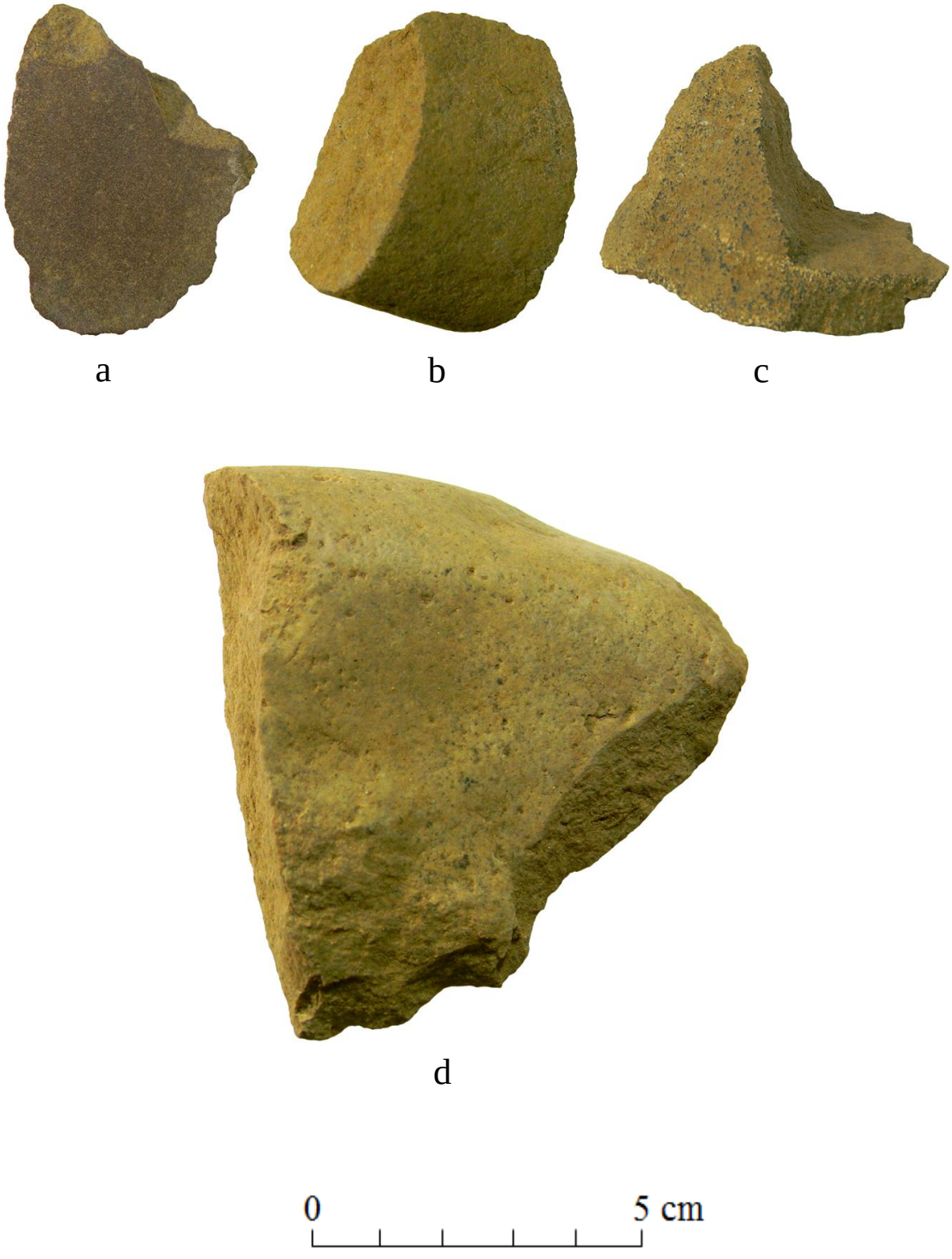


Figure 155. **Thermally fractured flake tools, Area E, 10CW34**: *a*, 58.8.4*; *b*, 52.8.14*; *c*, 52.8.15*; *d*, 108.7.2*.
*Item has not been washed in order to preserve protein residues for future analysis.

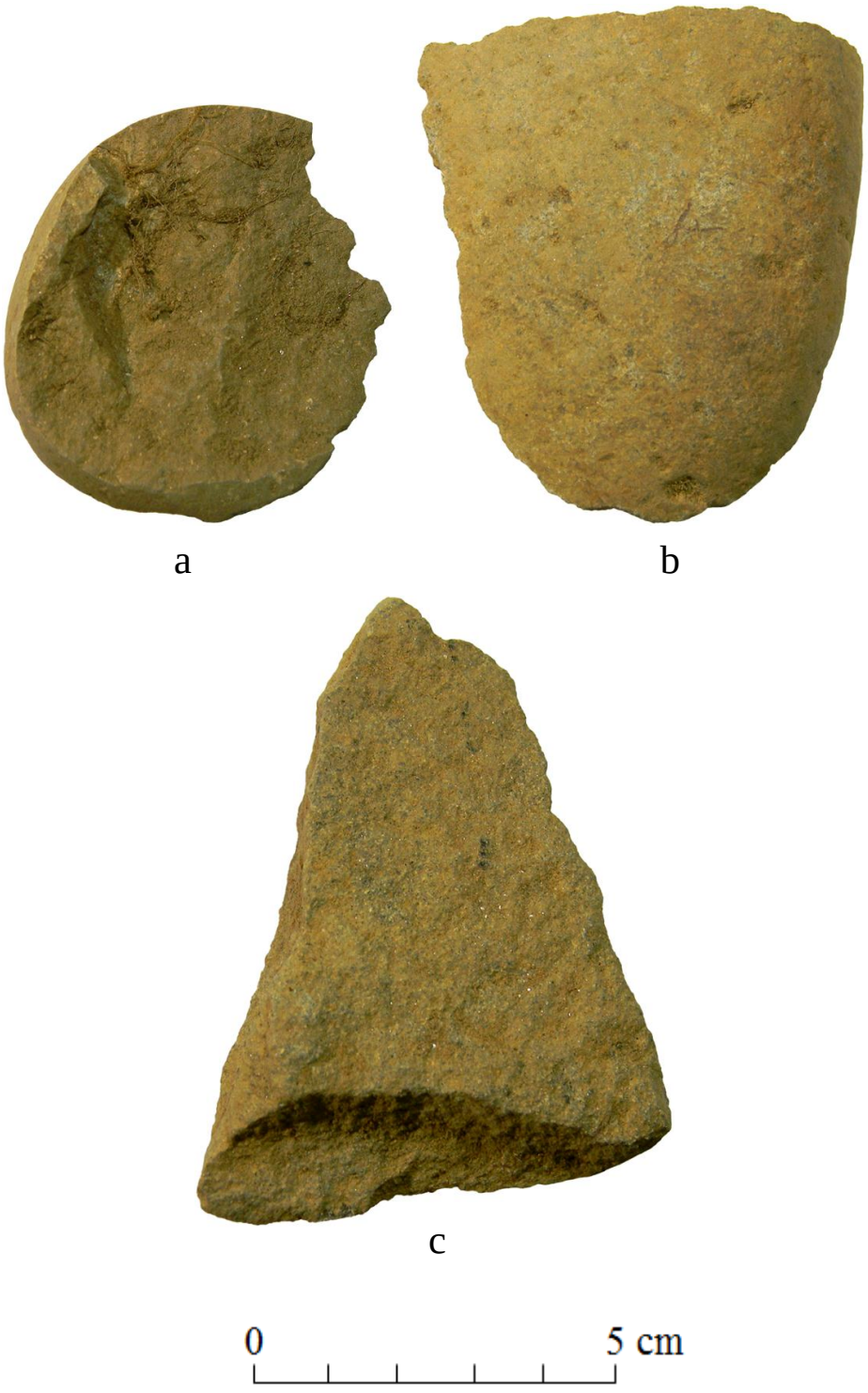


Figure 156. **Thermally fractured flake tools, Area E, 10CW34**: *a*, 73.8.10*; *b*, 57.8.8*; *c*, 86.8.9*.
*Item has not been washed in order to preserve protein residues for future analysis.

increase in production effort and possible extended use for a greater number of tasks. A number of flake tools (n=39) exhibit unifacial flake scars that were produced over the dorsal or ventral surface after detachment from the objective piece, and these were then retouched either unimarginally (n=23, 8%) or bimarginally (n=16, 6%). Bifacially modified and bimarginally retouched flakes are less common (n=8, 3%) though they, along with unifacially modified flake tools, represent a more complex manufacturing strategy in which design may have focused on producing tools that would function for longer or in a wider variety of tasks.

One bimarginally modified uniface flake tool (99.11.3, Figure 153*f*) has a shallow concave edge and a lateral convex edge. This tool may have functioned as a spokeshave for working bone or wood. Eleven flake tools are produced from metamorphic cobble flakes which are thermally discolored and have abrupt, cracked edges, characteristic of fractures caused by exposure to high temperatures (Figures 155-156). Most of these are modified unimarginally (n=8), while one is bimarginally modified (108.7.2, Figure 155*d*), and two are unifacially flaked (58.8.4, Figure 155*a*; 86.8.9, Figure 156*c*).

Cherts (n=148, 54%) and metamorphic cobble (n=100, 36%) are the most frequent flake tool materials, while basalt (n=11, 4%), quartz crystal (n=11, 4%), vitrophyre (n=3, 1%), and argillite (n=3, 1%) were also used (Table 15). Cortex presence is highest for metamorphic cobble flake tools (n=52, 52%) and, while the sample sizes of the remaining non-chert materials are too small for representative inference, it is important to note that chert flake tools are the most numerous but contain the smallest percentage of tools with cortex (n=21, 14%). These proportions suggest that chert was generally introduced to the site in a more advanced state of reduction than materials

which were likely to have been procured on-site or relatively nearby, such as fine-grained cobbles and quartz crystal. The highest percentage occurs in the unimarginally modified flake tools category (n=60, 32%), while overall, 80 (29%) flake tools retain cortex. Fifty-two flake tools from Areas A and E were submitted for protein residue testing and fourteen tools resulted in single and multiple hits for rabbit, guinea pig, bovine, human, horse, sheep, dog, and swine antisera (see Chapter 10).

Preforms

Twenty-five preforms were recovered in Areas A (n=2), B (n=1), D (n=2), and E (n=20) (Table 16, Figure 157). These items were designed for modification into hafted tools, however they lack hafting elements and exhibit minimal retouch and stylistic shapes. Most preforms are produced form chert (n=18), while metamorphic cobble (n=4), vitrophyre (n=1), basalt (n=1), and quartz crystal (n=1) were also used. Eighteen are bifacially flaked, seven are unifaces, and all except one (111.8.8, Figure 157*h*) are decorticated. A number are slightly damaged (n=7) or fragmented (n=11) as a result of bending (n=13) and perverse (n=5) fractures which probably occurred during the manufacture process. One of the larger preforms (38.9.5, Figure 157*g*) is broken at a its thickest area and retouch is focused along one distal blade edge. This item may have also served as a core or slicing tool before it was discarded. Another unique item (62.8.8, Figure 157*f*) is a uniface with a proximal bending fracture and a flake detachment that resulted in a hinge termination. Four performs (84.3.2, Figure 157*b*; 86.6.3, Figure 157*e*; 101.7.6, Figure 157*c*), including 38.9.5, may have been refurbished as cutting tools prior to being discarded, and these were submitted for protein residue analysis. Both 84.3.2 and 86.6.3 reacted positively with sheep antiserum (see Chapter 10).

Table 16. 10CW34 preform inventory and summary.

Recovery Area	Cat. No.*	Material	L (mm)	WD (mm)	TH (mm)	WT (g)
D	1981Sur.1 (s) (f)[1]	MC	43.9	37.2	8.8	15.8
E West	2010misc.28 (s) (sd)[2]	C	28.4	21.4	6.4	3.76
B	2011misc.12 (s) (sd)[3]	C	56.8	28.5	12	17.84
E West	2011misc.14 (s) (sd)[4]	C	24.8	20.3	5.1	2.82
E Central	2012misc.28 (s) (sd)[5]	C	25.1	18	3.6	1.7
E Central	96.1.4	C	33.4	18.8	6.1	3.81
A	1.2.6	V	50.6	27.5	7.7	11.13
E Central	95.2.8 (f)	B	15.5	23	4.6	2.1
D	1981Hel.3.3.2 (f)	C	18	11.1	2.5	0.47
A	13.3.3	C	40.1	22.3	3.9	4.25
E Central	84.3.2 (PRA+) (f)	C	29.5	22.3	6.4	5.9
E East	104.4.4 (f)	C	10.7	20.4	5.2	3.48
E Central	86.6.3 (sd) (PRA+)	C	33.4	16.2	5.2	3.48
E Central	89.6.6 (f)	C	14.2	25.4	4.8	16.62
E Central	46.7.6	MC	61.3	28	10	16.62
E Central	62.7.4	C	34.8	19.2	5.5	4.03
E Central	73.7.10 (f)	C	34.6	29.8	5.9	4.95
E Central	101.7.6 (sd) (PRA–)	C	34	20.4	6.2	5.5
E Central	52.8.10	MC	101.8	50.2	25.3	128.81
E Central	62.8.8 (sd)	C	44.3	19.7	5	5.07
E Central	111.8.8	MC	78.4	40.1	21.1	75.99
E Central	38.9.5 (f) (PRA–)	C	75.2	54.8	19.9	95.56
E Central	83.10.6 (f)	C	16.9	28.2	10.1	4.82
E Central	103.10.3 (f)	QC	32.1	29	9	9.46
E Central	107.10.4 (f)	C	11	19.8	5.9	1.29
	Range**		24.8-101.8	16.2-50.2	3.6-25.3	1.7-128.81
	Average**		46.2	25	8.8	20.3
	Standard Deviation**		42.6	9.2	6.3	35.3

*Items are listed in order of increasing level depth; surface items (s) are listed first.
(f) = fragmented item.
(sd) = slightly damaged item.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result; + = positive result.
**Fragmented items (n=11) are not included in summary.
[1]Area D surface collection coordinates (September, 1981 grid system, see Figure 82): 6+50-7+00 W/2+00-2+50 S.
[2]Area E surface collection coordinates: N109/W153.
[3]Area B surface collection: 60 m W of Area A grid coordinates N140/W100.
[4]Area E surface collection coordinates: N100/W122.
[5]Area E surface collection coordinates: N115/W94.

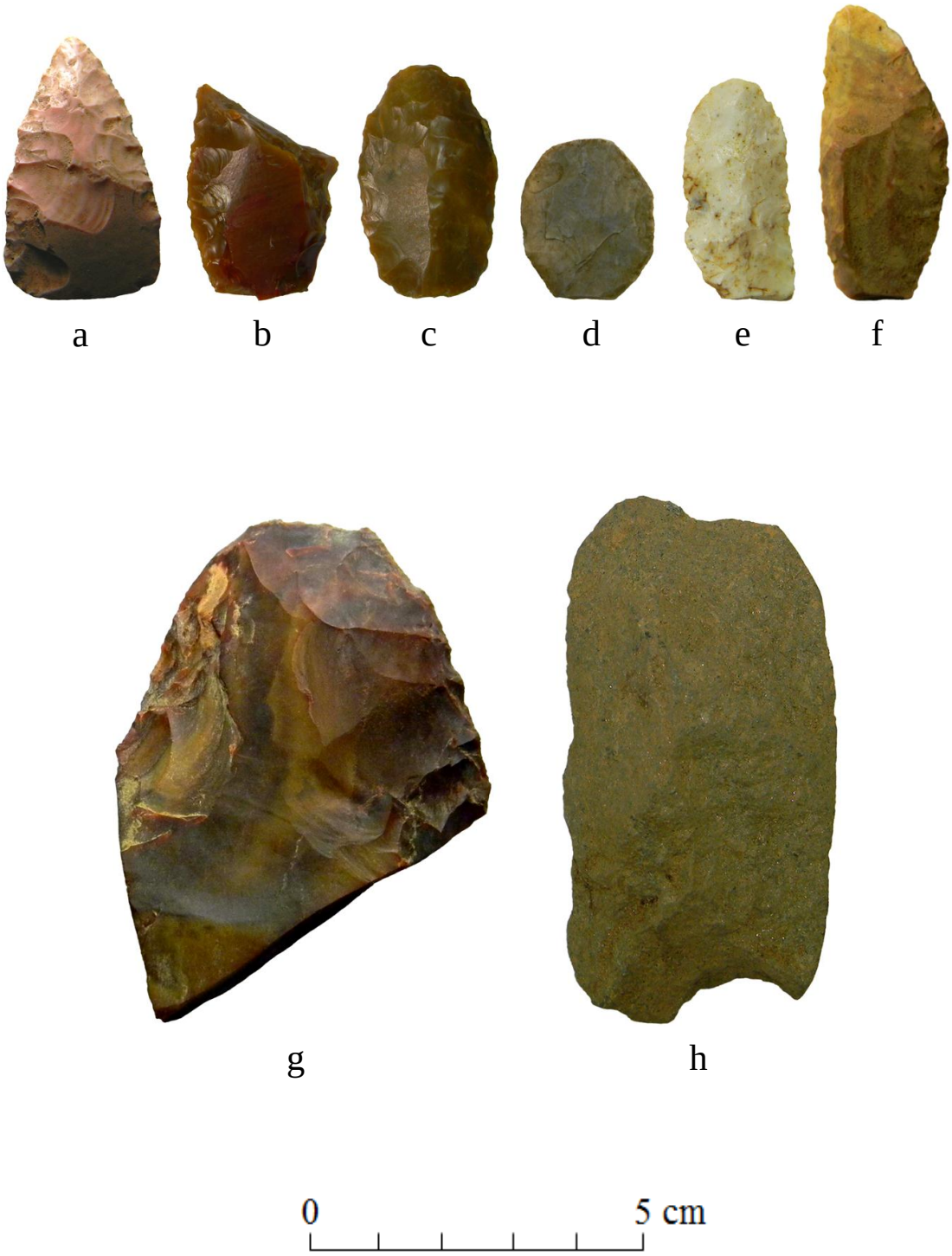


Figure 157. **Preforms, Areas A and E, 10CW34**: *a*, 13.3.3*; *b*, 84.3.2; *c*, 101.7.6; *d*, 2011misc.14*; *e*, 86.6.3; *f*, 62.8.8*; *g*, 38.9.5; *h*, 111.8.8*.
*Item has not been washed in order to preserve protein residues for future analysis.

Point/Preform Fragments

Thirty-five biface and uniface fragments which lack hafting elements and correspond to either the point or preform classifications were recovered in Areas A (n=2), D (n=1), and E (n=32) (Table 17, Figure 158). Fragmentation of these items may have occurred during use, or during the manufacture process, and identification is limited to the specific tool segments which can be recognized. The majority of fragments are biface (n=24) and uniface (n=2) tips (n=26), while a number are midsections (n=8). One item (29.5.7), a uniface produced from argillite, may be an unfinished distal end of a preform, however the fracture appears to have been caused by impact indicating that it could be the hafted portion of a broken point. Nine tips and three midsections exhibit impact fractures, while bending (n=13) and perverse (n=9) fractures are together more common. Bending and perverse fractures are often caused by stresses resulting from an imbalanced pressure application to a tool during thinning or pressure flake detachment (Whittaker 1994:161-165). The high instance of such fractures suggests that tool fragmentation frequently occurred during manufacture and repair. Materials consist of chert (n=29), basalt (n=3), metamorphic cobble (n=1), quartz crystal (n=1), and argillite (n=1). Twelve point/preform fragments were submitted for protein residue testing; 30.8.3 (Figure 158*j*) tested positive for guinea-pig and 77.11.4 (Figure 158*c*) reacted positively with both rat and sheep antisera (see Chapter 10).

Biface Fragments

Forty-four biface fragments, recovered in Areas A (n=2) and E (n=42) (Table 18, Figure 159), were too fragmentary for classification. All are bifacially worked and only one, made from quartz crystal (58.15.e1, Figure 159*l*), retains cortex. These items may be

Table 17. 10CW34 point/preform fragment inventory and summary.

Recovery Area	Cat No.*	Material	Fragment Type	Fracture Type	L (mm)	WD (mm)	TH (mm)	WT (g)
E Stockpile	SB.1-5.3 (np)	C	midsection	perverse	14.5	12	3.8	0.88
E Stockpile	SB.41-45.1 (np)	C	tip	impact	18	14.2	2.2	0.67
D	1981Sur.19 (s)[1]	C	tip	perverse	19.9	21.5	6.9	2.46
A	3.1.4	C	tip	impact	13.6	17.8	2.1	0.54
E Central	59.1.5	B	midsection	perverse	10.6	14.1	4.4	0.79
A	17.2.2	C	tip	impact	13.4	7.1	2.8	0.18
E Central	21.3.4	C	tip	bending	11	9.1	2	0.19
E Central	25.3.3 (PRA–)	B	tip	bending	23.1	18	4.3	1.9
E Central	98.3.3	C	tip	bending	12.1	12.9	3	0.39
E Central	110.3.3	C	tip	bending	12.8	9.8	3.3	0.33
E Central	29.5.7	A	(nd)	impact	19	15.2	3.4	1.08
E Central	91.5.2	C	tip	impact	15.1	2.1	3.1	0.39
E Central	101.5.5 (PRA–)	QC	tip	bending	25.5	17	5.5	2.06
E Central	65.6.b (PRA–)	C	tip	impact	41.2	26.4	9.8	7.84
E Central	25.7.6	B	tip	impact	7.8	7.5	2.2	0.08
E Central	51.7.4	C	midsection	impact	21.7	16	4.5	1.47
E Central	70.7.7	C	midsection	bending	23.4	15.1	6.2	2.39
E Central	113.7.3	C	tip	impact	7.8	5.2	2.3	0.1
E Central	30.8.3 (PRA+)	C	midsection	impact	27.5	17.5	3.8	2.54
E Central	111.8.4 (PRA–)	C	tip	bending	25.4	17	4.9	2.21
E Central	111.8.5 (PRA–)	C	tip	bending	15	15	2.5	0.59
E Central	70.9.6	C	tip	perverse	15.4	13.2	3.4	0.67
E Central	47.10.8	MC	midsection	bending	15	12.9	4.5	1.11
E Central	51.10.f (PRA–)	C	midsection	bending	38.2	13.4	6	3.35
E Central	57.10.5	C	midsection	impact	27.4	14.9	4.4	1.84

*Items are listed in order of increasing level depth; non-provenienced items (np) are listed first, followed by surface items (s).
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result; + = positive result.
(nd) = not determined.
[1]Area D surface collection coordinates (September, 1981 grid system, see Figure 82): 8+00-7+50 W/0+50 S.

Table 17. *Continued.*

Recovery Area	Cat No.*	Material	Fragment Type	Fracture Type	L (mm)	WD (mm)	TH (mm)	WT (g)
E Central	64.10.e (PRA–)	C	tip	impact	21.1	19.5	5.5	1.68
E Central	93.10.6	C	tip	perverse	16.1	4.2	4.1	1.08
E Central	110.10.4 (PRA–)	C	tip	bending	10.9	11.4	2.8	0.32
E Central	50.11.c (PRA–)	C	tip	perverse	21.2	18.7	4.9	1.76
E Central	60.11.b (PRA–)	C	tip	bending	14.9	14.8	4.8	0.98
E Central	77.11.4 (PRA+)	C	tip	perverse	28.4	15.8	6.1	2.6
E Central	82.11.16	C	tip	perverse	20.5	15.5	4.6	1.15
E Central	82.11.17	C	tip	bending	29.7	26	5.5	5.04
E Central	90.11.4	C	tip	perverse	20.4	17.8	4	1.31
E Central	53.14.4	C	tip	impact	23.6	14.1	4.5	1.29
				Range	**	2.1-26.4	2-9.8	**
				Average		14.4	4.2	
				Standard Deviation		5.2	1.6	

*Items are listed in order of increasing level depth.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result; + = positive result.
(nd) = not determined.
**Length and weight summaries are not applicable.

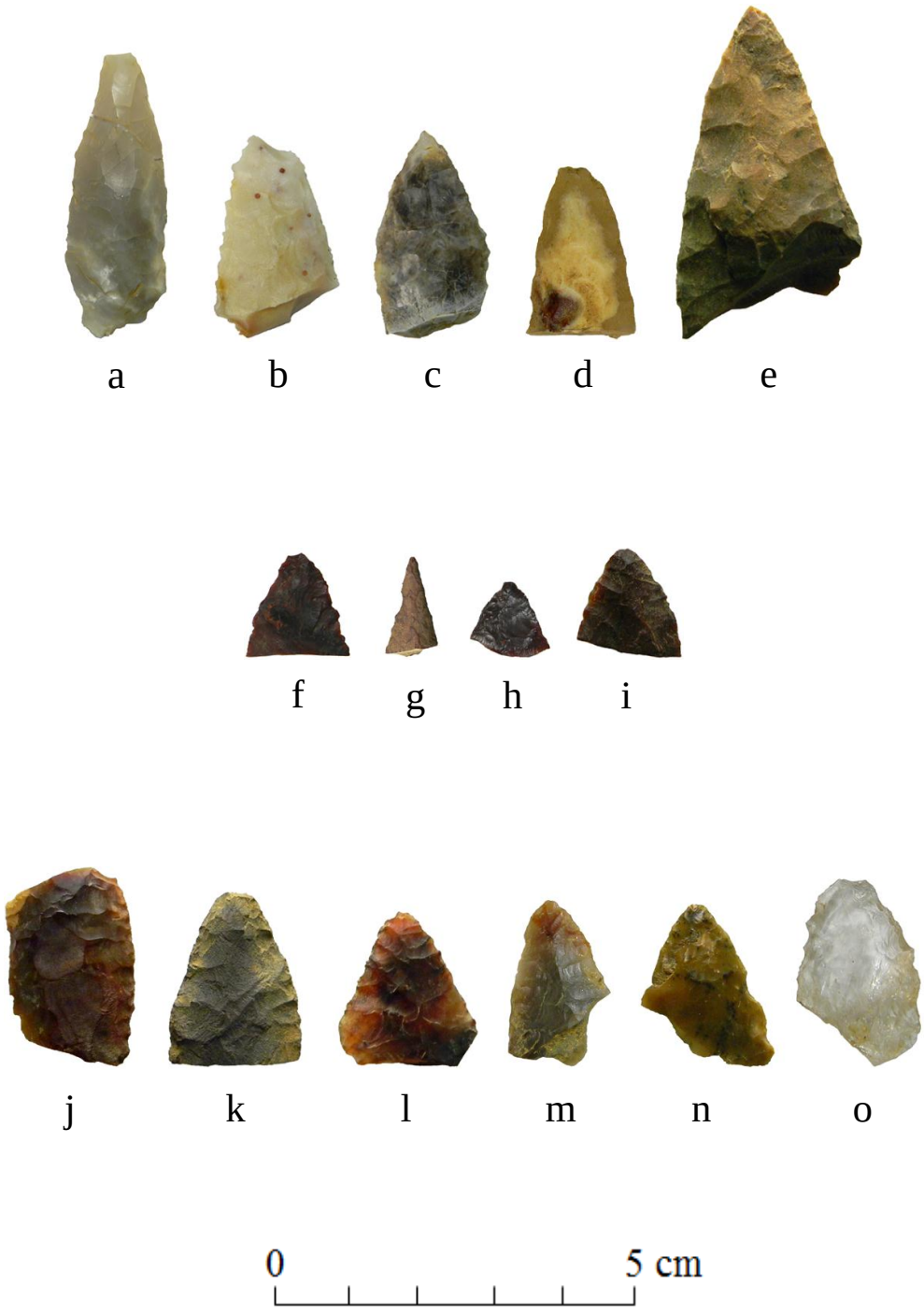


Figure 158. **Point/preform fragments, Areas A and E, 10CW34**: *a*, 51.10.f; *b*, 111.8.4; *c*, 77.11.4; *d*, 70.7.7*; *e*, 65.6.b; *f*, 111.8.5; *g*, 17.2.2*; *h*, 110.10.4; *i*, 60.11.b; *j*, 30.8.3; *k*, 25.3.3; *l*, 50.11.c; *m*, 53.14.4*; *n*, 64.10.e; *o*, 101.5.5.
*Item has not been washed in order to preserve protein residues for future analysis.

Table 18. 10CW34 biface fragment inventory.

Recovery Area	Cat. No.*	Material	Fracture Type	L (mm)	WD (mm)	TH (mm)	WT (g)
E Central	61.1.1	C	perverse	16.4	21.2	5.3	1.91
E Central	74.1.3	C	bending	13.1	17.4	3	0.18
E Central	87.1.4	C	bending	11.5	7.5	2	0.18
E Central	87.1.5	C	bending	7.9	6.5	3.1	0.16
E Central	87.1.6	C	bending	6.9	10.2	3.7	0.64
E Central	30.2.3	C	bending	8.6	12.4	2.8	0.3
E Central	59.2.4	MC	impact	20.2	37.7	8.9	8.53
E Central	87.2.5	C	bending	10.1	10	2.4	0.23
E Central	91.2.3	MC	impact	32	37.9	5.1	9.22
E Central	60.3.3	C	perverse	12.7	9.3	3.3	0.23
E Central	87.3.6	C	bending	15.4	15.9	2.8	0.22
E Central	73.4.4	C	bending	6.6	15.7	4	0.51
E Central	106.4.4	C	bending	7	11.4	2.9	0.24
A	5.5.2	C	perverse	3.7	21.2	10	5.58
E Central	63.5.3	C	perverse	21.6	5.7	4.7	0.66
E Central	30.6.5	C	impact	19.7	5.4	2.4	0.29
E Central	47.6.3	MC	impact	6.9	32	5.7	1.95
E Central	65.7.5	C	bending	14	13.2	3.6	0.79
A	13.8.3 (PRA+)	C	perverse	25.1	13	4.6	1.68
E Central	52.8.12	MC	perverse	26.3	21.6	8.1	4.11
E Central	75.8.8	C	perverse	2.6	8.7	5.2	0.91
E Central	79.8.6	C	bending	21.4	7.6	2.4	0.37
E Central	55.9.8	C	impact	28	16.1	6.2	2.95
E Central	59.9.6	QC	perverse	29	16.4	7	3.74
E Central	64.9.5	C	perverse	30.6	11.3	6.5	1.41
E Central	73.9.7	C	perverse	13.2	14.2	5.6	1.73
E Central	77.9.7 (PRA+)	C	bending	25.4	29.6	7	4.54
E Central	100.9.5	C	bending	10.5	22	5.6	1.33
E Central	56.10.11	C	perverse	17.1	12.7	3.1	0.56
E Central	62.10.6	C	impact	11.5	13.4	3.2	0.8
E Central	65.10.5	C	bending	23.2	9.6	6.4	1
E Central	81.10.6	C	bending	16.4	9.1	6.2	1.06
E Central	93.10.7	C	perverse	16.2	5.9	2.5	0.21
E Central	20.11.3 (PRA+)	C	bending	27.9	22	6.9	3.85
E Central	62.11.3	V	impact	16.5	6.1	3.9	0.27
E Central	65.11.7	C	bending	19.4	20.9	11.6	5.28
E Central	80.11.10 (PRA–)	C	perverse	55.1	28.8	7.6	17.19
E Central	85.11.4	C	perverse	10.8	10.2	4	0.45
E Central	107.11.5	QC	bending	4.9	5.6	4.4	0.33
E Central	109.11.3 (PRA–)	C	perverse	15	21.3	7.7	3.49
E Central	76.12.3 (PRA+)	C	impact	22.3	13.7	4.9	2.25
E Central	64.13.6	QC	perverse	28	17.5	4	2.3
E Central	64.13.7	C	perverse	34.3	13.2	7.7	2.82
E Central	58.15.e1 (PRA+)	QC	bending	28.2	27.8	16.5	3.79

*Items are listed in order of increasing level depth.

(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result; + = positive result.

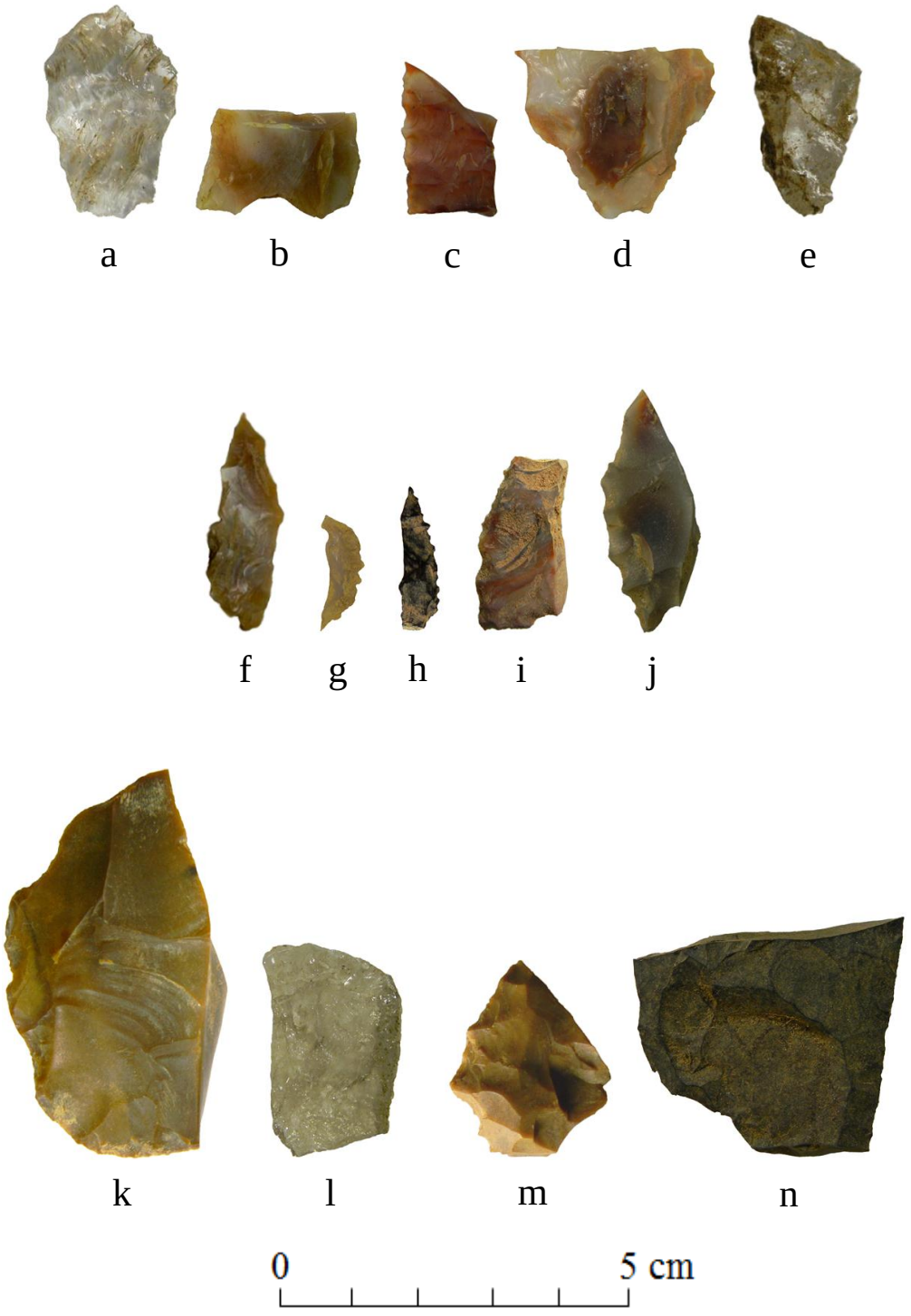


Figure 159. **Biface Fragments, Areas A and E, 10CW34**: *a*, 64.13.6*; *b*, 109.11.3; *c*, 76.12.3; *d*, 77.9.7; *e*, 59.9.6*; *f*, 64.9.5*; *g*, 93.10.7*; *h*, 30.6.5*; *i*, 13.8.3; *j*, 64.13.7*; *k*, 80.11.10; *l*, 58.15.e1; *m*, 20.11.3; *n*, 91.2.3*.
*Item has not been washed in order to preserve protein residues for future analysis.

fragments of hafted tools or preforms, and most exhibit bending (n=19) or perverse (n=17) fractures, while several are fractured from impact damage (n=8). Materials consist of chert (n=35), metamorphic cobble (n=4), quartz crystal (n=4), and vitrophyre (n=1). Seven biface fragments were submitted for protein residue testing and five (13.8.3, Figure 159*i*; 20.11.3, Figure 159*m*; 58.15.e1, Figure 159*l*; 76.12.3, Figure 159*c*; 77.9.7, Figure 159*d*) produced single and multiple hits for rabbit, bovine, rat, and sheep (see Chapter 10).

Core Tools

Cores are stone nodule remnants which have been fractured, struck, or flaked in order to produce raw material for lithic tool manufacture. Six objective cores which exhibit edge-retouch and use-modification were recovered in Areas B (n=1), D (n=1), and E (n=4) (Table 19, Figure 160-161). Edge-battering on five and unimarginal retouch on one (1996K-39.1.2, Figure 160*c*) indicate that these items may have functioned as bashing or cutting tools in addition to having provided raw material for other lithic tools. All but one (102.8.5, Figure 161*a*) exhibit well-defined platforms and are flaked unidirectionally, while three are exhausted (1996K-39.1.2; 1981Sur.12, Figure 160*a*; 56.2.2, Figure 160*b*). Cortex is present on all five core tools produced from metamorphic cobbles and is absent on the only chert core tool, 1996K-39.1.2.

Other Flaked Items

Five modified items that do not correspond with a specific tool category were recovered in Areas B and E (Table 20, Figure 162). Three of these are quartz crystals which still retain much their natural hexagonal shape and cortex. Flake scars on two

Table 19. 10CW34 core tool inventory.

Recovery Area	Cat. No.*	Material	Flake Removal	Modification	L (mm)	WD (mm)	TH (mm)	WT (g)
D	1981Sur.12 (s)[1]	MC	unidirectional	edge-battered	86.2	66	28.6	117.21
B	1996K-39.1.2	C	unidirectional	unimarginally retouched	38.7	30.7	3.1	13.9
E Central	56.2.2	MC	unidirectional	edge-battered	114.8	54.8	25.7	221.31
E East	102.8.5	MC	multidirectional	edge-battered	103	99.6	41.5	399.54
E Central	65.9.4	MC	unidirectional	edge-battered	110	111.5	43.7	540
E Central	64.10.16	MC	unidirectional	edge-battered	160.3	140.8	45.2	1320

*Items are listed in order of increasing level depth; surface items (s) are listed first.
[1]Area D surface collection coordinates (September, 1981 grid system, see Figure 82): 8+50-9+00 W/0+00-0+50 S.

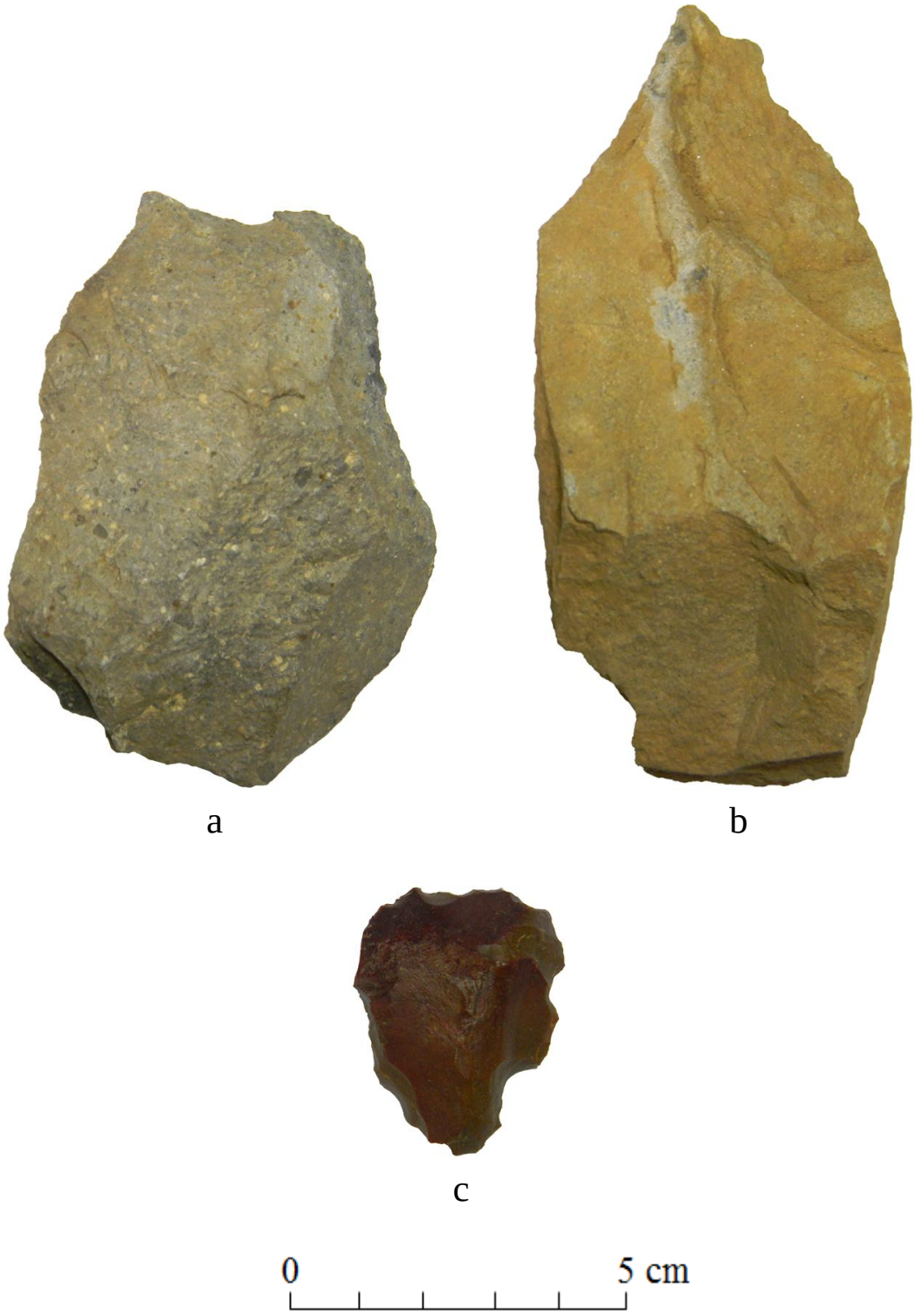


Figure 160. **Core tools, Areas B, D, and E, 10CW34**: *a*, 1981Sur.12*; *b*, 56.2.2*; *c*, 1996K-39.1.2*.
*Item has not been washed in order to preserve protein residues for future analysis.

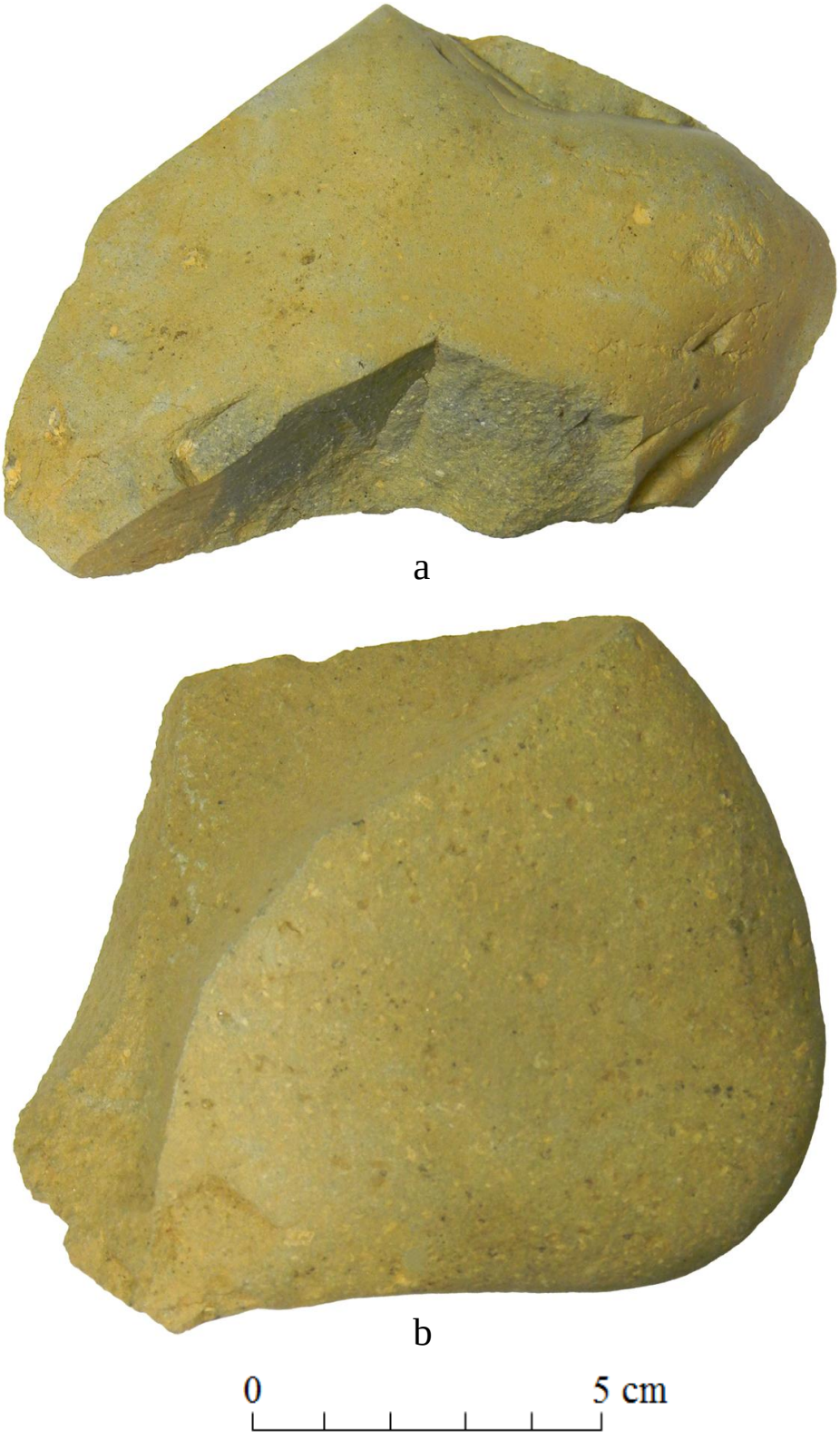


Figure 161. **Core tools, Area E, 10CW34**: *a*, 102.8.5*; *b*, 65.9.4*.
*Item has not been washed in order to preserve protein residues for future analysis.

Table 20. 10CW34 other flaked items inventory.

Recovery Area	Cat. No.*	Material	L (mm)	WD (mm)	TH (mm)	WT (g)
E Central	20.1.3	QC	33.4	10.4	10.5	3.7
E Central	51.7.7	C	10.2	5	1.4	0.09
B	199696-A.9.3	QC	60.2	19.5	8.4	15.78
E Central	85.9.4	QC	20.3	13.9	7.9	2.18
E Central	78.11.7 (PRA+)	QC	40.1	39.5	10.2	14.95

*Items are listed in order of increasing level depth.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; + = positive result.

(20.1.3, Figure 162*c*; 199696-A.9.3, Figure 162*a*) may be a result of deliberate breakage or modification, though it is uncertain what function they may have served. The third quartz crystal (85.9.4, Figure 162*d*) appears to have been broken and abraded to form a wedge shape at its thinnest edge. It is worth mentioning that this item was recovered in the same unit and depth level as a unique and apparently unmodified fragment of natural metallic material (85.9.5, Figure 162*e*) which could not be macroscopically identified with any known mineral. The closest mineral matches indicate that this material may have meteoritic origins, and further analyses to determine its chemical signature may take place in the future.

A fourth artifact (78.11.7, Figure 162*b*) produced from quartz crystal is a small, decorticated biface which exhibits characteristics that are comparable to a number of flaked tool categories, however, due to its unique morphology, retouch, and flaking patterns, the intended function and style of this tool could not be determined with certainty. While the overall rectangular shape from the proximal to the distal end resembles the hafted section of a stemmed point, the considerable cross-sectional thickness (10.2 mm), is more indicative of a preform that may have been rejected for use

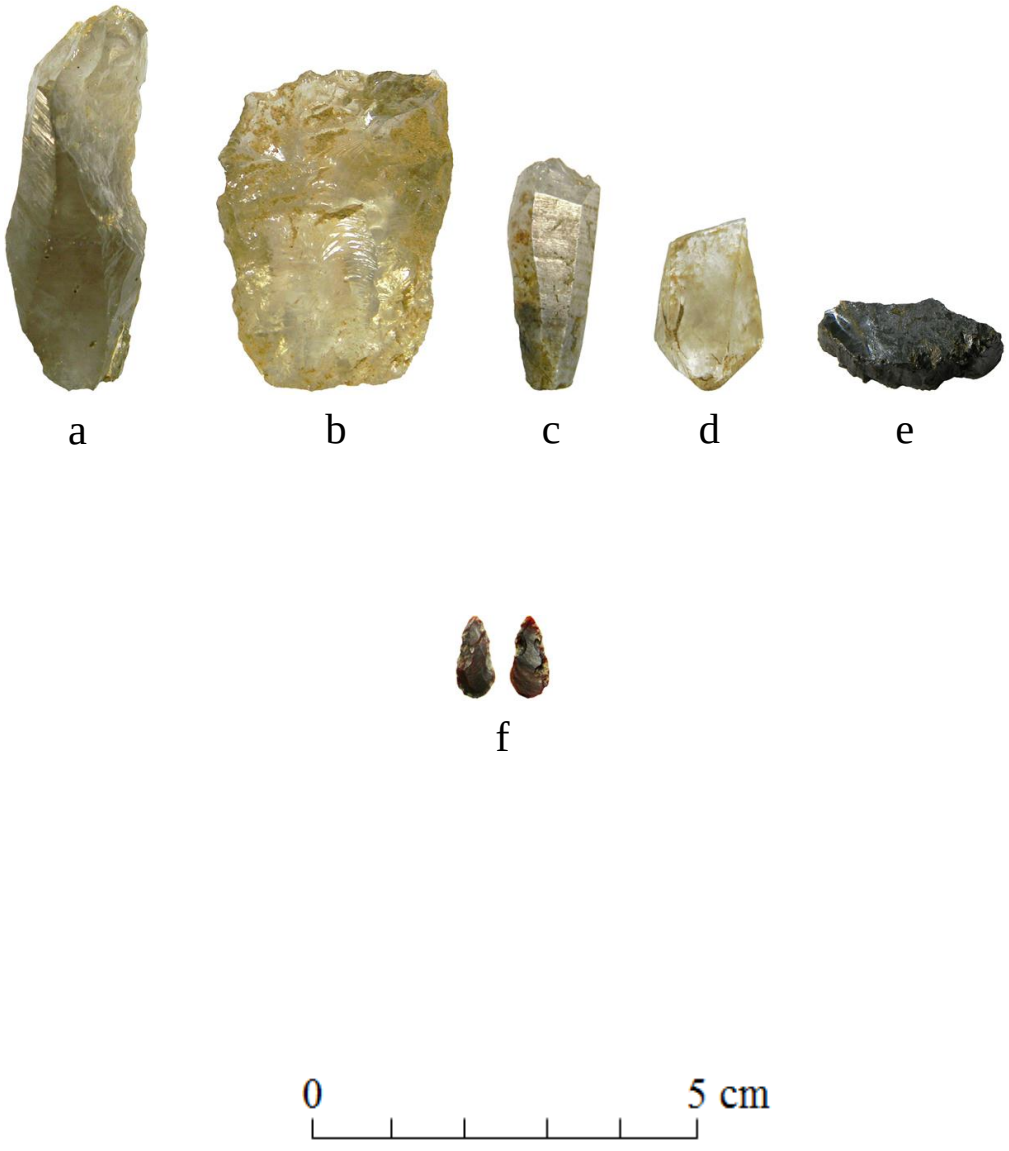


Figure 162. **Other flaked items Areas B and E, 10CW34**: *a*, 199696-A.9.3*; *b*, 78.11.7; *c*, 20.1.3*; *d*, 85.9.4*; *e*, 85.9.5*; *f*, 51.7.7*.
*Item has not been washed in order to preserve protein residues for future analysis.

as a hafted tool and instead reworked for other uses. It is also possible that this item may be the remnant of an exhausted core which was later refurbished. The widest, distal end is bifacially flaked and serrated into a straight edge, while the proximal end exhibits long, bifacial thinning scars. The flaking pattern throughout is predominantly irregular and bifacial retouch is extensive along both edges. Protein residue analysis performed on 78.11.7 produced a positive result for sheep (see Chapter 10), implying that this tool likely functioned similar to a small thumb scraper and was used for processing game.

The fifth item (51.7.7, Figure 162*f*) is a teardrop-shaped, bimarginally retouched uniface made from chert and it is the smallest intact flaked item recovered at 10CW34. The dorsal face contains a remnant of a large, longitudinal thinning flake scar, while the ventral side is marked by potlid cavities, indicating that it was produced from a larger flake originally detached from a heat treated blank or preform. The dimensions of this item are within the measurement ranges of Ahsahka micropoints and micropoint preforms recovered at the Clearwater Fish Hatchery Site (10CW4) located at the mouth of the North Fork (Sappington et al.1991:46-48). A small uniface of similar shape and size, though slightly larger (102.8.6, Figure 149*c*), was also recovered in Area E, and this item is considered to have functioned as a perforator prior to being broken (see Perforators section above).

Debitage

Debitage (n=16,252) was the most frequent cultural material recovered in Areas A (n=573), B (n=91), D (n=82), and E (n=15,504), and accounts for 92% of the 10CW34 assemblage (Table 21; Appendices 3a-3d, see Figure 136) . Two additional flakes were included in previous collections from 10CW34, however, because specific coordinates

Table 21. 10CW34 Area debitage summaries.

Area A				
Material	**Lot. No.**	**No. (%)**	**Wt. (g)**	**Wt. (%)**
C	431	75.2	163.82	36.2
O	5	0.9	0.13	0.0
V	54	9.4	24.94	5.5
B	31	5.4	11.01	2.4
QC	15	2.6	3.29	0.7
MC	37	6.5	249.88	55.2
Total	**573**		**453.07**	
Area B				
Material	**Lot. No.**	**No. (%)**	**Wt. (g)**	**Wt. (%)**
C	52	57.1	10.9	28.5
V	17	18.7	3.01	7.9
B	4	4.4	5.09	13.3
QC	12	13.2	6.76	17.6
MC	6	6.6	12.55	32.8
Total	**91**		**38.31**	
Area D				
Material	**Lot. No.**	**No. (%)**	**Wt. (g)**	**Wt. (%)**
C	48	58.5	35.87	32.5
O	2	2.4	0.16	0.1
V	3	3.7	0.14	0.1
B	4	4.9	1.02	0.9
QC	2	2.4	1.95	1.8
A	1	1.2	1.04	0.9
MC	22	26.8	70.07	63.6
Total	**82**		**110.25**	
Area E				
Material	**Lot. No.**	**No. (%)**	**Wt. (g)**	**Wt. (%)**
C	12254	79.0	2029.89	28.9
O	56	0.4	3.39	0.0
V	461	3.0	96.52	1.4
B	825	5.3	257.3	3.7
QC	523	3.4	153.74	2.2
A	54	0.3	36.63	0.5
MC	1331	8.6	4446.75	63.3
Total	**15504**		**7023.75**	

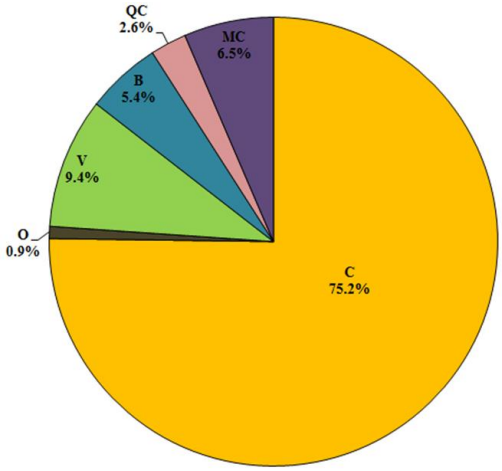
Table 22. 10CW34 non-provenienced debitage inventory.

Catalogue No.*	Lot No.	WT (g)	Material
1982Sur.1[1]	1	39.18	MC
Prevmisc.3[2]	1	3.53	C

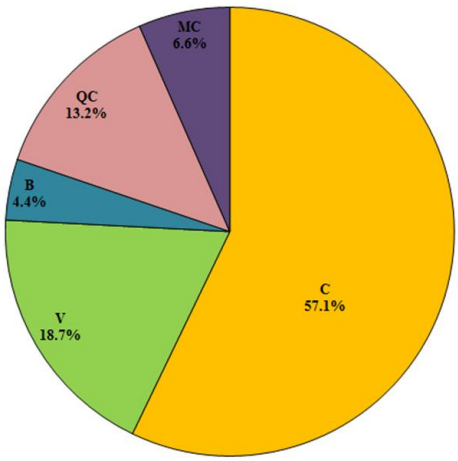
[1]Unknown coordinates or collector.
[2]Unknown coordinates, collector, or date.

and collector information for these items could not be determined, they are not included within a specific Area (Table 22). Debitage, or lithic debris, is generated during the production of stone tools and core reduction, and its examination can provide insights into raw material selection and use, tool manufacture and repair techniques, and the types of tools produced. Raw materials are represented by seven types, and all except obsidian and argillite were present in each of the tested Areas of the site (Figure 163). Cherts (n=12,786, 78.7%) are the most frequent material overall and comprise the largest percentages within each Area. Metamorphic cobble (n=1397, 8.6%) is the next most frequent, followed by basalt (n=864, 5.3%), quartz crystal (n=552, 3.4%), and vitrophyre (n=535, 3.3%). Obsidian (n=63, 0.4%) and argillite (n=55, 0.3%) comprise the smallest percentages and both of these materials were absent in Area B. By overall weight, metamorphic cobble debitage predominates (total=4817.96 g, 62.8%), reflecting its greater density and the tendency for flakes produced from this material to be larger in size (Figure 164). Cherts (total=2244.01 g, 29.3%) are the next most frequent and the weight proportions for basalt (total=274.42 g, 3.6%), vitrophyre (total=124.61 g, 1.6%), quartz crystal (total=165.74 g, 2.2%), argillite (total=37.67g, 0.5%), and obsidian (total=3.68 g, <0%) are similar to the recovered flake quantities.

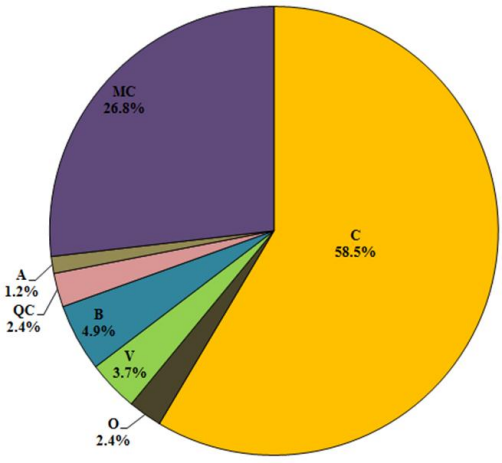
A preliminary size grade analysis was performed with 16% (n=2524) of the



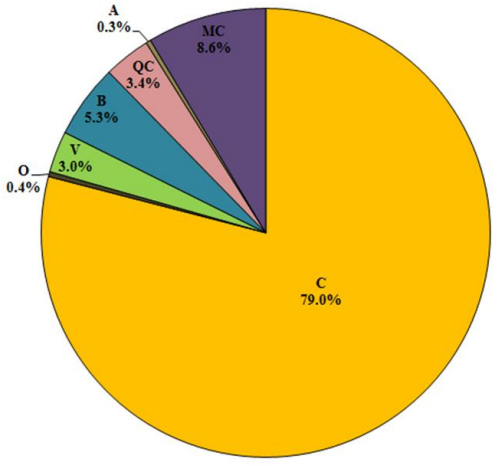
Area A Debitage Material (n=573)



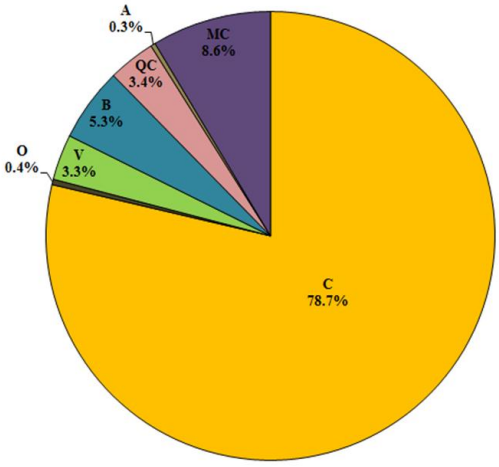
Area B Debitage Material (n=91)



Area D Debitage Material (n=82)

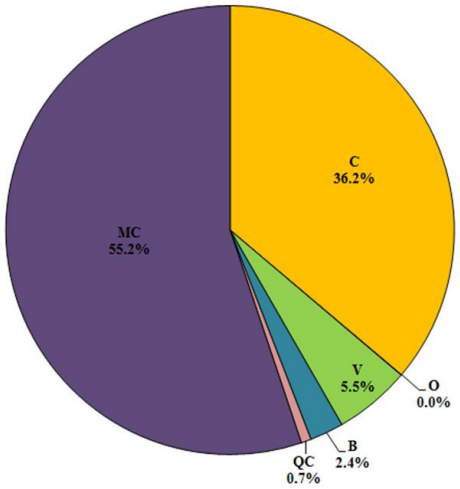


Area E Debitage Material (n=15,504)

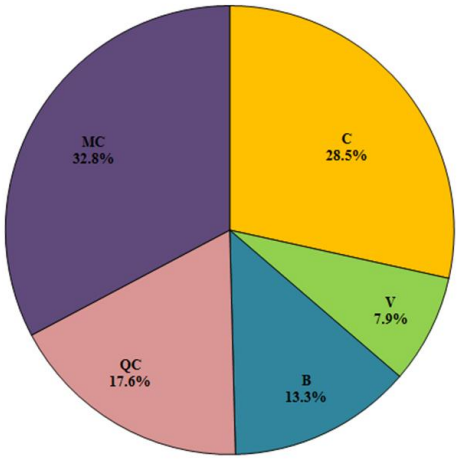


10CW34 Debitage Material (n=16,252)

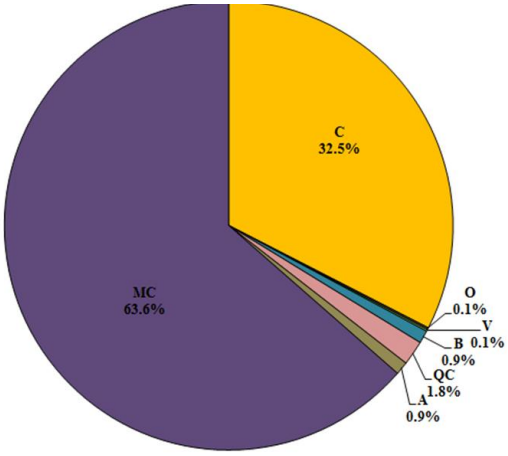
Figure 163. Pie charts showing debitage material percentages for Areas A, B, D, and E. Overall debitage material percentages for 10CW34 are shown in the bottom chart. Two non-provenienced flakes are included in the 10CW34 material total.



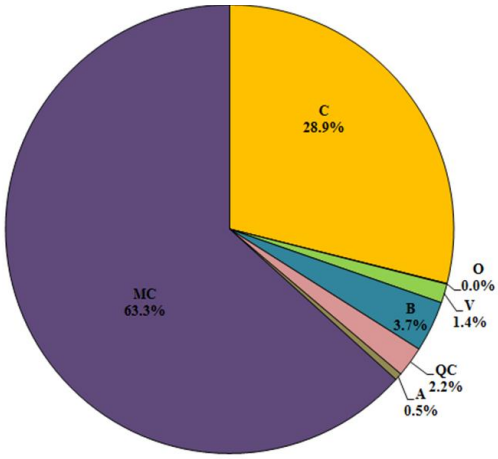
Area A Debitage Weight (453.07 g)



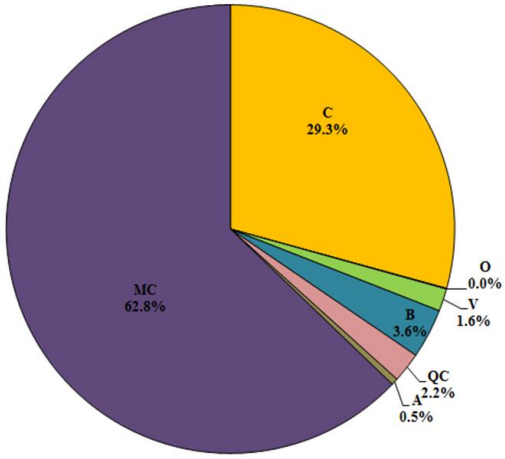
Area B Debitage Weight (38.31 g)



Area D Debitage Weight (110.25 g)



Area E Debitage Weight (7023.75 g)



10CW34 Debitage Weight (7668.09 g)

Figure 164. Pie charts showing debitage weight percentages by material for Areas A, B, D, and E. Overall weight percentages for 10CW34 are shown in the bottom chart. Two non-provenienced flakes (42.71g) are included in the 10CW34 weight total.

debitage assemblage from 10CW34. Debitage sizes from thirteen units in the Central zone of Area E (Figure 165) were measured by passing flakes through a series of ten wire mesh screens ranging in arbitrary sizes from 8 mm (0.31 inch) to 2 mm (0.08 inch) (Appendix 3e). Counts for individual flake sizes were recorded for each unit and depth level, while basic flake types (shatter or controlled) (explained below), flake conditions (fragmented or intact), raw material type, and cortex presence were also recorded. It is important to note that this method alone is not sufficient to diagnostically characterize a debitage assemblage nor to determine technological signatures of particular reduction stages or production events (Andrefsky 2007; Bradbury and Carr 2009). The present analysis is not intended to address these inquiries, rather it functions simply as an expedient procedure that provides a rudimentary sample data set which may then be employed to summarize debitage generation during the multiple production/reduction events that took place throughout the occupation of 10CW34.

Flakes occur in an extensive variety of shapes and sizes and morphological studies are important for understanding the production of specific tool types and reduction techniques. Flakes that were size graded for the 10CW34 analysis were distinguished using two very basic types: shatter (s) is considered to represent debris generated from an uncontrolled detachment of material which may occur during heavy load application, percussion flaking, or as a result of fracture to the objective piece, such as a tool or blank; the controlled flake category (c) encompasses all flakes that exhibit attributes such as conchoidal fractures, striking platforms, and definable dorsal and ventral surfaces, each of which can indicate that flake detachment was anticipated or predicted in a controlled manner (Andrefsky 2006:12, 16). It was also noted whether

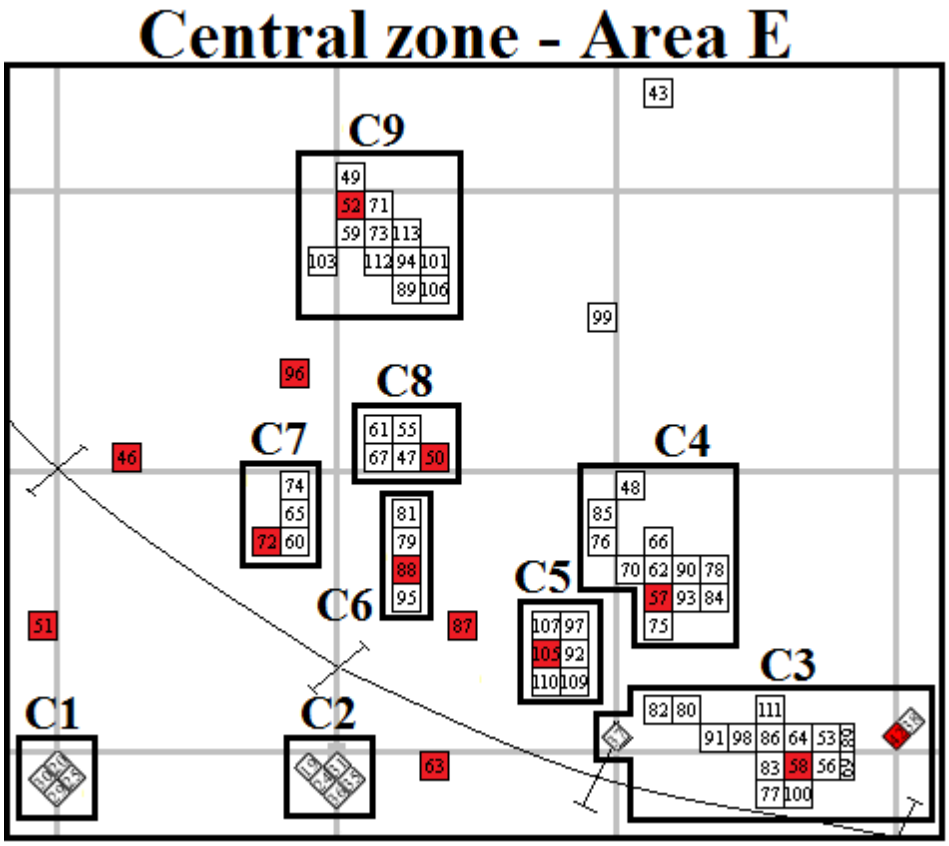


Figure 165. Close-up image of the Central zone in Area E, with Units 42, 46, 50, 51, 52, 57, 58, 63, 72, 87, 88, 96, and 105 shaded red (n=13) from which debitage was sampled for size grade analysis.

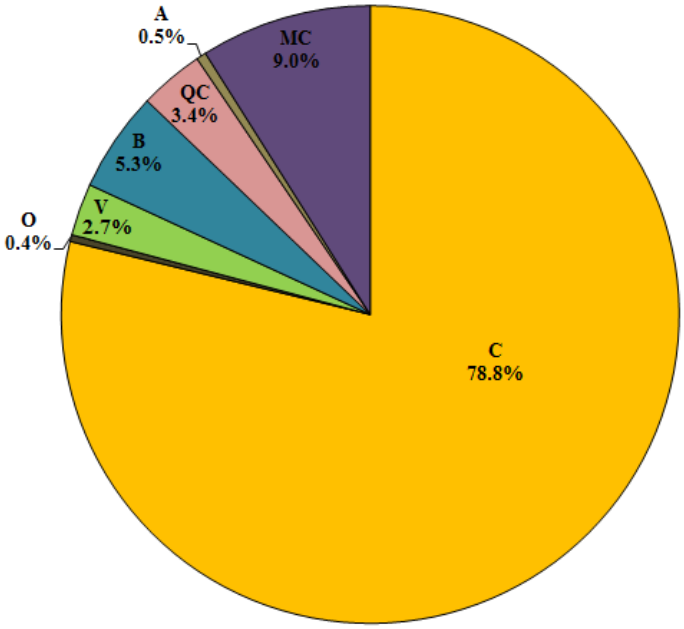


Figure 166. Pie chart showing percentages of debitage materials sampled for size grade analysis.

controlled flakes were fragmented (f/c) or intact (i/c) to prevent size representation by flakes which are smaller due to having been broken. The presence and amount of dorsal cortex on a flake may relate to a potential interval in the reduction sequence, and cortical flakes have been used as an indicator of early stage reduction. This is based on the idea that areas containing cortex are generally the first to be removed during tool production and core reduction, however, this attribute is not necessarily a reliable technological marker (Andrefsky 2006:103-104; Sullivan and Rozen 1985:756). The recovery of several bifacially and unifacially flaked tools containing cortex remnants (92.12.2, Figure 144*c*; 65.12.b, Figure 148*a*; 58.15.e2, Figure 147*b*; 111.8.8, Figure 157*h*; 58.15.e1, Figure 159*l*), suggests that cortical variation at 10CW34 is related to additional factors such as raw material procurement and nodule extraction and reduction techniques.

The majority of the sampled debitage are intact/controlled (i/c) flakes measuring between 5.6 mm and 2.8 mm (Table 23, Figure 167). As a group, controlled flakes (n=2295, 90.9%) are far more common than shatter (n=229, 9.1%), and while intact flakes are more frequent (n=1477), fragmented flakes (n=818) are common. The relatively high volume of fragmented flakes may have resulted from frequent occurrence of post depositional processes between knapping events, such as trampling or natural disturbances. The percentages of materials sampled for analysis (Figure 166) reflect the overall debitage material percentages for 10CW34 shown in Figure 163. Cherts (n=1989) make up 78.8% of the debitage sampled for analysis and metamorphic cobble (n=226, 9%) is the next most frequent. Basalt (n=133, 5.3%), quartz crystal (n=85, 3.4%), and vitrophyre (n=69, 2.7%) are moderately represented, while obsidian (n=9, 0.4%) and argillite (n=13, 0.5%) comprise slight amounts.

Table 23. Debitage size grade analysis inventory for Units 42, 46, 50, 51, 52, 57, 58, 63, 72, 87, 88, 96, 105 (0-190 cm BD).

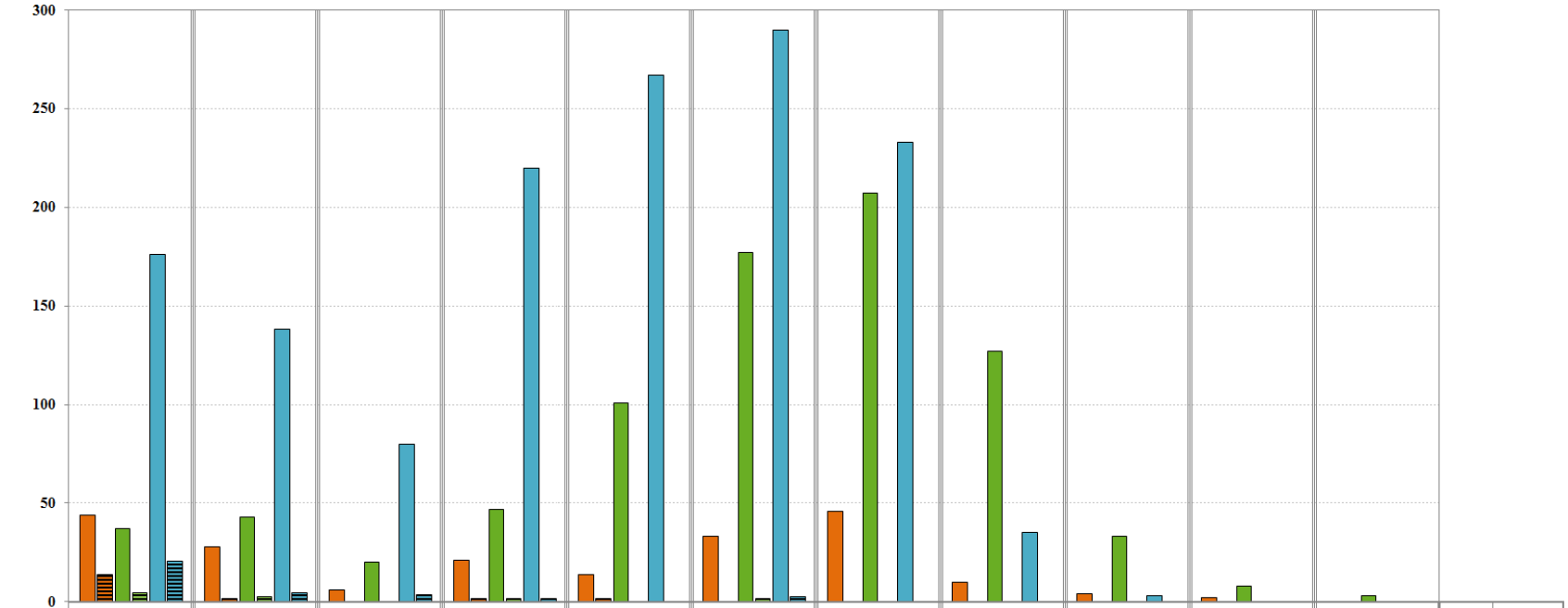
Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx	8				2							10
			28	19	4	13	11	27	40	8	4	2		156
	f/c	cx	3	3	1	1	1							9
			29	35	13	38	83	151	173	111	26	4	2	665
	i/c	cx	9	2	4	2	1	3						21
			93	103	55	184	211	243	204	34	1			1128
C Total			**170**	**162**	**77**	**238**	**309**	**424**	**417**	**153**	**31**	**6**	**2**	**1989**
O	s	cx												
	f/c	cx												
						1	1	2		1				5
	i/c	cx												
							2	1		1				4
O Total						**1**	**3**	**3**		**2**				**9**
V	s	cx												
	f/c	cx												
			1	3	2	4	4	5	5	4	1	1	1	31
	i/c	cx												
			6	3	1	1	10	9	6		2			38
V Total			**7**	**6**	**3**	**5**	**14**	**14**	**11**	**4**	**3**	**1**	**1**	**69**
B	s	cx												
							1			1				2
	f/c	cx												
			1	1	1	1	5	6	10	2	2	1		30
	i/c	cx												
			22	8	12	12	19	17	11					101
B Total			**23**	**9**	**13**	**13**	**25**	**23**	**21**	**3**	**2**	**1**		**133**

s = shatter; f/c = fragmented / controlled; i/c = intact / controlled.

Table 23. *Continued*.

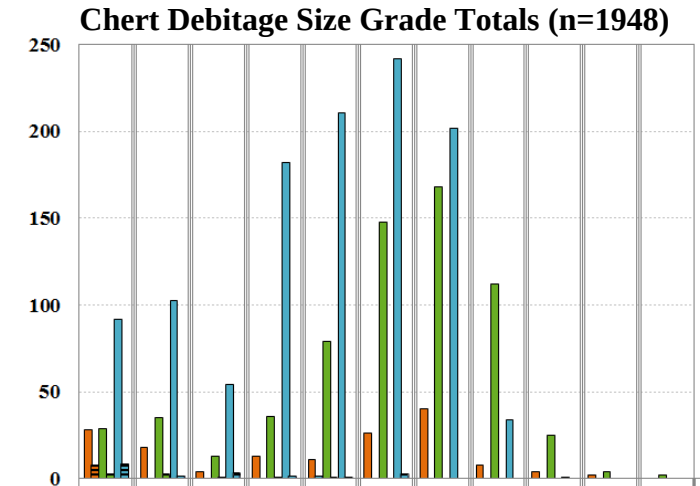
Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	**6.7**	**6.3**	**5.6**	**4.75**	**4**	**3.35**	**2.8**	**2.36**	**2**	**< 2**	
QC	s	cx												
					1									1
	f/c	cx	1			1		1						3
			3	2	3	2	6	10	12	8	2	1		49
	i/c	cx		1										1
			4	5	2	6	3	8	3					31
QC Total			**8**	**8**	**6**	**9**	**9**	**19**	**15**	**8**	**2**	**1**		**85**
A	s	cx												
	f/c	cx	1											1
			2	2				2			1			7
	i/c	cx	1											1
			2			2								4
A Total			**6**	**2**		**2**		**2**			**1**			**13**
MC	s	cx	6	2	1	2								11
			16	8	1	8	2	7	6	1				49
	f/c	cx						1	1					2
			1		1	1	3	1	7		1	1		16
	i/c	cx	11	2										13
			49	18	10	13	23	13	9					135
MC Total			**83**	**30**	**13**	**24**	**28**	**22**	**23**	**1**	**1**	**1**		**226**
Size Grade Totals			**297**	**217**	**112**	**292**	**388**	**507**	**487**	**171**	**40**	**10**	**3**	**2524**

s = shatter; f/c = fragmented / controlled; i/c = intact / controlled.

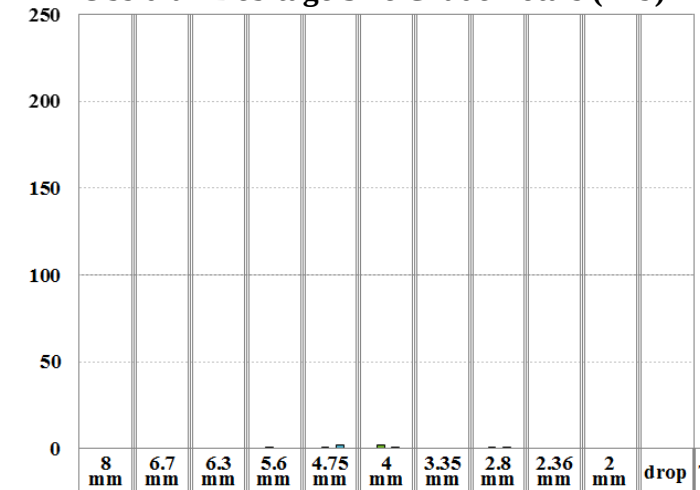


	8 mm	6.77 mm	6.3 mm	5.6 mm	4.75 mm	4 mm	3.35 mm	2.8 mm	2.36 mm	2 mm	drop	Total	%
s	44	27	6	21	14	34	46	10	4	2		208	8.2%
s cx	14	2	1	2	2							21	0.8%
f/c	37	43	20	47	102	177	207	126	33	8	3	803	31.8%
f/c cx	5	3	1	2	1	2	1					15	0.6%
i/c	176	137	80	218	268	291	233	35	3			1441	57.1%
i/c cx	21	5	4	2	1	3						36	1.4%
Total	297	217	112	292	388	507	487	171	40	10	3	2524	
%	11.8%	8.6%	4.4%	11.6%	15.4%	20.1%	19.3%	6.8%	1.6%	0.4%	0.1%		

Figure 167. Clustered column chart showing the sampled debitage frequencies within each size grade from thirteen units in the Central zone in Area E. Frequencies are divided into six debitage categories: shatter (s); shatter with cortex (s cx); fragmented/controlled (f/c); fragmented/controlled with cortex (f/c cx); intact/controlled (i/c); and intact/controlled with cortex (i/c cx).



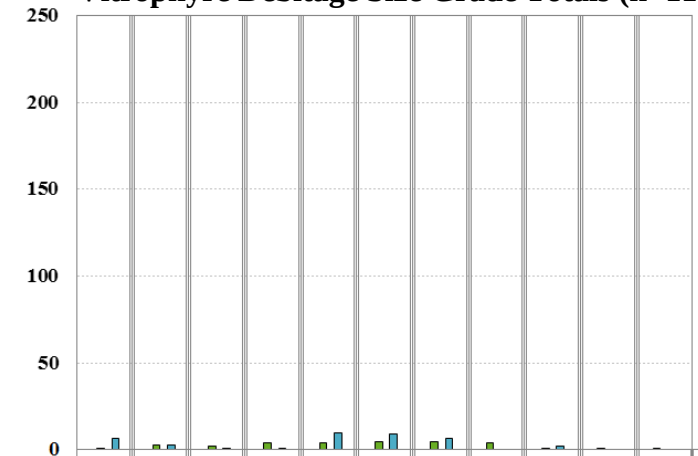
	8 mm	6.7 mm	6.3 mm	5.6 mm	4.75 mm	4 mm	3.35 mm	2.8 mm	2.36 mm	2 mm	drop	Total	%
s	28	19	4	13	11	27	40	8	4	2		156	7.8%
s cx	8				2							10	0.5%
f/c	29	35	13	38	83	151	173	111	26	4	2	665	33.4%
f/c cx	3	3	1	1	1							9	0.5%
i/c	93	103	55	184	211	243	204	34	1			1128	56.7%
i/c cx	9	2	4	2	1	3						21	1.1%
Total	170	162	77	238	309	424	417	153	31	6	2	1989	
%	8.5%	8.1%	3.9%	12%	15.5%	21.3%	21%	7.7%	1.6%	0.3%	0.1%		



	8 mm	6.7 mm	6.3 mm	5.6 mm	4.75 mm	4 mm	3.35 mm	2.8 mm	2.36 mm	2 mm	drop	Total	%
s													
s cx													
f/c				1	1	2		1				5	55.6%
f/c cx													
i/c					2	1		1				4	44.4%
i/c cx													
Total				1	3	3		2				9	
%				11.1%	33.3%	33.3%	22.2%						

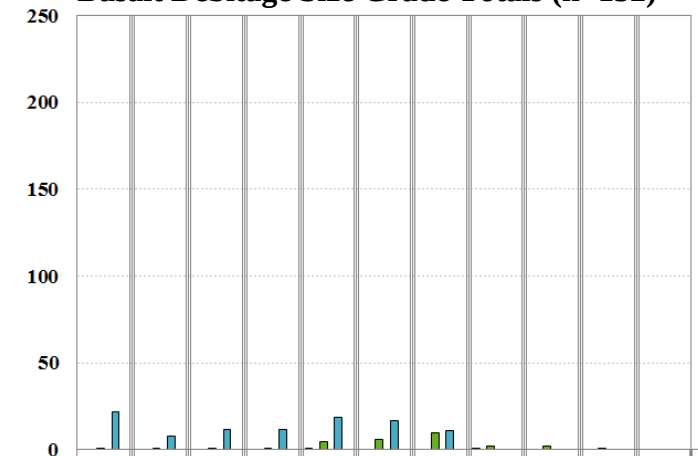
Figure 168. Clustered column charts showing size grade totals for chert and obsidian debitage sampled from thirteen units in the Central zone of Area E.

Vitrophyre Debitage Size Grade Totals (n=114)



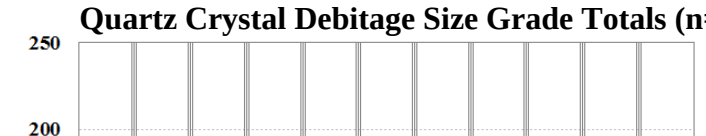
	8 mm	6.7 mm	6.3 mm	5.6 mm	4.75 mm	4 mm	3.35 mm	2.8 mm	2.36 mm	2 mm	drop	Total	%
s													
s cx													
f/c	1	3	2	4	4	5	5	4	1	1	1	31	44.9%
f/c cx													
i/c	6	3	1	1	10	9	6		2			38	55.1%
i/c cx													
Total	7	6	3	5	14	14	11	4	3	1	1	69	
%	10.1%	8.7%	4.3%	7.2%	20.3%	20.3%	15.9%	5.8%	4.3%	1.4%	1.4%		

Basalt Debitage Size Grade Totals (n=132)



	8 mm	6.7 mm	6.3 mm	5.6 mm	4.75 mm	4 mm	3.35 mm	2.8 mm	2.36 mm	2 mm	drop	Total	%
s					1			1				2	1.5%
s cx													
f/c	1	1	1	1	5	6	10	2	2	1		30	22.6%
f/c cx													
i/c	22	8	12	12	19	17	11					101	75.9%
i/c cx													
Total	23	9	13	13	25	23	21	3	2	1		133	
%	17.3%	6.8%	9.8%	9.8%	18.8%	17.3%	15.8%	2.3%	1.5%	0.8%			

Figure 169. Clustered column charts showing size grade totals for vitrophyre and basalt debitage sampled from thirteen units in the Central zone of Area E.

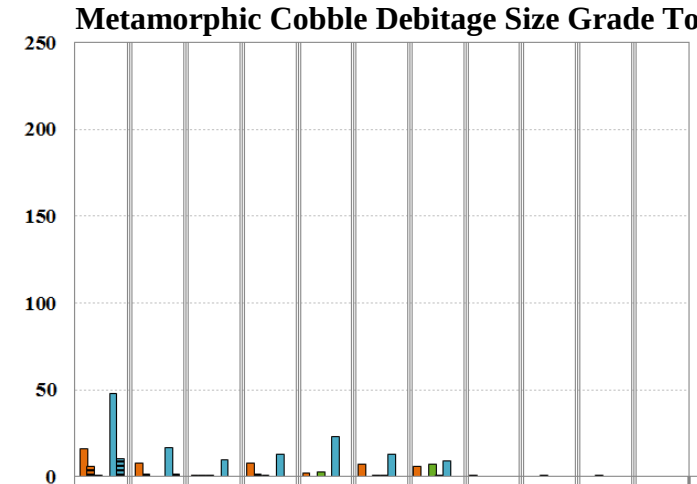


	8 mm	6.7 mm	6.3 mm	5.6 mm	4.75 mm	4 mm	3.35 mm	2.8 mm	2.36 mm	2 mm	drop	Total	%
s			1									1	1.2%
s cx													
f/c	3	2	3	2	6	10	12	8	2	1		49	57.6%
f/c cx	1			1		1						3	3.5%
i/c	4	5	2	6	3	8	3					31	36.5%
i/c cx		1										1	1.2%
Total	8	8	6	9	9	19	15	8	2	1		85	
%	9.4%	9.4%	7.1%	10.6%	10.6%	22.4%	17.6%	9.4%	2.4%	1.2%			



	8 mm	6.7 mm	6.3 mm	5.6 mm	4.75 mm	4 mm	3.35 mm	2.8 mm	2.36 mm	2 mm	drop	Total	%
s													
s cx													
f/c	2	2				2			1			7	53.8%
f/c cx	1											1	7.7%
i/c	2			2								4	30.8%
i/c cx	1											1	7.7%
Total	6	2		2		2			1			13	
%	46.2%	15.4%		15.4%		15.4%			7.7%				

Figure 170. Clustered column charts showing size grade totals for quartz crystal and argillite debitage sampled from thirteen units in the Central zone of Area E.



	8 mm	6.7 mm	6.3 mm	5.6 mm	4.75 mm	4 mm	3.35 mm	2.8 mm	2.36 mm	2 mm	drop	Total	%
s	16	8	1	8	2	7	6	1				49	21.7%
s cx	6	2	1	2								11	4.9%
f/c	1		1	1	3	1	7		1	1		16	7.1%
f/c cx						1	1					2	0.9%
i/c	49	18	10	13	23	13	9					135	59.7%
i/c cx	11	2										13	5.8%
Total	83	30	13	24	28	22	23	1	1	1		226	
%	36.7%	13.3%	5.8%	10.6%	12.4%	9.7%	10.2%	0.4%	0.4%	0.4%			

Figure 171. Clustered column charts showing size grade totals for metamorphic cobble debitage sampled from thirteen units in the Central zone of Area E.

The overall percentage of debitage containing cortex is highest for metamorphic cobble (n=26, 11.6%), argillite (n=2, 15.4%), and quartz crystal (n=4, 4.7%). The presence of cortex is most frequent at or above 8 mm in size, and declines substantially as size decreases (Figures 168-171). Cortex presence is relatively minor for cherts (n=40, 2.1%) and is absent on all of the sampled vitrophyre, basalt, and obsidian materials. Metamorphic cobble contains the largest proportion of shatter (n=60, 26.6%) and the lowest percentage (n=18, 8%) of fragmented flakes. While cobble materials are the more resilient to damage, the higher occurrences of shatter and cortex may reflect the local abundance of this toolstone near 10CW34. Shatter is also common in cherts (n=166, 8.3%) indicating that tool production from reduced blanks or small cores took place on-

site. As with obsidian, vitrophyre, basalt, quartz crystal, and argillite, the larger proportion of chert controlled flakes indicates that the retouch and repair to tools made from these materials were the primary debitage-generating activity at 10CW34.

Cobble Tools

One hundred and fifty-three cobble tools were recovered at 10CW34. This group consists of cobbles which were intentionally manufactured such as ground cobbles (n=2), net weights (n=6), and flaked cobbles (n=58), or which were modified as a result of use such as anvils (n=5) and battered cobbles (n=82) (Figure 172). All cobble tools were produced from metamorphic and granitic, alluvial gravels, ranging in size from small pebbles to small boulders (Figure 173). These materials are interchangeable with the naturally occurring cobbles at the site today, an indication that most cobble tools were probably procured on-site or in nearby areas. While fishing and plant processing are represented by net weights and ground cobbles, the frequency of flaked and battered cobbles suggests that a variety of tasks were performed at 10CW34, which in addition to game processing and tool manufacture and repair, may also have included bone-, animal hide-, and wood-working.

Ground Cobbles

Two cobble tools with ground and polished surfaces were recovered from 10CW34 (Table 24). One of these is an elongated metamorphic cobble, battered at one end and minimally polished to a small, flat, circular surface at the opposing end (1996Sur.2, Figure 174). This item was labeled as having been collected from the surface near the shore of the North Fork in 1996, though no other collection or provenience information was provided. Its function may have been similar to a pestle for

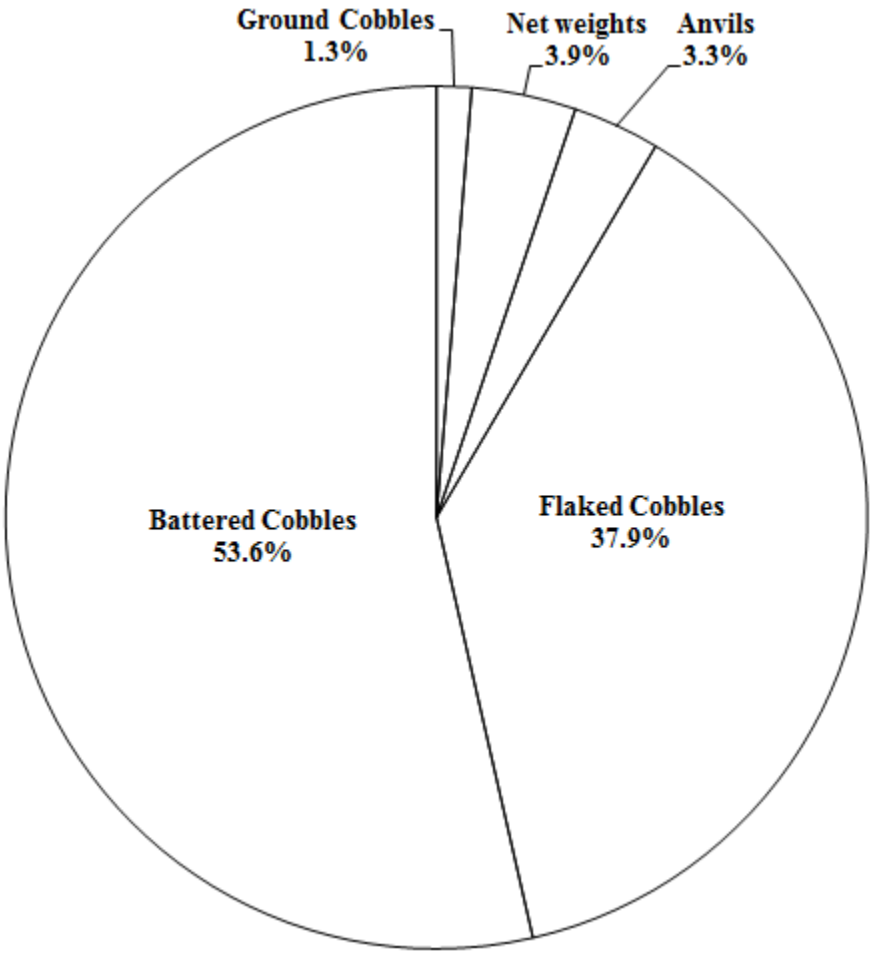


Figure 172. Pie chart showing cobble tool type percentages recovered at 10CW34.

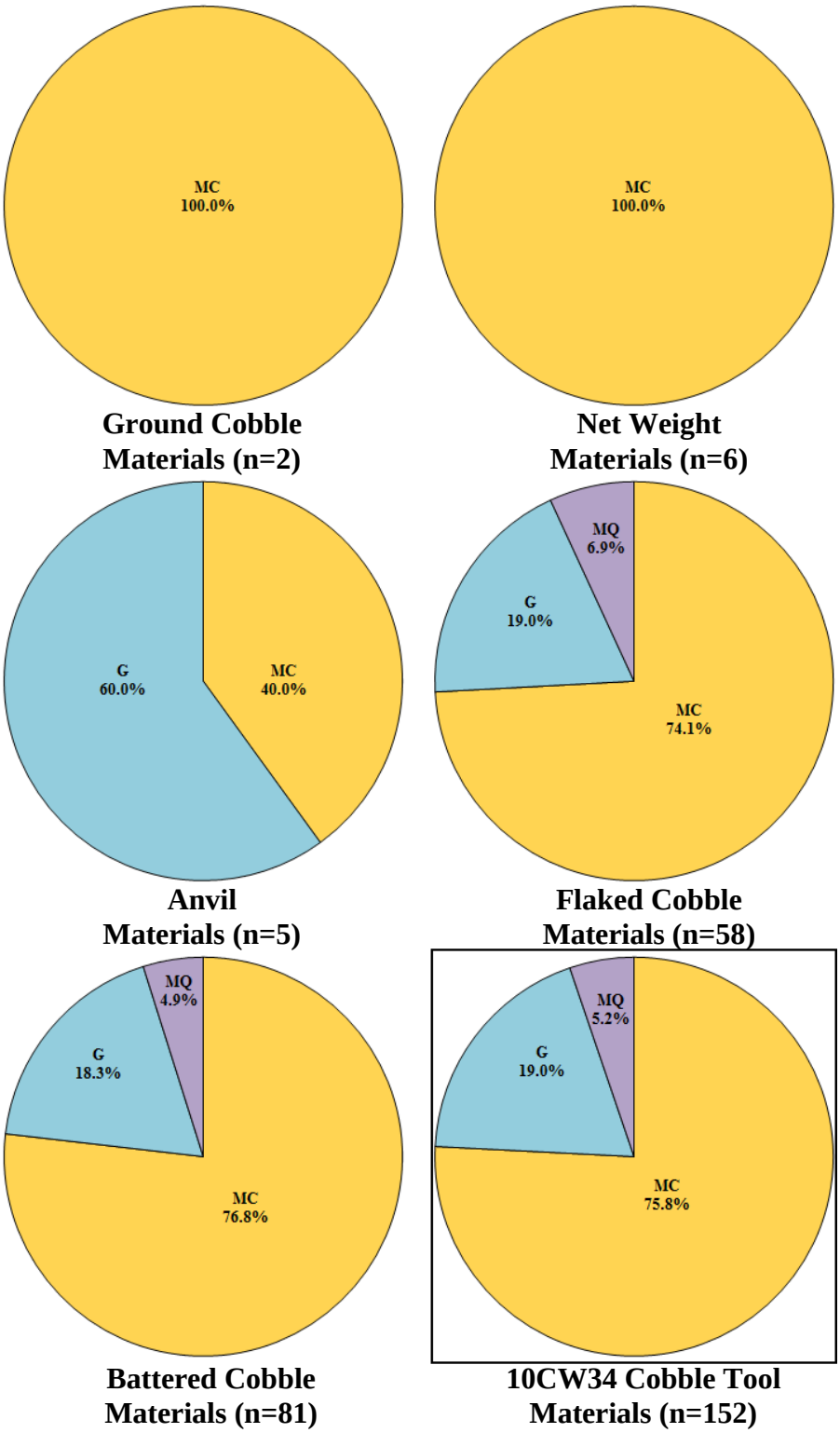


Figure 173. Pie charts showing cobble tool material percentages for ground cobbles, net weights, anvils, flaked cobbles, and battered cobbles recovered at 10CW34. Total cobble tool material percentages for 10CW34 are shown in the bottom right chart.



Figure 174. **End-battered and end-polished cobble, 1996.Sur.2, possibly Area A or B, 10CW34**. In both images the artifact is positioned at an angle to show the polished end (left) and the battered end (right). This item may have been collected from the surface in either Area A or B, as the 1996 fieldwork was conducted in those areas of the site.



Figure 175. **Edge-ground cobble, 103.7.7, Area E, 10CW34**. In the top image the artifact is lying flat with the polished edge on the left. The bottom image shows an edge-on view of the polished and faceted edge.

processing plant foods, and it may also have served as a hammerstone or a battering implement in activities such as processing bone. The second item is a flat, broken, fine-grained cobble with one polished and faceted edge (103.7.7, Figure 175). This tool appears to have been broken intentionally and there is one battering scar at one edge of the break. Polished, faceted edges are characteristic of edge-ground cobbles, a hallmark artifact of the Cascade phase (8000-4500 BP) in the Clearwater River region. Edge-ground cobbles are thought to have functioned as root or seed processing tools (Sappington 1994:131, 136; Sappington et al. 1997:45).

Table 24. 10CW34 ground cobble tool inventory.

Recovery Area	Cat. No.	Material	Item Description	L (mm)	WD (mm)	TH (mm)	WT (kg)
-	1996Sur.2 (np)[1]	MC	end-battered end-ground	190	72.4	61.2	1.54
E Central	103.7.7 (PRA –)	MC	edge-ground	105.98	78	39.5	0.7

(np) = non-provenienced item.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result.
[1]1996 surface collection, possibly in Area A or B. The artifact label described location as "on the shore at confluence of Kelly Creek and North Fork."

Net Weights

Six small, flat, percussion flaked cobbles, exhibiting modifications consistent with net weight production, were recovered at 10CW34 in Area E (Table 25). Two of these (95.7.4, Figure 176*c*; 88.8.7, Figure 176*a*) appear to be completed net weights, similar to those recovered from sites in the region, such as at Weitas Creek (10CW30) on the upper North Fork (Keeler 1973:55, Figure 22) and the Clearwater Fish Hatchery Site (10CW4) at Ahsahka (Sappington et al. 1991:56-59). Flaking on both has been concentrated on opposing sides; 95.7.4 is unifacially flaked, while 88.8.7 is flaked bifacially. Four cobbles

are considered to either be incomplete or rejected net weights. Two of these (86.8.10; 95.7.3, Figure 176*b*) are small, flat, and disc-shaped cobbles from which a single flake has been removed.

The remaining two cobbles (24.8.4, Figure 177; 57.9.12, Figure 178) are modified extensively and exhibit both unifacial and bifacial flaking on opposing sides. One side of 24.8.4 is unifacially notched, while a large portion of the other side is removed, forming an edge which contains small bifacial flake scars. This may have occurred as a result of deliberate removal, however, it seems more likely the detachment occurred unintentionally during its manufacture into a net weight, after which repair was attempted and the cobble subsequently rejected. Also an apparently rejected net weight, 57.9.12 is flaked bifacially on two opposing long edges. One of the shorter ends is reduced by three large unifacial flake scars, while the rounded end, retaining the shape of the original cobble, contains surface battering, indicating that this item may also have functioned similar to a hammerstone.

Table 25. 10CW34 net weight inventory.

Recovery Area	**Cat. No.***	**Material**	**L (mm)**	**WD (mm)**	**TH (mm)**	**WT (g)**	**Modification Location and Type**
E Central	95.7.3 (R/I)	MC	66.2	45.5	21.9	91.4	one flake
E Central	95.7.4	MC	68.1	52.1	16.2	63.1	opposing sides unifacial
E Central	24.8.4 (R/I)	MC	87.2	94.3	28.1	303.19	opposing sides unifacial / bifacial
E Central	86.8.10 (R/I)	MC	175	148	47.2	1700	one side bifacial
E Central	88.8.7	MC	124.9	103.9	26	620	opposing sides bifacial
E Central	57.9.12 (R/I)	MC	103.3	62.6	30.3	293.54	opposing sides opposing ends bifacial / unifacial surface battering

*Items are listed in order of increasing level depth.
(R/I) = rejected or incomplete net weight.



Figure 176. **Net weights, Area E, 10CW34** : *a*, 88.8.7; *b*, 95.7.3; *c*, 95.7.4.



Figure 177. **Net weight, 24.8.4, Area E, 10CW34**.



Figure 178. **Net weight, 57.9.12, Area E, 10CW34**.

Fishing with the use of woven nets anchored to the river bottom by cobble net weights or sinkers was an important technique employed by the Nez Perce along the Snake and Clearwater rivers. This method was also useful in confined areas such as the more narrow pools of smaller tributaries (Landeen and Pinkham 1999:46-47, 93). The presence of complete and unfinished net weights at 10CW34 indicates that manufacture of these items, as well as fishing took place at the site.

Anvils

Five large, flat, battered cobbles, considered to have functioned as anvils, were recovered in Areas A (n=1) and Area E (n=4) (Table 26). Four anvils were recovered from features (4, F2011A, and F2011B, respectively, see Chapter 9) which included concentrations of flaked and battered cobbles, flaked tools, and debitage, indicating that they served as working surfaces during activities such as tool repair and manufacture, and animal processing (see Chapter 9). All but one of the feature anvils are broken either at one edge (53.10.7, 71.9.7) or several (53.10.8, 13.5.10), and most of the detached

Table 26. 10CW34 anvil inventory.

Recovery Area	Cat. No.*	Material	L (cm)	WD (cm)	TH (cm)	WT (kg)	Feature	Associated Soil Sample (PRA result)
E West	26.1.5	MC	26.9	23.8	5.35	5.38	-	-
A	13.5.10a (f)	G	34.5	25.4	5.91	11.38	F4	13.5.11 (human)
A	13.5.10b (f)	G	26.8	9.4	5.41	2.6	F4	-
A	13.5.10c (f)	G	13.45	5.37	1.82	.25	F4	-
E Central	71.7.9 (f)	G	27.4	18.5	4.85	3.52	F2011B	71.7.10 (rabbit)
E Central	53.10.7 (f)	MC	24.5	18.9	5.81	4.66	F2011A	53.10.17 (rabbit)
E Central	53.10.8 (f)	G	21.4	19.7	8.3	5.72	F2011A	-

*Items are listed in order of increasing level depth.
(f) = fragmented item.

fragments appear to have been transported elsewhere, as they were not recovered during excavation of the features or nearby areas. Two large fragments of the feature anvil in Area A (13.5.10a and 13.5.10b) were encountered together, and a third, smaller fragment (13.5.10c) was screened in the same level. The only and intact and apparently isolated anvil (26.1.5) was recovered from the surface level in the West zone of Area E. This anvil may have been transported from another location nearby, as cobble tools were absent in Units 26 and 33, though a number of other artifacts were present, including a fragment of fire-cracked rock, a non-tool cobble core, a side-notched point, and a considerable amount of chert debitage. Two of the anvils are of a dense, granitic material (53.10.8, 71.7.9), one of granite/schist (13.5.10a-c), and two are of metamorphic cobble material (26.1.5, 53.10.7). Soil samples (13.5.11, 71.7.10, 53.10.17; Appendix 8) were collected from below three of the feature anvils and submitted for protein residue analysis; results were positive for human (13.5.10a-c) and rabbit (71.7.10, 53.10.17) (see Chapter 10).

Flaked Cobbles

Flaked cobbles, sometimes referred to as "choppers" or cores, are a common tool found at archaeological sites throughout the Plateau culture area in both lower and upland settings. In the Clearwater River region, they are present in a range of temporal and cultural assemblages, and are often accompany a variety of artifacts associated with lithic manufacture, and game and vegetable processing (Mattson 1984:6-7; Sappington et al. 1991:63; Sappington et al. 1997:45).

Mattson (1984) used shapes of flake edges and overall cobble forms (Figures 179-180), to distinguish three descriptive categories of flaked cobbles recovered from sites in

the Clearwater River region. Small tools with flat or slightly convex edge shapes (1), and somewhat larger tools with arced or rounded edge shapes (2) were common at village sites on the lower and middle Clearwater River and at the mouth of the North Fork. An increase in size and acuteness of flake edges were observed at camp sites in the more forested environments of the lower North Fork where large tools with pointed or acute edge shapes (3) were more common (1984:69, 74). Mattson also observed an increase in flaked cobbles and projectile points at sites on the lower North Fork, while collections from lower and middle Clearwater sites contained smaller quantities of flaked cobbles in comparison to flake tools, various bifaces, knives, and points (1984:85).

The assemblage recovered at Weitas Creek (10CW30), located near 10CW34 and the only upper North Fork site examined in Mattson's analysis, differed from the lower North Fork collections. Smaller flaked cobbles with flat and slightly arced edges were more frequent, while large, pointed tools made up only a small proportion. Flake tools, bifaces, knives and points were also more frequent than flaked cobble tools at Weitas Creek, a ratio more analogous to the lower and middle Clearwater sites (1984:87).

Identifying flake edge shape and overall cobble size as potential attributes reflecting flaked cobble tool function, Mattson proposed a relationship between environmental settings and tool specialization and suggested that the higher frequency of larger, more convex shaped flaked cobbles encountered in the forested, lower North Fork environments may have reflected an increased importance of wood-working activities, in addition to hunting, fishing, and plant gathering (1984:85, 87, 91-92).

Forty-five flaked cobbles and thirteen flaked cobble fragments were recovered at 10CW34 in Areas A (n=2), D (n=1), and E (n=55) (Table 27, Figures 181-185). All are

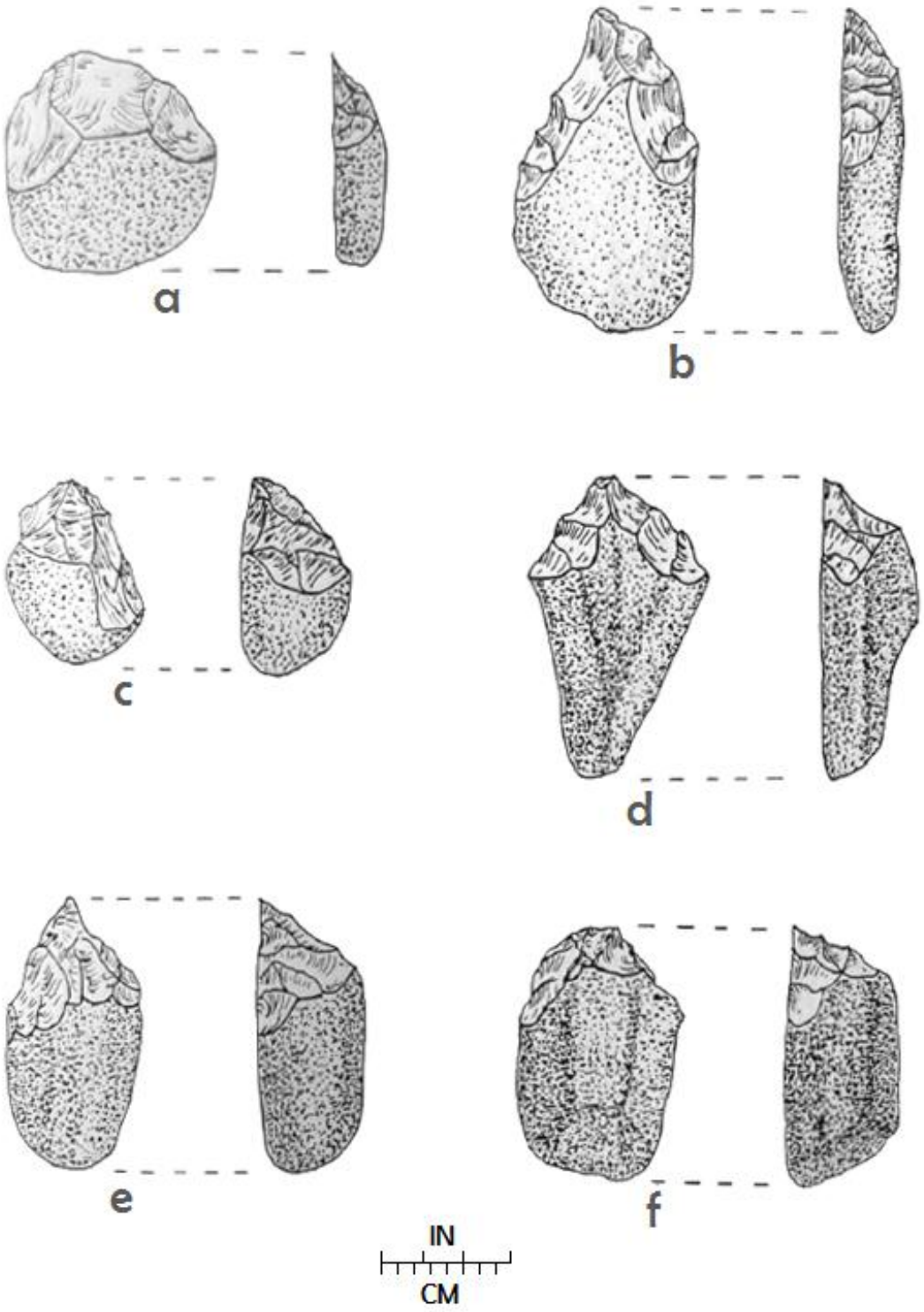


Figure 179. Cobble shape categories used by Mattson (1984:Figure 8) and employed in the examination of the cobble tools recovered at 10CW34. *a*, flat and disc-like; *b*, flat and elongated; *c*, nearly round; *d*, angular; *e*, elongated; *f*, rectangular.

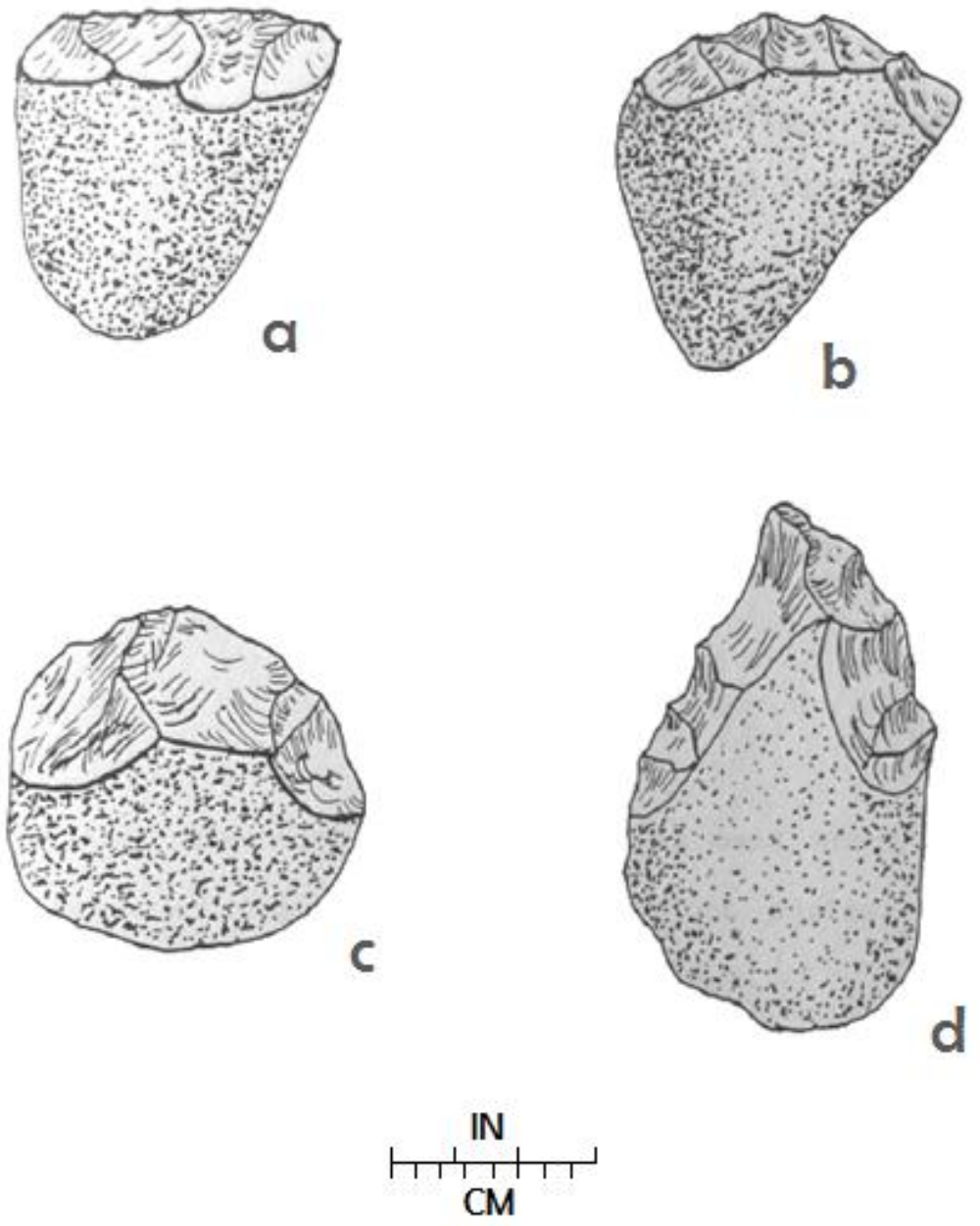


Figure 180. Flake-edge shape categories used by Mattson (1984:Figure 9) and employed in the examination of the flaked cobble tools recovered at 10CW34. *a*, straight; *b*, slightly convex; *c*, arced; *d*, pointed.

Table 27. 10CW34 flaked cobble inventory.

Recovery Area	Cat. No.*	Material	L (cm)	WD (cm)	TH (cm)	WT (kg)	Battered (b) Crushed (c)	Cobble Shape	Flake Edge Shape	Flake Removal
D	1981Sur.18 (s)[1]	MC	39.6	22.5	5.3	6.32		flat and disc-like	slightly convex	uni
A	23.2.4	MC	20.9	9.2	4.2	1.16		flat and elongated	straight	uni
E Central	62.2.3	MQ	17.1	14.4	6.8	1.4	(b) (c)	nearly round	pointed	uni
E	76.2.3 (f) (PRA–)	MC	7	8.2	3	0.19		-	-	multi
E Stockpile	DA1.2.4	MC	7.4	4.2	3.4	0.09	(b) (c)	nearly round	pointed	multi
A	18.3.5	MC	21.2	20.3	4.4	2.92		flat and disc-like	arced	uni
E Central	51.3.3	G	11.4	8.4	3.2	0.58		flat and disc-like	straight	uni
E Central	103.3.4 (f)	MC	8.8	6.5	4.4	0.24		-	-	uni
E Central	110.3.7 (f)	MC	9.2	6.8	4.6	0.29		-	-	multi
E Central	71.4.5 (t)	MC	9.1	7.2	2.8	0.09		flat and disc-like	-	-
E Central	101.4.4 (f)	MC	9.4	5.9	3.7	0.2		-	-	multi
E East	104.4.5 (t)	MC	4	3.6	2.3	0.04		nearly round	-	-
E Stockpile	54.6.1 (f)	MC	8.6	3.4	1.4	0.05		-	-	uni
E Central	20.7.6 (t)	MC	13.8	8.2	5.3	0.9	(b)	flat and elongated	-	-
E Central	38.7.3 (t)	MC	6.3	5.1	2.4	0.11		flat and disc-like	-	-
E Central	112.7.5 (PRA–)	MC	12	6	5.1	0.3	(b)	angular	pointed	multi
E Central	20.8.5	MC	10.5	6.9	5.1	0.58	(b) (c)	flat and elongated	straight	uni
E Central	36.8.11	MC	15.2	11.9	3.2	0.8	(b)	flat and elongated	pointed	uni
E Central	52.8.9	MC	13.7	6.6	4.4	0.5	(b) (c)	elongated	slightly convex	uni
E Central	59.8.8 (f)	G	10.3	7.2	4.1	0.42		-	-	uni
E Central	67.8.7 (f)	MC	6.5	5.4	1.5	0.07		-	-	uni
E Central	79.8.8	MQ	14.8	13.9	4.3	1.44		flat and disc-like	straight	uni

*Items are listed in order of increasing level depth; surface items (s) are listed first.
(f) = flaked cobble fragment.
(t) = tested cobble.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result.
[1]Area D surface collection, unknown coordinates (September, 1981 grid system, see Figure 82): possible “GS3” designation.

Table 27. *Continued*.

Recovery Area	Cat. No.*	Material	L (cm)	WD (cm)	TH (cm)	WT (kg)	Battered (b) Crushed (c)	Cobble Shape	Flake Edge Shape	Flake Removal
E Central	81.8.6 (t)	G	21.2	17.4	5.5	4.12	(b)	flat and disc-like	-	-
E Central	95.8.7 (t)	MC	15.6	11.7	5	1.42		angular	-	-
E Central	101.8.4	MC	14.2	10.2	6.5	1.12		angular	straight	uni
E Central	101.8.5 (f)	MC	6.9	6	2.2	0.16		-	-	uni
E Central	107.8.5	G	14	11.5	4.4	0.8	(b)	flat and disc-like	straight	uni
E Central	112.8.4 (f)	MC	16	4.5	4.9	0.56	(b)	-	-	uni
E Central	113.8.8	MC	13.7	10.2	6.4	0.96		nearly round	pointed	multi
E Central	30.9.9 (t)	G	15	10.4	6.2	1.36		rectangular	-	-
E Central	35.9.5	MC	12.6	8.4	3	0.52		flat and disc-like	pointed	uni
E Central	38.9.3	MC	9	6.3	1.9	0.18	(b)	flat and elongated	pointed	uni
E Central	42.9.6	G	10.6	8.7	3.3	0.54	(b)	flat and elongated	slightly convex	uni
E Central	42.9.7	G	17.4	11.8	5.7	1.32	(b)	rectangular	slightly convex	uni
E Central	50.9.5 (t)	MC	9.8	8	3.4	0.46		flat and disc-like	-	-
E Central	51.9.7	G	13.2	8.3	5.6	0.68		angular	arced	uni
E Central	62.9.6	MC	18.2	10.9	4	1.16	(b)	flat and disc-like	pointed	multi
E Central	62.9.7	MC	9.7	6.4	4	0.38	(b) (c)	flat and disc-like	straight	uni
E Central	70.9.5 (t) (TF)	MQ	14.3	21.2	6	2.08		angular	-	-
E Central	76.9.5 (f)	MC	11	9	4.5	0.29		-	-	multi
E Central	76.9.6 (t) (B)	MC	8.4	5.7	4	0.25		nearly round	-	-
E Central	97.9.6	MC	7.1	3.3	3.4	0.15		elongated	straight	uni
E Central	105.9.8 (f) (PRA–)	MC	8.5	7	4	0.33		-	-	uni

*Items are listed in order of increasing level depth.
(f) = flaked cobble fragment.
(t) = tested cobble.
(TF) = thermally fractured.
(B) = burned.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result.

Table 27. *Continued*.

Recovery Area	Cat. No.*	Material	L (cm)	WD (cm)	TH (cm)	WT (kg)	Battered (b) Crushed (c)	Cobble Shape	Flake Edge Shape	Flake Removal
E Central	111.9.2 (PRA–)	MC	19	7.2	5.5	1.38	(b) (c)	elongated	straight	multi
E Central	111.9.3	MC	10.3	5.3	3.9	0.22	(b) (c)	elongated	pointed	multi
E Central	111.9.4 (f)	MC	7.3	6.9	2.6	0.15		-	-	multi
E Central	56.10.8	MC	22.1	17.7	5	4.08	(b)	flat and elongated	straight	uni
E Central	68.10.5	MC	14.5	10.9	5.8	1.24	(b)	angular	pointed	multi
E Central	82.10.3 (f)	MC	10.1	8.2	3.4	0.31	(b) (c)	-	-	uni
E Central	90.10.7 (t)	G	17.5	11.4	2.9	1.4		angular	-	-
E Central	106.10.6	MC	11.3	7.3	5	0.52	(b) (c)	elongated	straight	uni
E Central	49.11.7	G	17.4	10.9	2	0.6		flat and elongated	slightly convex	uni
E Central	52.11.7	MC	11.6	7.4	7.9	1.22		nearly round	straight	uni
E Central	82.11.12	MC	10.4	4.6	3	0.2		elongated	slightly convex	uni
E Central	82.11.13 (t)	MC	8.8	4.4	7.9	0.46		nearly round	-	-
E Central	64.14.6 (t)	G	12.5	8.6	5.6	0.72	(b)	elongated	-	-
E Central	64.15.5 (t) (TF)	MC	8.3	7.3	1.1	0.12		rectangular	-	-
E Central	64.15.6 (t)	MQ	18.9	17.3	6.8	1.9		angular	-	-

*Items are listed in order of increasing level depth.
(f) = flaked cobble fragment.
(t) = tested cobble.
(TF) = thermally fractured.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result.



Figure 181. **End-battered, bifacially flaked cobble tool, 111.9.2, Area E, 10CW34**. On the right, the bifacially flaked, crushed end is shown. The bottom side is in view on the left and the flaked end is pointing upwards.

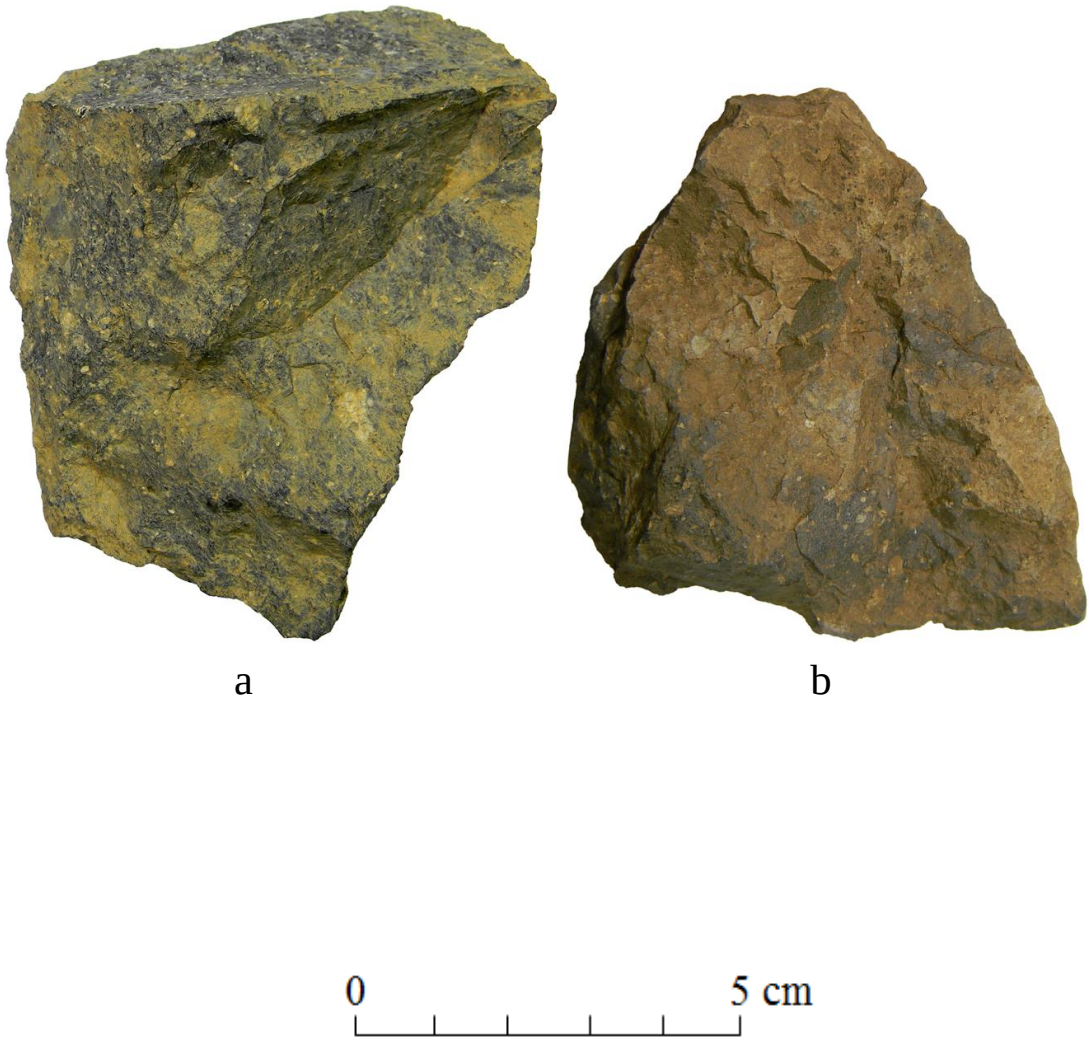


Figure 182. **Flaked cobble tool fragments, Area E, 10CW34**: *a*, 105.9.8; *b*, 76.2.3.



Figure 183. **End-battered, flaked cobble tool, 112.7.5, Area E, 10CW34**.



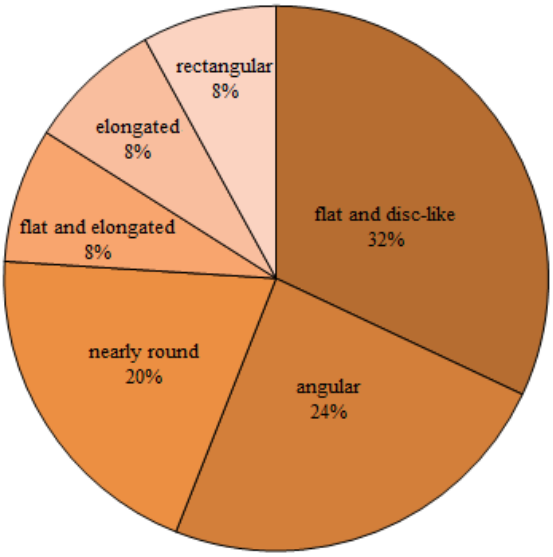
Figure 184. **End-battered, flaked cobble tool, 64.14.6, Area E, 10CW34**. The artifact is positioned at an angle with the battered and flaked end in view.



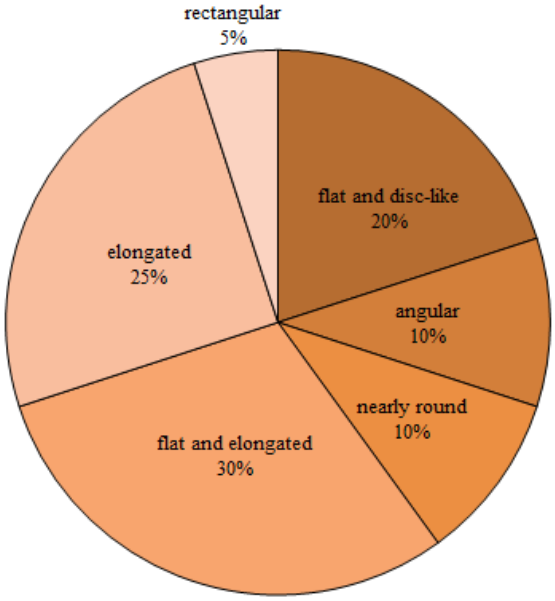
Figure 185. **Flaked cobble tool, 18.3.5, Area E, 10CW34**.

produced from alluvial cobbles, consisting of metamorphic cobble (n=43, 74%), granite (n=11, 19%), and metamorphic quartzite (n=4, 7%) materials, identical to the coarse gravels which can be observed at the site today along the bank of the North Fork. Fifteen flaked cobbles are only minimally modified by the removal of several flakes (n=2) or a single flake (n=13), and these are considered to be tested and rejected cobbles. Three tested cobbles have been burned (n=1) or cracked by high temperatures (n=2). In addition to flaking, a number of flaked cobbles (n=20, 44%) exhibit varying amounts of edge-, end-, and surface-battering, while just under half of these (n=9, 45%) are also crushed along the battered and flaked edges. Modification of flaked cobble fragments may have occurred prior to or following fragmentation. The majority of fragments are angular in shape and only small portions of the original cobble shape are discernable. Therefore, the cobble shapes and flake edge shapes of flaked cobble fragments could not be reliably discerned.

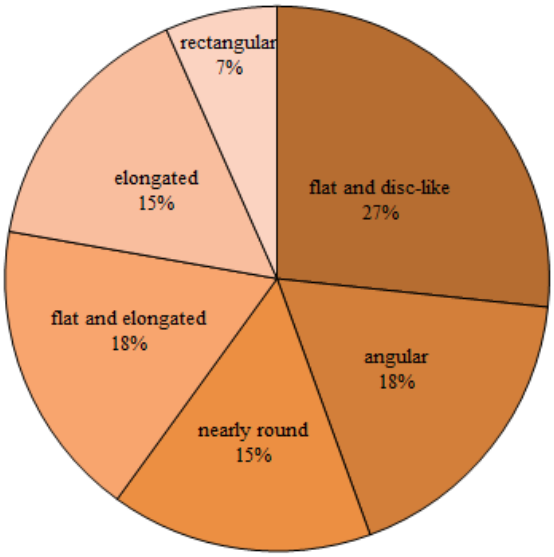
Excluding flaked cobble fragments (n=13), the most frequent flaked cobble shapes recovered at 10CW34 are flat and disc-like (n=12, 27%), followed by angular (n=8, 18%) and flat and elongated (n=8, 18%). Elongated (n=7, 15%) and nearly round (n=7, 15%) flaked cobbles are also present, while rectangular-shaped cobbles (n=3, 7%) are relatively rare (Figure 186). Excluding tested cobbles (n=15) and flaked cobble fragments (n=13), the most common flake edge shape is straight (n=12, 40%), followed by pointed (n=10, 33%), slightly convex (6, 20%), and arced (n=2, 7%) (Figure 187). Flake edge shapes differ considerably between flaked cobbles and flaked and battered cobbles. Straight edges (n=6, 46%) are most common for flaked cobbles which have not been battered, while pointed edges (n=8, 47%) make up the largest proportion of flaked



Cobble Shape Frequencies for Flaked Cobbles (n=25)

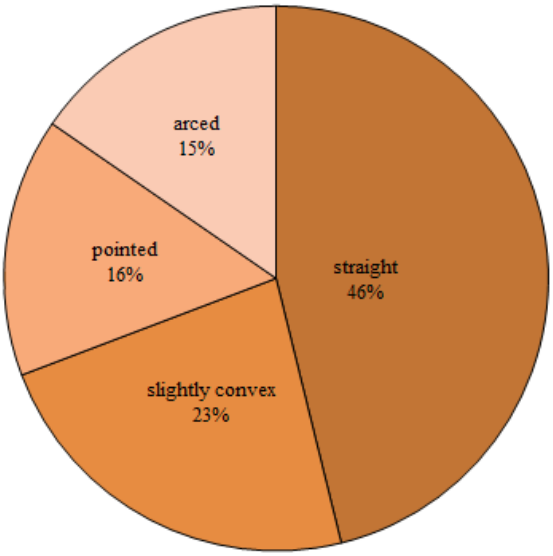


Cobble Shape Frequencies for Flaked and Battered Cobbles (n=20)

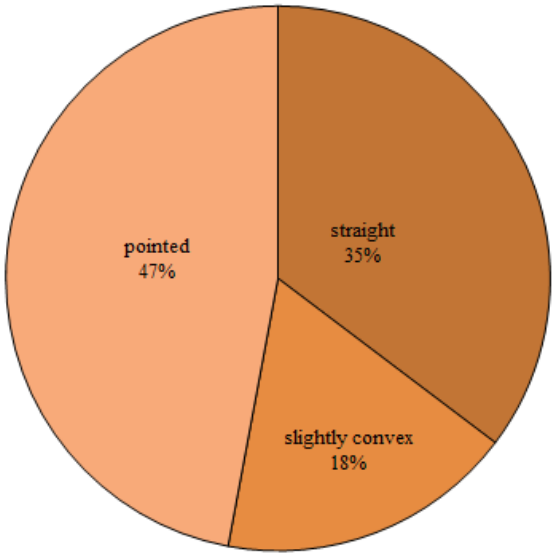


Total 10CW34 Flaked Cobble Shape Frequencies (n=45)

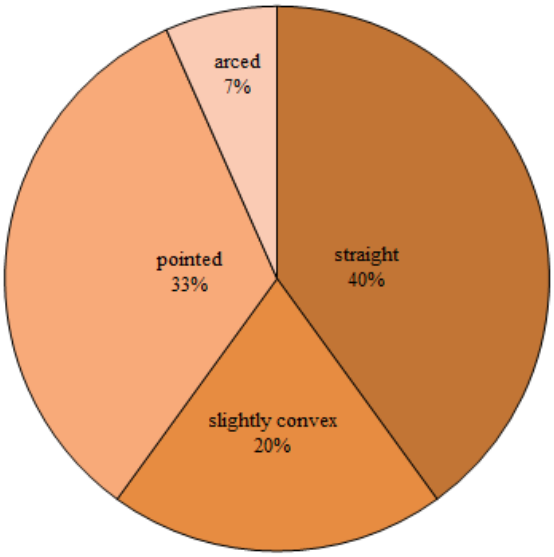
Figure 186. Pie charts showing cobble shape percentages for flaked cobbles and flaked and battered cobbles recovered at 10CW34. Overall cobble shape percentages are shown in the bottom chart. Flaked cobble fragments (n=13) are not included.



Flake Edge Shape Frequencies for Flaked Cobbles (n=13)



Flake Edge Shape Frequencies for Flaked and Battered Cobbles (n=17)



Total 10CW34 Flake Edge Shape Frequencies for Flaked Cobbles (n=30)

Figure 187. Pie charts showing flake edge shape percentages for flaked cobbles and flaked and battered cobbles recovered at 10CW34. Overall flake edge shape percentages are shown in the bottom chart. Tested cobbles (n=15) and flaked cobble fragments (n=13) are not included.

cobbles which have been battered. Excluding tested cobbles, the majority of flaked cobbles and flaked cobble fragments at 10CW34 are unidirectionally and unifacially flaked (n=31, 72%), a proportion which is comparable with Mattson's (1984:62, 65) estimate that unifacially flaked cobbles comprised over 85% of flaked cobbles in the Clearwater River region. Two of the multidirectionally flaked cobbles are bifacially flaked (76.2.3, Figure 182*b*; 111.9.2, Figure 181), and nearly half (n=5) are fragments.

As encountered at Weitas Creek, flaked tools at 10CW34 such as points, bifaces, knives, and particularly flake tools are more frequent than flaked cobbles. It is likely that this tool-class ratio is a reflection of the recurring occupations and intensive use of both sites over time. Another similarity between both sites is the common occurrence of flaked cobbles with straight edges. However, pointed flake edges were more common at 10CW34, while arced flake edges, dominant at Weitas Creek, were virtually absent. It is apparent that flaked cobbles were important tools at both sites and their presence, along with the diversity of artifact classes, including shaft abraders and net weights, indicate that tool manufacture and game processing were probable activities in which flaked cobbles were regularly employed. Two flaked cobble fragments (76.2.3, Figure 182*b*; 105.9.8, Figure 182*a*) and two flaked and battered cobbles (111.9.2, Figure 181; 112.7.5, Figure 183) were submitted for protein residue analysis, and no positive reactions were identified (see Chapter 10).

Battered Cobbles

Seventy-seven battered cobbles and five battered cobble fragments were recovered at 10CW34 in Areas A (n=4) and E (n=76); two are non-provenienced and were included with artifacts previously collected from the site (Table 28, Figures 188-

Table 28. 10CW34 battered cobble inventory.

Recovery Area	Cat. No.*	Material	L (cm)	WD (cm)	TH (cm)	WT (kg)	Surface-battered (s-b) Crushed (c)	Battering Extent	Cobble Shape
-	Prevmisc.1 (np)	MC	13.7	7	4.9	0.68	(c)	end/edge	elongated
-	1979Sur.1 (np)	MC	12.5	10.4	5.1	0.86	(c)	edge	flat and disc-like
A	13.1.2	MC	11.3	6.8	5.9	0.74	(c)	end/edge	elongated
E Central	99.1.5 (B)	MC	12.1	7.3	2.8	0.39		end/edge	flat and elongated
E Central	111.1.4	MC	5.7	6	4.2	0.18		edge	angular
E Central	24.2.6	MC	12.8	12.8	5.7	1.98	(c)	edge	rectangular
E Central	91.3.3	MC	6.8	7.2	4.7	0.34		end	nearly round
E Central	82.2.3 (TF) (PRA–)	G	8.5	7.3	7.3	0.4		edge	flat and disc-like
E Central	96.3.7	MC	7.6	3.7	2.6	0.12		end	elongated
E Central	106.3.4	MC	19.3	13.5	6.5	1.88		edge	flat and disc-like
E Central	110.3.8	MC	14.6	9	3.1	0.56		edge	flat and disc-like
A	4.4.2	G	9	7.6	2.8	0.33		edge	flat and elongated
E Stockpile	54.4.2	MC	28.7	21.9	4.6	4.88	(s-b)	edge	flat and disc-like
E Central	112.4.4	MC	20.1	8.4	2.6	0.7	(c)	edge	flat and elongated
E Central	112.4.5	MC	28.9	29.4	4.6	7.14	(s-b)	edge	flat and disc-like
E Central	35.6.3	MC	8.1	7.6	6.2	0.52		edge	nearly round
E East	41.6.3	G	12.2	3.3	4	0.05		end	elongated
E Central	86.6.4	MC	26.3	17.2	3	2.8		edge	flat and disc-like
E Central	24.7.5	MC	18.8	7.6	6.8	1.5		end	elongated
E Central	31.7.6	MC	12	11	3.3	0.74	(s-b)	edge	flat and disc-like
E Central	31.7.7	MC	10.2	5.4	2.7	0.27	(s-b)	end	nearly round
E Central	81.7.5	G	26.9	18.8	6.5	4.66	(s-b)	edge	flat and disc-like
E Central	88.7.4	MC	11	6.6	2.6	0.35	(c)	edge	flat and elongated
E Central	99.7.2	MC	9.7	5.7	3	0.19		end	flat and elongated
E Central	99.7.3	G	11.8	9	5.7	0.78		end	flat and elongated
A	13.8.4	MC	13.8	12.7	5.1	1.62		end	flat and elongated

*Items are listed in order of increasing level depth; non-provenienced items (np) are listed first.
(B) = burned.
(TF) = thermally fractured.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result.

Table 28. *Continued*.

Recovery Area	Cat. No.*	Material	L (cm)	WD (cm)	TH (cm)	WT (kg)	Surface-battered (s-b) Crushed (c)	Battering Extent	Cobble Shape
E Central	36.8.5	MC	5	4	2.2	0.06		end	elongated
E Central	52.8.6	MC	16.8	6.2	5.7	1.48		end	elongated
E Central	57.8.6	MC	9	4.4	4.4	0.21	(c)	end	elongated
E Central	62.8.6	MC	11.3	8.8	2.9	0.46		edge	flat and disc-like
E Central	71.8.8	MC	11.3	6.6	3.7	0.38		end	nearly round
E Central	73.8.5	MC	23	6.8	3.7	0.82	(c)	end/edge	elongated
E Central	73.8.6	MC	8.8	5.9	5.3	0.33		edge	nearly round
E Central	86.8.12	MC	12.5	8.6	2.7	0.62		end	nearly round
E Central	86.8.13	G	13.9	7.5	4.5	0.76		end	elongated
E Central	86.8.14	MC	11.5	7.3	4.6	0.56		end	elongated
E Central	86.8.15	G	11.6	10.8	4.4	1		end	flat and disc-like
E Central	86.8.16	MC	19.4	17.8	4.3	2.2		edge	flat and disc-like
E Central	87.8.5	MC	8	6.5	3.7	0.23		edge	nearly round
E Central	95.8.6	MC	9.7	5.8	3.9	0.33	(c)	end	flat and elongated
E Central	96.8.6	MC	15.5	10.5	3	0.38		edge	angular
E East	104.8.4	MC	13.3	8.8	3.7	0.62		edge	angular
E Central	111.8.12	MC	8.2	7.6	5.1	0.32		end	nearly round
E Central	112.8.3	MC	10.2	4.6	4.2	0.23	(c)	end/edge	angular
E Central	112.8.5	MC	9.7	8.9	6.8	1.02		edge	nearly round
E Central	30.9.10	MC	18.2	15.8	3.6	1.5	(s-b) (c)	edge	flat and disc-like
E East	39.9.5	MC	16.2	3.9	4	0.48	(s-b)	end	elongated
E Central	42.9.5	G	14.6	6.7	2	0.46		edge	flat and elongated
E Central	68.9.4	G	8.3	5.8	2.9	0.24	(c)	end	flat and disc-like
E Central	71.9.6	MC	27.8	7.9	6.5	3.04	(c)	end	elongated
E Central	83.9.6	MQ	11.8	8.4	5.6	0.84	(c)	end	nearly round
E Central	92.9.4	MC	10.1	8	3.8	0.4		end	flat and disc-like
E Central	95.9.4	MC	13.3	4.8	4.8	0.46		end	elongated
E Central	97.9.4	MC	10	4.7	3	0.27		end	flat and elongated

*Items are listed in order of increasing level depth.

Table 28. *Continued*.

Recovery Area	Cat. No.*	Material	L (cm)	WD (cm)	TH (cm)	WT (kg)	Surface-battered (s-b) Crushed (c)	Battering Extent	Cobble Shape
E Central	97.9.5	MC	8.8	6.9	3.2	0.25		end	flat and disc-like
E Central	105.9.10 (f)	MC	9.6	8.3	3.8	0.4		edge	-
E Central	105.9.11 (f)	MC	8.4	2.5	2.7	0.08		edge	-
E Central	107.9.5 (f)	MC	7.3	5.4	1.1	0.05	(c)	edge	-
E Central	52.10.5	MC	8	7.8	5.1	0.44	(c)	edge	nearly round
E Central	53.10.4	G	13.5	7.9	6.8	0.9		end/edge	flat and elongated
E Central	53.10.5	G	11.7	7.3	4.7	0.66	(s-b)	edge	flat and disc-like
E Central	53.10.6	MQ	17.4	17.2	7.1	1.38		edge	nearly round
E Central	56.10.7	MC	22.4	15.8	5.3	2.5		edge	flat and disc-like
E Central	64.10.10	MC	12.7	8.5	5.2	0.78		edge	flat and disc-like
E Central	64.10.11	G	20.2	12.7	3.9	1.44		edge	flat and disc-like
E Central	64.10.12	G	14.8	13.3	5.6	1.24	(s-b)	edge	flat and disc-like
E Central	64.10.13	G	16.2	11.3	5.8	1.34		end/edge	flat and elongated
E Central	69.10.4	MC	18.5	10.1	6.5	1.22		end	elongated
E Central	69.10.5	MC	12.9	12.8	4.4	0.94	(c)	edge	flat and disc-like
E Central	69.10.6	MC	21.8	15.3	6.6	2.76		edge	flat and disc-like
E Central	69.10.7	MC	18.6	18.3	6	3.06	(s-b)	edge	flat and disc-like
E Central	77.10.6	MQ	14.3	10.6	3.8	0.96		edge	flat and disc-like
E Central	80.10.7	MC	9	5.8	3.1	0.24	(c)	end	elongated
E Central	91.10.4	MC	8.4	6.2	4.9	0.37	(c)	end	nearly round
E Central	91.10.5	MC	9.6	8	4.5	0.54		end	flat and elongated
E Central	92.10.7	MC	6.2	6.7	3.5	0.22		end	flat and disc-like
E Central	84.11.10	MC	16.8	7.4	5.3	1.1		end	elongated
E Central	77.12.6	MQ	22.2	7.4	5	1.08		end	elongated
E East	102.14.2	G	12.1	11.1	3.2	0.82		end	flat and disc-like
E Central	100.15.5 (f)	MC	3.9	7.5	2	0.08		edge	-
A	8.16.1	MC	13.3	7.4	4	0.54		edge	flat and elongated
E Central	100.17.3 (f)	MC	6.8	7.2	1.7	0.08	(c)	edge	-

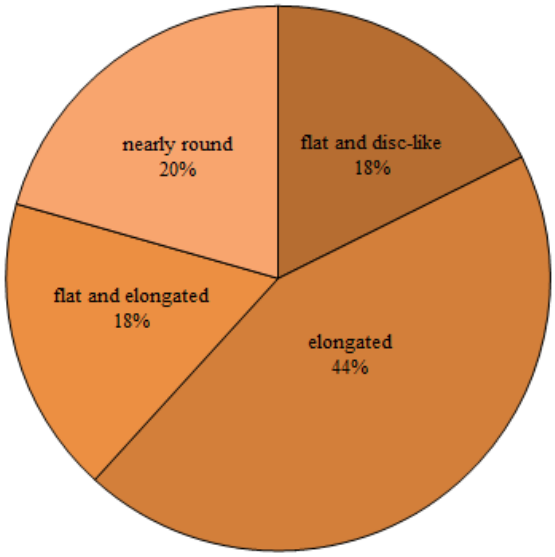
*Items are listed in order of increasing level depth.
(f) = battered cobble fragment.



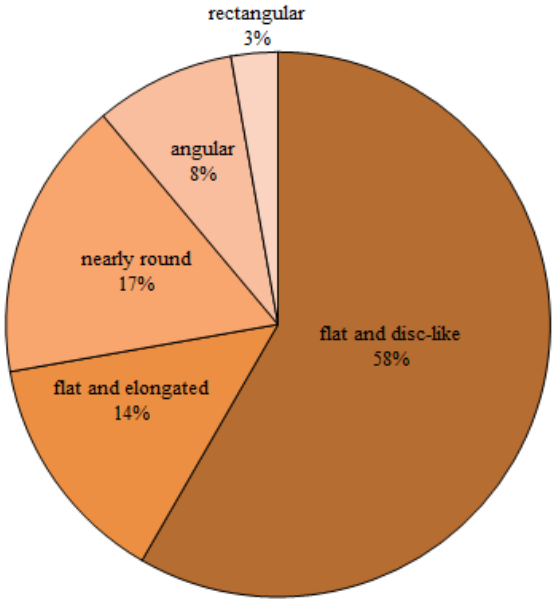
Figure 188. **End-battered cobble tool, 39.9.5, Area E, 10CW34**.



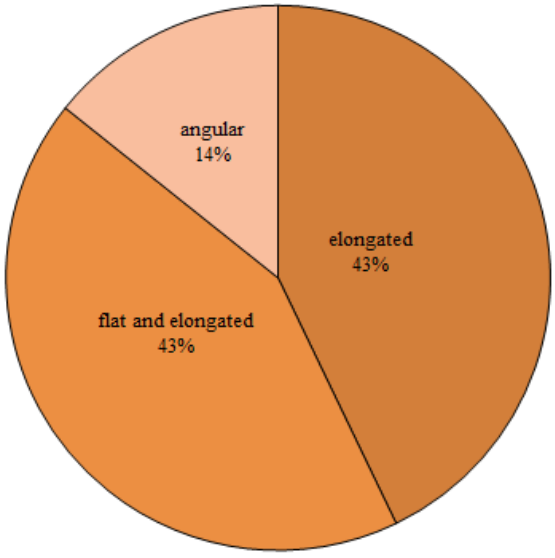
Figure 189. **End- and edge-battered cobble tools, Area E, 10CW34**: *a*, 35.6.3; *b*, 68.9.4; *c*, 82.2.3.



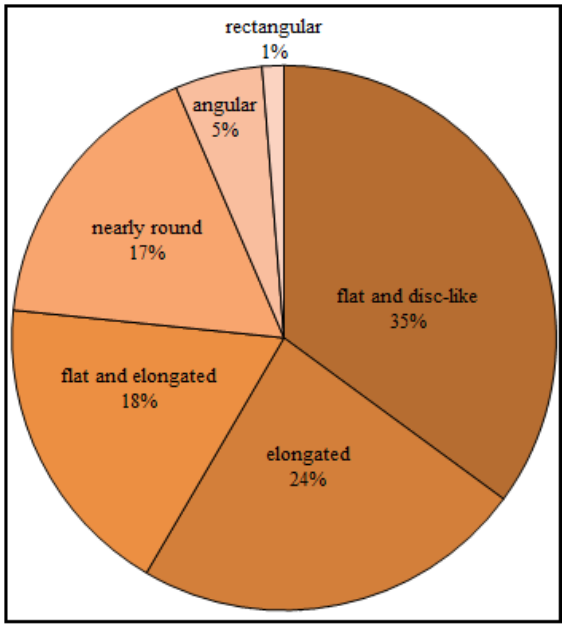
Cobble Shape Frequencies for End-Battered Cobbles (n=34)



Cobble Shape Frequencies for Edge-Battered Cobbles (n=35)



Cobble Shape Frequencies for End/Edge-Battered Cobbles (n=7)



Total 10CW34 Battered Cobble Shape Frequencies (n=76)

Figure 190. Pie charts showing cobble shape percentages for battered cobbles recovered at 10CW34. Overall cobble shape percentages are shown in the bottom right chart. Battered cobble fragments (n=5) are not included.

189). River cobbles consisting of metamorphic material (n=63, 77%) were predominantly used, while granite (n=15, 18%), and quartzite (n=4, 5%) were also utilized. Many battered cobbles probably functioned as hammerstones during activities such as tool production or food processing, in which stress to the cobble occurred as a result of use rather than deliberate manufacture. Battering on most cobbles is located at edges (n=41, 50%) or ends (n=34, 41%), and a number are both end-and edge-battered (n=7, 9%). Surface battering is evident on ten battered cobbles, and extensive use is indicated on twenty (25%) which are also crushed at the battered ends and edges. Shapes of battered cobbles were recorded using the cobble shape categories developed by Mattson (1984:57, Figure 8; see Figure 179) (Figure 190), and these were also employed for flaked cobbles, discussed above. Excluding fragments (n=5), flat and disc-like (n=27, 35%) and elongated (n=18, 24%) were the most frequent shapes. Flat and elongated (n=14, 18%) and nearly round (n=13, 17%) were common, while angular (n=4, 5%) and rectangular (n=1, 1%) cobbles were rare. Different cobble shapes may have functioned separately in specific tasks. The majority of end-battered cobbles are elongated (n=15, 44%), while edge-battered cobbles are predominantly flat and disc-like (n=21, 58%). Elongated and flat and elongated cobbles are equally important for cobbles which are both end- and edge-battered. One edge-battered cobble tool (82.2.3, Figure 189*c*) was submitted for protein residue analysis, however, no residues were identified (see Chapter 10).

Grooved Abraders

Grooved abraders are lithic artifacts that exhibit ground or polished linear channels and functioned as palm-size shaping and sharpening tools in the production and maintenance of other bone, wood, and stone tools, including arrow and/or spear shafts.

They are frequently encountered throughout the Plains in archaeological components dating from the Paleoindian to the contact periods, and the ethnographic use of arrow shaft abraders has been extensively documented among Plains tribes such as the Crow, Sioux, Omaha, Pawnee, and Cheyenne (Flenniken 1979:1-2, 15). Shaft abraders have also been recovered in southern Idaho and the Great Basin (Rudolph 1995:6-97; Sappington 1981:119), while a number have been reported in the Clearwater River region at sites such as Sweetwater Springs, in the vicinity of Craig Mountain (10NP313) (Lyon 2000:43, 45), Hatwai (10NP143) and Arrow Beach (10NP102), on the lower Clearwater River (Ames et. al 1981:142; Toups 1970:63), Fords Creek (10CW2) on the main Clearwater River (Osmundson and Hulse 1966:18), the Kooskia National Fish Hatchery site (10IH820) (Sappington et. al 1997:45), the Kooskia Bridge site (10IH1395) (Sappington and Carley 1987), and in the lower North Fork area (Draper and Olson 1990:133-134).

In his experimental classification of Plains grooved abraders, Flenniken (1979) used the dimensions and morphologies of experimentally produced grooves to distinguish between several functional types. Flintknapping abraders were produced by abrading the margins of other flaked lithic tools in order to strengthen edges and prevent chipping during knapping. The grooves on these types of abraders were generally very narrow, deep, and V-shaped in cross-section (62-72). Abraders used to produce and sharpen pointed tools such as antler pressure flakers, bone awls, and needles contained U-shaped grooves that were not straight (non-parallel with the abrader edges) and deeper in the center of groove than at the end (47-56). Abraders used as arrow-shaft smoothers contained U-shaped grooves which were parallel with the abrader edges, and consistent

in depth from one end to the other. Further distinction was made between arrow-shaft abraders used together as a pair and abraders used as single implements. Paired abrader grooves formed more expansive U-shapes, while single abraders contained deeper and narrower grooves (35-40).

Four tabular-shaped, longitudinally grooved abraders were recovered in Area E at 10CW34 (Table 29, Figures 191-192). Each are produced from similar, yet slightly different coarse sandstone materials, containing varying amounts of granular quartz, mica flecks, and iron fragments. All four abraders exhibit linear grooves which are parallel with the edges of the abraders, and which extend over the full length of the artifact. The grooves of 111.7.6 (Figure 191*b*), 105.9.7 (Figure 192*a*), and 90.10.6 (Figure 192*b*) are similar in width and depth. In cross-section, they are relatively broad and U-shaped, indicating that these abraders may each have comprised one component of a shaft-abrader pair at one time. Only 105.9.7 appears to be intact, that is, in its original manufactured form, while 90.10.6 and 111.7.6 appear to be the end-remnants of larger abraders. Also an apparently broken abrader end, 71.7.a (Figure 191*a*) contains the deepest and narrowest groove, indicating that it either was manufactured as a single abrader, or

Table 29. 10CW34 shaft abrader tool inventory.

Recovery Area	Cat. No.*	Material	L (mm)	WD (mm)	TH (mm)	WT (g)	Groove WD (mm)	Groove Depth (mm)
E Central	71.7.a (PRA–)	SND	51.8	40.5	18.5	55.32	8.8	4
E Central	111.7.6 (PRA–)	SND	34.9	38.5	17.5	39.78	16.1	3.1
E Central	105.9.7 (PRA–)	SND	69.9	36.4	21.3	98.1	15.2	2.4
E Central	90.10.6 (PRA–)	SND	52.8	51	21.5	96.3	14.9	3.9-1.4

*Items are listed in order of increasing level depth.
(PRA) = item submitted for protein residue analysis, discussed in Chapter 10; – = negative result.

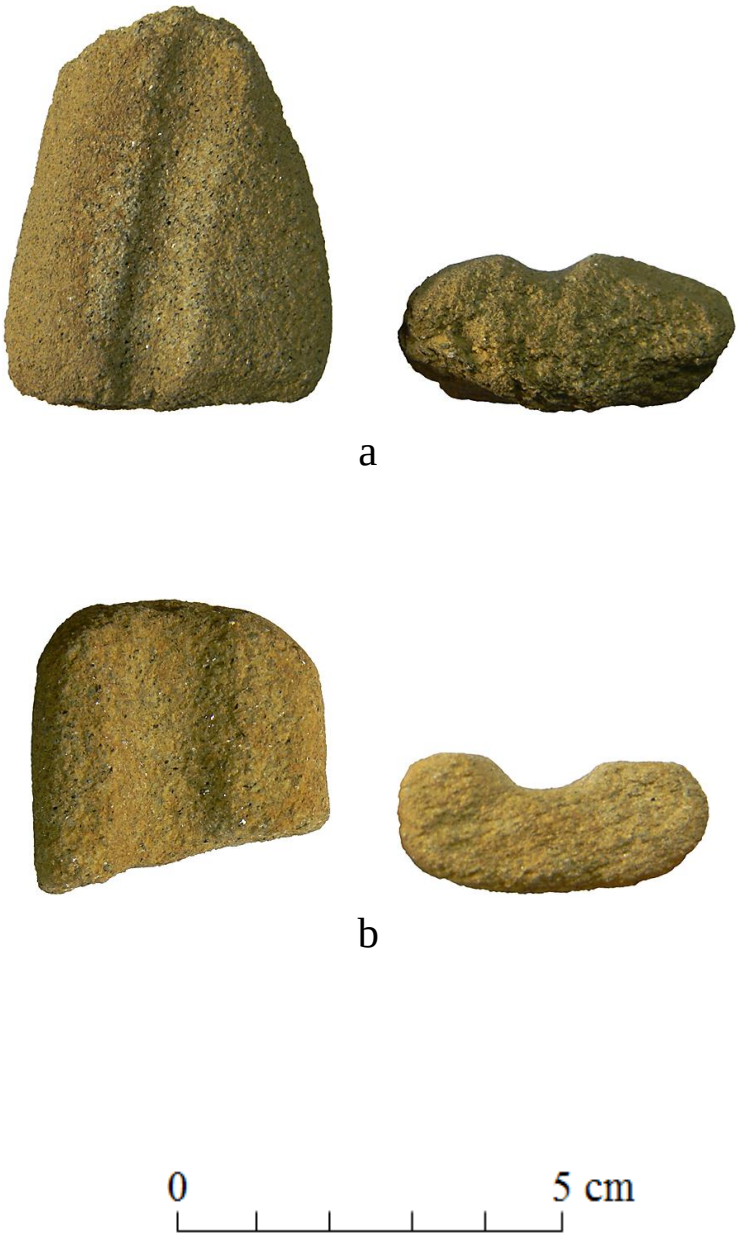


Figure 191. **Grooved abraders, Area E, 10CW34**: *a*, 71.7.a; *b*, 111.7.6.

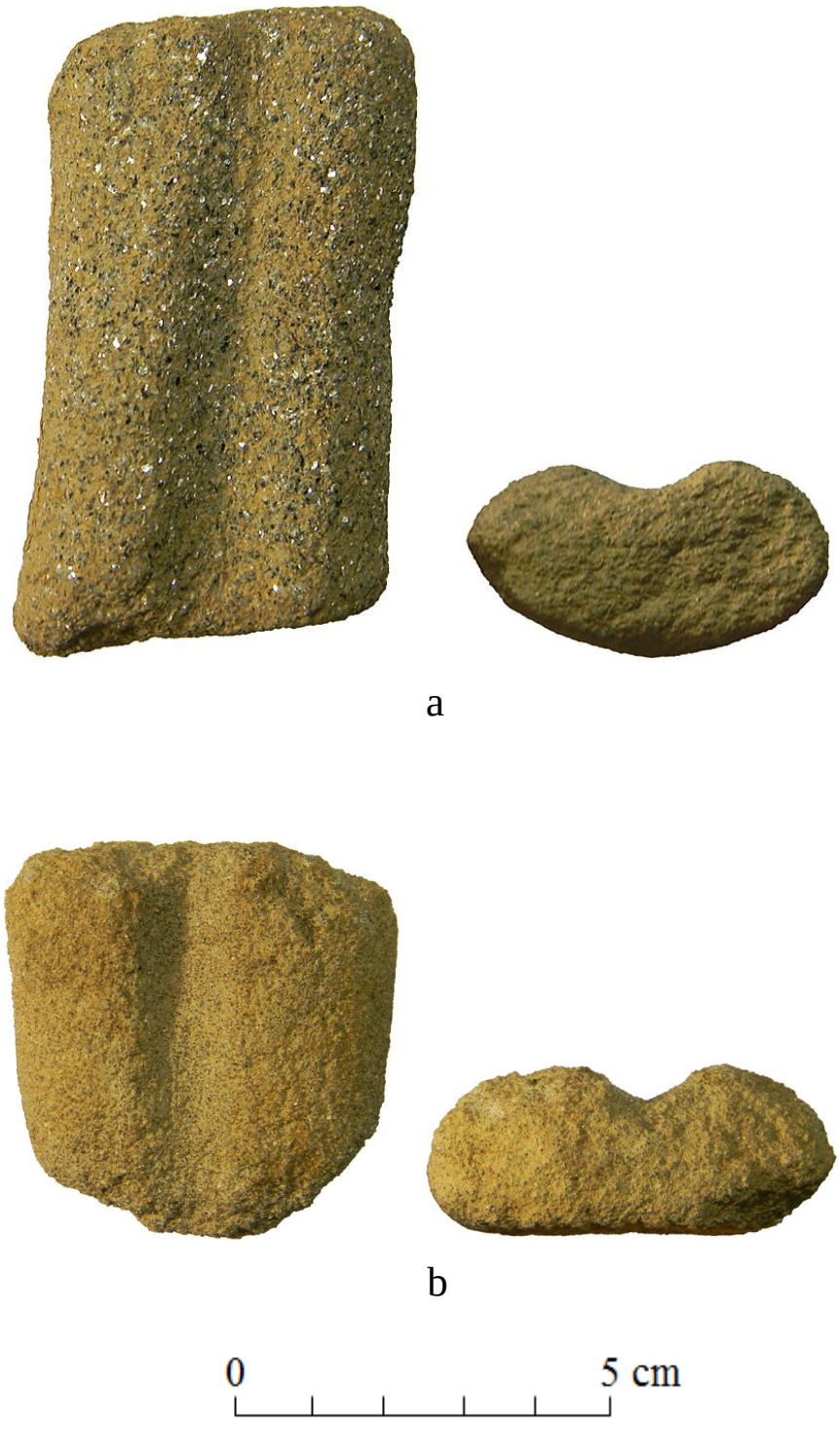


Figure 192. **Grooved abraders, Area E, 10CW34**: *a*, 105.9.7; *b*, 90.10.6.

originally used in a pair, broken, and subsequently reworked to function for an extended time as a single abrader. Continued use following breakage is evident on the three broken abraders by an extension of the groove over the edges of fragmentation. In particular, 90.10.6 exhibits a range in groove depth from 3.9 mm in the center to 1.4 mm at the end, a sign that a more steeply angled pressure was applied to form the groove. This type of groove with a larger central depth was produced in Flenniken's (1979:49) experiments during the manufacture and sharpening of pointed tools, such as a pressure flakers.

Flenniken's experiments indicate that it is more difficult to achieve the desired results of smoothing an entire shaft with abraders used singly rather than in pairs, while smoothing small portions of shafts could be done effectively with single abraders (1979:85). Additionally, it is noted that abraders recovered in the Plains from late Woodland to contact time periods have been referred to as "arrow-shaft abraders," whereas abraders from Paleoindian and Archaic sites, described as "shaft abraders," were most likely used to smooth larger shafts such as spear shafts (1979:16-17). Flenniken's analysis focused on abraders used for smoothing arrow shafts, which produced groove widths between 6 and 9 mm (1979:14, 37). Only the groove width of 71.7.a is within this range. The remaining three contain much wider grooves, an indication that they were used to smooth implements larger in diameters than arrow shafts. Each of the 10CW34 abraders were submitted for protein residue analysis, however, none reacted positively with the animal and plant antisera used in the analysis (see Chapter 10).

Non-tool Cores

Fifty-six non-tool cores were recovered in Areas A (n=3), D (n=1), and E (n=52) at 10CW34 (Table 30, Figures 193-195). These items lack signs of modification beyond

Table 30. 10CW34 non-tool core inventory.

Recovery Area	Cat. No.*	Material	L (mm)	WD (mm)	TH (mm)	WT (g)	Cortex Presence (x=yes)	Exhausted (x=yes)	Flake Removal
E Stockpile	SB.36-40.4 (np)	MC	100.1	63	25.6	261.39	x		unidirectional
D	1981Sur.7 (s)[1]	MC	120.1	88.9	52	540	x		unidirectional
E Central	2012misc.33 (s)[2]	MC	65.4	42.9	28.8	125.99	x	x	unidirectional
E West	26.1.4	MC	83.2	69.5	40.1	258.14	x		unidirectional
E Central	24.2.5	MC	188	214	79.1	2640	x		unidirectional
E East	41.2.4	MC	129.7	97.9	66.8	1640	x		unidirectional
E Central	65.2.5	MC	57.8	53.6	16.2	55.73		x	multidirectional
E Central	74.2.4	MC	77.6	47.9	39.6	162.58	x		unidirectional
E Central	87.2.6	MC	119.8	79.2	38.8	357.25			multidirectional
E Central	95.2.5	A	22.1	25.1	4.2	9.85	x	x	unidirectional
E Central	92.3.3	MC	126.2	98.9	58.9	660	x	x	unidirectional
E Central	105.3.4	MC	107.1	101.6	64.9	980	x		multidirectional
E Central	110.3.6	MC	67.3	59.8	111.1	191.55	x		unidirectional
A	1991AH18.4.1	MC	160.5	89.9	44.4	680	x		unidirectional
E Central	106.4.2	MC	119.7	72.8	26.3	264.35			multidirectional
E Central	110.4.4	MC	60.3	63	32.6	160.91	x	x	unidirectional
A	23.5.4	MC	126.7	111.7	54.8	960			multidirectional
E Central	61.5.2	QC	22.5	14.2	14.2	4.52	x		multidirectional
E Central	70.5.3	C	22	28.5	12	9.3	x	x	unidirectional
E Central	89.5.4	MC	50.7	48	22.6	51.02	x		unidirectional
A	18.6.4	MC	136.7	72.3	64.9	1040	x		unidirectional
E Central	87.6.6	MC	66.4	48	20	69.9	x		multidirectional
E Central	94.6.5	MC	87.7	41.4	42.4	127.24	x		multidirectional
E Central	52.8.5 (TF)	MC	148.7	75.8	52.7	900	x		unidirectional
E Central	52.8.7 (TF)	MC	149.8	110.4	65.8	1160	x		unidirectional
E Central	57.8.7	MC	110.7	64.8	38.8	227.13			multidirectional
E Central	60.8.5	C	25.3	14.6	14.6	4.65	x	x	unidirectional

*Items are listed in order of increasing level depth; non-provenienced items (np) are listed first followed by surface items (s).
[1]Area D surface collection coordinates (September, 1981 grid system, see Figure 82): 9-9+50 W/0-50 S, "GS #1."
[2]Surface collection at the southwest corner of Unit 37 (N100/W90).
(TF) = thermally fractured.

Table 30. *Continued.*

Recovery Area	Cat. No.*	Material	L (mm)	WD (mm)	TH (mm)	WT (g)	Cortex Presence (x=yes)	Exhausted (x=yes)	Flake Removal
E Central	61.8.3	MC	78.2	42	59.5	339.7	x		multidirectional
E Central	62.8.4	C	28.2	23.4	13	7.69		x	unidirectional
E Central	62.8.5	MC	70.9	40	23.6	72.27	x		unidirectional
E Central	67.8.8	MC	88	133	77	1500	x		unidirectional
E Central	71.8.6 (TF)	MC	142.4	59.3	55.3	840	x		unidirectional
E Central	71.8.7	MC	122.7	59.2	42.1	400	x	x	unidirectional
E Central	95.8.5	MC	77.4	72	42.4	318.13	x		unidirectional
E Central	96.8.4	MC	96.9	68.5	45.9	480	x		unidirectional
E Central	105.8.4	MC	69.9	66.5	38.5	163.04	x	x	unidirectional
E East	108.8.6	MC	143.7	71.4	47.8	740	x		unidirectional
E Central	112.8.9	MC	108.7	83.4	38.4	480	x	x	unidirectional
E Central	51.9.6	MC	63.4	30.1	16.5	32.48		x	unidirectional
E Central	77.9.8	MC	47.5	31.4	19.3	51.19	x		multidirectional
E Central	83.9.3	C	42.3	28.2	15.8	28.4		x	multidirectional
E Central	87.9.4	MC	73.1	46.6	32.7	183.5	x		unidirectional
E Central	89.9.5	MC	75.4	65.4	30.8	231.17	x		unidirectional
E Central	89.9.6	MC	81.1	67.4	28.4	182.72	x	x	unidirectional
E East	102.9.3	MC	98.7	45.9	44.9	183.66	x		multidirectional
E Central	37.10.5	QC	21.1	16.4	13.5	3.75		x	multidirectional
E Central	53.10.9	MC	124.3	85.3	33.8	580	x		unidirectional
E Central	84.10.5	MC	51.1	29.3	28	26.44	x	x	multidirectional
E Central	85.10.4	MC	79.4	46.3	30	141.06	x		multidirectional
E East	102.10.4	MC	68.2	34.1	20.2	61.87	x		multidirectional
E Central	110.10.5	MC	68.7	62.5	33.6	214.83	x	x	multidirectional
E Central	37.11.7	MC	93.8	88.2	59.8	700		x	unidirectional
E Central	67.11.6	C	26.8	10	10	3.28		x	unidirectional
E Central	90.11.5	MC	127.1	86	35.8	560	x		unidirectional
E Central	53.14.2 (TF)	MC	60.8	72	62.7	500	x		unidirectional
E Central	77.14.4	MC	35.2	31.2	13.2	19.66	x		multidirectional

*Items are listed in order of increasing level depth.
(TF) = thermally fractured.

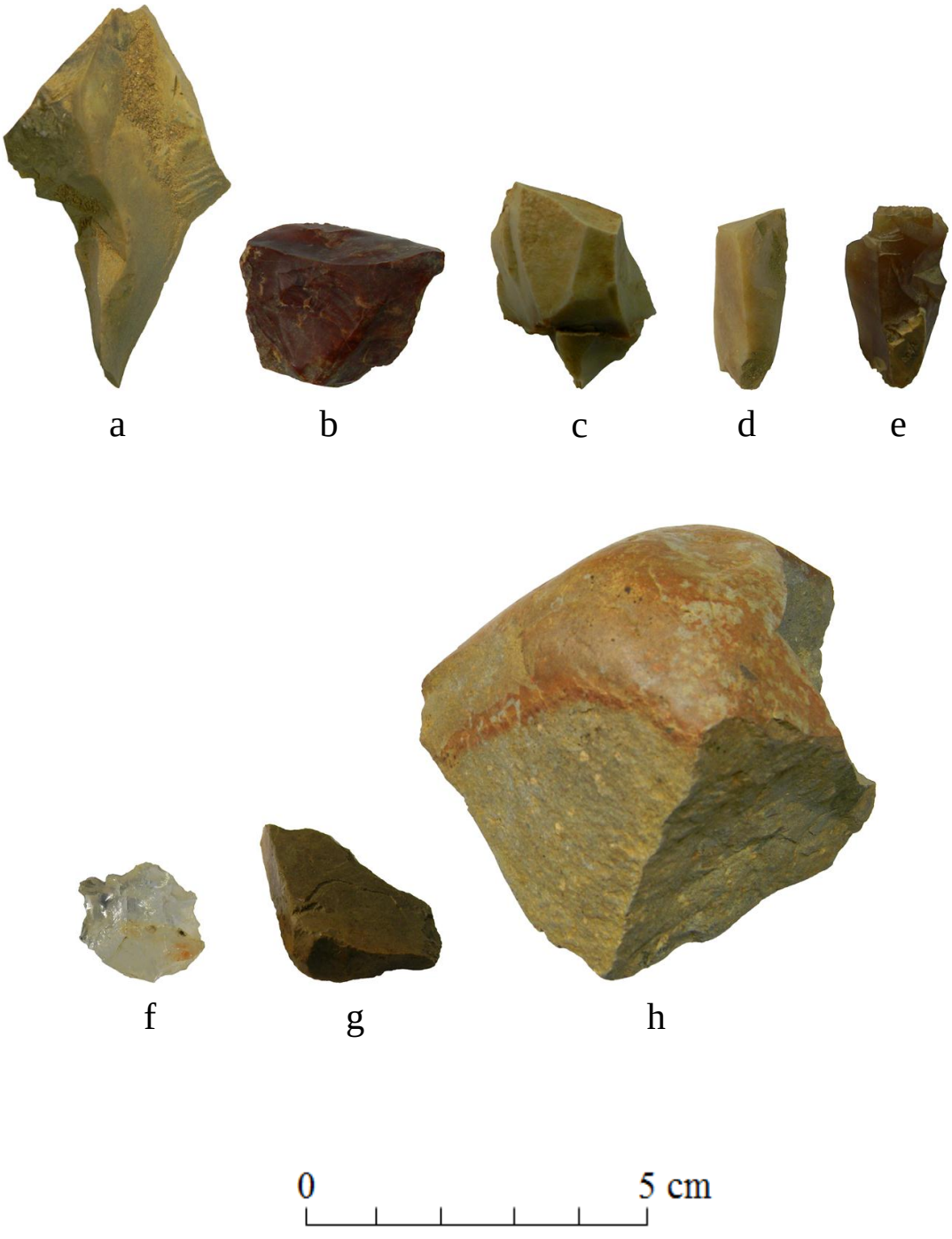


Figure 193. **Non-tool cores, Area E, 10CW34**: *a*, 83.9.3; *b*, 70.5.3; *c*, 62.8.4; *d*, 67.11.6; *e*, 60.8.5; *f*, 37.10.5; *g*, 95.2.5; *h*, 53.14.2.



Figure 194. **Non-tool core, 37.11.7, Area E, 10CW34**.



Figure 195. **Non-tool core, 18.6.4, Area A, 10CW34.**

flake detachment, such as edge retouch or battering, and are therefore considered to have functioned primarily as objective cores, rather than as tools. Most are produced from metamorphic river cobbles (n=48, 86%), an indication that this material was predominantly selected for on-site flake and blank production. (Figure 196*a*). Additional materials are rare and include cherts (n=5, 9%), quartz crystal (n=2, 3%), and argillite (n=1), each of which are exhausted. In comparison, thirty-four (71%) metamorphic cobble cores still retain sufficient raw material for further use (Figure 196*b*), reflecting the relative abundance of this raw material. Most of the metamorphic cobble cores retain cortex (n=41, 85%), while nodule and tabular cortex is also present on cores produced from chert (n=2, 40%), quartz crystal (n=1, 50%), argillite (n=1, 100%) (Figure 196*c*). The majority of cores (n=37, 66%) are reduced unidirectionally from well-defined platforms, though one chert core (83.9.3, Figure 193*a*) and both quartz crystal cores lack evidence of platforms and exhibit multidirectional flake scars (Figure 196*d*).

Fire-Cracked Rock

Rocks heated with fire were essential for a variety of activities that required a heat source such as boiling water, producing steam in sweat lodges, and baking food, as well as other lithic materials, in subterranean ovens (Thoms 2009:584-585). Signs of thermal damage resulting from exposure to high temperatures include cortex discoloration, circular spall or potlid fractures, and angular cracks. Rocks that are heated rapidly and cooled slowly in hearths and ovens typically produce rounded fractures, while rocks gradually heated and cooled for boiling tend to fracture in angular patterns (Sappington et al. 1991:76). A total of 202.05 kg (n=303) of fire-cracked rock fragments were recovered at 10CW34 (Table 31). Nearly all were concentrated in Area E (n=292, 200.99 kg), and

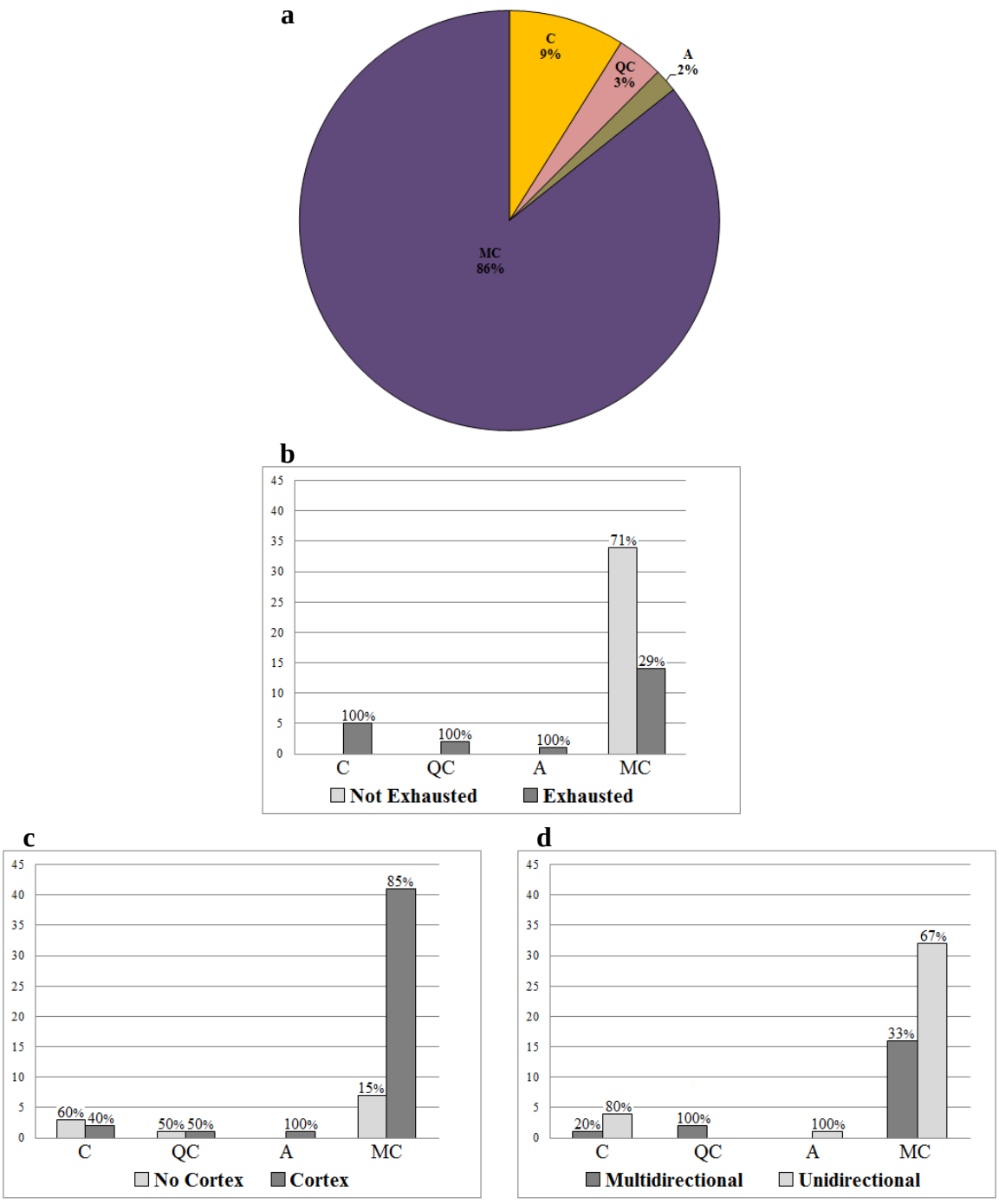


Figure 196. Summaries for all non-tool cores (n=56) recovered at 10CW34. *a*, Raw material percentages for non-tool cores. *b*, Exhausted and non-exhausted core frequencies by material. *c*, Cortex retention frequencies by material. *d*, Frequencies of multidirectionally and unidirectionally reduced cores by material.

Table 31. 10CW34 fire-cracked rock inventory.

Recovery Area	Cat. No.*	Lot No.	WT (g/kg)	Material	Cortex Absent (x=yes)	Thermal Spall (x=yes)
E Stockpile	SB.36-40.3 (np)	1	11.07 g	MC		
E Stockpile	SB.41-45.2 (np)	1	90.44 g	MC		
D	1981Sur.5 (s)[1]	1	0.26 kg	MC		
B	2010misc.4[2]	1	58.56 g	G		x
E Stockpile	2010misc.29 (s)[3]	4	0.33 kg	G		
E Central	2012misc.6[4]	1	71.53 g	MQ		
E Central	2012misc.14[5]	1	6.53 g	MC		
E	2012misc.29 (s)[6]	1	21.22 g	MC		
E Central	2012misc.30 (s)[7]	1	1.16 kg	MC		
E	2012misc.31 (s)[8]	1	0.58 kg	MC		
E Central	2012misc.32 (s)[9]	1	84.94 g	G		x
D	1981TP-2.1.1	1	23.42 g	G		
A	22.1.1	1	56.89 g	MC		
E West	28.1.3	2	46.44 g	MC		
E West	32.1.4	1	0.14 kg	MC		
E Central	36.1.3	1	8.59 g	G		
E East	41.1.3	1	0.13 kg	MC		
E Central	52.1.4	1	17.7 g	MQ		
E Central	99.1.4	2	8.53 g	MC		
E East	102.1.2	1	9.16 g	MC		
E Stockpile	DA2.1.4	1	22.17 g	MC		x
B	10.2.1	1	0.24 kg	MC		
E West	26.2.3	1	73.92 g	MC		
E West	27.2.4	1	17.44 g	MC		
E West	32.2.4	1	77.84 g	MC		
E Central	38.2.4	1	93.74 g	MC		

*Items are listed in order of increasing level depth; non-provenienced items (np) are listed first, followed by surface items (s).
(np) = non-provenienced item.
(s) = surface collection.
[1]Area D surface collection coordinates (September, 1981 grid system, see Figure 82): 9-9+50 W/50-100 S.
[2]Recovered in Trench 5 during an east wall clean from 0 to 20 cm BD.
[3]Surface collection west of Stockpile (approximately N140/W180).
[4]Recovered in Unit 77 during a 4-wall clean from 60 to 90 cm BD.
[5]Recovered in Unit 105 during an east wall collapse from 60 to 95 cm BD.
[6]Area E surface collection coordinates: N83/W94.
[7]Area E surface collection coordinates: N108/W93.
[8]Area E surface collection coordinates: N92/W83.
[9]Area E surface collection coordinates: N107/W82.

Table 31. *Continued*.

Recovery Area	Cat. No.*	Lot No.	WT (g/kg)	Material	Cortex Absent (x=yes)	Thermal Spall (x=yes)
E Central	38.2.5	1	0.44 kg	G		x
E Central	42.2.2	1	0.22 kg	G		
E Central	43.2.4	1	24.46 g	G		
E Central	53.2.2	1	1.27 g	MC		
E Stockpile	54.2.3	1	17.29 g	MC		
E Central	57.2.4	1	37.86 g	G		
E Central	66.2.3	1	14.16 g	MC		
E Central	75.2.5	1	1 kg	G		
E Central	76.2.2	1	15.81 g	MC		
E Central	77.2.2	1	0.35 kg	G		
E Central	80.2.4	3	0.23 kg	MC		
E Central	82.2.2	1	48.63 g	MQ		
E Central	84.2.3	1	50.81 g	MC		
E Central	87.2.4	1	0.12 kg	MC		
E Central	88.2.5	1	71.11 g	MC		
E Central	91.2.4	1	1.72 kg	MC		
E Central	93.2.2	1	0.15 kg	MC		
E Central	98.2.3	1	1.74 kg	MC		
E Central	100.2.2	1	0.17 kg	MC		
B	1996K-8.3.1	1	51.63 g	MC		
A	23.3.5	1	0.15 kg	MC		
E West	32.3.4	3	0.88 g	MC		
E Central	37.3.4	1	50 kg	G		
E East	39.3.4	1	0.28 kg	MC		
E Central	53.3.2	1	0.88 kg	MQ		
E Central	60.3.2	1	0.78 kg	MC		
E Central	62.3.3	1	0.16 kg	G		
E Central	65.3.3	1	0.51 kg	MC		
E Central	67.3.4	1	1.28 kg	G		
E Central	72.3.4	2	25.58 g	MC		
E Central	75.3.4	1	1.14 kg	MQ		
E Central	78.3.2	1	0.31 kg	G		
E Central	82.3.2	1	0.38 g	MC		
E Central	87.3.5	1	0.29 kg	MC		
E Central	88.3.5	2	0.52 kg	MC		
E Central	91.3.4	1	0.15 kg	MC		
E Central	96.3.5	1	98.74 g	MC		
E Central	99.3.6	1	0.26 kg	MC		
E Central	99.3.7	2	3.58 kg	G		

*Items are listed in order of increasing level depth.

Table 31. *Continued*.

Recovery Area	Cat. No.*	Lot No.	WT (g/kg)	Material	Cortex Absent (x=yes)	Thermal Spall (x=yes)
E Central	109.3.4	1	5.55 g	MC		
E West	32.4.3	1	83.52 g	B		
E Central	37.4.4	1	18.46 g	MC		x
E Central	46.4.4	1	0.66 kg	G		
E Central	53.4.4	1	1.6 g	MC		
E Central	59.4.5	1	0.1 kg	G		
E East	102.4.3	1	22.83 g	MC		
A	13.5.4	1	63.04 g	MC		
E West	27.5.3	1	53.65 g	MC		
E Central	29.5.6	1	56 kg	G		
E Central	51.5.3	1	0.12 kg	G		
E Central	76.5.3	1	14.74 g	MC		
E Central	87.5.4	1	26.39 g	G		
D	1981TP-2.6.2	1	34.61 g	MC		
A	9.6.3	1	7.48 g	MC		
A	13.6.5	1	0.12 kg	MC		
E Central	29.6.3	1	91.16 g	MC		
E Central	48.6.4	1	19.42 g	G		
E Central	72.6.6	1	21.67 g	MQ		
E Central	89.6.5	1	0.17 kg	MQ		
E Central	98.6.3	1	0.82 kg	G		
E Central	106.6.4	1	0.12 kg	MC		
E Central	20.7.5	1	18.04 g	MC		
E West	21.7.6	3	0.48 kg	MC		
E Central	24.7.6	1	0.5 kg	MC		
E Central	31.7.8	1	7.43 g	MC		x
E West	32.7.3	1	13.42 g	G		
E Central	51.7.3	2	0.16 kg	G		
E Stockpile	54.7.2	1	10.37 g	MC		
E Central	55.7.5	1	0.11 kg	MC		
E Central	59.7.7	1	47.51 g	MC		
E Central	63.7.2	1	0.14 kg	G		
E Central	67.7.5	1	0.54 kg	MQ		
E Central	70.7.6	1	72.66 g	MC		
E Central	71.7.6	1	34.97 g	G	x	
E Central	73.7.9	1	81.95 g	MQ		
E Central	77.7.2	1	8.49 g	MC		
E Central	81.7.4	1	0.58 kg	MC		
E Central	106.7.5	1	0.64 kg	MC		

*Items are listed in order of increasing level depth.

Table 31. *Continued*.

Recovery Area	Cat. No.*	Lot No.	WT (g/kg)	Material	Cortex Absent (x=yes)	Thermal Spall (x=yes)
E Central	106.7.6	1	98.56 g	MC		
E Central	110.7.2	1	12.04 g	MC		x
E Central	112.7.6	1	86.31 g	MC		x
E Central	19.8.5	1	0.13 kg	MC		
E West	21.8.4	2	81.68 g	MC		
E Central	24.8.8	1	0.5 kg	G		
E Central	24.8.9	1	1 kg	MC		
E Central	25.8.4	2	0.35 kg	G		
E Central	29.8.6	1	0.44 kg	MC		
E West	32.8.4	1	26.47 g	MC		
E Central	36.8.10	2	0.62 kg	G		
E Central	38.8.6	1	34.69 g	MC		
E Central	47.8.4	2	1.32 kg	G		
E Central	49.8.10	1	2.02 kg	MC		
E Central	50.8.6	1	0.26 kg	G		
E Central	52.8.8	1	0.36 kg	MC		
E Central	55.8.5	1	0.23 kg	G		
E Central	55.8.6	1	0.9 kg	MQ		
E Central	57.8.9	1	0.58 kg	G		
E Central	57.8.10	1	20.05 g	MC		
E Central	61.8.5	1	40.3 g	MC	x	
E Central	61.8.6	1	0.62 kg	G		
E Central	65.8.6	1	0.32 kg	G		
E Central	66.8.5	1	0.24 kg	MC		
E Central	67.8.5	2	43.4 g	G		
E Central	70.8.2	1	26.41 g	MC		
E Central	70.8.3	1	0.54 kg	MQ		
E Central	72.8.6	1	58.4 g	MC	x	
E Central	73.8.7	1	2.1 kg	MQ		
E Central	73.8.8	1	0.96 kg	MC		
E Central	73.8.9	1	8.86 g	G		
E Central	75.8.7	2	0.84 kg	G		
E Central	75.8.8	1	0.26 kg	MC		
E Central	76.8.3	1	46.38 g	MC		
E Central	79.8.5	1	1.37 g	MC		
E Central	81.8.5	1	88.28 g	G		
E Central	83.8.2	3	0.7 kg	G		
E Central	83.8.3	2	14.19 g	MQ		
E Central	86.8.6	2	0.34 kg	MC		

*Items are listed in order of increasing level depth.

Table 31. *Continued*.

Recovery Area	Cat. No.*	Lot No.	WT (g/kg)	Material	Cortex Absent (x=yes)	Thermal Spall (x=yes)
E Central	86.8.7	2	0.72 kg	G		
E Central	86.8.8	1	0.5 kg	MQ		
E Central	87.8.4	1	6.58 g	MQ		
E Central	88.8.4	1	.2 kg	MQ		
E Central	89.8.3	1	0.23 kg	MQ		
E Central	92.8.3	1	0.9 g	MC	x	
E East	104.8.5	1	64.8 g	MC		
E Central	111.8.11	1	11.06 g	MC		
E Central	113.8.7	1	29.52 g	MC		x
E Central	20.9.6	1	0.13 kg	MC		
E Central	30.9.8	1	0.24 kg	G		
E Central	35.9.7	1	0.11 kg	MC		
E Central	36.9.5	1	1.36 kg	G		
E East	39.9.4	1	0.64 kg	G		
E Central	47.9.5	1	0.46 kg	MC		
E Central	48.9.7	2	0.41 kg	G		
E Central	48.9.8	1	18.85 g	MC		
E Central	50.9.6	2	10.84 g	G	x (n=2)	
E Central	51.9.4	2	0.82 kg	G		
E Central	55.9.7	1	0.56 kg	MQ		
E Central	57.9.8	1	44.01 g	MC		
E Central	57.9.9	1	35.5 g	MC		
E Central	57.9.10	1	0.1 kg	G		
E Central	58.9.3	1	5.43 g	G		
E Central	59.9.4	1	11.58 g	G		
E Central	62.9.8	3	1.82 g	MC		
E Central	66.9.5	1	41.53 g	MQ		
E Central	67.9.7	1	0.14 kg	MQ		
E Central	68.9.3	1	1.74 g	MC		
E Central	71.9.8	1	0.16 kg	MC		
E Central	71.9.9	1	0.11 kg	MC		
E Central	74.9.4	1	6.82 g	MC	x	
E Central	75.9.4	1	91.98 g	G		
E Central	75.9.5	1	98.48 g	G		
E Central	76.9.4	1	45.4 g	MQ		
E Central	77.9.4	3	0.18 kg	MC		
E Central	77.9.5	1	40.88 g	MC		
E Central	77.9.6	2	0.18 kg	G		
E Central	81.9.6	1	98.33 g	MC		

*Items are listed in order of increasing level depth.

Table 31. *Continued*.

Recovery Area	Cat. No.*	Lot No.	WT (g/kg)	Material	Cortex Absent (x=yes)	Thermal Spall (x=yes)
E Central	81.9.7	1	0.4 kg	MQ		
E Central	89.9.4	1	31.94 g	MC		
E Central	111.9.6	1	7.14 g	MC		x
E Central	19.10.4	1	43.67 g	G		
E Central	35.10.5	1	1.24 kg	G		
E Central	47.10.7	1	34.7 g	G		
E Central	49.10.5	1	3.22 kg	G		
E Central	50.10.5	1	0.17 kg	G		
E Central	51.10.5	1	11.88 g	G		
E Central	52.10.6	1	14.68 g	MC		
E Central	52.10.7	1	0.21 kg	MQ		
E Central	52.10.8	1	0.7 kg	MQ		
E Central	51.10.6	1	0.27 kg	MQ		
E Central	53.10.10	1	0.17 kg	MC		
E Central	56.10.9	1	94.41 g	MC		
E Central	57.10.4	1	86.57 g	MC		
E Central	58.10.4	1	2.01 g	MC	x	
E Central	58.10.5	1	83.36 g	G		
E Central	61.10.4	1	8.27 g	MC		
E Central	62.10.5	3	24.77 g	MQ		
E Central	64.10.14	2	0.2 kg	MC		
E Central	64.10.15	1	0.4 kg	MQ		
E Central	68.10.6	1	0.34 kg	MC		
E Central	76.10.3	1	2.26 g	MQ		
E Central	76.10.4	1	0.9 kg	G		
E Central	80.10.8	1	0.46 kg	G		
E Central	83.10.4	2	22.63 g	MC		
E Central	84.10.6	5	0.35 kg	MC		
E Central	84.10.7	1	40.8 g	MQ		
E Central	88.10.4	1	49.25 g	MC		
E Central	99.10.5	1	0.94 kg	MQ		
E Central	92.10.6	1	0.12 kg	G		
E Central	35.11.6	1	0.13 kg	MC		
E Central	37.11.6	1	0.26 kg	MC		x
E Central	51.11.2	1	0.58 kg	G		
E Central	51.11.3	2	2.1 kg	MC		
E Central	52.11.6	1	15 g	MC		
E Central	53.11.6	1	45.26 g	G		
E Central	60.11.4	1	0.92 kg	G		

*Items are listed in order of increasing level depth.

Table 31. *Continued*.

Recovery Area	Cat. No.*	Lot No.	WT (g/kg)	Material	Cortex Absent (x=yes)	Thermal Spall (x=yes)
E Central	61.11.2	1	27.22 g	MC		
E Central	66.11.2	1	27.64 g	MC		
E Central	71.11.5	1	9.2 g	MC		
E Central	72.11.4	1	26.5 g	MC	x	
E Central	76.11.4	1	1.08 kg	G		
E Central	78.11.5	7	2.84 kg	G		
E Central	78.11.6	2	1.4 kg	MQ		
E Central	78.11.9	1	54.48 g	G		
E Central	80.11.6	1	4.48 g	MQ		
E Central	80.11.7	1	0.2 kg	MC		
E Central	82.11.6	2	4.08 kg	MC	x	
E Central	82.11.9	1	0.11 kg	MC		
E Central	82.11.10	1	0.12 kg	MC		
E Central	82.11.11	1	63.04 g	MC		
E Central	84.11.4	2	0.54 kg	MC		
E Central	84.11.5	2	0.26 kg	G		
E Central	58.12.4	1	8.5 g	G		
E Central	60.12.3	1	0.11 kg	G		
E Central	64.12.4	1	44.09 g	G		
E Central	83.12.4	1	2.13 g	MC		
E Central	77.12.5	1	77.25 g	G		
E East	39.13.3	1	19.2 kg	MC		
E Central	77.13.4	1	46.91 g	MC		
E Central	83.13.2	1	48.79 g	G		
E Central	53.14.3	1	3.8 g	MQ		
E Central	58.14.3	1	0.95 g	MC		
E Central	58.15.7	1	65.68 g	G		
E Central	58.15.8	1	78.72 g	MC		
E Central	64.16.3	1	2.36 g	MC	x	

*Items are listed in order of increasing level depth.

only a minor amount were encountered in Area A (n=5, 0.39 kg), Area B (n=3, 0.35 kg), and Area D (n=3, 0.32 kg). Granite (n=101, 139.6 kg) and metamorphic cobble (n=164, 49.73 kg) were the predominant materials in each Area. Quartzite (n=37, 12.64 kg) was only encountered in Area E, where one fire-cracked, fine-grained basalt fragment (0.08

kg) was also recovered. The vast majority of the fire-cracked rock (96%, 201.02 kg) are angular fragments, fractured along sharp cracks. Eleven spalls, or potlids (1.03 kg) were encountered, eight of which are metamorphic, and one granite. Absence of cortex was noted on eleven fragments (4%, 4.26 kg), three of which are granite and eight metamorphic.

The Historic Component

Historic artifacts recovered at 10CW34 were largely concentrated in the eastern portion of the site in Areas A (n=313) and B (n=26), and a small number were encountered in Area E (n=12). One item (1996Sur.1, Figure 198) was collected from the surface in 1996. While it was not labeled with provenience information, this item was likely collected in either Area A or B, as the 1996 fieldwork was conducted in those areas. Most historic materials are fragmented and/or highly corroded, and manufacturer's marks are absent on all but a few hardware and ammunition items. Though diagnostic characteristics are limited, it is evident that both early historic and modern artifacts co-occur in Areas A and B, reflecting the early use and continued occupation of these areas by Euroamericans in the twentieth century. With the exception of several lead bullets, historic materials in Area E appear to be modern and were not encountered below 20 cm BD. Historic artifacts were classified in accordance with functional categories developed by Roderick Sprague (1981).

Area A Historic Component

Structural items (n=162), comprising flat glass (n=34) and a variety of hardware items (n=128) were encountered most frequently in Area A (Table 32, Figure 197). Flat glass is associated with windows, typically set in buildings or doors. All flat glass

Table 32. 10CW34, Area A historic component inventory.

Cat. No.*	Item Description	Lot. No.	Material	WT (g)
Container Items – Vessel Glass				
1991AH6.1.1	brown vessel glass	3	glass	1.35
1.1.5	clear vessel glass	3	glass	10.69
9.1.2	clear vessel glass	1	glass	1.27
9.1.10	clear vessel glass	1	glass	4.38
13.1.6	clear vessel glass	1	glass	1.54
13.1.7	brown vessel glass	1	glass	1.56
1996K-30.2.3	brown vessel glass, melted	1	glass	3.96
13.2.7b	clear vessel glass	1	glass	3.03
23.2.8	clear blue vessel glass	1	glass	0.82
1996K-30.3.1	brown vessel glass	1	glass	0.15
1996K-30.4.1	brown vessel glass	1	glass	0.06
Vessel Glass Totals		15		28.81
Container Items – Cans				
2.1.3	can fragment	1	metal	3.78
4.1.5	key can opener	1	metal	4.9
Cans Totals		2		8.68
Container Items – Lids and Closures				
9.1.7	can lid	1	metal	8.35
7.3.3	can lid	1	metal	32.52
7.3.4	bottle cap	1	metal	2.92
1996K-25.4.2	COREGA cap, Pat #1926186	1	metal	1.12
Lids and Closures Totals		4		44.91
Area A Container Items Totals		**21**		**82.4**
Structural Items – Flat Glass				
1.1.6	clear flat glass	1	glass	3.34
2.1.5	clear flat glass	1	glass	3.41
3.1.6	clear flat glass	1	glass	0.26
4.1.2	clear flat glass	2	glass	1.31
7.1.1	clear flat glass	1	glass	0.59
8.1.4	clear flat glass	3	glass	0.71
23.1.4	clear flat glass	4	glass	3.75
1.2.9	clear flat glass	2	glass	0.95
2.2.6	clear flat glass	4	glass	4.6
5.2.3	clear flat glass	1	glass	0.54
6.2.3	clear flat glass	1	glass	4.91
7.2.2	clear flat glass	4	glass	2.37
8.2.4	clear blue flat glass	1	glass	2.77
13.2.7a	clear flat glass	2	glass	2.56

*Items are listed in order of increasing level depth within each subcategory.

Table 32. *Continued*.

Cat. No.*	Item Description	Lot. No.	Material	WT (g)
Structural Items – Flat Glass *continued*				
18.2.4	clear flat glass	1	glass	0.24
23.2.7	clear flat glass	2	glass	2.34
13.3.5	clear flat glass	1	glass	0.18
18.3.7	clear blue flat glass	1	glass	0.86
7.4.3	clear blue flat glass	1	glass	1.5
Flat Glass Totals		34		37.19
Structural Items – Hardware - Nails				
1991AH9.1.1	nail	1	metal	0.5
1.1.2	nail	1	metal	15.77
1.1.3	nail	1	metal	3.05
1.1.4	nail	1	metal	0.65
2.1.6	nail	1	metal	0.89
2.1.7	nail head	1	metal	0.14
2.1.8	nail	1	metal	2.93
2.1.9	nail	1	metal	15.82
3.1.7	nail	1	metal	5.17
3.1.8	nail	1	metal	3.18
4.1.3	nail	1	metal	15.37
4.1.4	nail	1	metal	1.45
6.1.6	nail	1	metal	2.9
6.1.7	nail	1	metal	6.78
6.1.8	nail	1	metal	1.87
7.1.3	nail	1	metal	3.32
7.1.4	nails	2	metal	7.37
8.1.5	nails	3	metal	6.1
8.1.6	nail	1	metal	1.69
8.1.7	nails	2	metal	2.45
8.1.8	broken nail	1	metal	1.22
8.1.9	nail fragment	1	metal	0.41
9.1.3	nail head	1	metal	0.93
9.1.4	bent nail	1	metal	1.94
9.1.5	bent broken nail	1	metal	0.53
9.1.8	nail	1	metal	9.94
9.1.9	bent nail	1	metal	1.3
13.1.3	bent nail	1	metal	0.92
13.1.4	nail	1	metal	1.24
18.1.4	bent nail	1	metal	1.4
18.1.5	nail	1	metal	2.29
23.1.6	nail	1	metal	3.04

*Items are listed in order of increasing level depth within each subcategory.

Table 32. *Continued*.

Cat. No.*	Item Description	Lot. No.	Material	WT (g)
Structural Items – Hardware – Nails *continued*				
23.1.7	nail	1	metal	2.42
23.1.8	bent nail	1	metal	2.5
23.1.9	bent nail	1	metal	2.1
23.1.10	nail	1	metal	0.67
23.1.11	bent nail	1	metal	2.73
23.1.12	nail	1	metal	3.1
23.1.13	bent nail	1	metal	2.34
23.1.14	nail	1	metal	26.77
1996K-30.2.2	bent nail	1	metal	2.07
1.2.10	nail	1	metal	2.84
2.2.5	nail	1	metal	2.9
3.2.4	nail head	1	metal	0.84
3.2.6	nail	1	metal	1.2
3.2.7	broken nail	1	metal	1.27
5.2.4	nail	1	metal	3.01
5.2.5	nail	1	metal	3.34
5.2.6	nails	2	metal	3.68
6.2.4	nail	1	metal	1.23
6.2.5	nail	1	metal	1.96
7.2.6	nails	2	metal	31.27
7.2.7	nails	4	metal	26.9
7.2.8	nail	1	metal	0.6
7.2.9	nails	3	metal	3.68
7.2.10	nails	3	metal	6.32
7.2.11	nails	4	metal	16.13
8.2.7	nail	1	metal	5.4
8.2.8	nail	1	metal	2.08
8.2.9	nails	2	metal	3.06
8.2.6	bent nails	2	metal	85.35
8.2.10	nail	1	metal	0.62
8.2.11	nail	1	metal	0.62
13.2.4	bent nail	1	metal	1.13
13.2.5	bent nail	1	metal	1.89
13.2.6	bent nails	2	metal	1.02
18.2.8	nail	1	metal	12.84
18.2.9	nail	1	metal	4.61
18.2.10	nail	1	metal	1.31
22.2.4	nail	1	metal	0.65
23.2.9	bent nails	2	metal	4.73

*Items are listed in order of increasing level depth within each subcategory.

Table 32. *Continued*.

Cat. No.*	Item Description	Lot. No.	Material	WT (g)
Structural Items – Hardware – Nails *continued*				
23.2.10	bent nail	1	metal	4.39
2.3.3	nail	1	metal	2
3.3.3	nail	1	metal	1.22
7.3.6	nail	1	metal	4.47
7.3.7	nails	2	metal	8.92
7.3.8	nail	1	metal	4.91
7.3.9	nails	2	metal	13.45
13.3.4	nail	1	metal	2
13.3.8	bent nail	1	metal	1.77
18.3.6	nail	1	metal	3
23.3.7	broken nail	1	metal	0.41
7.4.4	nail	1	metal	2.11
7.4.5	nail	1	metal	4.48
7.5.1	nail	1	metal	16.09
9.6.6	nail fragment	1	metal	3.24
Nails Totals		108		472.2
Structural Items – Hardware – Screws				
6.1.5	screw	1	metal	4.27
Screws Totals		1		4.27
Structural Items – Hardware – Wire				
5.1.4	wire fragment	1	metal	209.98
7.1.6	wire fragment	1	metal	7.76
23.1.15	bent wire fragment	1	metal	1.22
23.1.16	bent wire fragment	1	metal	18.36
1.2.7	wire fragment	1	metal	3.32
7.2.4	twist wire fragment	1	metal/paper	0.39
7.2.5	wire fragment	2	metal	5.47
23.3.8	wire fragment	1	metal	1.04
Wire Totals		9		247.54
Structural Items – Hardware – Nuts				
3.2.5	square nut	1	metal	3.02
7.2.3	bolt nut	1	metal	10.39
Nuts Totals		2		13.41
Structural Items – Hardware – Washers				
13.1.8	washer	1	metal	3.04
5.2.7	washer	1	metal	3.63
1996K-29.5.2	washer	1	metal	0.1
Washers Totals		3		6.77

*Items are listed in order of increasing level depth within each subcategory.

Table 32. *Continued*.

Cat. No.*	Item Description	Lot. No.	Material	WT (g)
Structural Items – Hardware – Electrical				
8.1.10	electrical hem	1	metal/glass/ porcelain	2.29
7.3.5	electrical wires	3	metal	8.98
Electrical Totals		4		11.27
Structural Items – Hardware – Miscellaneous				
7.1.5	wooden wedge	1	wood	44.68
Miscellaneous Totals		1		44.68
Area A Structural Items Totals		**128**		**837.33**
Personal Items – Ammunition				
1991TU-A.1.2	REM-UMC 38 short cartridge	1	metal	3.26
1.1.7	Super X 22 cartridge	1	metal	0.78
18.1.3	bullet	1	metal	3.16
18.2.7	UMC 22 cartridge	1	metal	0.89
8.7.5	PCC 22 cartridge	1	metal	0.59
Ammunition Totals		5		8.68
Personal Items – Clothing				
3.1.5	broken rivet/button	1	metal	0.82
Clothing Totals		1		0.82
Personal Items – Miscellaneous				
6.1.4	Junkunc Bros. padlock	1	metal	130.35
Miscellaneous Totals		1		130.35
Area A Personal Items Totals		**7**		**139.85**
Miscellaneous Fragments				
2010misc.6[1]	chalk fragment	1	chalk	0.42
2010misc.10[2]	styrofoam fragment	1	styrofoam	0.01
1996K-30.1.1	metal fragments	2	metal	0.17
5.1.2	slag fragments	2	slag	0.3
5.1.3	concrete/mortar fragments	4	concrete/mortar	392.2
7.1.2	plastic fragments	5	plastic	0.6
8.1.11	plastic fragment	1	plastic	0.09
8.1.12	concrete/mortar fragments	2	concrete/mortar	67.59
8.1.13	wood fragments	2	wood	6.43
9.1.6	concrete/mortar fragments	2	concrete/mortar	80.77
13.1.5	styrofoam fragment	1	styrofoam	0.04
18.1.2	metal fragments	5	metal	0.58
18.1.6	concrete mortar fragment	1	concrete/mortar	0.34

*Items are listed in order of increasing level depth within each subcategory.
[1]Recovered in Unit 5 during a 4-wall clean from 0 to 100 cm BD.
[2]Recovered in Unit 13 during a 4-wall clean from 0 to 30 cm BD.

Table 32. *Continued*.

Cat. No.*	Item Description	Lot. No.	Material	WT (g)
Miscellaneous Fragments *continued*				
23.1.5	metal fragment	1	metal	0.59
23.1.17	red plastic fragments	2	plastic	0.08
1996K-30.2.1	metal fragments	5	metal	0.53
1.2.8	metal fragments	10	metal	15.21
3.2.3	metal fragment	1	metal	0.09
5.2.8	metal fragments	2	metal	1.29
8.2.12	metal fragments	2	metal	0.34
8.2.13	aluminum fragment	1	aluminum	1.02
18.2.5	metal fragments	3	metal	0.63
18.2.6	concrete/mortar fragment	1	concrete/mortar	0.05
1996K-30.3.2	metal fragments	3	metal	0.21
5.3.3	metal fragment	1	metal	0.27
7.3.10	slag fragments	3	slag	1.71
13.3.7	aluminum foil fragment	1	aluminum	0.19
1996K-30.4.2	metal fragments	4	metal	0.17
2.4.2	metal fragment	1	metal	0.86
3.4.3	metal fragments	2	metal	0.5
5.4.4	metal fragments	8	metal	3.25
1996K-30.5.2	metal fragments	2	metal	0.19
2.5.3	metal fragments	2	metal	1.43
5.5.3	metal fragments	20	metal	6.92
5.6.3	metal fragments	11	metal	8.54
3.7.2	orange chalk fragment	1	chalk	2.93
5.7.3	metal fragment	1	metal	0.76
5.8.3	metal fragment	1	metal	0.4
Area A Miscellaneous Fragments Totals		**118**		**597.7**
Fragmented Items				
2.1.4	clear glass tube fragment	1	glass	0.08
8.2.5	clear glass tube fragment	1	glass	0.17
13.2.3	peg fragment	1	metal	4.83
18.2.11	plastic wrapper fragment	1	plastic	0.02
13.3.6	mirror fragment	1	glass	0.04
Area A Fragmented Items Totals		**5**		**5.14**
Area A Historic Component Totals		**313**		**1662.42**

*Items are listed in order of increasing level depth within each subcategory.



Figure 197. **Historic items, Areas A and B, 10CW34**: *a*, 1.1.7; *b*, 8.7.5; *c*, 18.1.3; *d*, 18.2.7; *e*, 1991TU-A.1.2; *f*, 1996K-25.4.2; *g*, 6.1.4. Items *a-f* are enlarged 2:1 to show detail; for these items two scale centimeters are equivalent to one actual centimeter.

fragments are clear, and with the exception of two blue-tinted fragments, all are colorless. Nails (n=108) were abundant, while a number of other hardware items were also recovered including wire fragments (n=9), washers (n=3), electrical items (n=4), two nuts, one screw, and a wedge-shaped wooden block. Non-glass container items (n=21) included a can fragment, a key can opener, two can lids, a bottle cap, and a COREGA cap, patented (#1926186) in 1933 for use with dry powder dispensing cans (1996K-25.4.2, Figure 197*f*). Though none of the vessel glass fragments contain manufacturer's marks, all exhibit varying amounts of curvature. Colors include clear (n=7), brown (n=7), and aqua (n=1); one brown vessel glass fragment is melted.

Of the personal items recovered in Area A, ammunition (n=5) was most common. One fired bullet was recovered along with four cartridge shells, each containing headstamps pertaining to several manufacturers including the Western Cartridge Company (1.1.7, Figure 197*a*), Peters Cartridge Company (8.7.5, Figure 197*b*), Union Metallic Cartridge Company (18.2.7, Figure 197*d*), and the Remington Arms-Union Metallic Cartridge Company (1991TU-A.1.2, Figure 197*e*). Other personal items include a metallic button or rivet which may have been used with a leather belt or harness, and a moderately corroded padlock made by Junkunc Bros. American Lock Company (6.1.4, Figure 197*g*).

Miscellaneous fragments (n=118) were frequent in Area A and this category includes corroded metal (n=87), plastic (n=8), slag (n=5), wood (n=2), chalk (n=2), aluminum foil (n=2), and styrofoam (n=2). Also recovered were ten concrete and mortar fragments, which are similar in color and consistency with a mortar fill encountered in Units 1, 4, and 5 (see Chapter 7). The fragments likely originated with this deposit and

they may have been scattered when portions of the mortar fill was removed. Unclassifiable fragmented items include a possible mirror fragment, a plastic wrapper fragment, a broken metal peg, and two small, curved clear glass tube fragments, which may have formed small light bulbs prior to being broken. The historic component in Area A was concentrated in the upper 50 cm BD, however, a number of items were recovered between 60 and 90 cm BD. These consist of one nail, a cartridge shell, and fourteen small fragments of material, all of which could easily have been transported by processes such as rodent burrowing.

Area B Historic Component

Structural items (n=13) also account for the majority of historic artifacts in Area B, and these include clear, colorless flat glass fragments (n=6), nails (n=2), metal wire fragments (n=3), a battery core, and a small, round lead sinker (Table 33). Container items consist of two bottle caps and three vessel glass fragments, one of which is blue and melted. Three rivets, similar to the rivet in Area A, were recovered in Area B, along with a fragmented four-hole button which appears to be produced from bone (1996K-23.5.3, Figure 198*a*). The historic use of horses is indicated by the recovery of a large horseshoe (2010misc.1, Figure 199), one horseshoe nail, and a horseshoe likely collected in either Area A or B in 1996 (1996Sur.1, Figure 200). Historic artifacts in Area B were limited to the upper 50 cm, and as in Area A, the large proportion of structural items reflects the extensive development that has taken place in this portion of the site.

Area E Historic Component

Historic or modern artifacts were rare in Area E, where personal items (n=8) comprised the largest category (Table 34). Four lead bullets (n=4) recovered in the

Table 33. 10CW34, Area B historic component inventory.

Cat. No.*	Item Description	Lot. No.	Material	WT (g)
Container Items – Vessel Glass				
1996K-44.1.1b	clear vessel glass	1	glass	0.92
T4.1.1	blue vessel glass, melted	1	glass	18.05
1996K-4.3.3	brown vessel glass	1	glass	0.05
Vessel Glass Totals		3		19.02
Container Items – Lids and Closures				
1996K-23.3.1	bottle cap	1	metal	3.24
1996K-23.5.2	bottle cap	1	metal	2.73
Lids and Closures Totals		2		5.97
Area B Container Items Totals		**5**		**24.99**
Structural Items – Flat Glass				
1996K-44.1.1a	clear flat glass	2	glass	3.76
1996K-37.2.1	clear flat glass	1	glass	0.47
1996K-37.3.1	clear flat glass	1	glass	0.04
199696-A.3.3	clear flat glass	1	glass	0.27
1996K-23.4.2	clear flat glass	1	glass	1.17
Flat Glass Totals		6		5.71
Structural Items – Hardware – Nails				
199696-A.2.1	nail	1	metal	3.45
16.2.1	nail	1	metal	0.61
Nails Totals		2		4.06
Structural Items – Hardware – Wire				
1996K-47.1.2	wire fragment	1	metal	1.82
T4.1.3	wire fragment	1	metal	1.18
T4.2.3	wire fragment	1	metal	0.92
Wire Totals		3		3.92
Structural Items – Hardware – Electrical				
T4.1.4	battery core	1	graphite	0.99
Electrical Totals		1		0.99
Structural Items – Hardware – Miscellaneous				
1996K-17.2.1	sinker	1	lead	2.5
Miscellaneous Totals		1		2.5
Area B Structural Items Totals		**13**		**17.18**
Personal Items – Clothing				
1996K-23.4.3	rivets	3	metal	3.27
1996K-23.5.3	4-hole button	1	bone	0.45
Clothing Totals		4		3.72
Area B Personal Items Totals		**4**		**3.72**

*Items are listed in order of increasing level depth within each subcategory.

Table 33. *Continued*.

Cat. No.*	Item Description	Lot. No.	Material	WT (g)
Transportation Items				
1996Sur.1 (np)[1]	horseshoe	1	metal	580
2010misc.1 (s)[2]	horseshoe	1	metal	292.84
1996K-47.1.1	horseshoe nail	1	metal	3.12
Area B Transportation Items Totals		**3**		**875.96**
Miscellaneous Fragments				
T4.1.2	metal fragments	2	metal	2.84
Area B Miscellaneous Fragments Totals		**2**		**2.84**
Area B Historic Component Totals		**26**		**924.69**

*Items are listed in order of increasing level depth within each subcategory; non-provenienced items (np) are listed first, followed by surface items (s).
[1]1996 surface collection, possibly in Area A or B. The artifact label described location as "on the shore at confluence of Kelly Creek and North Fork."
[2]Area E surface collection in backhoe backfill near Trench 5.

Central zone, and an aluminum cartridge shell screened from the stockpile backdirt, indicate that Area E was used for firearm practice (Figure 198*b*-*f*). Three cents, dating to 1964, 1993, and 1994 were recovered within a two meter area in close proximity to the southern pasture fence, where they may have been deposited during its assembly. Structural items were sporadic and consist of nail and a washer in the Central zone, and a clear, colorless flat glass fragment screened from the stockpile backdirt. One clear glass fragment exhibiting slight curvature was also recovered in the backdirt from the stockpile. Modern items, while infrequent, comprise the majority of the historic component in Area E, suggesting that historic use of this portion of the site was occasional and unobtrusive until recent times when activities increased in the Stockpile zone.



Figure 198. **Historic items, Areas B and E, 10CW34**: *a*, 1996K-23.5.3; *b*, 112.1.3; *c*, 20.1.5; *d*, 65.1.5; *e*, 93.1.4; *f*, SB51-55.3. All items are enlarged 2:1 to show detail and two scale centimeters are equivalent to one actual centimeter.



Figure 199. **Horseshoe, 2010misc.1, Area B, 10CW34**.



Figure 200. **Horseshoe, 1996Sur.1, possibly Area A or B, 10CW34**. This item was probably collected from the surface in Areas A or B, as the 1996 fieldwork was conducted in those areas of the site.

Table 34. 10CW34 Area E historic component inventory.

Cat. No.*	Item Description	Lot. No.	Material	WT (g)
Structural Items – Flat Glass				
SB.6-10.3 (np)	clear flat glass	1	glass	0.26
Flat Glass Totals		1		0.26
Structural Items – Hardware – Nails				
98.1.2	nail	1	metal	29.33
Nails Totals		1		29.33
Structural Items – Hardware – Washers				
113.2.4	washer	1	plastic	0.21
Washers Totals		1		0.21
Area E Structural Items Totals		**3**		**29.8**
Personal Items – Ammunition				
SB.51-55.3 (np)	cartridge fragment	1	aluminum	3.23
20.1.5	bullet	1	lead	2.51
65.1.5	bullet	1	lead	2.5
93.1.4	bullet	1	lead	9.08
112.1.3	bullet	1	lead	2.56
Ammunition Totals		5		19.88
Personal Items – Coins				
100.1.4	1994 cent	1	metal	2.42
58.2.1	1964 cent	1	metal	3
83.2.3	1993 cent	1	metal	2.45
Coins Totals		3		7.87
Area E Personal Items Totals		**8**		**27.75**
Fragmented Items				
SB.46-50.5 (np)	clear curved glass fragment	1	glass	0.15
Area E Fragmented Items Totals		**1**		**0.15**
Area E Historic Component Totals		**12**		**57.7**

*Items are listed in order of increasing level depth within each subcategory ; non-provenienced items (np) are listed first, followed by surface items (s).

9. RADIOCARBON DATING AND FEATURES

Radiocarbon Dating

Twenty-six charcoal samples from Areas A (n=2) and E (n=24) were selected for radiocarbon dating in 2010, 2011, and 2012 (Table 35, Appendices 4a-4d). All samples were analyzed at Beta Analytic Radiocarbon Dating Laboratory. In January 2012, the radiocarbon dates obtained in 2010 (Sample No. Beta-288076-288085) were corrected using the INTCAL 09 database which was used in the analysis of the samples submitted in 2011 and 2012. Charcoal samples were chosen from each of the three anvil features (4, 2011A, and 2011B) and from a variety of depths to provide both stratigraphic and temporal context for time diagnostic artifacts, including tools commonly associated with particular cultural phases of occupation in the Clearwater River region (Figures 201-202). Most dates generally follow a stratified sequence, though several samples produced later dates than expected (Beta-288078, Beta-336975, Beta-288079). Likely causes include animal burrowing and insect activity, natural precipitation and reorganization of particulates in the soil, and roots burns which may have deposited charred material in older strata.

Four Windust phase dates from 13,740 to 9520 cal. BP were obtained from samples collected between 146 and 186 cm BD in Block C3, Area E (Table 36, Figures 203-209). These dates are associated with a number of flaked tools including a Windust point base (58.14.e), a large biface (58.15.e2), a point tip (53.14.4) and a biface fragment (58.15.e1). Debitage (n=434), fire-cracked rock (n=5), two non-tool cores, and a number of flake tools (n=11) and flaked and battered cobbles (n=5) were also recovered in the vicinity from between 130 and 200 cm BD. A fifth Windust phase date (9130-9000

Table 35. Radiocarbon date summary, 10CW34, Areas A and E, 2010-2012.

Lab No.	UI Sample No.	Depth (cm BD)	Conventional Radiocarbon Age (BP)	Calibrated Age (2σ) (cal BP)	Material	$\delta^{13}C/^{13}C$	Context
Beta-288081	33.3.4	21	120±40	280-0 BP	charcoal	-24.3‰	proximity to side-notched point, Area E
Beta-288083	39.5.3	50	140±40	290-0	charcoal	-24.8‰	depth, East sample, Area E
Beta-288076	13.6.7	58-60	1060±40	1060-920	charcoal	-22.8‰	Feature 4, Area A
Beta-288078	24.8.5	74	1420±40	1380-1290	charcoal	-21.9‰	proximity to Cascade Point, Area E
Beta-336975	105.9.12	80-82	4070±30	4790-4440	charcoal	-24.5‰	proximity to shaft abrader, Area E
Beta-288079	30.9.11	89	5150±40	5990-5760	charcoal	-22.9‰	depth sample, proximity to tools, Area E
Beta-288082	37.7.2	60-62	5200±40	6000-5910	charcoal	-24.8‰	proximity to Cascade Point, Area E
Beta-288077	8.12.2	117	5690±40	6560-6400	charcoal	-23.8‰	depth sample, Area A
Beta-313694	72.11.6	106	6870±40	7790-7620	charcoal	-23.2‰	depth, block C7 sample, Area E
Beta-313691	58.10.6	92	6960±40	7920-7690	charcoal	-23.1‰	Feature 2011A, Area E
Beta-313687	51.10.7	99	6980±40	7930-7700	charcoal	-23.3‰	depth sample, proximity to tools, Area E
Beta-313695	75.11.4	100	7030±40	7950-7790	charcoal	-22.7‰	depth sample, Area E
Beta-313689	52.12.4	118	7200±40	8150-7950	charcoal	-22.4‰	depth, Block C9 sample, Area E
Beta-288080	32.7.4	69	7390±40	8330-8160	charcoal	-23.6‰	depth, West sample, Area E
Beta-336974	104.13.4	124-125	7480±40	8380-8190	charcoal	-23.2‰	depth sample, proximity to tools, Area E
Beta-336970	88.11.3	101	7660±30	8540-8400	charcoal	-22.6‰	proximity to net weight, Area E
Beta-336972	97.12.2	113	7730±40	8590-8420	charcoal	-23.3‰	proximity to Windust point, Area E
Beta-288084	41.9.1	82	7790±40	8630-8460	charcoal	-24.7‰	depth, East sample, Area E
Beta-313688	52.8.23	71	7900±40	8980-8600	charcoal	-25.0‰	Feature 2011B, Area E
Beta-336971	94.9.9	90	7930±40	8990-8600	charcoal	-23.3‰	proximity to Goshen point, Area E
Beta-313686	50.9.10	84-86	7940±40	8990-8610	charcoal	-23.8‰	proximity to Windust point, Area E
Beta-313690	57.9.13	89	8120±40	9130-9000	charcoal	-22.8‰	proximity to Windust point, Area E
Beta-313693	58.17.3	167	8580±40	9560-9520	charcoal	-24.0‰	depth sample, Area E
Beta-313692	58.15.9	146	9490±40	11070-10600	charcoal	-23.3‰	proximity to tools, Area E
Beta-288085	42.18.3	180	10680±50	12650-12560	charcoal	-25.3‰	depth sample, proximity to tools, Area E
Beta-336973	100.19.1	185-186	11780±40	13740-13490	charcoal	-25.5‰	depth sample, Area E

Recalibrated dates are provided for Lab No.'s Beta-288076 through Beta-288085 (see Appendix 4b).

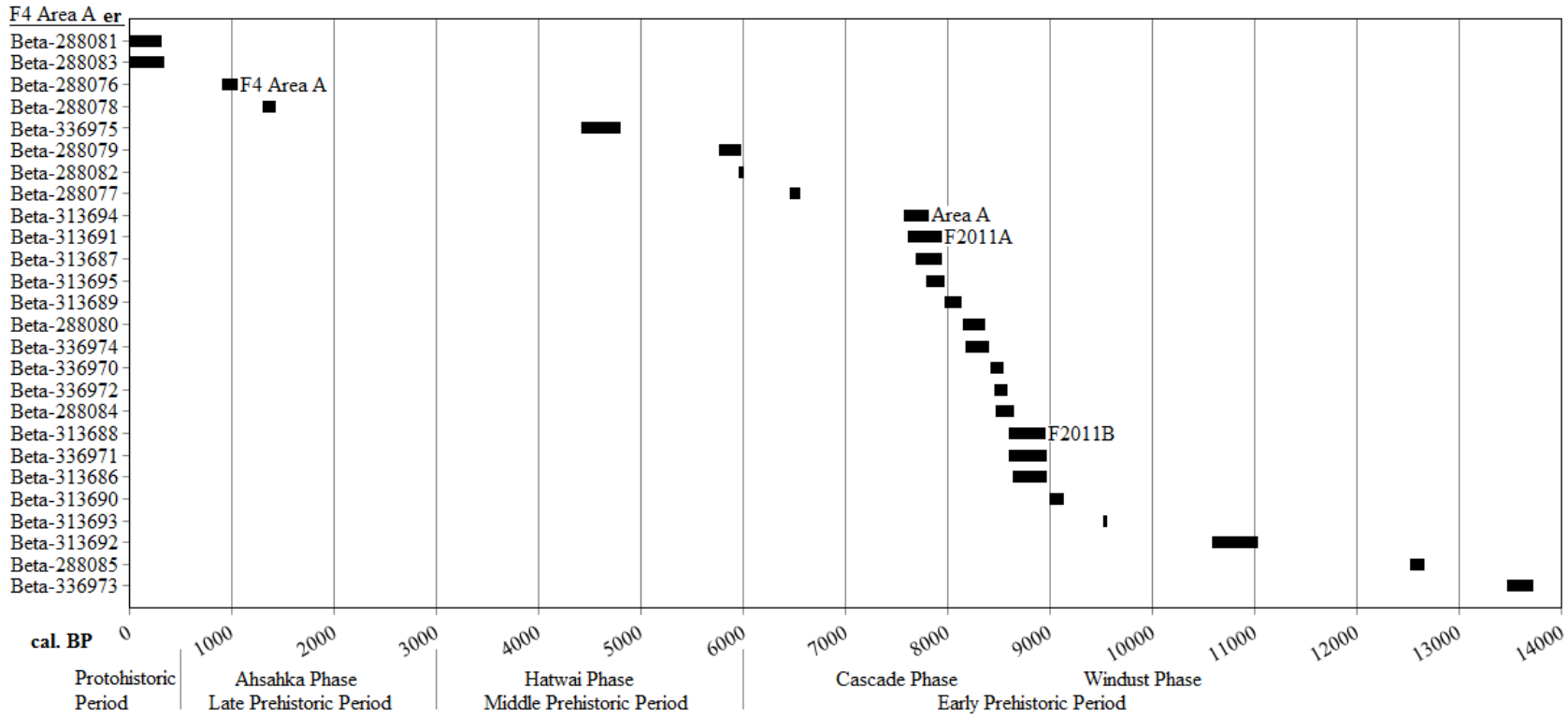


Figure 201. Temporal distribution of all (2σ) calibrated radiocarbon dates at 10CW34. Features 4, 2011A, and 2011B are indicated.

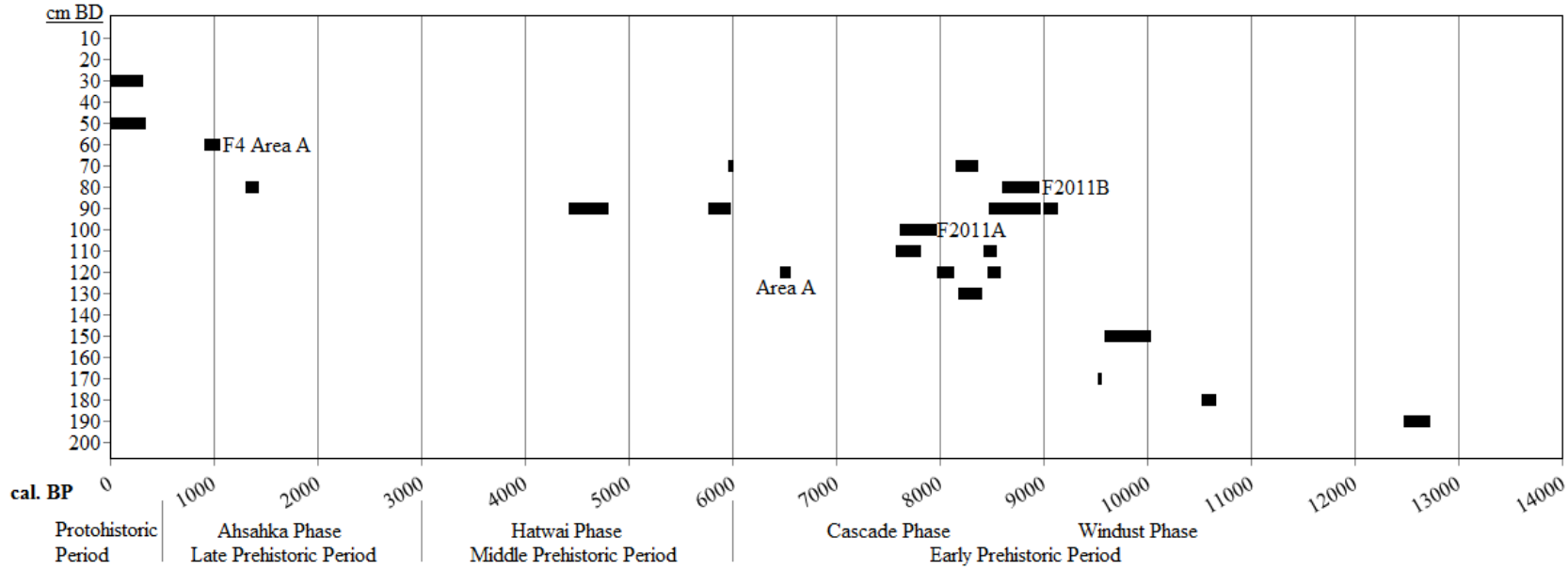


Figure 202. Stratigraphic (10 cm BD) distribution of all (2σ) calibrated radiocarbon dates at 10CW34. Samples from the same level are stacked.

Table 36. Inventory of artifacts in proximity to four Windust phase radiocarbon dates at 10CW34, Block C3, Area E[1].

Lab No.'s: Beta-336973, -288085, -313692, and -313693
Age range: 13740-9520 cal BP
Charcoal sample depth range: 186-146 cm BD
Area range: Units 42, 38, 53, 56, 58, 64, 77, 83, 86, 100

Cat. No.[2]	Description	Material	Lot No.	Depth (cm BD)	Coordinates[3]	
					E/W	N/S
42.17.1	debitage	C	7	-	-	-
42.17.2	debitage	QC	2	-	-	-
42.18.1	debitage	C	2	-	-	-
42.18.2	debitage	MC	1	-	-	-
42.19.1	debitage	C	3	-	-	-
53.14.1	debitage	C	19	-	-	-
53.14.2	non-tool core	MC	1	131-137	2-8 W	21-30 N
53.14.3	fire-cracked rock	MQ	1	135-136	14-16 W	11-13 S
53.14.4	point/preform frag.	C	1	-	-	-
53.15.1	debitage	C	10	-	-	-
53.15.2	debitage	B	1	-	-	-
53.15.3	debitage	MC	1	-	-	-
53.16.1	debitage	C	3	-	-	-
53.17.1	debitage	C	9	-	-	-
53.17.2	flake tool	C	1	-	-	-
53.18.1	debitage	C	4	-	-	-
53.19.1	debitage	C	5	-	-	-
53.20.1	debitage	C	3	-	-	-
56.14.1	debitage	C	23	-	-	-
56.14.2	debitage	V	1	-	-	-
56.14.3	debitage	QC	4	-	-	-
56.14.4	flake tool	C	1	-	-	-
56.15.1	debitage	C	16	-	-	-
56.16.1	debitage	C	17	-	-	-
56.16.2	debitage	B	1	-	-	-
56.16.3	debitage	MC	1	-	-	-
56.17.1	debitage	C	5	-	-	-
56.17.2	flake tool	MC	1	168	65-73 E	-3-3S
56.18.1	debitage	C	8	-	-	-
56.19.1	debitage	C	4	-	-	-
56.20.1	debitage	C	1	-	-	-
58.14.1	debitage	C	16	-	-	-
58.14.2	debitage	V	1	-	-	-
58.14.3	fire-cracked rock	MC	1	-	-	-

[1]All listed items are those included within a depth range of approximately 10 cm above and below the depth range of the dated samples and within an area distance of 2 m from dated units.
[2]Items are listed in order by unit and increasing level depth within each unit.
[3]Proveniences were mapped within each 1 x 1 m unit, and coordinates correspond to distance from the north, south, east, or west.

Table 36. *Continued*.

Cat. No.*	Description	Material	Lot No.	Depth (cm BD)	Coordinates*	
					E/W	N/S
58.14.e	Windust point base	C	1	140	25-30 W	25-30 N
58.15.1	debitage	C	32			
58.15.2	debitage	B	1			
58.15.3	debitage	QC	4			
58.15.4	debitage	MC	1	145	26-28 W	21-23 N
58.15.5	debitage	MC	1			
58.15.7	fire-cracked rock	G	1			
58.15.8	fire-cracked rock	MC	1			
58.15.e1[4]	biface fragment	QC	1			
58.15.e2[5]	large biface	C	1	144-146	27-32 W	16-22 N
58.16.1	debitage	C	17			
58.16.2	debitage	QC	1			
58.16.3	debitage	MC	1	160	5-9 E	36-38 N
58.17.1	debitage	C	13			
58.17.2	debitage	V	1			
58.18.1	debitage	C	7			
58.18.2	debitage	V	1			
58.19.1	debitage	C	9			
58.19.2a	debitage	V	1			
58.19.2b	debitage	V	1			
58.19.3	debitage	QC	1			
58.19.e[6]	flake tool	MC	1	187	47-52 E	10-14 N
64.14.1	debitage	C	20	140	34-36 W	2-4 S
64.14.2	debitage	B	1			
64.14.3	debitage	QC	1			
64.14.4[7]	debitage	MC	2	139 137-139	36-40 E 25-29 W	67-70 N 7-13 N
64.14.6	flaked/battered cobble	G	1	134-140	26-34 W	37-39 N
64.15.1	debitage	C	18			
64.15.2	debitage	B	1			
64.15.3	debitage	V	1			
64.15.4	debitage	QC	2			
64.15.5	flaked cobble	MC	1	136-144	31-44 W	47-60 N
64.15.6	flaked cobble	MQ	1	141-143	37-42 E	11-13 S
64.15.7	flake tool	QC	1			
64.16.1	debitage	C	13			
64.16.2	debitage	MC	1			
64.16.3	fire-cracked rock	MC	1			
64.17.1	debitage	C	7			
64.17.2	debitage	MC	1	166-168	25-30 E	20-24 N
64.17.3	flake tool	C	1			

*Items are listed in order by unit and increasing level depth within each unit.
[4]PRA = positive for bovine, rabbit
[5]PRA = positive for rabbit
[6]PRA = positive for rabbit
[7] Two flakes in catalogue number 64.14.4 (n=2) were mapped in place.

Table 36. *Continued*.

Cat. No.*	Description	Material	Lot No.	Depth (cm BD)	Coordinates*	
					E/W	N/S
64.18.1	debitage	C	2			
64.19.1	debitage	C	6			
64.19.2	debitage	V	1			
64.19.3	debitage	QC	1			
77.14.1	debitage	C	18			
77.14.2	debitage	V	1			
77.14.3	debitage	B	1			
77.14.4	non-tool core	MC	1	130-132	13-16 E	51-54 N
77.14.5	flake tool	C	1			
77.15.1	debitage	C	8			
77.15.2	flake tool	C	1	142-145	0 E	7-10 S
77.16.1	debitage	C	5	155	7-10 E	6-8 S
77.16.2	flake tool	C	1			
77.17.1	debitage	C	4			
77.17.2	flake tool	C	1			
77.17.3	flake tool	C	1			
77.17.4	debitage	MC	1	161	11-14 E	35-39 S
83.14.1	debitage	C	5			
83.14.2	debitage	QC	2			
83.15.1	debitage	C	3			
83.16.1	debitage	C	3			
100.14.1	debitage	C	13			
100.14.2	debitage	MC	1			
100.14.3	debitage	QC	1			
100.15.1	debitage	C	13			
100.15.2	debitage	B	1			
100.15.3	debitage	MC	1			
100.15.4	debitage	MC	1	144-145	35-37 E	33-35 N
100.15.5	edge-battered cobble	MC	1	141-143	21-26 W	26-34 S
100.16.1	debitage	C	7			
100.16.2	debitage	MC	1	155-157	39-42 W	11-14 S
100.16.3	debitage	MC	1	156-158	-1-4 E	12-13 S
100.17.1	debitage	C	3			
100.17.2	flake tool	MC	1	166-168	10-15 E	25-31 N
100.17.3	edge-battered cobble	MC	1	166-168	17-23 E	28-35 N
100.17.4	debitage	MC	1			
*Items are listed in order by unit and increasing level depth within each unit.						

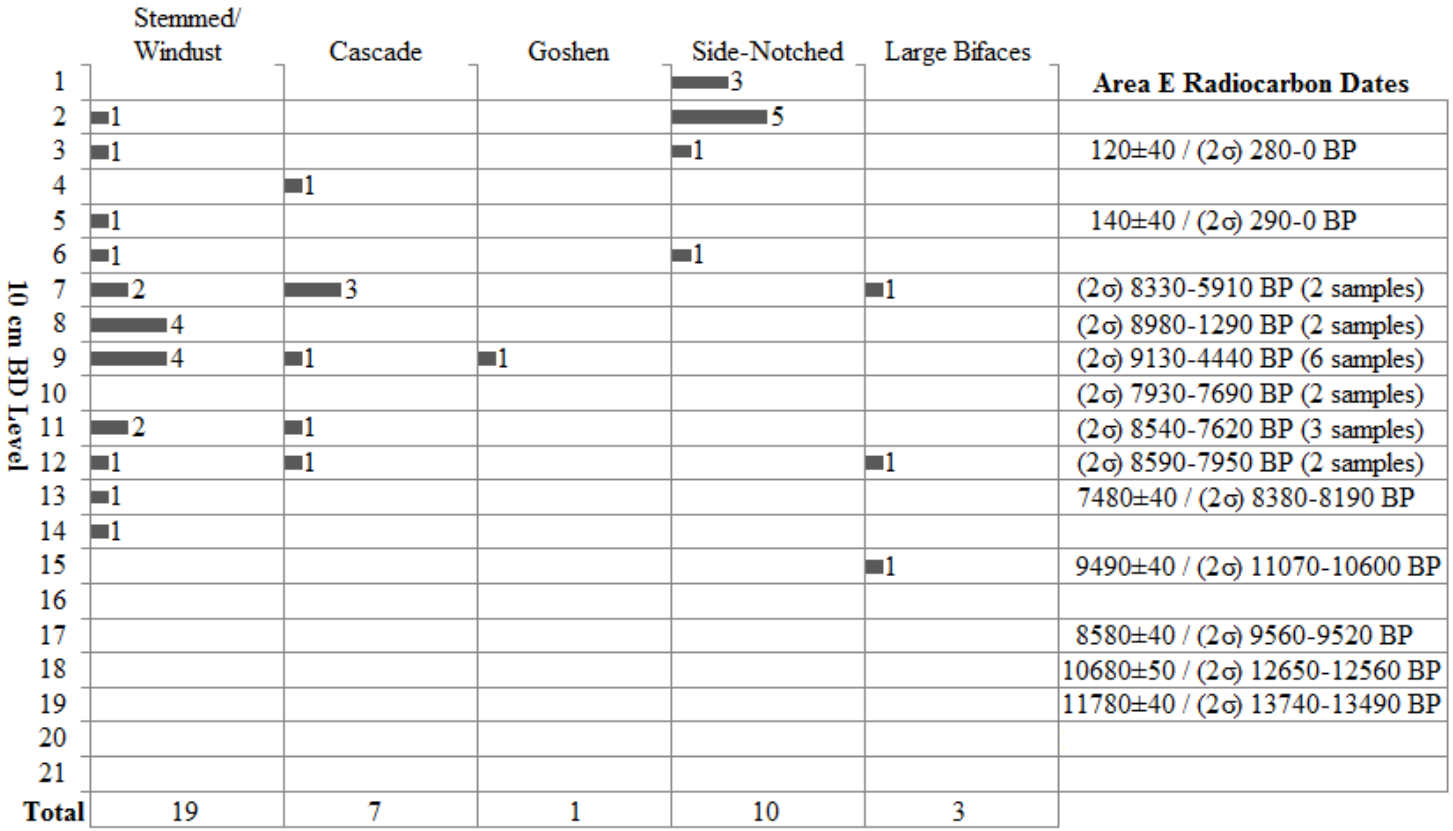


Figure 203. Stratigraphic distribution of radiocarbon dates and Area E hafted tools and large bifaces by 10 cm levels. Only items which are provenienced to a specific level depth are included. Non-provenienced items are: 1 side-notched point (2012misc.27); 1 large biface (2010misc.32).

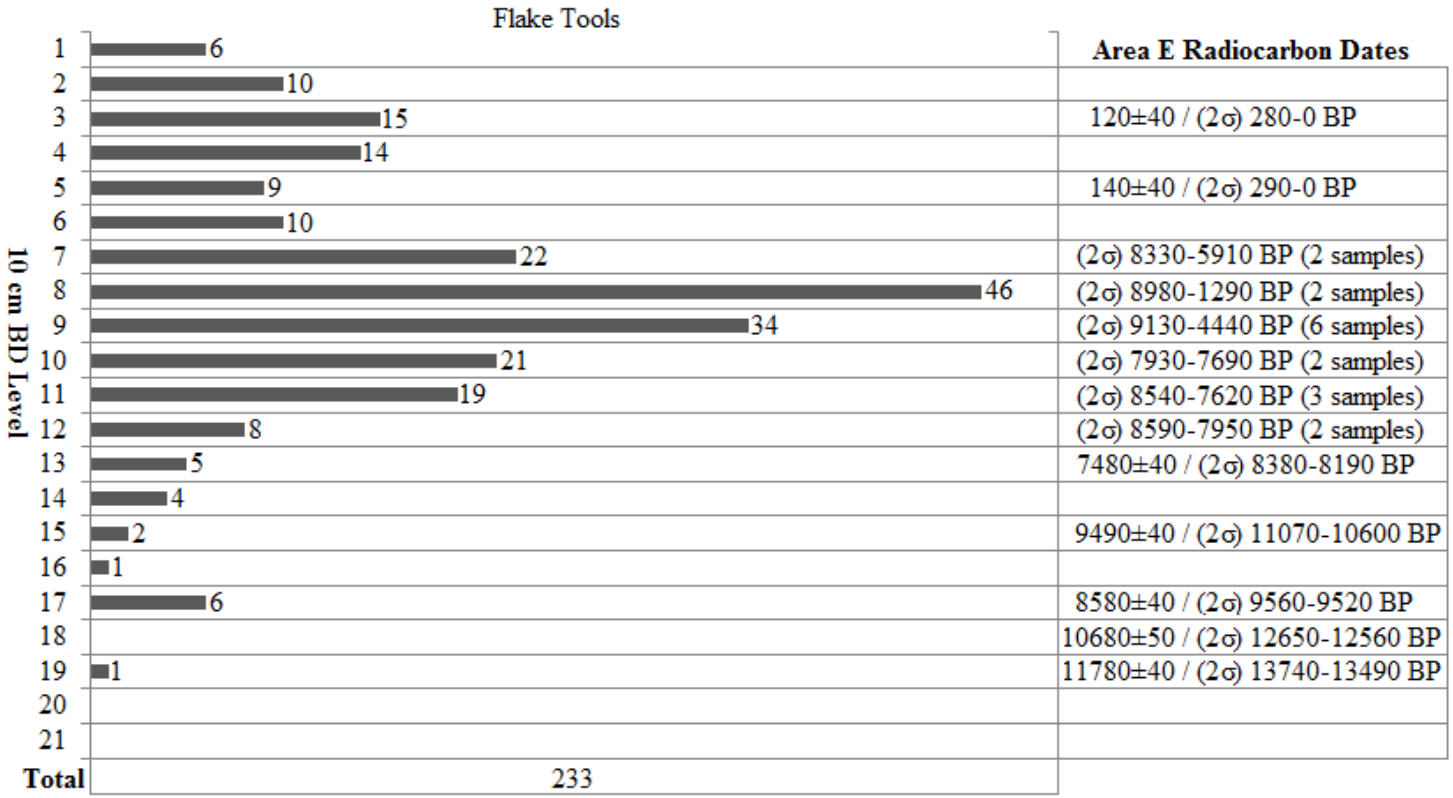
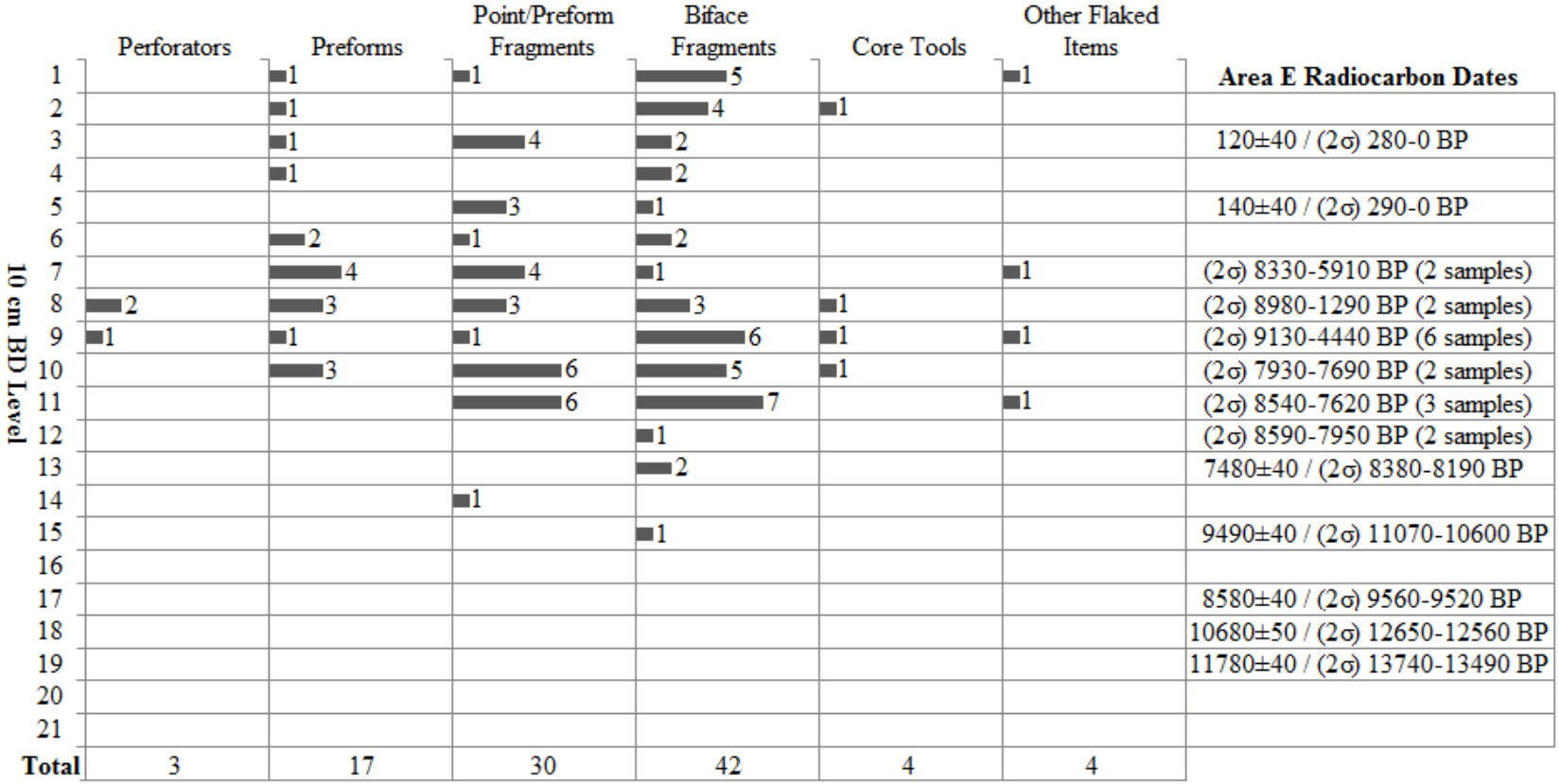


Figure 204. Stratigraphic distribution of radiocarbon dates and Area E flake tools by 10 cm levels. Only items which are provenienced to a specific level depth are included. Non-provenienced items are: 5 flake tools (2010misc.26, 2010misc.30, 2011misc.1, 2011misc.15, SB.11-15.3).



10 cm BD Level	Perforators	Preforms	Point/Preform Fragments	Biface Fragments	Core Tools	Other Flaked Items	Area E Radiocarbon Dates
1		1	1	5		1	
2		1		4	1		
3		1	4	2			120±40 / (2σ) 280-0 BP
4		1		2			
5			3	1			140±40 / (2σ) 290-0 BP
6		2	1	2			
7		4	4	1		1	(2σ) 8330-5910 BP (2 samples)
8	2	3	3	3	1		(2σ) 8980-1290 BP (2 samples)
9	1	1	1	6	1	1	(2σ) 9130-4440 BP (6 samples)
10		3	6	5	1		(2σ) 7930-7690 BP (2 samples)
11			6	7		1	(2σ) 8540-7620 BP (3 samples)
12				1			(2σ) 8590-7950 BP (2 samples)
13				2			7480±40 / (2σ) 8380-8190 BP
14			1				
15				1			9490±40 / (2σ) 11070-10600 BP
16							
17							8580±40 / (2σ) 9560-9520 BP
18							10680±50 / (2σ) 12650-12560 BP
19							11780±40 / (2σ) 13740-13490 BP
20							
21							
Total	3	17	30	42	4	4	

Figure 205. Stratigraphic distribution of radiocarbon dates and Area E perforators, preforms, point/preform fragments, biface fragments, core tools, and other flaked items by 10 cm levels. Only items which are provenienced to a specific level depth are included. Non-provenienced items are: 1 perforator (2012misc.26); 3 preforms (2010misc.28, 2011misc.14, 2012 misc.28); and 2 point/preform fragments (SB.1.5.3, SB.41-45.1).

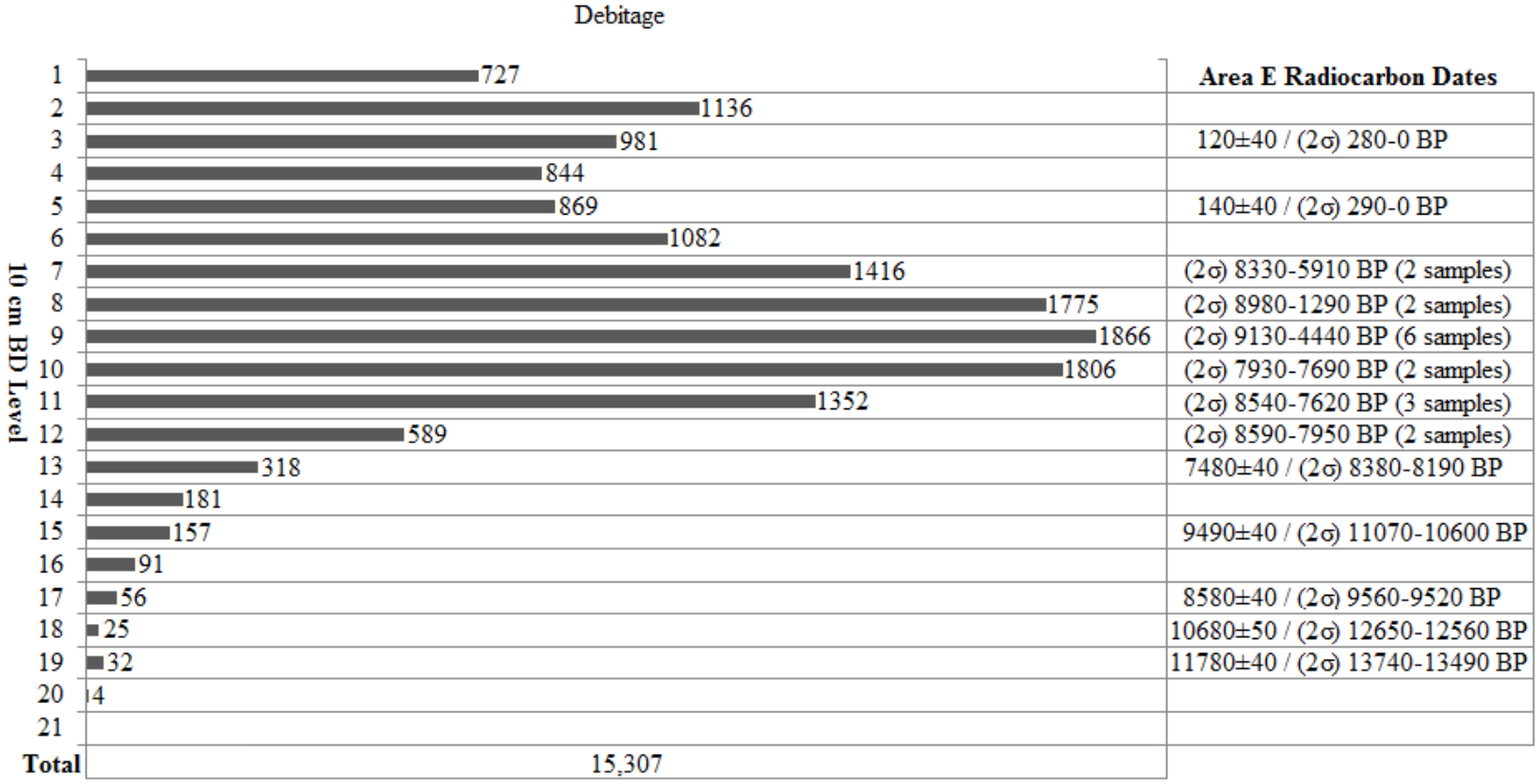


Figure 206. Stratigraphic distribution of radiocarbon dates and Area E debitage by 10 cm levels. Non-provenienced debitage (n=197) are not included.

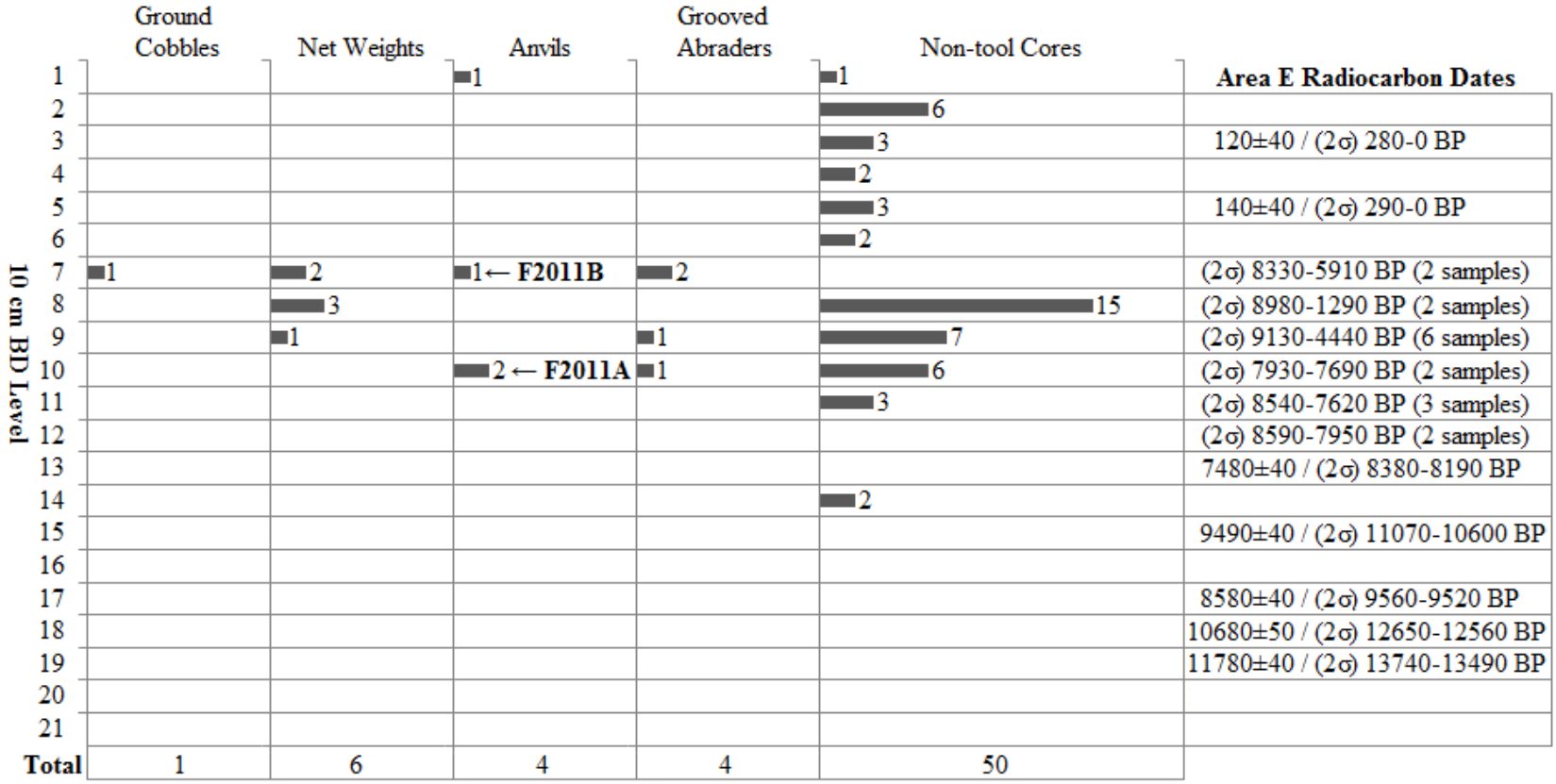


Figure 207. Stratigraphic distribution of radiocarbon dates and Area E ground cobbles, net weights, anvils, grooved abraders, and non-tool cores by 10 cm levels.

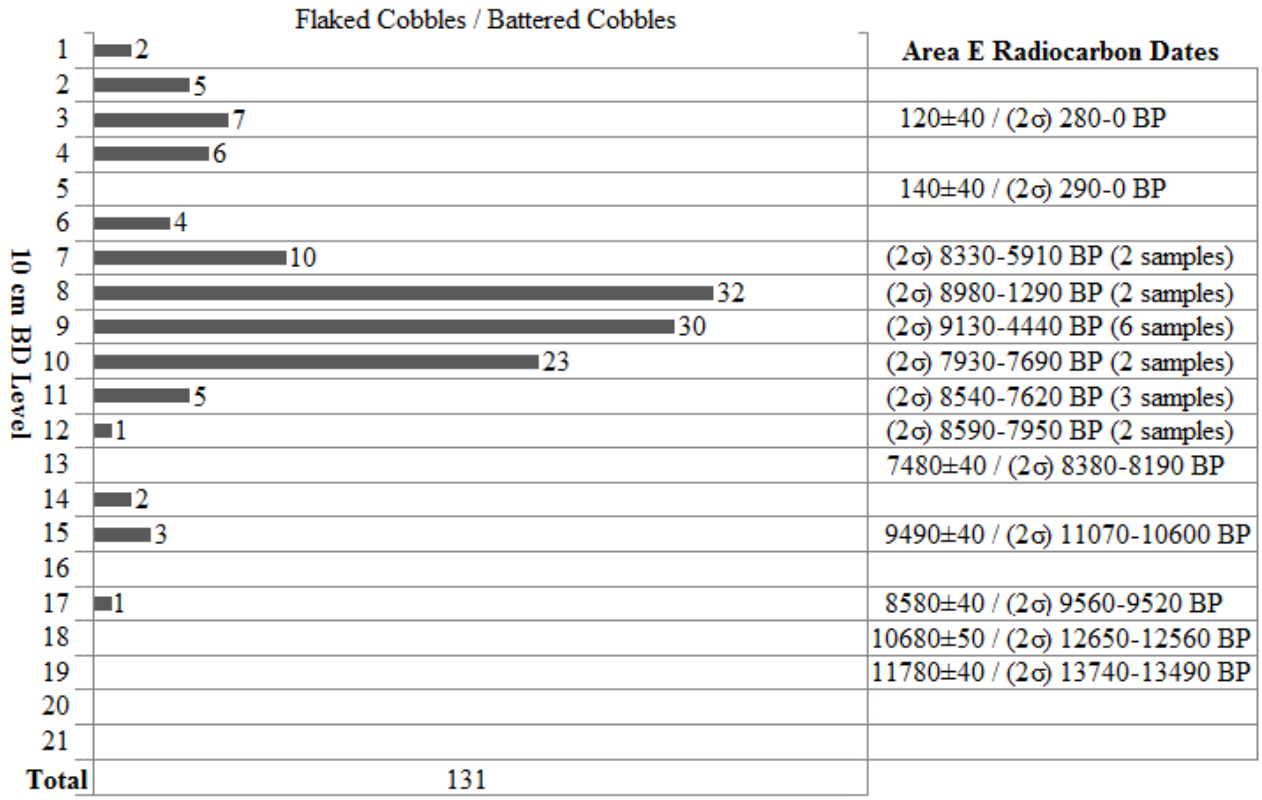


Figure 208. Stratigraphic distribution of radiocarbon dates and Area E flaked cobbles and battered cobbles by 10 cm levels.

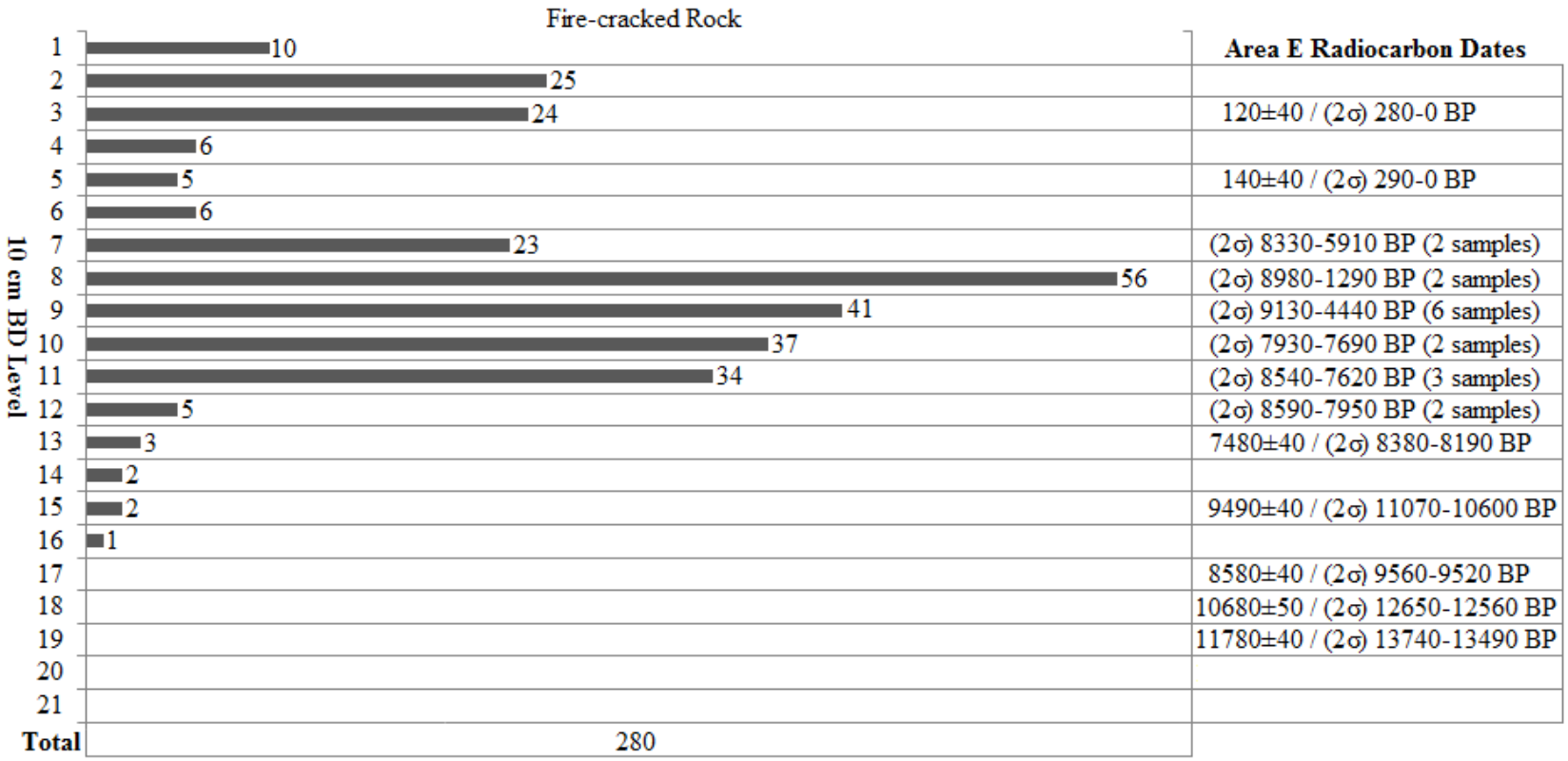


Figure 209. Stratigraphic distribution of radiocarbon dates and Area E fire-cracked rock by 10 cm levels.

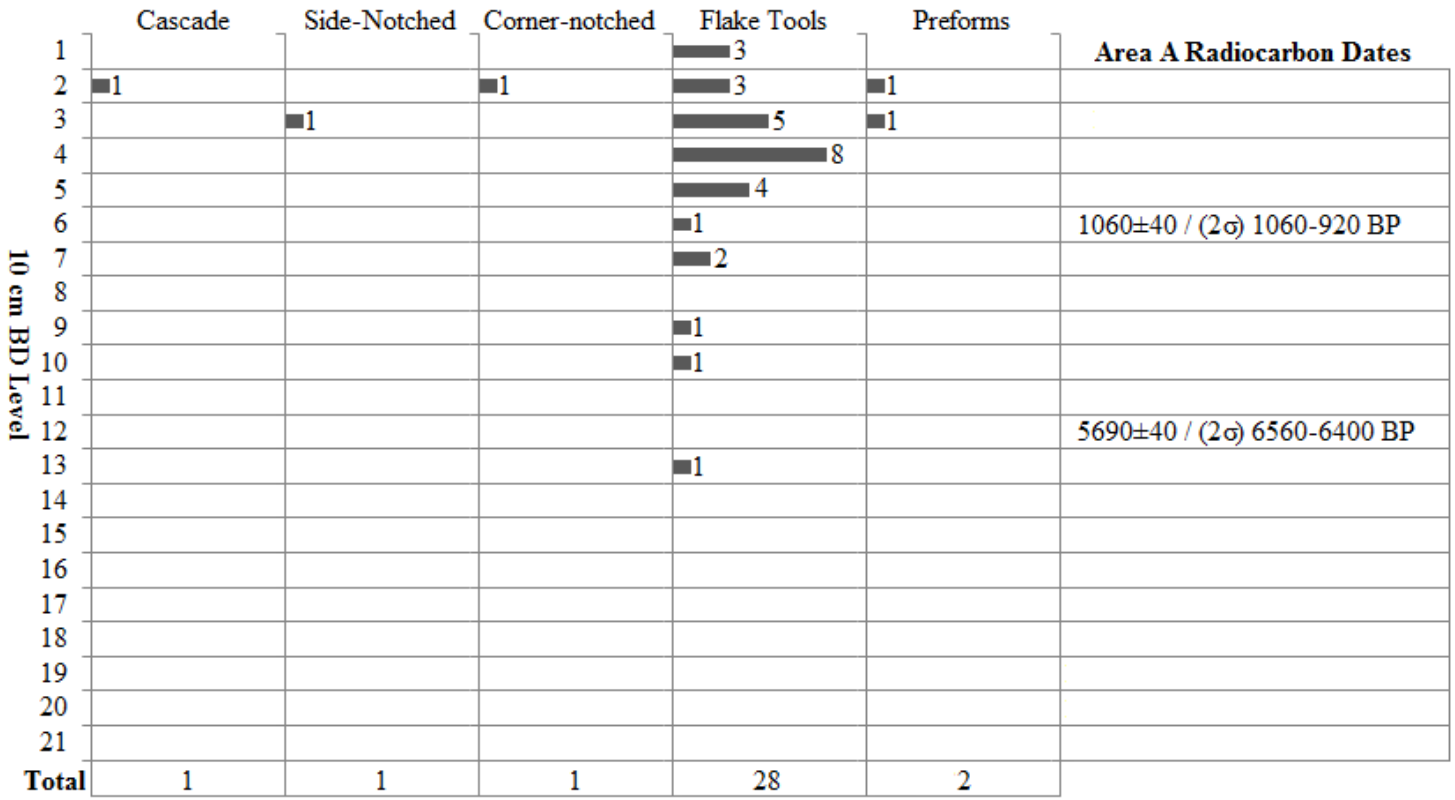


Figure 210. Stratigraphic distribution of radiocarbon dates and Area A hafted tools, flake tools, and preforms by 10 cm levels.

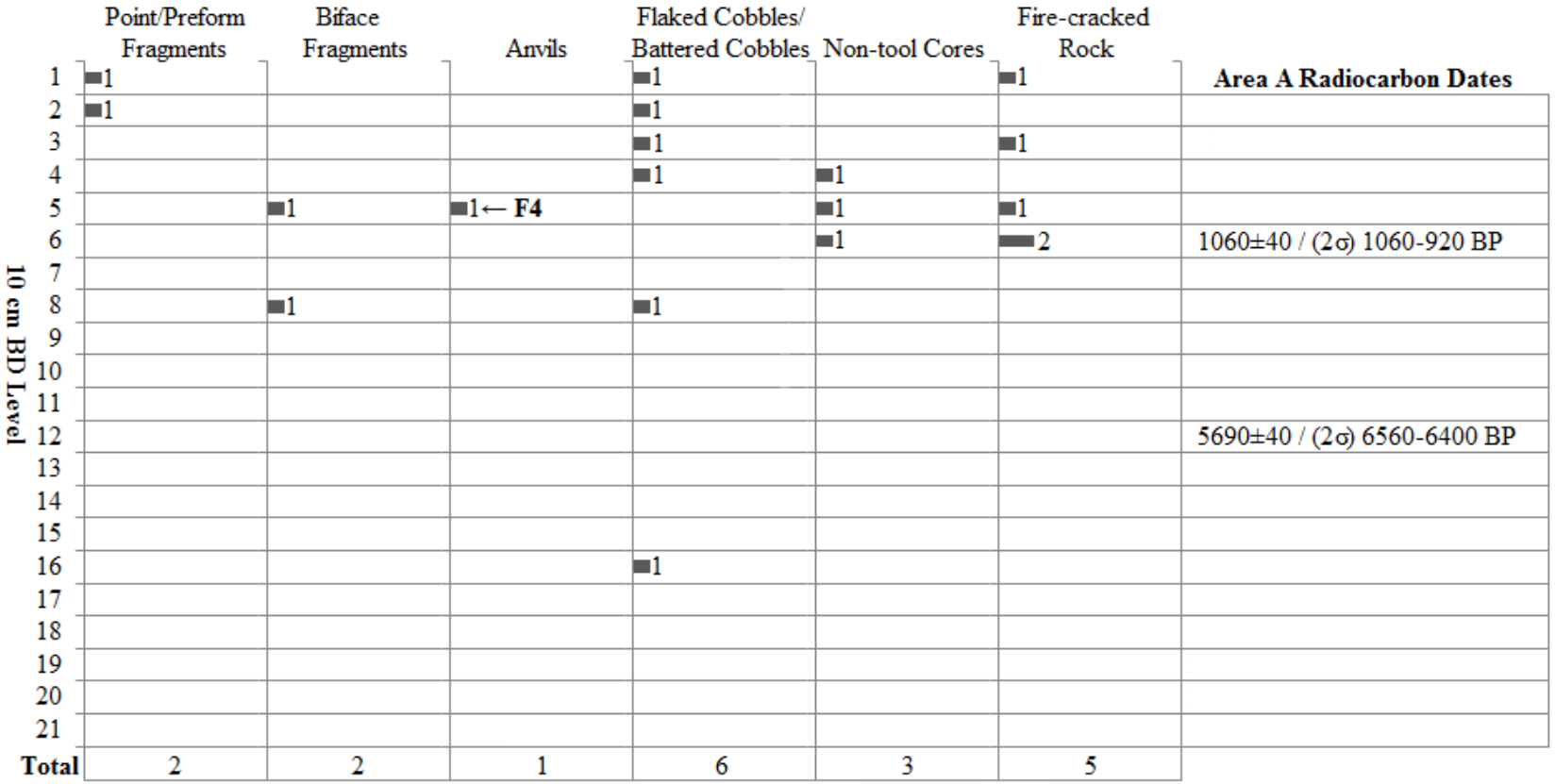


Figure 211. Stratigraphic distribution of radiocarbon dates and Area A point/preform fragments, biface fragments, anvils, flaked cobbles, battered cobbles, non-tool cores, and fire-cracked rock by 10 cm levels.

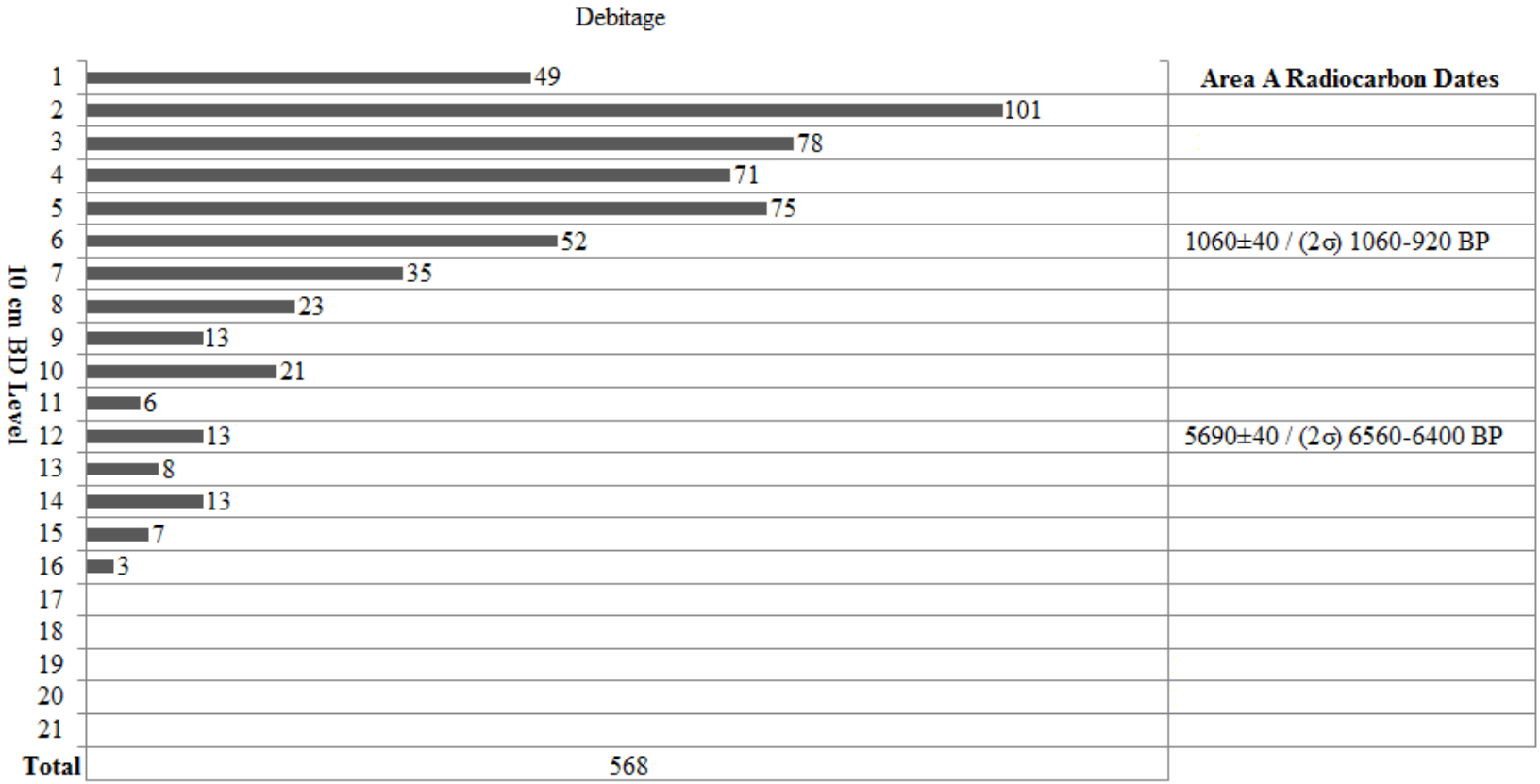


Figure 212. Stratigraphic distribution of radiocarbon dates and Area A debitage by 10 cm levels. Non-provenienced debitage (n=5) are not included.

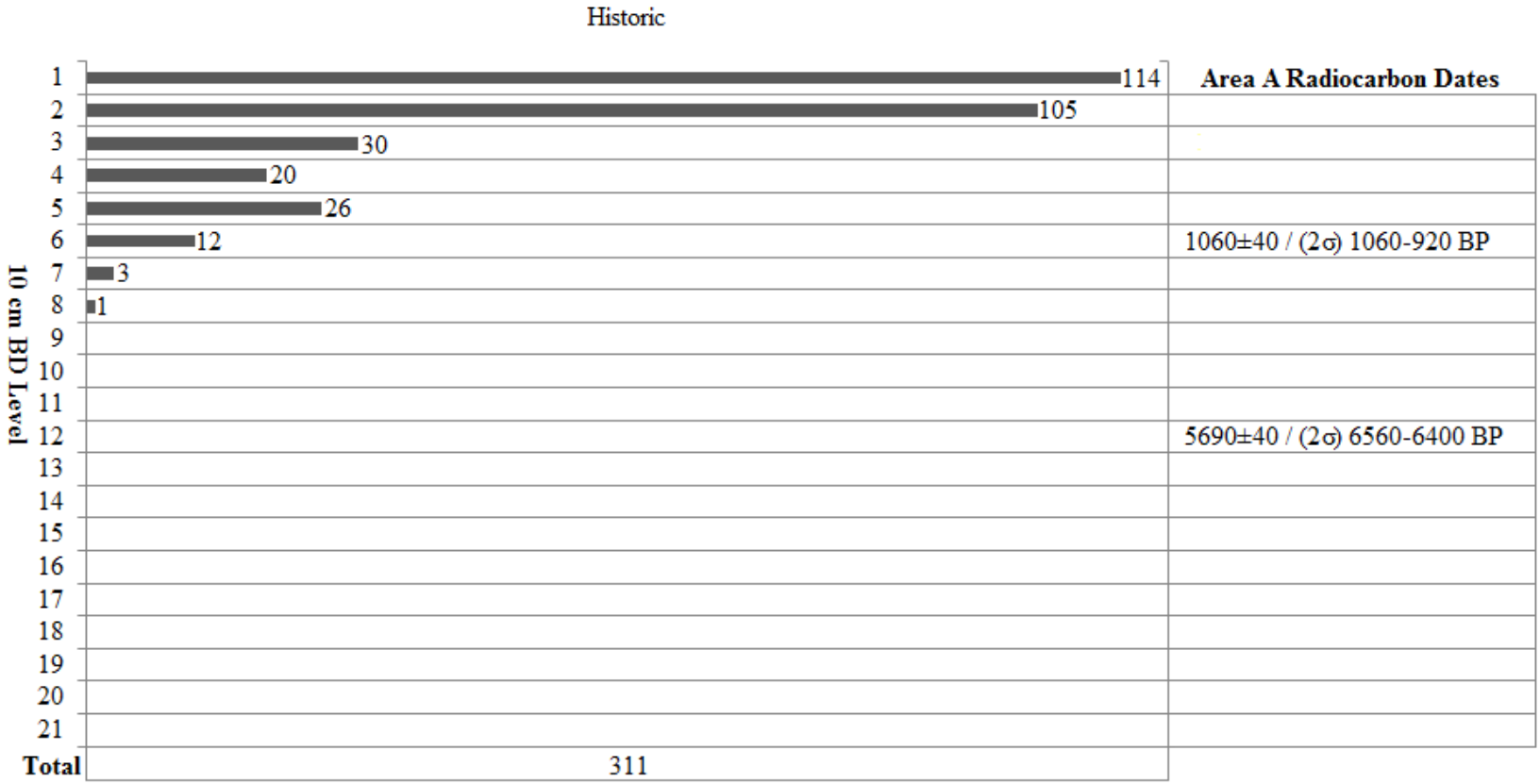


Figure 213. Stratigraphic distribution of radiocarbon dates and Area A historic artifacts by 10 cm levels. Only items which are provenienced to a specific level depth are included. Non-provenienced items are: 1 chalk fragment (2010misc.6); 1 styrofoam fragment (2010misc.10).

cal. BP) was obtained from Unit 59 (89 cm BD) near a Windust point base (62.8.d, 76 cm BD), a net weight (57.9.12), a grooved abrader (90.10.6), and a number of flake tools, fire-cracked rock, biface fragments, and debitage. An adjacent charcoal sample from 75.11.4 (100 cm BD) produced a somewhat later date of 7950-7790 cal. BP.

Nineteen charcoal samples from between 60 and 125 cm BD provided Cascade and Hatwai phase dates which extend from 8990 to 4440 cal. BP in Areas A and E (Figures 203-213). These correspond with the highest frequencies in most artifact classes as well as the densest cultural strata in Area E which generally occurred between 60 and 110 cm BD. It is important to note that due to the occurrence of a cobble layer in Area E, depths below 120 cm BD were accessed in only a few units consisting of nine Block C3 units (38, 42, 53, 56, 58, 64, 77, 83, and 100), one Block C1 unit (29) and two West units (102 and 108). This resulted in a limited sample size and relatively lower overall artifact frequency from these depths. Similarly, excavations in all but four units (8, 13, 18 and 23) in Area A were terminated at or before 110 cm BD, resulting in a limited testing sample from between 110 and 160 cm BD. Four dates, obtained from between 21 and 74 cm BD, span the late prehistoric and protohistoric periods, from 1380 and 280 ca. BP. These periods are well represented in both Areas A and E and associated artifacts include side-notched and corner-notched points, flake tools, cobble tools, and debitage.

Area A Features

Feature 1

The first feature identified during UI investigations at 10CW34 consisted of a portion of what is believed to be a historic mortar and concrete foundation exposed in the west wall of Unit 1 and the east wall of Unit 4 from approximately 7 to 9 cm BD (Figures

214-215, see Figure 92). Feature 1 was partially excavated and the surface surrounding Units 1 and 4 was probed to identify the boundaries, however, surface rocks prevented accurate boundary identification. This feature is likely related to the occupation of this area of the site by the ERA camp in the mid-1930s and it likely served as a foundation for a structure which was disassembled following the dispersal of the camp. No artifacts associated specifically with this feature were collected, though historic items were prevalent in the top twenty cm BS of both units.

Feature 2

Three oxidized cans were partially excavated in the northeast corner of Unit 5 from 57 to 96 cm BD (Figure 216, see Figure 95). Two of these protruded approximately 7 cm from the wall, while the third and deepest can was just visible at 96 cm BD. No artifacts specifically associated with Feature 2 were collected, though metal fragments occurred throughout the unit. Nails, glass and other historic items were also common in the top twenty cm. These cans were likely deposited during the ERA camp period and Feature 2 may represent a portion of a dump at this location.

Temporary Feature 3

Three medium sized rocks were encountered together in the northwest corner of Unit 9 between 19 and 35 cm BD (Figure 217). These were pedestaled for the duration of excavation and it was later determined that the cobbles were unmodified and that the arrangement was the result of natural deposition. The cobbles were not collected and the feature was abrogated. Of the artifacts recovered in Unit 9, none appeared to be associated with the three cobbles.



Figure 214. Photograph of the west wall of Unit 1 in Area A showing Feature 1, a concrete and mortar foundation from 7 to 9 cm BD. The southeast corner of Unit 4 is visible at top right. Photo by Lee Sappington, 21 June 2010.



Figure 215. Photograph of the east wall of Unit 4 in Area A showing Feature 1, a concrete and mortar foundation from 7 to 9 cm BD. The northwest corner of Unit 1 is visible at top right. Photo by Lee Sappington, 21 June 2010.



Figure 216. Photograph of the north wall of Unit 5 in Area A showing Feature 2 which consisted of three cans excavated in the northeast corner from 57 to 96 cm BD. Photo by Lee Sappington, 16 June 2010.



Figure 217. Photograph of the south wall of Unit 9 in Area A. The three pedestaled cobbles from 19 to 35 cm BD in the northwest corner comprised Feature 3 which was later terminated. Photo by Lee Sappington, 16 June 2010.

Feature 4

A fragmented and battered anvil (13.5.10) was encountered in Unit 13 at 49 cm BD and excavations in adjacent Units 8, 18, and 23 recovered two non-tool cobble cores, fire-cracked rock fragments, and concentrations of flake tools, debitage, and charcoal from between 30 and 56 cm BD (Figure 218, Tables 37-38). Flake tools and debitage were common throughout the cultural strata in these four units, however frequencies reached a maximum near the anvil, indicating that tool manufacture and repair was focused at this location. Game processing is also indicated by a positive reaction for



Figure 218. Photograph of the fragmented Feature 4 anvil excavated at 49 cm BD in Unit 13, Area A. The two largest fragments (13.5.10a and 13.5.10b) are shown, while a third smaller fragment (13.5.10c) was later recovered in the screen. A portion of the floor of Unit 8 is visible at right where excavations were completed at 160 cm BD. Photo by Lee Sappington, 23 June 2010.

rabbit on one flake tool (23.4.2) in the vicinity. A soil sample (13.5.11) collected from below the anvil was submitted for protein residue analysis and reacted positively with human antiserum. Human proteins may have been present in the soil as a result of injury during tool manufacture. It is also possible that this location was used to dispose of human waste either in prehistoric times or more recently. One charcoal sample taken from 58-60 cm BD provided a date of 1060-920 cal. BP, placing Feature 4 within the late prehistoric period.

Table 37. Units 8, 13, 18, 23 artifact distributions and Feature 4 (shaded), Area A.

Level	DBG	Flaked Tools			Cobble Tools			NT Cores	FCR	Total Prehistoric	Historic
		FT	P	BF	A	FC	BC				
1	19	1					1			21	50
2	32	1				1				34	37
3	29		1			1			1	32	9
4	17	8								25	
5	37	3			1			1	1	43	
6	23							1	1	25	
7	18									18	1
8	12			1			1			14	
9	11	1								12	
10	17	1								18	
11	6									6	
12	13									13	
13	8	1								9	
14	13									13	
15	7									7	
16	3						1			4	
Total	265	16	1	1	1	2	3	2	3	294	97

DBG = debitage; FT = flake tool; P = preform; BF = biface fragment; A = anvil; FC = flaked cobble; BC = battered cobble; NT = non-tool; FCR = fire-cracked rock.

Table 38. Feature 4 artifact inventory and mapped coordinates, 30-56 cm BD, Area A.

Cat. No.	Description	Material	Lot No.	Depth (cm BD)	Coordinates[1]	
					E/W	N/S
8.4.1	debitage	C	5	-	-	-
8.4.2	flake tool	MC	1	30-31	0-5 W	14-18 S
8.4.3	flake tool	MC	1	37-39	33-41 W	29-35 N
8.4.4	flake tool	C	1	31-32	0-3 W	46-48 S
8.4.5	flake tool	MC	1	-	-	-
13.4.1	debitage	C	2	-	-	-
13.4.2	flake tool	MC	1	32-33	20-32 E	23-28 N
13.4.3	flake tool	MC	1	36-39	9-17 E	42-45 S
13.4.4	flake tool	MC	1	35-40	16-21 E	18-26 N
18.4.1	debitage	C	5	-	-	-
18.4.2	debitage	MC	1	-	-	-
23.4.1	debitage	C	3	-	-	-
23.4.2	flake tool	C	1	37-40	81-83 E	38-41 S
23.4.3	debitage	MC	1	34-36	83-84 E	78-81 S
8.5.1	debitage	C	4	-	-	-

[1]Proveniences were mapped within each 1 x 1 m unit, and coordinates correspond to distance from the north, south, east, or west.

Table 38. *Continued*.

Cat. No.	Description	Material	Lot No.	Depth (cm BD)	Coordinates E/W	Coordinates N/S
8.5.2	flake tool	MC	1	41-40	37-44 W	0-4 N
8.5.3	flake tool	MC	1	44	59-63 W	36-42 S
13.5.1	debitage	C	6	-	-	-
13.5.2[2]	debitage	MC	2	48	14-16 E	49-51 N
13.5.4	fire-cracked rock	MC	1	41-47	36-42 E	11-13 N
13.5.5	flake tool	MC	1	-	-	-
13.5.10a	anvil fragment	G	1	44-49	11-36 E	30-64 N
13.5.10b	anvil fragment	G	-	44-49	2-11 E	23-49 S
13.5.10c[3]	anvil fragment	G	-	-	-	-
18.5.1	debitage	C	10	-	-	-
18.5.3	debitage	QC	1	-	-	-
18.5.4	debitage	B	1	-	-	-
23.5.1[4]	debitage	C	9	46	64-66 E	6-7 N
23.5.2	debitage	V	1	-	-	-
23.5.3	debitage	QC	2	-	-	-
23.5.4	non-tool core	MC	1	43-48	10-21 E	15-28 N
23.5.5	debitage	MC	1	-	-	-
8.6.1	debitage	C	5	-	-	-
13.6.1	debitage	C	5	-	-	-
13.6.2	debitage	V	1	-	-	-
13.6.3	debitage	MC	1	-	-	-
13.6.4	debitage	MC	1	51	35-37 W	26-29 N
13.6.5	fire-cracked rock	MC	1	55-56	24-33 E	57-64 N
18.6.1	debitage	C	2	-	-	-
18.6.2	debitage	V	1	-	-	-
18.6.3	debitage	B	1	-	-	-
18.6.4	non-tool core	MC	1	-	-	-
23.6.1	debitage	C	3	-	-	-
23.6.2	debitage	V	1	-	-	-
23.6.3	debitage	B	1	-	-	-
23.6.4	debitage	C	1	-	-	-

[2]One flake in catalogue number 13.5.2 (n=2) was mapped in place.
[3]13.5.10c was recovered in the screen.
[4]One flake in catalogue number 23.5.1 (n=8) was mapped in place.

Area E Features

Feature 2011A

Two anvils (53.10.7 and 53.10.8) surrounded by battered and flaked cobbles, fire-cracked rock, and charcoal deposits were excavated in Units 53, 56, 58, 64, 68, and 69 between 90 and 100 cm BD (Figure 219; Tables 39-40). A non-tool core and a number of flaked tools including flake tools (n=2), a point/preform fragment, a biface fragment, and a core tool were also recovered from within the feature area. Apart from a peak in debitage and the first appearances of biface and point/preform fragments in these units, the most distinguishing aspect of F2011A is a sharp increase in battered cobbles. This, in addition to the presence of two cores, suggests that the vicinity around the anvils served as a workstation for the production and repair of tools. While flake tools are common throughout the cultural strata of the feature units, this particular location may have functioned as a workstation during several events, as implied by the presence of two flaked cobbles and an increase in point/preform and biface fragments, flake tools, and a Windust point base at depths below F2011A. One soil sample (53.10.17), collected from beneath one anvil (53.10.7), was submitted for protein residue analysis and reacted positively with rabbit antiserum, indicating that game processing also took place. A charcoal sample collected from the feature area (58.10.6) produced a date of 7920-7690 cal. BP for F2011A, placing it in the early Cascade phase.



Figure 219. Photograph of Feature 2011A in Area E at 100 cm BD in Units 53, 56, 64, 68, and 69. The labeled anvils are surrounded by battered and flaked cobbles as well as a number of large and apparently unmodified boulders, all of which were collected. Unit 58 at bottom left has been excavated to boulders at 200 cm BD. Photo by Lee Sappington, 6 July 2011.

Table 39. Units 53, 56, 58, 64, 68, and 69 artifact distributions and Feature 2011A (shaded), Block C3, Area E.

Level	DBG	Flaked Tools						Cobble Tools			NT Cores	FCR	Total Prehistoric	Historic/ Recent
		HT	LB	FT	PF	BF	CT	A	FC	BC				
1	5												5	
2	14	W					1					1	17	1
3	21											1	22	
4	17			1								1	19	
5	12			1									13	
6	41												41	
7	51			2									53	
8	70			2									72	
9	131			4		1				1		2	139	
10	209			2	1	1	1	2	2	12	1	8	239	
11	130											1	131	
12	126			2								2	130	
13	142			3		2							147	
14	88	W		1	1				1		1	2	95	
15	89		1	1		1			1			3	96	
16	55											1	56	
17	36			3									39	
18	22												22	
19	29			1									30	
20	4												4	
21														
Total	1292	2	1	23	2	5	2	2	4	13	2	22	1370	1

DBG = debitage; HT = hafted tool; W = Windust; C = Cascade; LB = large biface; FT = flake tool; PF = point/preform fragment; BF = biface fragment; CT = core tool; A = Anvil; FC = flaked cobble; BC = battered cobble; NT = non-tool; FCR = fire-cracked rock.

Table 40. Feature 2011A artifact inventory and mapped coordinates, 90-100 cm BD, Block C3, Area E.

Cat. No.	Description	Material	Lot No.	Depth (cm BD)	Coordinates[1] E/W	N/S
53.10.1	debitage	C	41	-	-	-
53.10.3	debitage	A	1	-	-	-
53.10.4	battered cobble	G	1	100	35-48 E	75-83 N
53.10.5	battered cobble	G	1	100	34-45 E	83-89 N
53.10.6	battered cobble	MQ	1	100	37-50 E	89-100 N
53.10.7	anvil	MC	1	100	66-90 E	81-107 N
53.10.8	anvil	G	1	89-93	0-15 E	71-90 N
53.10.9	non-tool core	MC	1	90-94	29-36 E	26-38 N
53.10.10	fire-cracked rock	MC	1	90-93	16-22 E	26-31 S
53.10.14	flake tool	C	1	-	-	-
56.10.1	debitage	C	36	-	-	-
56.10.2	debitage	V	2	-	-	-
56.10.3	debitage	B	1	-	-	-
56.10.4	cobble debitage	MC	1	-	-	-
56.10.7	battered cobble	MC	1	100	18-40 W	42-57 S
56.10.8	flaked cobble	MC	1	83-91	24-40 W	19-44 N
56.10.9	fire-cracked rock	MC	1	93-95	29-34 W	61-66 S
56.10.10	debitage	MC	1	87-98	-2-5 E	9-11 S
56.10.11	biface fragment	C	1	-	-	-
58.10.1	debitage	C	26	-	-	-
58.10.2	debitage	V	1	-	-	-
58.10.2a	debitage	V	1	-	-	-
58.10.3	cobble debitage	MC	1	-	-	-
58.10.4	fire-cracked rock	MC	1	-	-	-
58.10.5	fire-cracked rock	G	1	97-99	33-40 E	39-43 S
64.10.1	debitage	C	54	-	-	-
64.10.2a	debitage	V	1	-	-	-
64.10.2b	debitage	V	1	-	-	-
64.10.3	debitage	B	2	-	-	-
64.10.4	debitage	QC	2	-	-	-
64.10.5	debitage	MC	4	-	-	-
64.10.10	battered cobble	MC	1	88-93	17-24 W	40-52 S
64.10.11	battered cobble	G	1	89-91	90-105 W	4-20 S
64.10.12	battered cobble	G	1	91-97	51-64 W	48-60 N
64.10.13	battered cobble	G	1	86-93	24-34 W	48-62 S
64.10.14[2]	fire-cracked rock	MC	2	93-94 93-96	3-7 E 93-102 W	24-25 S 43-49 N

[1]Proveniences were mapped within each 1 x 1 m unit, and coordinates correspond to distance from the north, south, east, or west.

[2] Two items in catalogue number 64.10.14 (n=2) were mapped in place.

Table 40. *Continued*.

Cat. No.	Description	Material	Lot No.	Depth (cm BD)	Coordinates E/W	Coordinates N/S
64.10.15	FCR	MQ	1	90-96	0-9 W	43-50 N
64.10.16	core tool	MC	1	87-91	34-50 W	43-57 N
64.10.e	point/preform frag.	C	1	93-94	3-7 E	24-25 S
68.10.1	debitage	C	9	-	-	-
68.10.2	debitage	B	1	-	-	-
68.10.3	cobble debitage	MC	2	-	-	-
68.10.5	flaked cobble	MC	1	86-92	34-43 E	37-50 N
68.10.6	fire-cracked rock	MC	1	81-91	29-37 E	9-18 N
68.10.7	flake tool	MC	1	89-91	22-29 E	9-17 N
69.10.1	debitage	C	20	-	-	-
69.10.2	debitage	QC	1	-	-	-
69.10.4	battered cobble	MC	1	85-91	25-39 E	24-34 S
69.10.5	battered cobble	MC	1	89-96	30-39 E	13-24 S
69.10.6	battered cobble	MC	1	87-99	19-32 E	12-29 S
69.10.7	battered cobble	MC	1	71-80	11-31 E	35-55 S

Feature 2011B

One broken anvil (71.7.9) was excavated with a number of tools including flake tools (n=14), flaked (n=2) and battered cobbles (n=4), non-tool cores (n=4), preforms (n=2), a Windust point base, and a biface fragment between 60 and 80 cm BD in Units 52, 59, 71, and 73 (Figure 220-221, Tables 41-42). Fire-cracked rock fragments (n=7) and charcoal deposits were also encountered in the feature area. As with Feature 2011A, a concentration of flake tools and cobble tools, and the presence of a grooved abrader and a Windust point base, indicate that the vicinity served as a workspace where tools were produced and repaired. An additional similarity between the two features is demonstrated by a positive reaction for rabbit antiserum with a soil sample collected below the F2011B anvil. A charcoal sample (52.8.3) collected from F2011B provided a late Windust phase date of 8980-8600 cal. BP, approximately one thousand years prior to F2011A.



Figure 220. Photograph of Feature 2011B at 70 cm BD in Units 73 (left) and 71 (right) with the feature anvil (labeled) and fire-cracked rock fragments pedestaled. Excavations in Units 59 (top left) and 52 (top right) have been excavated to 120 cm BD. Photo by author, 6 July 2011.



Figure 221. Photograph of Feature 2011B at 80 cm BD in Units 73 and 71. Battered cobbles, fire-cracked rock fragments, non-tool cores are concentrated at center near the edge of the north wall of both units. Photo by author, 7 July 2011.

Table 41. Units 52, 59, 71, and 73 artifact distributions and Feature 2011B (shaded), Block C9, Area E.

Level	DBG	Flaked Tools					Cobble Tools			GA	NT Cores	FCR	Total Prehistoric
		HT	FT	P	PF	BF	A	FC	BC				
1	48		1		1							1	51
2	57		1			1							59
3	41												41
4	42		3			1		1				1	48
5	46		1										47
6	87		1										88
7	122		1	1			1			1		3	129
8	100	W	13	1		1		2	4		4	4	130
9	102		7			2			1			3	115
10	79		2						1			3	85
11	92		1					1				2	96
12	50												50
Total	866	1	31	2	1	5	1	4	6	1	4	17	939

DBG = debitage; HT = hafted tool; W = Windust; FT = flake tool; P = preform; PF = point/preform fragment; BF = biface fragment; A = Anvil; FC = flaked cobble; BC = battered cobble; GA = grooved abrader; NT = non-tool; FCR = fire-cracked rock.

Table 42. Feature 2011B artifact inventory and mapped coordinates, 60-80 cm BD, Block C9, Area E.

Cat. No.	Description	Material	Lot No.	Depth (cm BD)	Coordinates[1]	
					E/W	N/S
52.7.1	debitage	C	13			
52.7.2	debitage	B	1			
52.7.3	debitage	QC	1			
52.7.4	debitage	MC	5			
52.7.5	flake tool	C	1			
52.8.1	debitage	C	21			
52.8.2	debitage	QC	1			
52.8.3	debitage	MC	6			
52.8.5	non-tool core	MC	1	67-71	20-29 E	76-87 S
52.8.6	battered cobble	MC	1	80	4-5 E	38 N
52.8.7	non-tool core	MC	1	78-80	26-40 E	37-45 S
52.8.8	fire-cracked rock	MC	1	78-80	10-18 E	29-30 S
52.8.9	flaked cobble	MC	1	77-80	29-28 E	31-38 S
52.8.a	flake tool	C	1	80	4-5 E	38 N
52.8.10	preform	MC	1	73-75	10-20 E	81-85 S
52.8.11	Windust point base	MC	1	72	17-18 W	22 N
52.8.12	biface fragment	MC	1	78	27-30 E	77-79 S

[1]Proveniences were mapped within each 1 x 1 m unit, and coordinates correspond to distance from the north, south, east, or west.

Table 42. *Continued*.

Cat. No.	Description	Material	Lot No.	Depth (cm BD)	Coordinates E/W	Coordinates N/S
52.8.13	flake tool	MC	1	76	6-10 E	87-91 S
52.8.14	flake tool	MC	1	71	19-21 E	37-40 S
52.8.15	flake tool	MC	1	77	50-54 E	7-11 N
52.8.16	flake tool	MC	1	71-72	36-37 W	19-23 N
52.8.17	flake tool	MC	1	80	63-66 E	28-31 N
52.8.18	flake tool	MC	1			
59.7.1	debitage	C	24			
59.7.2	debitage	V	2			
59.7.3	debitage	B	3			
59.7.4	debitage	A	1			
59.7.5	debitage	QC	2			
59.7.6	debitage	MC	10			
59.7.7	fire-cracked rock	MC	1	66	47-50 E	17-21 N
59.8.1	debitage	C	17			
59.8.2	debitage	V	4			
59.8.3	debitage	O	1			
59.8.4	debitage	B	1			
59.8.5	debitage	QC	1			
59.8.6	debitage	MC	4			
59.8.7	flake tool	C	1	74	12-14 W	46-49 S
59.8.8	flaked cobble	G	1	70-75	26-33 E	38-48 S
71.7.1[2]	debitage	C	20	61	30-33 W	48-50 N
71.7.2	debitage	V	1			
71.7.3	debitage	B	2			
71.7.4	debitage	QC	1			
71.7.5	debitage	MC	9			
71.7.6	fire-cracked rock	G	1			
71.7.a	shaft abrader	SND	1			
71.7.9	anvil	G	1	62-65	29-50 W	16-35 S
71.8.1	debitage	C	8			
71.8.2	debitage	V	1			
71.8.3	debitage	QC	2			
71.8.4	debitage	B	1			
71.8.5	debitage	MC	4			
71.8.6	non-tool core	MC	1	73-80	6-19 W	3-10 S
71.8.7	non-tool core	MC	1	78	12-22 W	-2-9 S
71.8.8	battered cobble	MC	1	76-80	42-49 W	8-22 N
71.8.9	flake tool	MC	1	73	9-16 W	2-4 S
73.7.1	debitage	C	18			
73.7.2	debitage	V	2			

[2]One flake in catalogue number 71.7.2 (n=20) was mapped in place.

Table 42. *Continued*.

Cat. No.	Description	Material	Lot No.	Depth (cm BD)	Coordinates E/W	Coordinates N/S
73.7.2a	debitage	V	1			
73.7.3	debitage	B	2			
73.7.4	debitage	QC	1			
73.7.5	debitage	MC	4			
73.7.9	fire-cracked rock	MQ	1	68-70	36-42 E	20-25 S
73.7.10	point/preform frag.	C	1	62	32 E	4-6 S
73.8.1	debitage	C	11			
73.8.2	debitage	V	1			
73.8.3	debitage	QC	1			
73.8.4	debitage	MC	14			
73.8.5	battered cobble	MC	1	69-76	31-53 E	29-36 S
73.8.6	battered cobble	MC	1	71-77	14-18 W	40-22 S
73.8.7	fire-cracked rock	MQ	1	71-80	19-34 E	9-19 S
73.8.8	fire-cracked rock	MC	1	66-73	23-33 E	27-36 S
73.8.9	fire-cracked rock	G	1			
73.8.10	flake tool	MC	1	65-71	32-37 E	42-47 S
73.8.11	flake tool	MC	1	76	0-3 W	8-9 N
73.8.12	flake tool	MC	1	73-76	0-3 E	39-44 N
73.8.13	flake tool	C	1			

10. LABORATORY RESULTS

Obsidian and Vitrophyre Sourcing

Between 2010 and 2012, a total of seventy-five obsidian and vitrophyre items recovered from 10CW34 in Areas A (n=10), B (n=3), D (n=2), and E (n=60) were submitted to Northwest Research Obsidian Studies Laboratory (NWROSL) for source identification using x-ray fluorescence analysis (Appendix 5, Table 43). Sixty items were sourced to locations in northwestern Montana (n=3, 5%), central, eastern, and southern Oregon (n=24, 40%), and southern Idaho (n=33, 55%). Of the submitted items, six were vitrophyre flakes which could not be identified with a source, while two vitrophyre and seven obsidian flakes were too small for the analysis. Timber Butte, in southern Idaho (n=25, 37.9%) was identified with the highest number of items, including one Windust point base (49.9.a) which was the only obsidian tool recovered from 10CW34. Additional southern Idaho sources consisted of Bear Gulch (n=3, 4.5%) and Big Southern Butte (n=5, 8%). The second most frequently identified source at 10CW34 was Gregory Creek (n=13, 19.7%) in eastern Oregon. Indian Creek (n=9, 13.6%) was also common, while additional Oregon sources included Whitewater Ridge (n=1, 1.5%), and Glass Buttes (n=1, 1.5%). Three vitrophyre flakes were identified with Montana Creek, a vitrophyre source in northwestern Montana approximately 25 miles from 10CW34.

The stratigraphic distribution of obsidian in Area E generally follows the overall cultural material distribution which is highest in density between 60 and 110 cm BD (Figures 222-223). Trade in and use of toolstone from sources such as Big Southern Butte, Bear Gulch, Glass Buttes, and Whitewater Ridge appear to have occurred primarily within this range, while Gregory Creek, Indian Creek, and Timber Butte are

Table 43. 10CW34 obsidian and vitrophyre NWORSL submission inventory.

Recovery Area	Cat. No.*	WT (g)	Material	NWORSL Result
E Central	2010misc.42a (np)[1]	0.03	V	too small, unlisted
E Stockpile	SB.21-25.2 (np)	0.02	O	Gregory Creek
E Stockpile	SB.31-35.2 (np)	0.03	O	Indian Creek
D	1981TP-1.4.1	0.08	O	Indian Creek
D	1981TP-1.5.2	0.08	O	Gregory Creek
B	T2.2.1	1.51	V	Unidentified
B	T2.3.1	0.19	V	Montana Creek
A	3.1.2a	9.13	V	Unidentified
A	4.2.2	0.02	O	too small, unlisted
A	5.7.2	0.08	O	Indian Creek
A	8.1.2a	0.06	V	Montana Creek
A	8.10.2	0.29	V	Unidentified
A	13.11.2	0.1	V	Montana Creek
A	13.12.2	0.14	V	Unidentified
B	16.12.1	0.06	V	too small, unlisted
A	18.3.2	0.01	O	Indian Creek
E Central	19.9.3	0.03	O	Timber Butte
E Central	20.1.2	0.03	O	Indian Creek
E Central	20.9.2a	0.02	V	Unidentified
E West	21.2.3	0.14	O	Timber Butte
A	22.4.2a	0.01	O	too small, unlisted
A	22.4.2b	0.01	O	too small, unlisted
E Central	25.8.5a	0.03	O	Glass Buttes
E Central	25.8.5b	0.01	O	too small, unlisted
E Central	25.9.2	0.01	V	Unidentified
E Central	29.2.4	0.46	O	Gregory Creek
E Central	30.7.3	0.06	O	Timber Butte
E Central	30.9.2	0.42	O	Big Southern Butte
E Central	35.11.2	0.03	O	Gregory Creek
E Central	36.8.9	0.02	O	Timber Butte
E Central	36.10.7	0.12	O	Gregory Creek
E East	39.10.2	0.13	O	Indian Creek
E Central	46.8.2	0.01	O	Timber Butte
E Central	48.2.2	0.06	O	Gregory Creek
E Central	48.4.2	0.02	O	Indian Creek
E Central	48.9.2	0.17	O	Timber Butte
E Central	49.9.a	1.56	O	Timber Butte
E Central	50.7.2	0.03	O	Timber Butte
E Central	50.10.2	0.01	O	Timber Butte
E Central	53.4.2	0.03	O	Timber Butte

*Items are listed in order by unit and increasing level depth; non-provenienced (np) items are listed first.

[1]Screened from Units 20 and 25, level 10.

Table 43. *Continued*.

Recovery Area	Cat. No.*	WT (g)	Material	NWORSL Result
E Central	57.9.2	0.03	O	Timber Butte
E Central	59.8.3	0.04	O	Bear Gulch
E Central	60.8.2	0.03	O	Gregory Creek
E Central	64.3.2	0.02	O	Timber Butte
E Central	67.11.2	0.04	O	Timber Butte
E Central	68.7.4	0.01	O	Timber Butte
E Central	73.11.2	0.02	O	Timber Butte
E Central	74.8.2a	0.01	O	Timber Butte
E Central	74.8.2.b	0.01	O	too small, unlisted
E Central	80.2.2	0.03	O	Gregory Creek
E Central	84.12.2	0.12	O	Timber Butte
E Central	85.4.2	0.01	O	too small, unlisted
E Central	86.8.2	0.01	O	Timber Butte
E Central	87.6.2	0.05	O	Indian Creek
E Central	89.6.2	0.43	O	Bear Gulch
E Central	91.11.2	0.01	O	Timber Butte
E Central	92.9.2	0.02	O	Whitewater Ridge
E Central	93.1.2	0.02	O	Gregory Creek
E Central	95.10.2a	0.14	O	Gregory Creek
E Central	95.10.2b	0.02	O	Timber Butte
E Central	96.3.2	0.01	O	Timber Butte
E Central	97.7.2	0.01	O	too small, unlisted
E Central	97.10.2	0.03	O	Big Southern Butte
E East	104.10.2	0.02	O	Bear Gulch
E Central	105.8.2	0.05	O	Gregory Creek
E Central	105.9.2	0.03	O	Timber Butte
E Central	105.11.2	0.04	O	Big Southern Butte
E Central	107.8.2	0.02	O	Big Southern Butte
E Central	107.9.2	0.03	O	Big Southern Butte
E Central	107.11.2	0.04	O	Timber Butte
E East	108.8.2	0.01	O	Timber Butte
E Central	110.4.2	0.07	O	Timber Butte
E Stockpile	DA1.1.4a	0.05	O	Gregory Creek
E Stockpile	DA1.1.4b	0.03	O	Gregory Creek
E Stockpile	DA1.6.1	0.02	O	Indian Creek

*Items are listed in order by unit and increasing level depth.

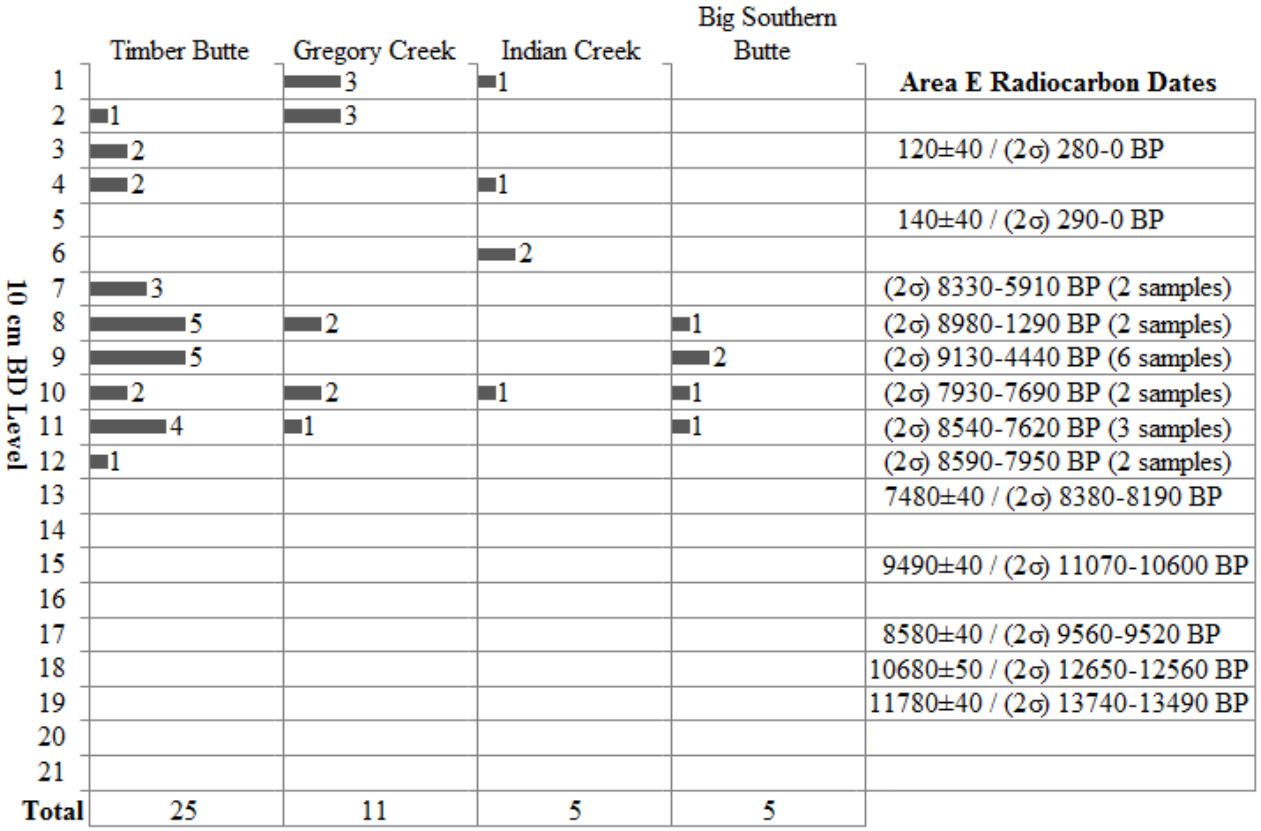


Figure 222. Stratigraphic distribution of Area E radiocarbon dates and obsidian items submitted for x-ray fluorescence analysis. Items identified with Timber Butte, Gregory Creek, Indian Creek and Big Southern Butte are shown. Only items which are provenienced to a specific level are included. Non-provenienced items are: SB.21-25.2 (Gregory Creek); SB.31-35.2 (Indian Creek).

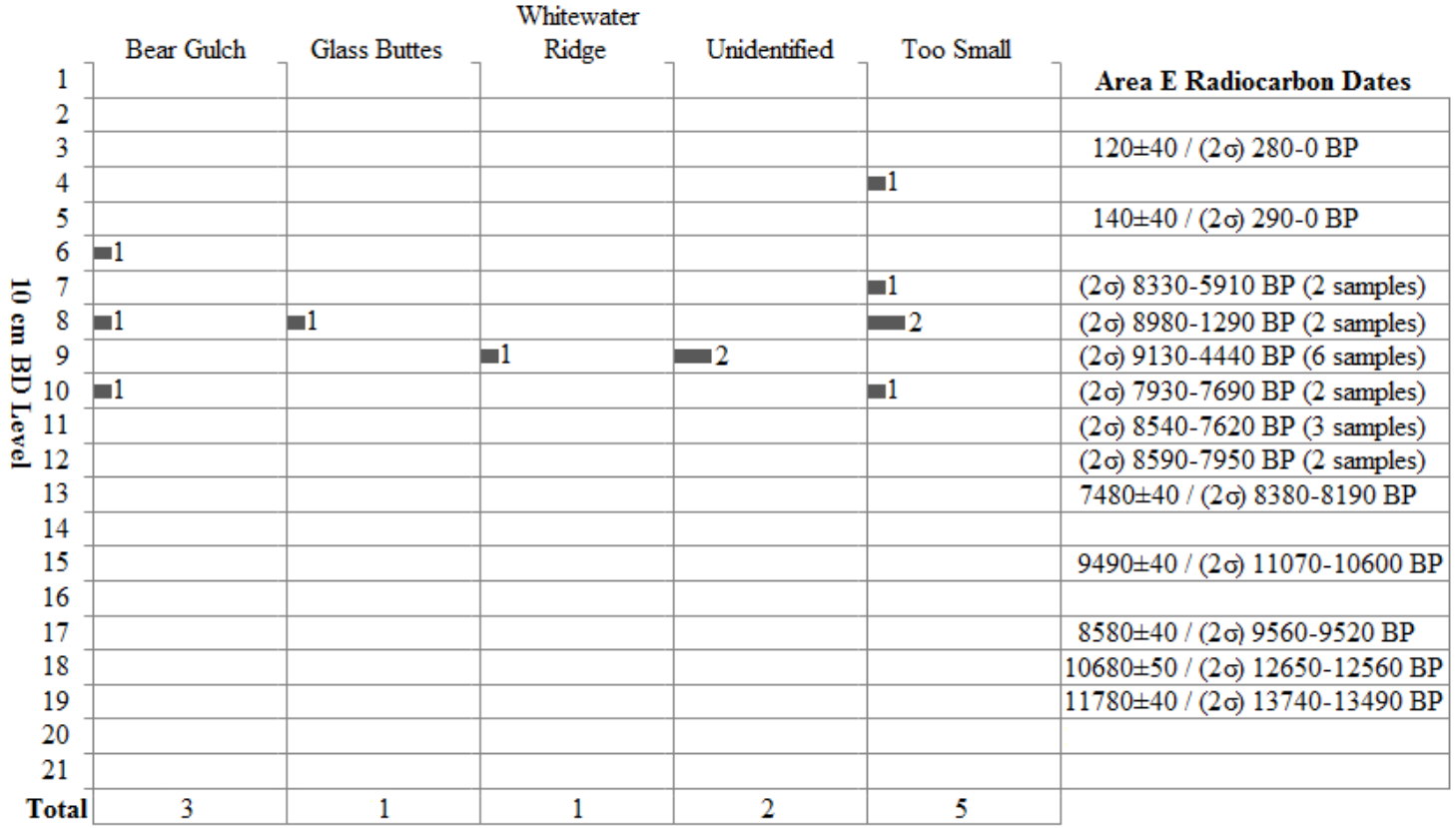


Figure 223. Stratigraphic distribution of Area E radiocarbon dates and obsidian and vitrophyre items submitted for x-ray fluorescence analysis. Items identified with Bear Gulch, Glass Buttes, Whitewater Ridge are shown. Two vitrophyre flakes (20.9.2a; 25.9.2) did not correlate with any known sources, and five flakes (85.4.2; 97.7.2; 74.8.2b; 25.8.5b; 2010misc.42a [level 10]) were too small for analysis.

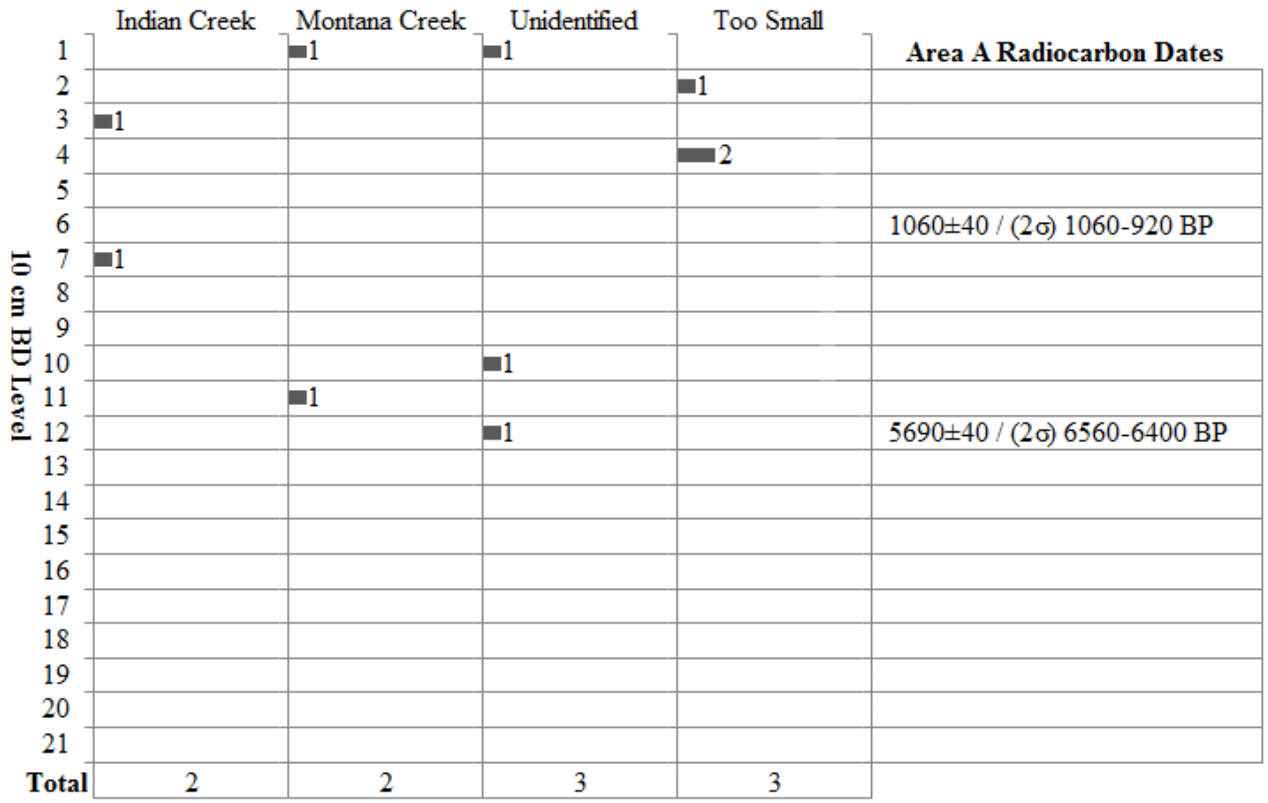


Figure 224. Stratigraphic distribution of Area A radiocarbon dates and all obsidian and vitrophyre items (n=10) submitted for x-ray fluorescence analysis. Two sources, Indian Creek and Montana Creek (vitrophyre) were identified with items recovered in Area A. Three vitrophyre flakes (3.1.2a; 8.10.2; 13.12.2) did not correlate with any known sources, and three flakes (4.2.2; 22.4.2a; 22.4.2b) were too small for analysis.

more consistent, occurring in higher levels which correspond with the late and protohistoric periods. While sample size is limited in Area A, the distribution of Montana Creek and Indian Creek also indicates a consistency in use and trade over time (Figure 224). Obsidian was not encountered below 120 cm BD at 10CW34, however, this may be a result of a limited sampling due to the termination of all but twelve units in Area E at or above this depth. Likewise, in Area A only four units reached depths below 110 cm BD.

Of the three Area B vitrophyre flakes submitted for analysis, one (T2.2.1) was unidentified, one (16.12.1) was too small for analysis, and one (T2.3.1) was sourced to Montana Creek. Because the trenches in Area B were excavated in 30 cm levels (see Chapter 5), the closest depth to which T2.3.1 can be assigned is between 60 and 90 cm BD. Two Area D obsidian flakes recovered from levels 4 and 5 in 1981 (1981TP-1.4.1 and 1981TP-1.5.2) were identified with Indian Creek and Gregory Creek, respectively, and their proveniences are consistent with the stratigraphic distribution of these sources in Areas E and A.

Protein Residue Analysis

A total of 123 artifacts and three soil samples recovered during the 2010-2012 fieldwork in Areas A (n=8) and E (n=115) were submitted to the Laboratory of Archaeological Science at California State University for protein residue analysis which tested for a suite of animal and plant antisera (Appendices 6a-6c). Twenty-nine tools and each of the soil samples registered forty-four positive reactions with nine antisera corresponding to rabbit (n=14), sheep (n=9), bovine (n=6), guinea pig (n=4), human (n=3), rat (n=3), dog (n=2), horse (n=2), and swine (n=1) families (Table 44). Flake tools (n=52) were the most frequent type of tool submitted and this tool category also

Table 44. 10CW34 protein residue analysis positive results inventory.

Cat. No.	Tool Category	Material	rabbit	sheep	bovine	guinea pig	human	rat	dog	horse	swine	Total
21.1.4	Hafted-side-notched point	V			x	x						2
5.2.2	Hafted-corner-notched point	B	x				x					2
58.15.e2	Large biface	C	x									1
21.8.5	Flake tool	MC	x									1
22.2.5	Flake tool	C	x			x						2
22.5.4	Flake tool	C			x		x					2
23.4.2	Flake tool	C	x									1
38.12.7	Flake tool	C				x						1
38.14.3	Flake tool	C	x									1
39.8.5	Flake tool	MC	x									1
50.6.c	Flake tool	C	x									1
58.19.e	Flake tool	MC	x									1
63.9.f	Flake tool	C	x									1
66.8.d	Flake tool	MC			x							1
88.7.5	Flake tool	MC		x						x		2
92.8.4	Flake tool	MC		x				x				2
94.7.4	Flake tool	MC		x					x	x	x	4
103.8.4	Flake tool	C							x			1
113.8.6	Flake tool	C			x							1
84.3.2	Preform	C		x								1
86.6.3	Preform	C		x								1
30.8.3	Point/preform fragment	C				x						1
77.11.4	Point/preform fragment	C		x				x				2
13.8.3	Biface fragment	C	x									1
20.11.3	Biface fragment	C			x							1
58.15.e1	Biface fragment	QC	x		x							2
76.12.3	Biface fragment	C		x								1
77.9.7	Biface fragment	C		x				x				2
78.11.7	Other Flaked / Biface	QC		x								1
13.5.11	Soil	-					x					1
53.10.17	Soil	-	x									1
71.7.10	Soil	-	x									1
Total	**32 Items**		**14**	**9**	**6**	**4**	**3**	**3**	**2**	**2**	**1**	44

contained the most tools with positive reactions (n=16) (Figures 225-226; Table 45). Hafted tools consisted of Windust (n=14), Cascade (n=6), and side-notched points (n=8), as well as a Goshen/Plainview point and a corner-notched point. Other submitted flaked tools included large bifaces (n=2), one perforator (111.8.6), preforms (n=4), point/preform fragments (n=12), biface fragments (n=7), and a quartz crystal biface tool (78.11.7). All of the recovered grooved abraders (n=4) were submitted as were six cobble tools consisting of an edge-ground cobble (103.7.7), flaked cobbles (n=4), and battered (n=1) cobbles, however, none of these reacted positively with antisera used in the analysis. Four unmodified flakes (debitage) which exhibited utilization potential were submitted for analysis and each of these were also negative.

Many of the animal residues identified on 10CW34 tools correspond with likely species that were present in the Clearwater River basin and surrounding regions at various times during the early to ethnographic past (Sappington 2010). Rabbit was the most frequent residue identified at 10CW34 and occurred in two soil samples associated with anvil features, and on a variety of tools in Areas A and E consisting of eight flake tools, two biface fragments, one corner-notched point, and one large biface. Stratigraphically, rabbit was also prevalent throughout each of the represented cultural phases at 10CW34 and this is consistent with other archaeological sites in the Clearwater River region where rabbit residue has been identified as the most common and temporally pervasive type (Figure 227-228) (Sappington 2010:231). Potential species include the Snowshoe Hare (*Lepus americanus*), White-tailed Jackrabbit (*Lepus townsendii*), Mountain Cottontail (*Sylvilagus nuttallii*), and American Pika (*Ochonta*

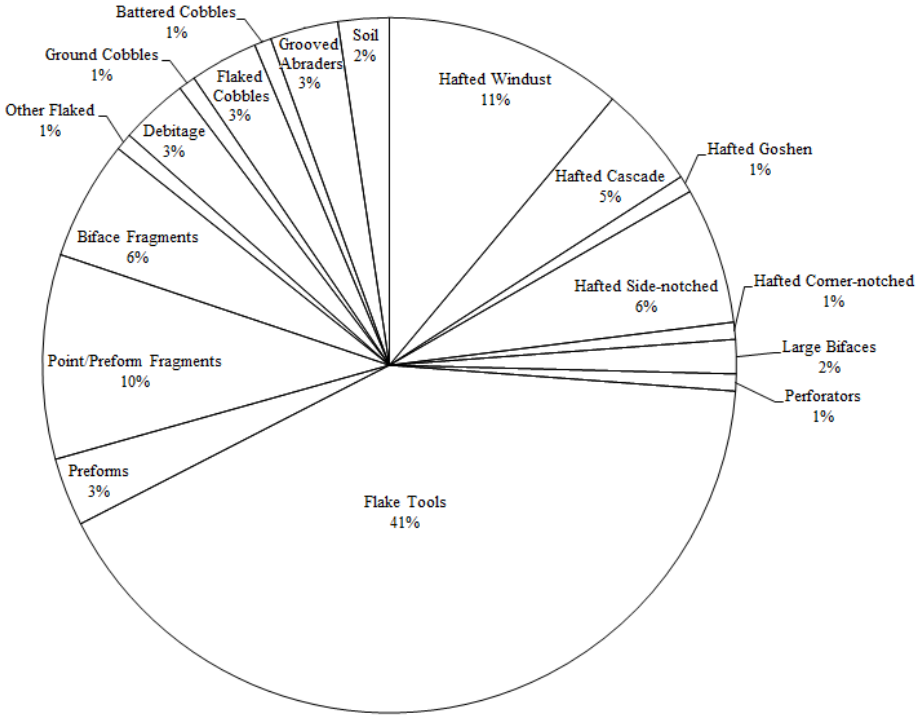


Figure 225. Pie chart showing the percentages of all 10CW34 tool type categories submitted for protein residue analysis.

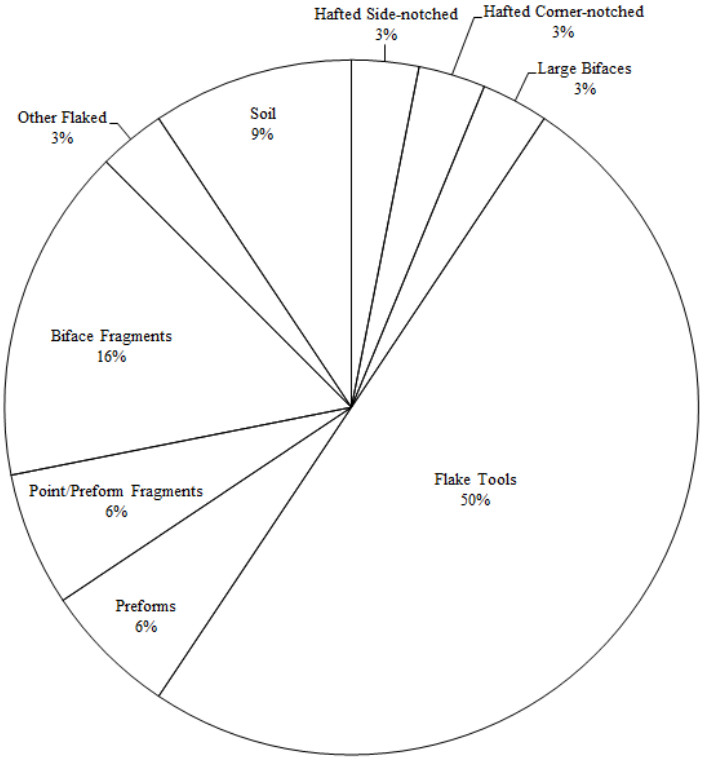


Figure 226. Pie chart showing the percentages of all 10CW34 tool type categories for which positive reactions were registered.

Table 45. 10CW34 protein residue analysis negative results inventory.

1 of 2

Cat. No.	Tool Category
38.12.5	Hafted-Windust point
47.9.c	Hafted-Windust point
49.9.a	Hafted-Windust point
58.14.e	Hafted-Windust point
62.7.d	Hafted-Windust point
62.8.d	Hafted-Windust point
74.9.b	Hafted-Windust point
76.8.4	Hafted-Windust point
78.5.2	Hafted-Windust point
83.9.7	Hafted-Windust point
97.3.2	Hafted-Windust point
97.11.8	Hafted-Windust point
100.13.4	Hafted-Windust point
101.6.4	Hafted-Windust point
31.7.5	Hafted-Cascade point
60.9.b	Hafted-Cascade point
57.4.d	Hafted-Cascade point
57.7.d	Hafted-Cascade point
57.11.d	Hafted-Cascade point
92.12.2	Hafted-Cascade point
94.9.6	Hafted-Goshen point
17.3.3	Hafted-side-notched point
33.2.2	Hafted-side-notched point
39.6.4	Hafted-side-notched point
48.2.f	Hafted-side-notched point
76.3.3	Hafted-side-notched point
95.2.7	Hafted-side-notched point
105.1.5	Hafted-side-notched point
65.12.b	Large biface
111.8.6	Perforator
8.9.2	Flake tool
18.10.3	Flake tool
24.8.6	Flake tool
29.8.5	Flake tool
30.10.5	Flake tool
31.3.5	Flake tool
34.2.5	Flake tool
37.10.6	Flake tool
37.11.5	Flake tool
38.2.3	Flake tool
39.5.4	Flake tool
39.10.5	Flake tool
40.11.2	Flake tool
42.9.3	Flake tool
42.9.4	Flake tool
46.4.f	Flake tool
50.5.c	Flake tool

2 of 2

Cat. No.	Tool Category
52.8.a	Flake tool
53.9.e	Flake tool
59.5.a	Flake tool
62.9.d	Flake tool
67.8.c	Flake tool
71.11.a	Flake tool
77.15.2	Flake tool
77.17.2	Flake tool
83.9.5	Flake tool
88.8.5	Flake tool
98.10.5	Flake tool
98.11.4	Flake tool
99.11.3	Flake tool
102.13.2	Flake tool
104.13.3	Flake tool
107.2.4	Flake tool
111.5.3	Flake tool
112.7.4	Flake tool
113.5.4	Flake tool
38.9.5	Preform
101.7.6	Preform
25.3.3	Point/preform fragment
50.11.c	Point/preform fragment
51.10.f	Point/preform fragment
60.11.b	Point/preform fragment
64.10.e	Point/preform fragment
65.6.b	Point/preform fragment
101.5.5	Point/preform fragment
110.10.4	Point/preform fragment
111.8.4	Point/preform fragment
111.8.5	Point/preform fragment
80.11.10	Biface fragment
109.11.3	Biface fragment
103.7.7	Ground cobble
76.2.3	Flaked cobble
105.9.8	Flaked cobble
112.7.5	Flaked cobble
111.9.2	Flaked cobble
82.2.3	Battered cobble
71.7.a	Grooved abrader
90.10.6	Grooved abrader
105.9.7	Grooved abrader
111.7.6	Grooved abrader
93.6.1	Debitage
113.11.5	Debitage
101.7.4	Debitage
109.9.3	Debitage

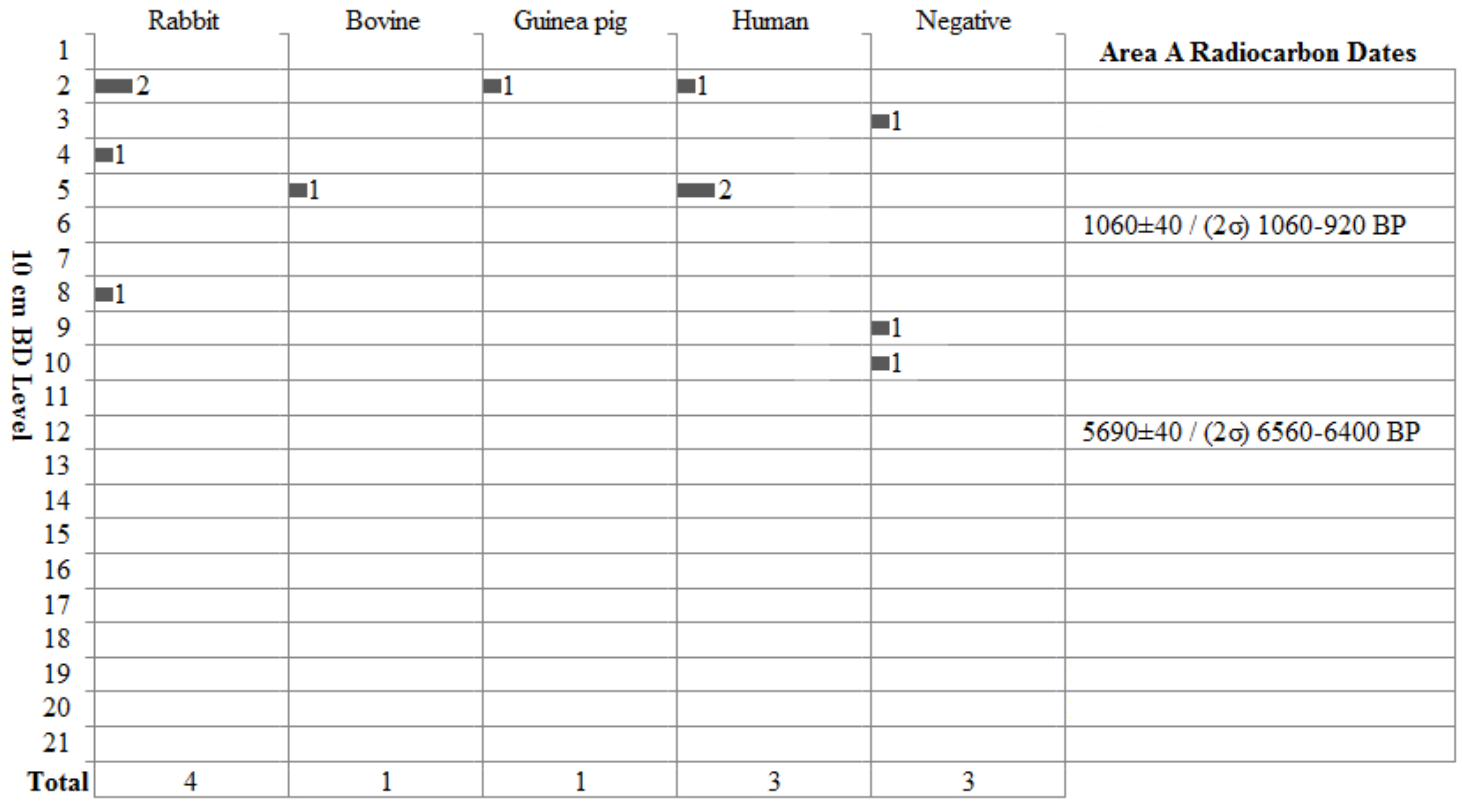


Figure 227. Stratigraphic distribution of Area A radiocarbon dates and all positive (n=9) and negative reactions (n=3) identified with eight tools submitted for protein residue analysis.

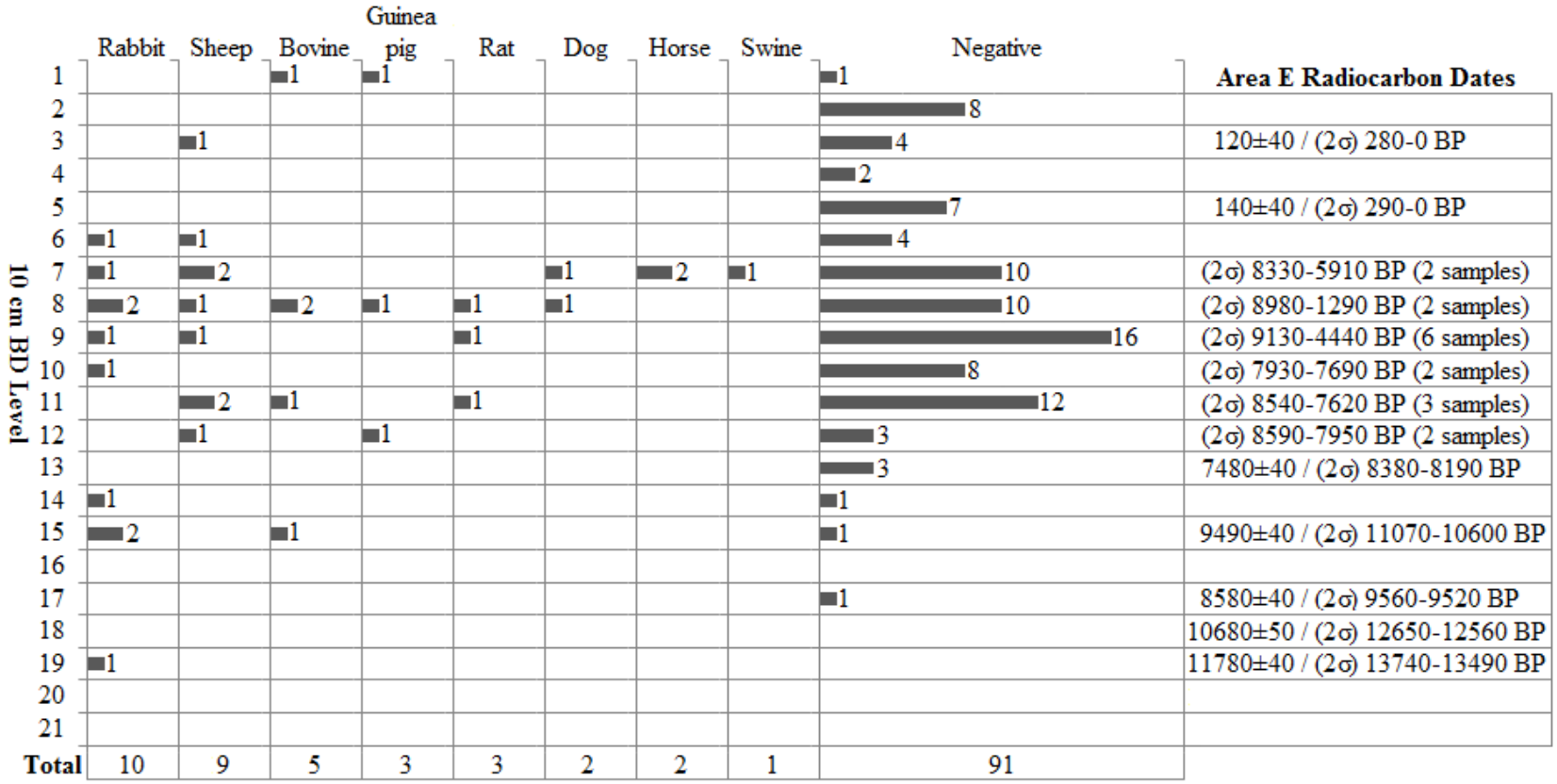


Figure 228. Stratigraphic distribution of Area E radiocarbon dates and all positive (n=35) and negative reactions (n=91) identified with 115 tools submitted for protein residue analysis.

princeps) (Groves et al. 1997:287-290).

Sheep was the next most frequent residue type at 10CW34 and was identified in Area E on three flake tools, two preforms, one point/preform fragment, two biface fragments, and one quartz crystal biface tool. Mountain sheep (*Ovis canadensis*) were a significant resource used by the Nez Perce and both hunting and processing of this animal is indicated during the most intense occupation of 10CW34 as well as in the late-prehistoric period. Bovine, like rabbit, occurred consistently throughout the cultural strata at 10CW34 and was identified in Areas A and E on six tools which included one side-notched point, three flake tools, and two biface fragments. This residue type corresponds with modern bison (*Bison bison*), an important big game animal which was available prehistorically on the southern Columbia Plateau as well as in the Plains where, historically, they were hunted extensively by the Nez Perce (Schroedl 1973). Bison faunal remains have been encountered at Ahsahka at the mouth of the North Fork and at archaeological sites on the lower Clearwater River (Sappington 2012:229).

Guinea pig was identified in Areas A and E on four tools associated stratigraphically with the early, middle, and protohistoric periods. Both hunting and processing are indicated by two flake tools, one side-notched point, and one point/preform fragment. Positive reactions with this antiserum can indicate beaver, porcupine, marmot, and squirrel. The Nez Perce hunted beaver (*Castor canadensis*) and ground squirrels for food while porcupine (*Erethizon dorsatum*) were pursued for their quills (Sappington 2010:229). 10CW34 is also located within the natural range of both the Yellow-bellied Marmot (*Marmota flaviventris*) and the Hoary Marmot (*Marmota caligata*), however, their use among the Nez Perce is not well documented (Lippincott

1997:298-299). A species of ground squirrel native to the region, the Columbian ground squirrel (*Spermophilus columbianus*) have successfully colonized the terrace and it is possible that guinea pig identification on 10CW34 tools may represent natural intrusions or on-site exploitation of these animals.

Rat, which corresponds with all rat and mouse species, was identified on one flake tool, one biface fragment, and one point/preform fragment in Area E. Use of small rodents in the Clearwater River region is not well documented, however, deer mice (*Peromyscus maniculatus*), a species which is the most common mammal in Idaho, are present at 10CW34, and as with the Columbian ground squirrel, the presence of rat residue may reflect intrusions or the use of this animal as a resource. Other possible species which are pervasive in north Idaho include the Bushy-tailed Woodrat (*Neotoma cinerea*), Southern Red-backed Vole (*Clethrionomys gapperi*), Heather Vole (*Phenacomys intermedius*), Meadow Vole (*Microtus pennsylvanicus*), Long-tailed Vole (*Microtus longicaudus*), Water Vole (*Microtus richardsoni*), and the Western Jumping Mouse (*Zapus princeps*) (Lippincott 1997:321-336).

Two flake tools in Area E registered positive reactions with dog. This taxa has been identified on hafted and flake tools recovered from several late prehistoric sites in the Clearwater River region, however, domestic dogs were not consumed by the Nez Perce. The identification of this taxa at 10CW34 likely represents the processing of coyotes (*Canis latrans*) and/or wolves (*Canis lupus*) (Sappington 2010:226, 231).

One corner-notched point, one flake tool, and one soil sample in Area A reacted positively with human residue. These items were recovered roughly twenty meters apart from strata which were located above a dated charcoal sample of 1060-920 cal. BP.

Recent contamination from the handling of these items by investigators is considered improbable, as great care was taken during all stages of fieldwork and processing to prevent items from coming into contact either directly or indirectly with skin, hair, exhalations, or any other source of human protein. The spatial distribution in Area A and variety of the items with which human was identified suggests that the presence of human protein residue may reflect the disposal of human waste in Area A or injuries that occurred prehistorically during tool production or use.

Three anomalous reactions consisting of horse (n=2) and swine (n=1) were obtained from two flake tools recovered from level 7 in Area E. Two charcoal samples collected from 60-62 and 69 cm BD provided respective dates of 6000-5910 and 8330-8160 cal. BP, which are too late to correlate with the wild horse which went extinct in North America at the end of the Pleistocene, and too early to represent domesticated horses which were acquired by the Nez Perce between AD 1730 and 1750 (Anastasio 1985:127; Price and Feinman 2005:154-155). Historical use of this portion of the site as a pasture has been documented in previous investigations and horses were present in Area E during each of the UI field seasons (see Figure 22). The most likely explanation for the identification of horse on tools at 10CW34 is that waste protein, deposited by recently pastured horses, was precipitated through the soil from the surface into older strata. One flake tool, 94.7.4 which contained horse protein also reacted positively with swine, comprising the sole identification of this residue type at 10CW34. It is not known whether domestic pigs were brought to the site during historic occupation or more recently, however, in addition to contamination of the sample, use of the pasture in Area E for such animals remains a possibility.

A final and interesting note is the absence of deer residue identification at 10CW34. Deer, which represents elk (*Cervus elaphus*), moose (*Alces alces*), and both Mule (*Odocoileus hemionus*) and White-tailed (*Odocoileus virginianus*) deer, is the second most common residue type identified in the Clearwater River region. Similarly, deer and elk faunal remains are frequently encountered at archaeological sites, and their significance as game animals in the region is specified in much of the ethnographic literature (Sappington 2010:231). When considering that the forests of the upper North Fork region would have provided excellent habitat for deer, elk, and moose throughout the Holocene, it is surprising to find that of the 123 tools submitted for analysis, none reacted positively with this residue type. Such low proportion may reflect a previously unidentified pattern of resource use employed by those who utilized 10CW34 or the upland settings of the upper North Fork, an interesting possibility which can be explored with the aid of further archaeological investigations and protein residue studies in the vicinity.

Mazama Tephra Identification

One soil sample (38-42.SIII) collected in Area E was submitted to Dr. Nick Foit at Washington State University for glass composition analysis and was found to contain volcanic tephra that was geochemically identified with the climactic eruption of Mt. Mazama, 6730 ± 40 ^{14}C BP (Appendix 7). Using the Stuiver et al. (1998) data set with CALIB 5, Power et al. (2011:2524) calibrated this date to 7509-7669 BP. Sample 38-42.SIII was collected from the center of the third stratum observed in Unit 42 at 80 cm BD during the examination of Units 38 and 42 soil profiles (see Figures 114, 121). This stratum (Stratum IV) was the fourth identified in Area E where it fluctuated considerably

between 12 and 120 cm BD in the Central zone and between 10 and 72 cm BD in the East zone (see Chapter 7). One of the most significant volcanic eruptions in the Cascade Arc was the climactic eruption of Mt. Mazama which deposited ash over much of Oregon, Washington, and parts of Idaho, Montana, Nevada, Alberta, and British Columbia (Bacon and Lanphere 2006) (Figure 229). The unique geochemical signature of Mazama tephra has been identified at archaeological sites on the lower Clearwater and Lochsa rivers (Sappington 1994:49) and its identification at 10CW34 provides a useful chronological indicator which can supplement the sequence delineated by radiocarbon dating.



Figure 229. Map showing the estimated spatial distribution of Mt. Mazama volcanic ash across the western United States and southwestern Canada (adapted from Kimsey 2006:6, Figure 1.1).

11. SUMMARY AND CONCLUSIONS

Summary

The Kelly Forks Work Center site (10CW34) is a ca. 50 acre alluvial terrace located at the confluence of Kelly Creek and the North Fork of the Clearwater River in the northern uplands of the Clearwater River drainage basin in north central Idaho. Significant historic and prehistoric cultural resources have been identified at the site since 1969, and during the 2010-2012 field seasons, intensive archaeological investigations were conducted by University of Idaho (UI) archaeologists and students in order to better understand the nature of human occupations at 10CW34. One hundred and eleven 1 x 1 m test units and two 1 x .5 m test units were excavated by UI in Areas A, B, C and E. These excavations amounted to a total volume of 128.151 m^3, which in addition to previous investigations, amounts to roughly 1% of the site terrace. In terms of general area, roughly half of the terrace remains uninvestigated. Ninety-three 1 m soil profiles in Areas A, B, C, and E were examined and drawn to scale, and while strata in each area were found to fluctuate considerably as a result of either natural or historic disturbances, the deposits encountered in Areas A and E were fairly consistent and indicated a gradual accumulation of soil following the initial establishment of the terrace by alluvial sands and sediments.

Cultural material was encountered in all investigated areas of 10CW34, including Area D, which was investigated in 1981. A total of 352 historic items, consisting predominantly of hardware and glass fragments, were recovered primarily in the eastern portions of the terrace in Areas A and B where historic activity has been focused during the last century. Stratified, intact prehistoric deposits were encountered in both Areas A

and E, and the highest concentrations of prehistoric cultural material and the earliest occupations were identified in Area E. The prehistoric component at 10CW34 consisted exclusively of lithic materials. Debitage (n=16,252) comprised the most frequently recovered artifact type. A total of 442 flaked tools, 153 cobble tools, and four grooved abraders were recovered, and a number of these items exhibited diagnostic characteristics associated with specific cultural phases in the Clearwater River region and as well as the northern Plains. Fifty-six non-tool cores and 303 fire-modified rock were also recovered. Areas A and E contained three similar anvil features which are considered to have functioned as workstations where animal processing was conducted and tools were produced and repaired. These features were radiocarbon dated to 1060-920 cal. BP (F4, Area A), 7920-7690 cal. BP (F2011A, Area E), and 8980-8600 cal. BP (F2011B, Area E).

Conclusions

Technology, Trade, and Subsistence

The variety of flaked lithic tools recovered at 10CW34 encompasses styles and forms common to the Clearwater River region and the Northern Plains. Stemmed, Cascade, and large side-notched points, along with the Goshen/Plainview point were fashioned for use with atlatl and dart technologies, while use of the bow and arrow is represented by small side-notched and corner-notched points. The frequency of tool refurbishment and finishing is demonstrated by the abundance and widespread distribution of small unmodified lithic debris, as well as the relatively high proportions of preforms and fragmented hafted tools and bifaces. All stages of lithic reduction were employed, however the preliminary debitage size grade analysis suggests that non-local

materials, such as chert and especially obsidian, were generally brought to the site in an advanced state of curation where they were subsequently retouched or repaired. Tools were also manufactured on-site and this is indicated by flaked and battered cobbles, which may have functioned as hammerstones or tools for processing bone, and retouched and non-tool cores, the majority of which were made of locally available metamorphic cobble materials. The largest flaked tool category consisted of flake tools, or modified flakes, which are associated with activities such as processing game and animal skins. These tools occurred in each area at 10CW34, and they were present in every cultural stratum in Area E.

An assortment of raw materials were brought to the site from regional and distant locations. Regional materials included cherts, basalts, and vitrophyre. Quartz crystal and argillite were likely obtained in the North Fork area, while metamorphic cobble, granite, and metamorphic quartzite materials were probably procured directly at 10CW34 or at nearby sites. The presence of obsidian from sources throughout southern Idaho and eastern Oregon, and as far as Glass Buttes in central Oregon delineates an extensive network of trade in which the people who visited 10CW34 regularly participated. Additional connections with areas east of the Bitterroots are indicated by Montana Creek vitrophyre as well as the late-prehistoric Avonlea point and a Paleoindian Goshen/Plainview point which are associated with northwestern Plains styles.

Subsistence activities represented by the material record at 10CW34 include hunting, fishing, and game processing. The presence of an edge-ground cobble and an end-polished cobble suggest that vegetable resources, such as edible berries and seeds, may have been processed at the site. Animal proteins were identified on a variety of

tools. Hafted tools and biface fragments may have been used for hunting, and flake tools and unhafted bifaces which are associated with meat and hide processing. Small mammals and species pertaining to rabbit appear to have been frequently exploited, and these animals would have provided food and skins for clothing. Use of big and medium-sized game is indicated by sheep and bovine proteins, both of which were significant resources in the region. The North Fork and Kelly Creek would have provided excellent habitats for trout, anadromous fish, and other aquatic resources and net weights, which comprise the only evidence for fishing at 10CW34, imply that this activity may have been conducted with the use of woven nets.

Cultural Chronology and Site-use Patterns

A comparison of radiocarbon dates with the stratigraphic distributions of time diagnostic tools and the frequencies of artifacts in Areas A and E indicates that intensive occupations were focused in separate areas of the site at different times in the past (Appendix 9, see Figures 203-213). Time diagnostic tools are items which are associated with specific temporal periods in the Clearwater River region, southern Plateau, and surrounding regions. Time diagnostic tools recovered at 10CW34 include Windust and Cascade points, which represent the early prehistoric period in the Clearwater River region, and the Goshen/Plainview point which is associated with the Paleoindian period in the Northern Plains. Additional time diagnostic tools are an edge-ground cobble, the hallmark artifact of the Cascade phase in the Clearwater River region, net weights, which typically occur during the Hatwai phase (5000-3000 BP), and side-notched and corner-notched points, associated with the late prehistoric period in the southern Plateau and northern Plains.

In Area E, the most intensive occupation appears to have occurred between roughly 9000 and 6000 BP, or during much of the Windust and Cascade phases in the early prehistoric period and into the early Hatwai phase. This is denoted by the greatest overall density and diversity of cultural material encountered between 70 and 100 cm BD, coupled with the ten radiocarbon dates obtained from these strata, three of which were much earlier than expected (cal. 5990-5760, 4790-4440, and 1380-1290 BP) and seven of which ranged between 9130 and 6000 BP (see Figures 203-209). An additional conventional date of 6780±40 BP was obtained for level 8 (80 cm BD) from a tephra sample which was identified with the climactic eruption of Mount Mazama. The majority of Windust and Cascade points occurred together and were concentrated in these strata, along with the Goshen/Plainview point, the edge-ground cobble, and net weights.

Nearly all artifact categories in Area E show a decrease in frequency above 60 cm BD, indicating that use of this portion of 10CW34 began to decline around 6000 BP. This corresponds with the advent of the middle historic period when local cultural developments, such as pit houses and a trend toward semi-permanent occupations along major rivers, begin to appear in the material record of the Clearwater River region. The first large side-notched point accompanies this decline in level 6, while small side-notched points, characteristic of the late prehistoric period, are concentrated in the upper 30 cm BD along with the remaining large side-notched points. Stratigraphic distributions in most artifact categories also show a slight increase in artifact density between 10 and 30 cm BD, which may reflect a resurgence in use of Area E during the late prehistoric period. Two late radiocarbon dates obtained from levels 5 and 2 suggest that Area E was occupied during the protohistoric period. Fewer artifacts were recovered in Area D,

where excavations were terminated at approximately 85 cm BD, however, the stratigraphic distribution of debitage frequencies in the central pasture indicates that occupations may have occurred in a similar temporal sequence as in Area E (Figure 230).

Time diagnostic tools recovered in Area A are comprised of one Cascade point midsection, an Avonlea side-notched point, which is associated with the late prehistoric period in the Northern Plains, and one corner-notched point, associated with the late prehistoric period in the Clearwater River region. The most frequent artifact categories in

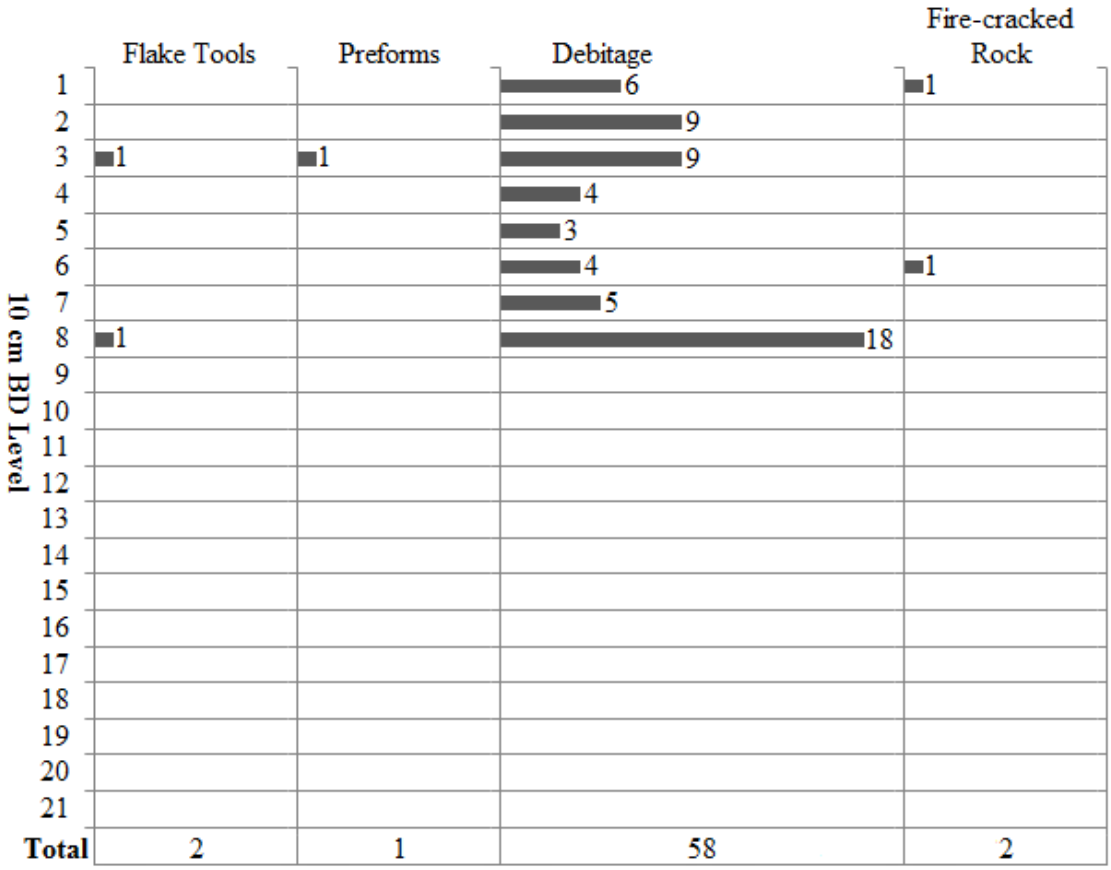


Figure 230. Stratigraphic distribution of all provenienced artifacts in Area D, recovered during the 1981 and 1987 investigations. Non-provenienced items are: 2 side-notched points (1981Sur.2, 1981Sur.3), 1 flake tool (1987Sur.1), 1 preform (1981Sur.1), 1 point/preform fragment (1981Sur.19), 1 core tool (1981Sur.12), 1 flaked cobble (1981Sur.18), 1 non-tool core (1981Sur.7), and debitage (n=24).

Area A consisted of flake tools and debitage. These artifacts reached a maximum above the level 6 radiocarbon date of cal. 1060-920 BP (see Figures 210-213), near levels 4 and 2. Feature 4 and the majority of other artifacts, such as biface fragments, cobble tools, and cores, were also concentrated above level 6, indicating that the most intense occupations in Area A occurred toward the end of the late prehistoric period, and possibly into the protohistoric period. Minor occupations beginning in the late prehistoric period are denoted by a radiocarbon date in level 12 and the presence of an edge-battered cobble, a flake tool, and debitage below this depth. Historic materials were concentrated in the upper 80 cm BD indicating that early and more recent historic activities in this portion of the site have affected the stratigraphic distributions of prehistoric materials. While radiocarbon dates were not obtained from Area B, the peak in artifact frequencies in level 4 suggests that occupations may have been most intense near the same temporal period as in Area A (Figure 231). Overall, artifact densities encountered in Area E were higher than that encountered in Areas A and B, though historic disturbances may have altered prehistoric deposits in the eastern portion of the terrace (Table 46).

Results of all investigations conducted at 10CW34 indicate that the site was utilized repeatedly as a temporary upland basecamp for at least 10,000 years by individuals and groups of people on their way to and from various locations in the North Fork area or throughout the Clearwater River basin and regions beyond. The rare incidence of large features or substantial artifact concentrations suggests that these occupations occurred as a series of separate, short-term visits, during which the principal on-site activity was tool kit maintenance. Processing activities, such as game preparation and hide, bone, and wood working were also important. Fishing is evidenced by the

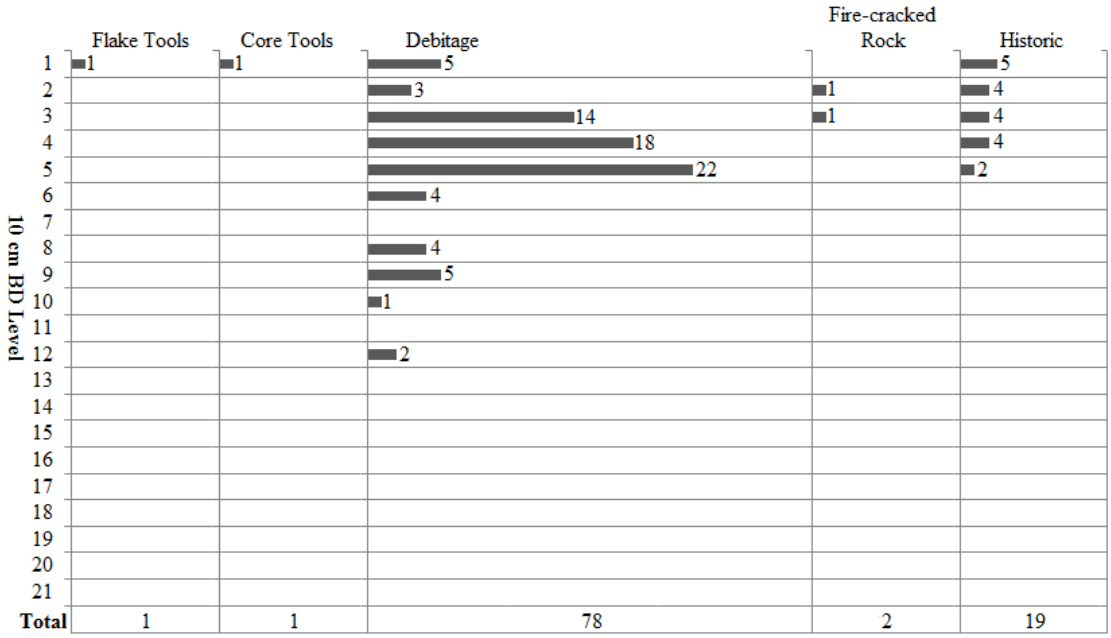


Figure 231. Stratigraphic distribution of all provenienced artifacts in Area B, recovered during the 1996 and 2010 investigations. Excluded items include non-provenienced artifacts, as well as artifacts recovered from the five trench walls in Area B, which were excavated in 30 cm levels. These items are: 2 flake tools (T5.1.1, T4.2.2, T2.3.2), 1 preform (2011misc.12), 1 fire-cracked rock fragment (2010misc.4), debitage (n=13), and 7 historic items (2010misc.1, T4.1.2 [n=2], T4.1.1, T4.1.3, T4.2.3, T4.1.4).

presence of net weights, while hunting likely took place both at the site and in the surrounding area. Lithic tool maintenance and game processing are represented in similar ways throughout the temporal range of occupations at 10CW34, indicating that the general function that the site served, as well as the subsistence strategies employed by the site's occupants, remained fairly constant for thousands of years. While this may reflect the relative stability of the regional environment, it also demonstrates a continuity maintained by the inhabitants' long-established familiarity with and intimate knowledge of landscape and resources.

Table 46. Prehistoric artifact densities and excavated volumes in Areas A, B, and E

Volume Totals	Flaked Tools*		Cobble Tools and Other Lithic Tools**		Debitage		Non-tool Cores		Fire-cracked Rock		Total Artifacts	Total density per m^3
	total	density per m^3	total	density per m^3	total	density per m^3	total	density per m^3	total	density per m^3		
Area A† 14.64 m^3	38	2.6	7	.48	572	39.07	3	.2	5	.34	625	42.69
Area B†† 5.08 m^3	6	1.18	-	-	88	17.32	-	-	3	.59	97	19.09
Area E 109.4 m^3	374	3.42	146	1.33	15,444	141.17	50	.46	282	2.58	16,296	148.96

Note: Artifacts which were excavated and catalogued as miscellaneous are included in these calculations, however, surface collections and non-provenienced items are excluded.

*Flaked tools include all tools classified within the flaked tool category in Chapter 8.

**Cobble tools include the edge-ground cobble and all flaked and/or battered cobbles; other lithic tools includes net weights, anvils, and grooved abraders.

†Area A volume total was calculated by the following:
UI total volume is 13.3m^3
1991: 10 shovel tests (25 cm diameter) and 1 test unit (1 x 1 m), all excavated to 1 m = total volume of 1.25 m^3.
1996: 6 shovel tests (estimated 30 cm diameter), excavated to .5 m = total estimated volume of .09 m^3.

††Area B volume total was calculated by the following:
UI total volume is 3.45m^3
1996: 42 shovel tests (estimated 30 cm diameter), excavated to .5 m, and 1 test unit (1 x 1 m), excavated to 1 m = total estimated volume of 1.63 m^3

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Appendices

Appendix 1a

Proposal for Archaeological Evaluation of the

Kelly Forks Work Center, 2009

By

Dr. Robert Lee Sappington

University of Idaho

A PROPOSAL FOR AN ARCHAEOLOGICAL EVALUATION OF THE KELLY FORKS WORK CENTER SITE (10CW34), CLEARWATER NATIONAL FOREST

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16 November 2009

Introduction

The United States Forest Service has a legal mandate to protect historic properties on public land through various laws such as the *Archaeological Resource Protection Act* and the *National Historic Preservation Act* (16 USC 470). As a nationally recognized leader in Cultural Resource Management (CRM), the Forest Service routinely cooperates with partners, including universities, to help analyze and interpret data, protect historic properties and educate the public.

Kelly Forks Work Center (work center) sits on a terrace at the confluence of Kelly Creek with the North Fork Clearwater River on the Clearwater National Forest (Forest Service) in north central Idaho. In the 1920s the Forest Service began construction of the Kelly Forks Ranger Station and that setting would eventually become the work center. The earliest map of the area is from 1926 when two buildings are indicated. During the mid-1930s the area was used as an Emergency Relief Administration camp and the 1936 cabin from that era is the oldest standing building at the work center. The woodshed and outhouse date to the 1950s and numerous additional buildings were added in the 1960s and 1970s. By 1990 the work center included 18 buildings and trailers, most of which were constructed or brought to the site between 1950 and 1983.

The work center was recorded as an archaeological site (10CW34) by Forest Service archaeologist Tom Schenarts in 1969. According to the site form, cultural material consisted of a "stone mortar, scrapers, few points, fire cracked stones and numerous chips." Test excavations on Kelly Creek began in 1977 when a possible gravel source was investigated and a prehistoric site (10CW92) was recorded (Knudson and Sappington 1977). Test excavations at the work center itself began in 1979 with a survey for a gravel pit in the horse pasture; four test pits in a 15-acre area indicated the presence of cultural material including a possible hearth feature at ca. 60 cm below surface (BS). The presence of prehistoric cultural materials led to the recordation of the site in the pasture as 10CW139 (Bryan 1979a) but that site number was soon vacated and that area is now considered to be part of 10CW34. Subsequent research, survey,

testing, and monitoring have encountered both undisturbed and disturbed deposits in various parts of the site (Bryan 1979b; Willig 1981a, 1981b; Frahm 1987; Tracy and Sappington 1992; McFarland 1996; Davis 1997; Fee 1999; Johnston 2004). In 1990 the historic component of the Kelly Forks Ranger Station, as represented by a single building (the original 1936 cabin), led to its nomination to the National Register of Historic Places. There is no mention of the prehistoric component at 10CW34 on the nomination form. The general history of the area is known (Space 1991) and the work center is within the historic boundaries of Nez Perce Country (Walker 1998). Nez Perce trails and ethnographic sites are known in the general area although none are specifically associated with the work center (Schwede 1966; Shawley 1984; Paul 1987; Sappington and others 1995). In summary, both prehistoric and historic cultural resources are present at the work center but despite the intermittent interest in this site, the boundaries and extent of the cultural resources here have not yet been determined.

The Forest Service has recently proposed to construct a new water distribution system, bunkhouses, and a small parking area at the work center. The Forest Service has determined that this construction could have an adverse effect on 10CW34. In cooperation with the Idaho State Historic Preservation Office (SHPO), the Forest Service completed a Memorandum of Agreement (MOA) to complete a series of measures prior to the implementation of the proposed construction activities. These measures will be conducted by the Forest Service and the Forest Service Heritage Manager to mitigate the potential adverse effects to 10CW34 and will include:

(1) Conducting a geophysical survey of the Area of Potential Effect (APE) to identify areas of archaeological interest including anomalies and potential features;

(2) Preparing a report on the findings of the geophysical survey;

(3) Preparing a testing plan, using the results of the geophysical survey, and in consultation with the SHPO and Nez Perce Tribe. The testing plan will include: (a) a proposal for formal excavation of anomalies and potential features; (b) the specific methods of excavation to be employed; (c) a list of potential related analyses, as appropriate; and, (d) a schedule for completion of the testing phase;

(4) Producing a report describing the results of the test, archaeological significance, and implications of the proposed construction and its impacts to site integrity and data potential;

(5) Pursuant to review of the testing report by SHPO and the Nez Perce Tribe, the Forest Service Heritage Manager will submit recommendations for appropriate mitigation of the proposed construction activities indicated above; and

(6) Producing a management plan for the site in consultation with the SHPO and Nez Perce Tribe. The management plan will guide future work at site 10CW34 including facilities development and archaeological investigations.

Discussion

As indicated above, the Kelly Forks Work Center is located in a culturally sensitive setting. The specific purpose of this proposal is to facilitate an agreement to conduct portions of the archaeological work outlined above. More specifically the University of Idaho (University or UI) proposes to use the information which will be provided by the Forest Service in parts 1-2 to conduct the investigations in parts 3-6, as indicated above.

Based on the results of the geophysical survey, the University will conduct subsurface testing at site 10CW34. Testing will be conducted in those areas where anomalies and potential features are identified as well as in other areas. Testing will consist of auger or post hole units across the site which will be followed by the excavation of 1 x 1 m units to ca. 1 m BS; in some cases 1 x 1 m units may be contiguous in order to excavate to greater depths and/or to better examine potential features. The total volume of material to be excavated during this testing phase will be approximately (ca.) 25 cubic m. All excavated sediment will be screened through 1/8-inch mesh and excavation will follow standard methods of fieldwork and recordation as employed by UI archaeologists on previous Forest Service and Nez Perce Tribe projects. Appropriate samples will be collected and submitted for examination by specialized experts including protein residue analyses, obsidian sourcing, radiocarbon dating, faunal analyses, and others when appropriate.

The results of the test investigations will be reported to the Forest Service and this information will facilitate future management at the site as determined by the Forest Service, SHPO, the Nez Perce Tribe, and other parties. This process is necessary for the Forest Service to meet responsibilities stipulated under Sections 106 and 110 of the *National Historic Preservation Act* and the Programmatic Agreement (PA) between the Forest Service and the Idaho SHPO.

The University is responsible for creating knowledge, providing active learning environments for students and offering programs and services responsive to the needs

of people in the Inland Northwest. The proposed agreement provides UI with the opportunity to supplement and develop coursework with field training, to engage students in the practical issues surrounding the management of cultural resources, to benefits from the use of such data in university courses, and to publish results associated with data sets resulting from this fieldwork.

The Forest Service and the University will mutually benefit as a result of the work completed under this agreement. It is in the interest of both parties to: collect information regarding landform histories; study the relationship of archaeological sites and preservation actions; share this information with other professionals, agencies, students, and others when appropriate; and, to encourage this line of investigations on public lands across the region to facilitate the further protection of archaeological properties and data sets. More specifically,

The Forest Service shall:

(1) Furnish historic and archaeological information related to the site, including the results of the geophysical survey;

(2) Review all draft reports prior to final acceptance, and provide the University with written comments on each draft and within 30 days of receipt of the final draft;

(3) Consult on the findings with the SHPO, Nez Perce Tribe, and any other interested parties as prescribed by the *National Historic Preservation Act* and the PA; and

(4) Provide payment to the University on a reimbursable basis upon submission of proper invoices, for costs stipulated for supplies delivered and accepted, or services rendered and accepted, less any deductions as provided by the agreement. Each invoice shall display the actual expenditures to date of the invoice and other details as documented in the financial plan. Funds in the amount of $75,000 will be available through 31 December 2010. Modifications or extensions shall be made by mutual consent of all parties prior to any changes for a total duration not to exceed five (5) years from the original date of execution.

The University shall:

(1) Conduct all fieldwork associated with this project;

(2) Perform excavation of twenty-five (25) cubic meters of combined shovel tests or post holes and 1 x 1 m archaeological test units in areas to be determined by the Principal Investigator through review of documentation and consultation with the Forest Service. The actual distribution and size of test units will be determined as the excavations progress and will be based on subsurface conditions as they are revealed.

(3) Provide educational opportunities to University students though field training and subsequent classroom lectures and methodological teachings;

(4) Mentor students wishing to use the resulting data for research purposes and projects;

(5) Bill the Forest Service for costs as specified by the Forest Service;

(6) Acknowledge the Forest Service in all publications and audio-visuals developed as a result of this project;

(7) Maintain records and appropriate documentation for a period of three years;

(8) Prepare a draft report on all results of the test excavations for submission to the Forest Service by 31 December 2010; and

(9) Prepare and submit a final report within 30 days of receipt of the Forest Service's comments on the draft report. The final report will include a detailed chronological ordering of the stratigraphic record of the site derived from profiles of test units, analyses of recovered cultural materials, radiocarbon dates (if suitable samples are recovered), and other methods. Final curation of all collections and documentation will be arranged between the University and the Forest Service after completion and acceptance of the final report.

Summary

The Forest Service has requested that University of Idaho archaeologists conduct test excavations at the ca. 150-acre Kelly Forks Work Center. An archaeological site was recorded here in 1969 and numerous surveys and tests have been conducted in response to specific developments at the work center but there have never been any controlled investigations or studies that have addressed the site as a whole. The nature, depth, integrity, extent, and age of site 10CW34 are unknown. The proposed investigations will

address these issues and the report will also include recommendations for mitigation of proposed and future adverse effects. The investigations will begin as soon as feasible with all field aspects of the agreement to be completed by 30 September 2010 and a final report to be completed by 31 December 2010 unless modifications or extensions are arranged prior to that time between the Forest Service and the University.

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Appendix 1b

Proposed Archaeological Testing Plan for the

Kelly Forks Work Center, 2010

By

Dr. Robert Lee Sappington

University of Idaho

A PROPOSED ARCHAEOLOGICAL TESTING PLAN FOR THE KELLY FORKS WORK CENTER SITE (10CW34), CLEARWATER NATIONAL FOREST

Robert Lee Sappington

Department of Sociology/Anthropology

University of Idaho, Moscow

4 January 2010

Introduction

The United States Forest Service has a legal mandate to protect historic properties on public land through various laws such as the *Archaeological Resource Protection Act* and the *National Historic Preservation Act* (16 USC 470). As a nationally recognized leader in Cultural Resource Management (CRM), the Forest Service routinely cooperates with partners, including universities, to help analyze and interpret data, protect historic properties and educate the public.

Kelly Forks Work Center (work center) sits on a terrace at the confluence of Kelly Creek with the North Fork Clearwater River on the Clearwater National Forest (Forest Service) in north central Idaho. In the 1920s the Forest Service began construction of the Kelly Forks Ranger Station and that setting would eventually become the present-day work center. The earliest map of the area is from 1926 when two buildings are indicated. During the mid-1930s the area was used as an Emergency Relief Administration (ERA) camp and the 1936 cabin from that era is the oldest standing building at the site. The woodshed and outhouse date to the 1950s and numerous additional buildings were added in the 1960s and 1970s. By 1990 the work center included 18 buildings and trailers, most of which were constructed or brought to the site between 1950 and 1983.

The work center was recorded as an archaeological site (10CW34) by Forest Service archaeologist Tom Schenarts in 1969. According to the site form, cultural material consisted of a "stone mortar, scrapers, few points, fire cracked stones and numerous chips." Test excavations on Kelly Creek began in 1977 when a possible gravel source was investigated and a prehistoric site (10CW92) was recorded (Knudson and Sappington 1977). Test excavations at the work center itself began in 1979 with a survey for a gravel pit in the horse pasture; four test pits in a 15-acre area indicated the presence of cultural material including a possible hearth feature at ca. 60 cm below surface (BS). The presence of prehistoric cultural materials led to the recordation of the site in the pasture as 10CW139 (Bryan 1979a) but that site number was soon vacated

and that area is now considered to be part of 10CW34. Subsequent research, survey, testing, and monitoring have encountered both undisturbed and disturbed deposits in various parts of the site (Bryan 1979b; Willig 1981a, 1981b; Frahm 1987; Tracy and Sappington 1992; McFarland 1996; Davis 1997; Fee 1999; Johnston 2004). In 1990 the historic component of the Kelly Forks Ranger Station, as represented by a single building (the original 1936 cabin), led to its nomination to the National Register of Historic Places. There is no mention of the prehistoric component at 10CW34 on the nomination form. The work center is within the Clearwater River region although no major studies have been conducted in this vicinity (Sappington 1994). The general history of the area is known (Space 1991) and the work center is within the historic boundaries of Nez Perce Country (Walker 1998). Nez Perce trails and ethnographic sites are known in the general area although none are specifically associated with the work center (Schwede 1966; Shawley 1984; Paul 1987; Sappington and others 1995). In summary, both prehistoric and historic cultural resources are present at the work center but despite the intermittent interest in this site, the boundaries and extent of the cultural resources have never been determined.

The Forest Service recently proposed to construct a new water distribution system, bunkhouses, and a small parking area at the work center. The Forest Service has determined that this construction could have an adverse effect on 10CW34. In consultation with the Idaho State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation, the Forest Service completed a Memorandum of Agreement (MOA) to complete a series of measures prior to the implementation of the proposed construction activities. These measures included:

(1) Conducting a geophysical survey of the Area of Potential Effect (APE) to identify areas of archaeological interest including anomalies and potential features;

(2) Preparing a report on the findings of the geophysical survey;

(3) Preparing a testing plan, using the results of the geophysical survey, and in consultation with the SHPO and Nez Perce Tribe. The testing plan will include: (a) a proposal for formal excavation of anomalies and potential features; (b) the specific methods of excavation to be employed; (c) a list of potential related analyses, as appropriate; and, (d) a schedule for completion of the testing phase;

(4) Producing a report describing the results of the test, archaeological significance, and implications of the proposed construction and its impacts to site integrity and data potential;

(5) Pursuant to review of the testing report by SHPO and the Nez Perce Tribe, the Forest Service Heritage Manager will submit recommendations for appropriate mitigation of the proposed construction activities indicated above; and

(6) Producing a management plan for the site in consultation with the SHPO and Nez Perce Tribe. The management plan will guide future work at site 10CW34 including facilities development and archaeological investigations.

Discussion

The Forest Service has recently completed measures (1) and (2), that is, the geophysical testing has been conducted and a preliminary report has been prepared (Carlson and Sheriff 2009). That information is being employed to propose a testing plan as indicated in measure (3); after the plan has been finalized and implemented the remaining measures will be addressed in that study.

The University of Idaho (University) will conduct subsurface testing at site 10CW34. Testing will be carried out in each of the six grids at locations where anomalies and potential features were identified, as well as in other areas at the site. Field work will consist of the excavation of auger or post hole units across the site which will be followed by the excavation of 1 x 1 m units to ca. 1 m BS; in some cases 1 x 1 m units may be contiguous in order to excavate to greater depths and/or to better examine anomalies and potential features. All excavated sediment will be screened through 1/8-inch mesh and excavation will follow standard methods of fieldwork and recording as employed by UI archaeologists on previous Forest Service and Nez Perce Tribe projects. Appropriate samples will be collected and submitted for examination by specialized experts including protein residue analyses, obsidian sourcing, radiocarbon dating, faunal analyses, and others when appropriate.

Geophysical testing consisted of total field magnetic surveys in six grid areas and one supporting grid of ground penetrating radar surveys. The six rectangular grids range from 2250 m2 to 5000 m2 and together cover approximately half the site (Carlson and Sheriff 2009: Plate 1). The results of this study indicate that the site has been disturbed by several phases of construction. The study did yield useful information in terms of areas for testing and cultural resource management.

The six areas examined were labeled Grid #1 through Grid #6 (Carlson and Sheriff 2009: Plate 1). Grid #1 is located in the northeast corner of the area examined. This is also the vicinity of the ERA camp. There were a number of magnetic anomalies and several strong signals indicating shallow metallic sources, such as possible cultural

features such as trash or can dumps, in this grid (Carlson and Sheriff 2009: Figure 1). Some of the sources are observable on the surface such as the fire hydrant and

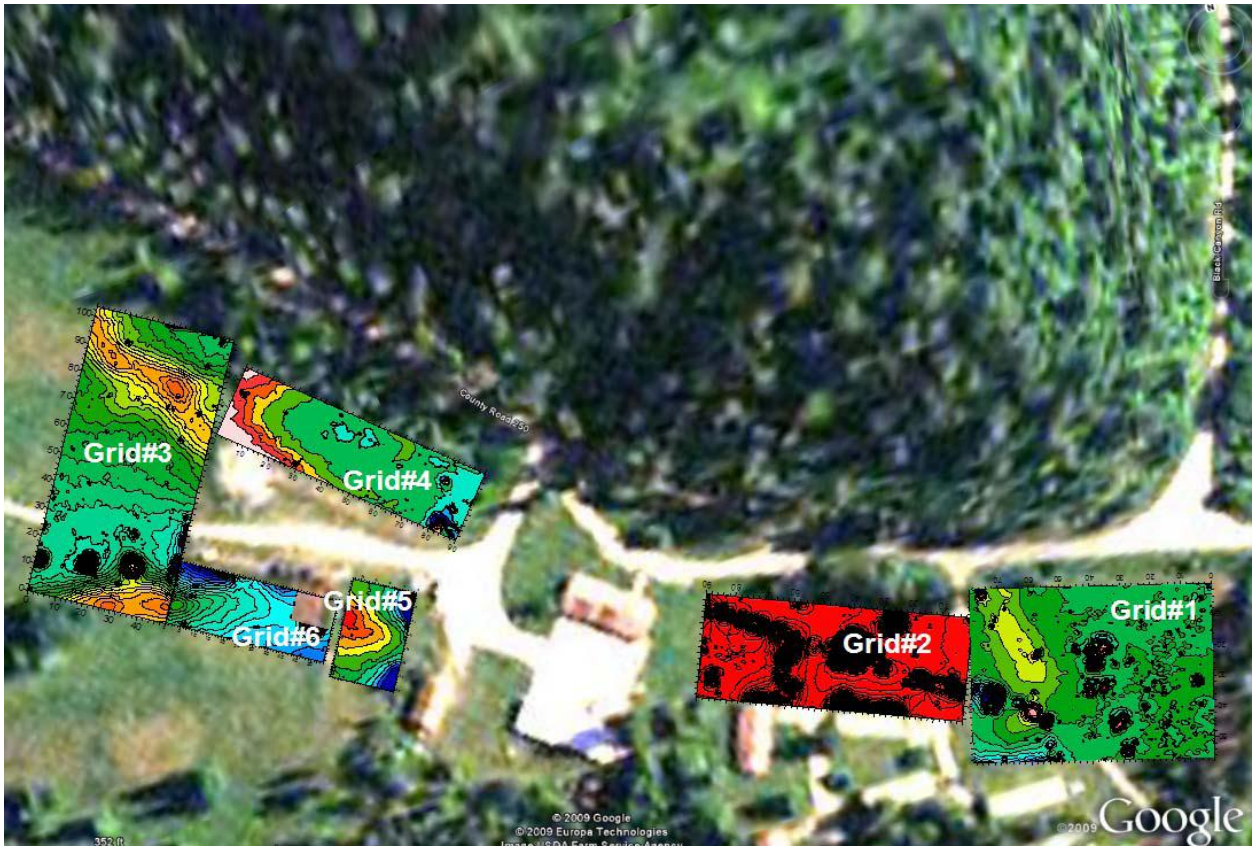


Figure 1. Composite sketch map showing the relative placement of magnetic grids overlaid on a Google Earth image of Kelly Forks Work Center.

associated plumbing. The four similar anomalies marked X1 are considered older depressions (Figure 3); the six anomalies marked X2 all have the same character and are considered modern pins or stakes. Ground penetrating radar (GPR) was also conducted in Grid #1 and it indicated a linear feature which may be an old road, as well as seven circular images that could be cultural features, either historic or possibly prehistoric house pits (Carlson and Sheriff 2009: Figure 6). The depressions marked X1 and several of the circular images should be tested. Testing should include a series of post hole probes both in and outside the anomalies; several 1 x 1 m test units should also be excavated to examine these potential cultural features.

Based on the geophysical testing, Grid #2 is apparently the most disturbed portion of the site (Carlson and Sheriff 2009: Figure 8). The area is almost totally dominated by magnetic signals from modern plumbing and residences. Feature X3 represents a visible manhole but neither of the features marked X4 has an obvious surface source. Feature X4 (located nearest the basketball court) is similar in character

to modern plumbing features but the characteristics of the other X4 are unknown. Feature X5 is near a survey pin and probably modern. It is proposed that the University excavate a series of five post holes in Grid #2 in order to examine the vicinity of one of

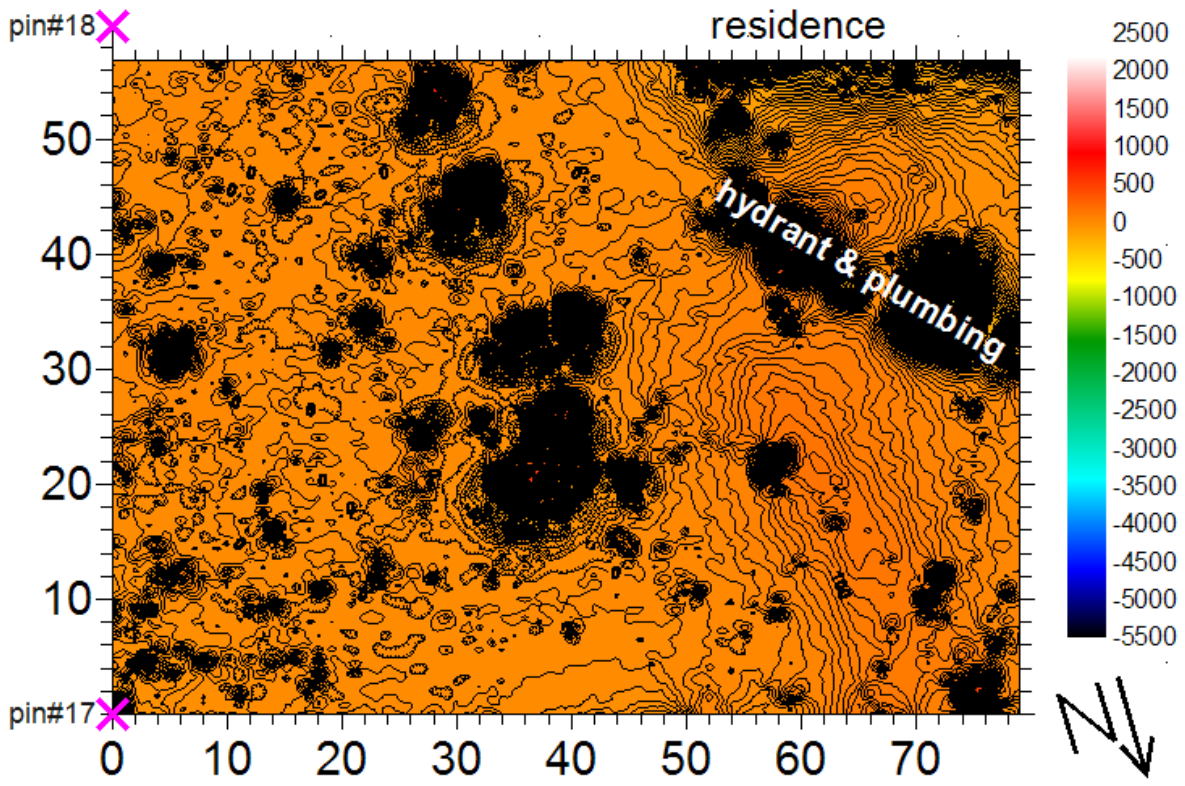


Figure 2. Total magnetic field intensity of Grid#1, after decorrugation and removal of the ambient field value. The position of the known hydrant and associated plumbing is marked, as is the location of a nearby residence which impacts this map. The contour interval is 10 nanotesla (nT); horizontal dimensions are meters. The lower left corner is at survey pin #17 and the eastern (left) edge trends 196.3o, towards pin # 18.

the X4 features and the adjoining open areas. At least one 1 x 1 m test unit will be excavated in this area to elaborate on the results of the post holes. Additionally, the anomaly identified as X4, where the characteristics are unknown, will be tested.

Grid #3 is located in the highest part of the terrace and thus has the potential for having the oldest sediment. The total magnetic intensity results for Grid #3 were dominated by the signal from three T-stakes and the steel gate at the southeastern edge. Grid #3 has a geological or natural feature at the north end (Carlson and Sheriff 2009:Figures 9, 10). This feature trends northwest/southeast and is enigmatic in that it is not straight like a trench. This anomaly could represent a portion of an old runway (or something else) and will be tested. A number of randomly distributed dipolar sources are marked X6 and their sources are probably individual pieces of old

equipment or perhaps rocks (Carlson and Sheriff 2009: Figure 10). X7 marks a larger high amplitude anomaly with a nearly rectangular shape. Post holes will be excavated to examine the linear feature at the north end as well as several of the anomalies marked X6 and anomaly X7. 1 x 1 m units will also be excavated to investigate each of these

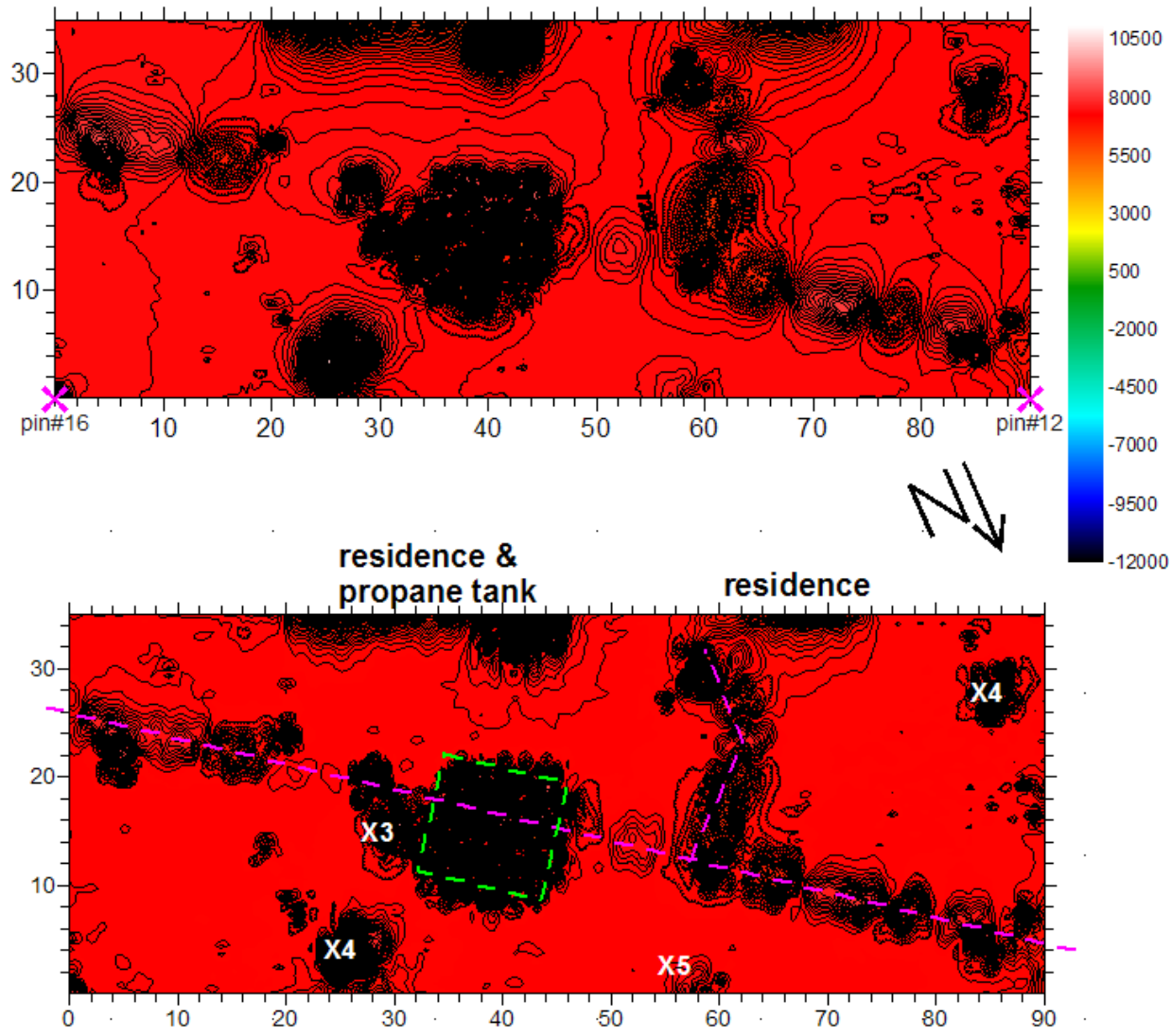


Figure 3. Total magnetic intensity (upper figure) of Grid#2 contoured at 50 nanotesla; horizontal dimensions are meters. On the lower image, dashed magenta lines mark anomalies from the plumbing, the dashed green box the basketball court, and X3 the manhole cover. Neither anomaly marked X4 has an obvious surface source but they have the same character as the others suggesting they are from modern disruption. The lower left (NE) cornercoincides with survey point #16; the lower (north edge) trends 293o to pin #12.

three potential features. Grid #3 has relatively less evidence of disturbance. A control unit to expose and define natural stratigraphy will be excavated in this area. This

control unit will be placed in an area without any anomalies and it will be excavated by a backhoe with appropriate monitoring.

Grid #4 is located adjacent to the previous grid on the north edge of the study area. The presence of 60 to 70-year old trees suggests that portions of the site have not been disturbed, at least during this time. There are relatively few anomalies in this area although it may have been affected by the nearby helipad (Carlson and Sheriff 2009:

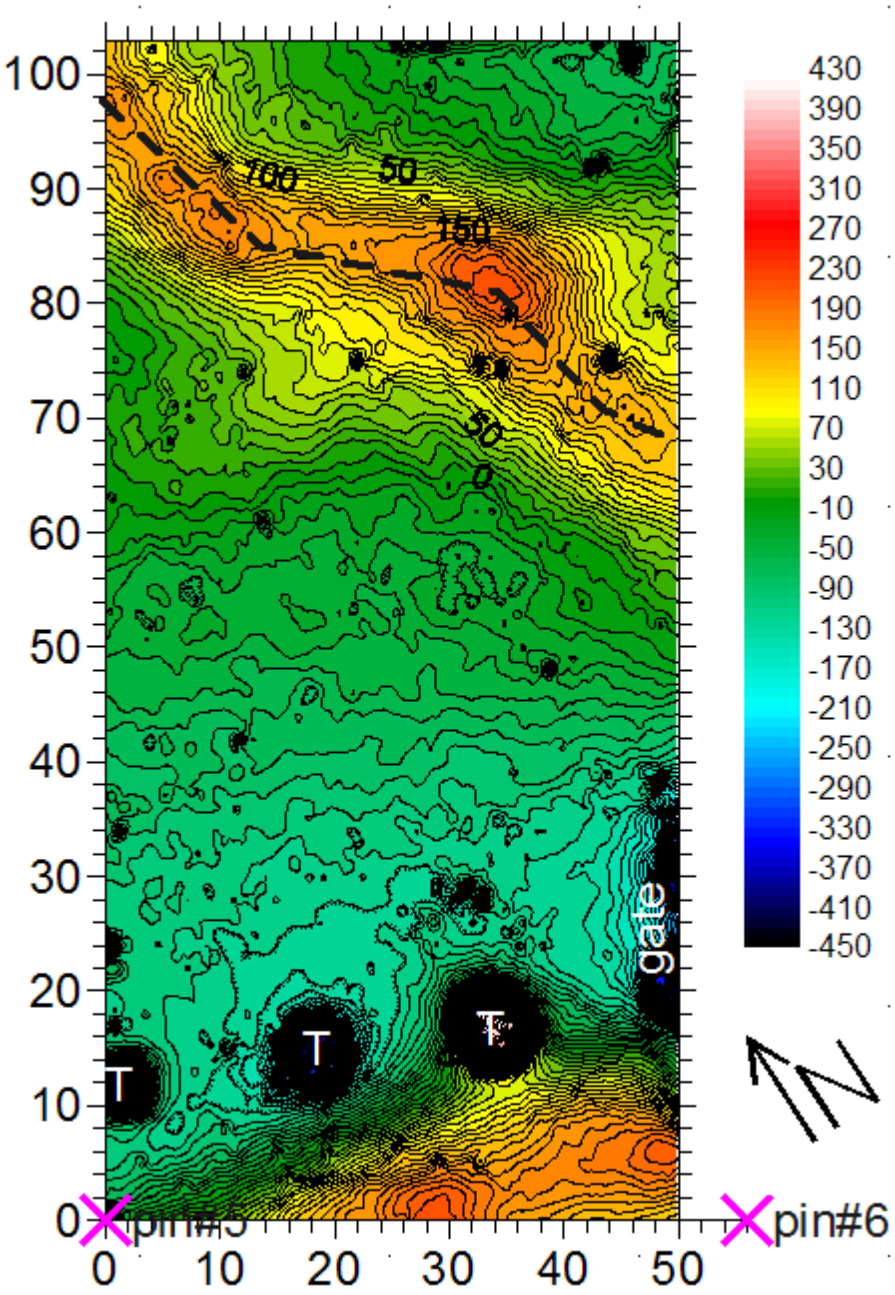


Figure 4, GRID 3. Contoured total magnetic intensity of values for Grid#3 within the first two standard deviations of the mean; results are de-corrugated and have had the ambient field value removed. T's mark the locations of T-stakes, and the effect of the steel gate, which is just east of the grid, is labeled. The dashed black line marks a magnetic high. Horizontal dimensions are meters, contour interval is 10 nT. The lower left corner is at survey pin # 5 and the western edge trends 33o through survey pin #3.

Figures 11-13). As with the previous grids a large magnetic anomaly labeled as X8 (located near the southeast corner) dominates the contour scheme. This high amplitude anomaly indicates that X8 is near the surface and could be a modern refuse burial; X8 will be tested by the excavation of a 1 x 1 m test unit. The three spots labeled X9 appear to be shallow and could be metallic or more magnetic boulders; at least one of these anomalies will be tested by the excavation of a 1 x 1 m unit. The rectilinear dashed blue line may be natural or the result of previous bulldozer work associated with the runway or helipad. A nearby contour point labeled as 10 could be a small natural or cultural feature; a 1 x 1 m test unit will be excavated here.

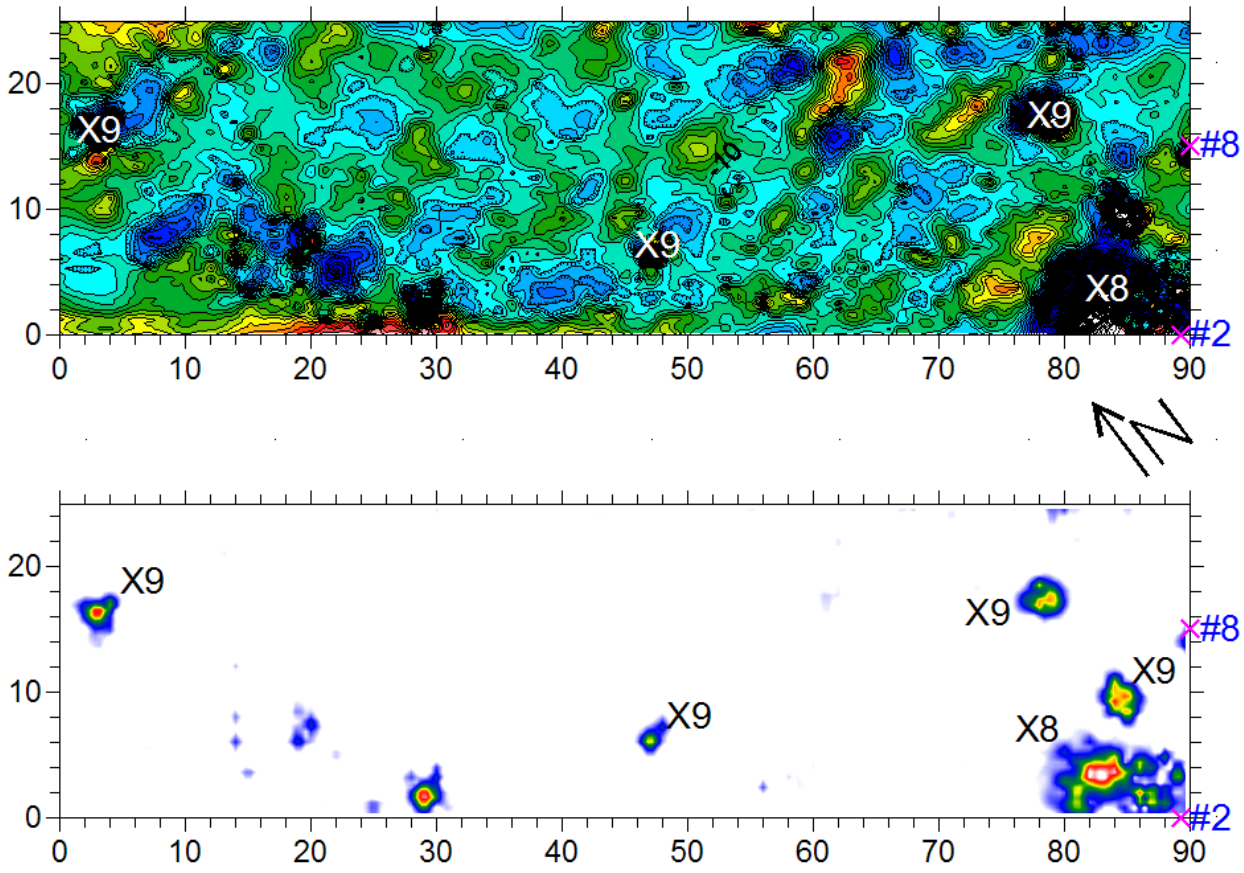


Figure 5, Grid 4. The lower image shows the calculated analytic signal for the upper image. The maximum of the analytic signal is the recommended location for test units. Those maxima not marked with X8 or X9 are most likely associated with helipad construction. The #2 and #8 markers show location of survey pins; horizontal dimensions are meters.

Grid #5 appears to have relatively less disturbance although it has been affected by the fuel shed and tank to the east. No distinct anomalies were encountered although a wooden panel is located near the center of the area (Carlson and Sheriff 2009: Figures 14-15). A rectangle indicates a potential older corral outlined by occasional buried metal such as nails or horseshoes; due to its size it should be tested by a series of postholes aligned with its north/south axis. It is proposed to excavate a series of post holes and then 1 x 1 m unit based on results of post holes. The possibility that this area is less disturbed suggests that it might have relatively better potential for encountering undisturbed natural and cultural deposits. It is therefore also proposed to excavate a 1 x 1 m unit to examine those deposits.

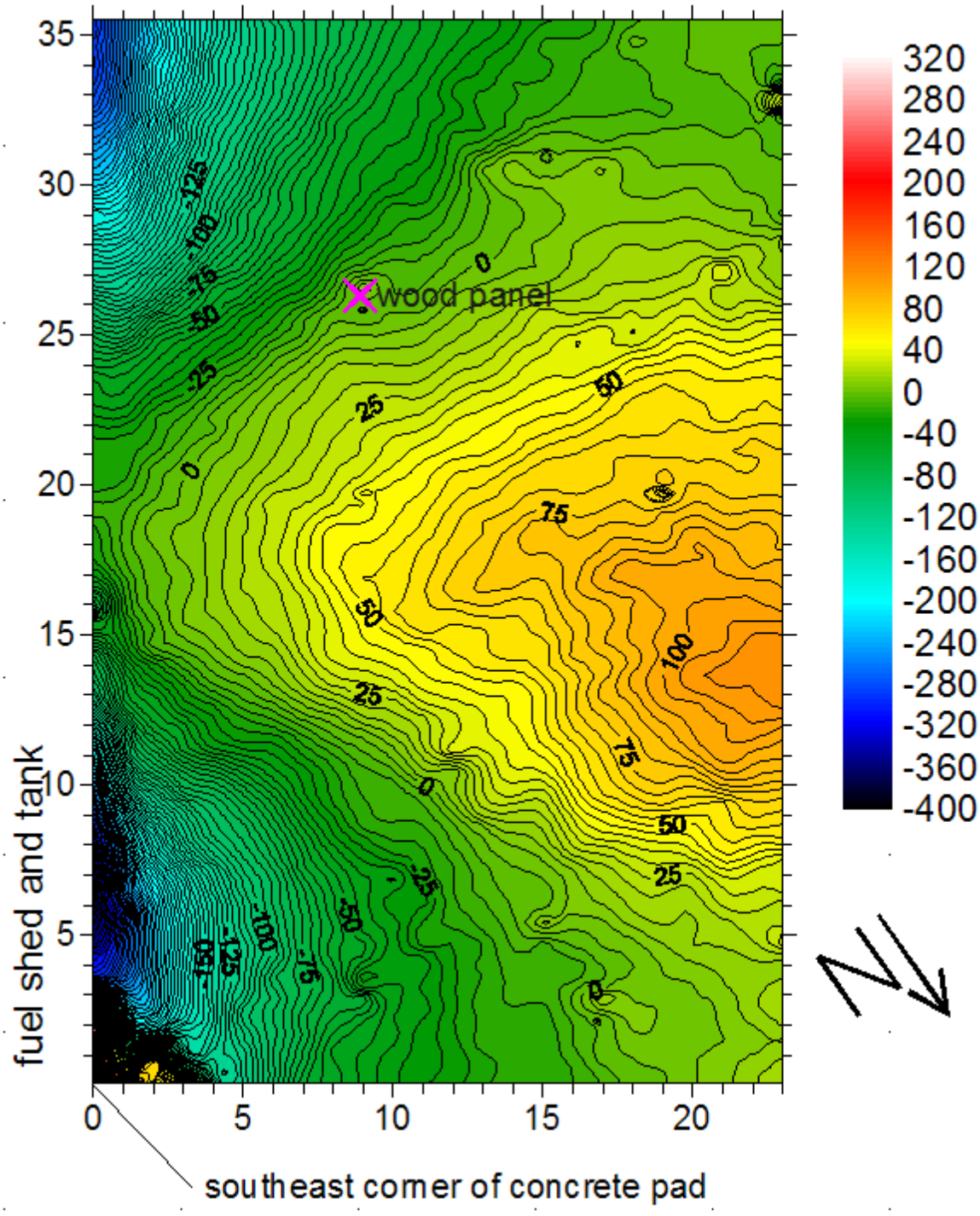


Figure 6. Total magnetic intensity after decorrugation and removal for the ambient field value for Grid#5. The tall axis trends 35$_o$ east of north. Horizontal coordinates are meters; contour interval is 5 nanotesla.

Grid #6 is located near the southwest corner of the study area. It was affected by steel roofs and surface debris but it did not indicate anomalies or obvious locations for testing although scattered small anomalies (from nails?) were noted along the northern

edge (Carlson and Sheriff 2009: Figures 16-17). This grid appears to be relatively undisturbed. Archaeological testing in this area should consist of a series of post holes on a north/south axis that could examine both the vicinity of the small anomalies as well as the apparently undisturbed area. Two 1 x 1 m units should then be placed in each area in order to better understand it.

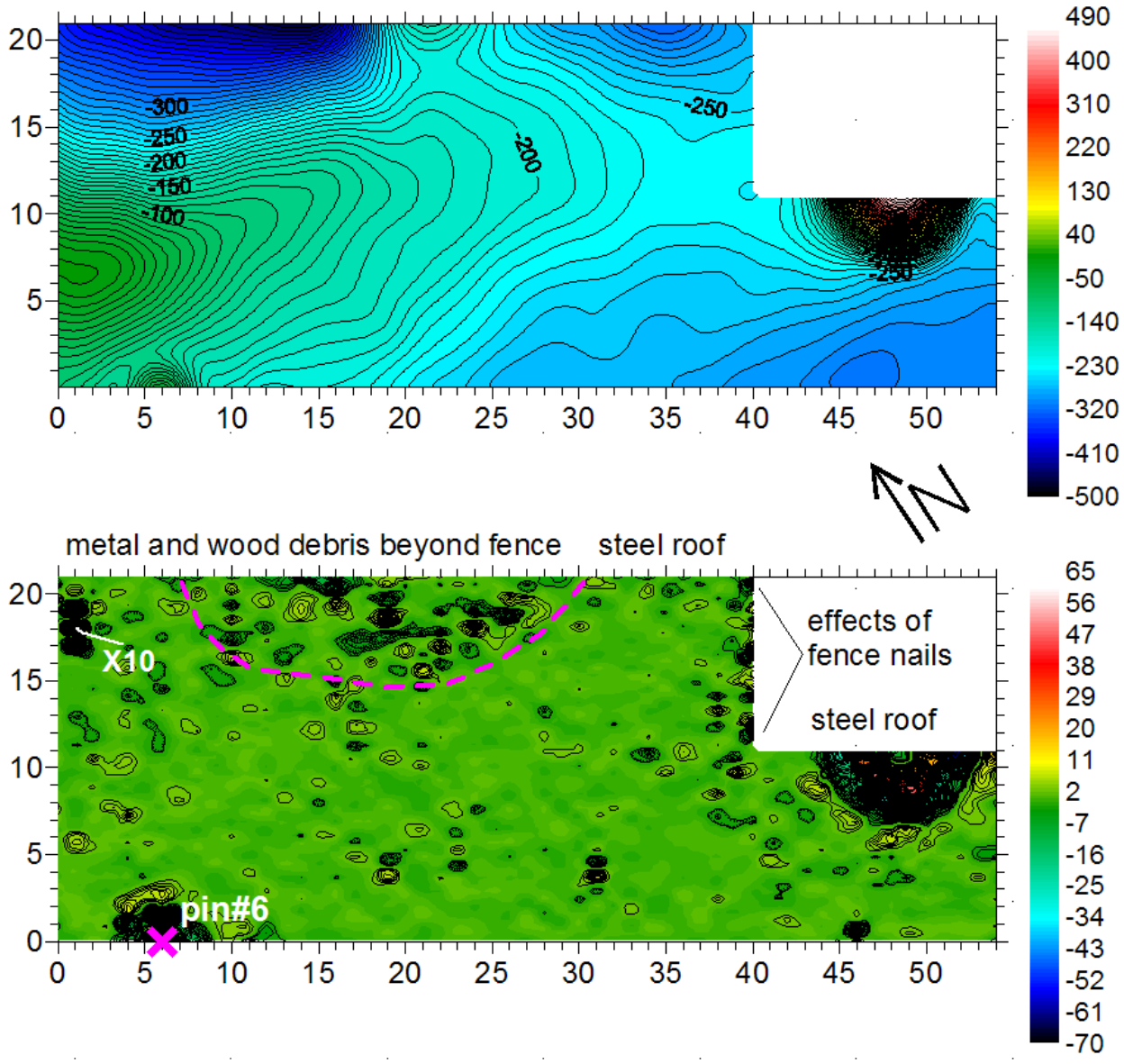


Figure 7, Grid 6. The upper image is the magnetic field from the deeper equivalent source layer after separation by matched filtering; contour interval is 10 nT. Much of the signal in the deeper layer is interference from the roofs, debris, and survey pin affecting a broad magnetic high trending through the grid. The lower image is the magnetic field from the shallower equivalent source layer. The lower image is contoured at 1 nT but the -1, 0, and 1 nT contours are omitted to highlight anomalies with an amplitude greater than 2 nT. X10 marks what is probably a vertical nail or other piece of metal. The magenta line enclose a higher concentration of anomalies from shallow sources, but that area is just south of the long-term debris and junk pile beyond the fence.

Approximately half of the proposed Area of Potential Effect was not examined in the magnetometry and ground penetrating radar study. Although this area had initially been proposed for study using the geophysical survey, an in-field inspection of the area by the contractor and Forest Archaeologist resulted in the decision to concentrate on the areas described above. This decision was based on the presence of the metal sided mobile homes, known subsurface power/water lines and other modern metal features that would have produced such substantial magnetic interference as to completely overshadow any other anomalies that might be related to earlier occupations of the site. It is therefore proposed that after the six grids are examined that post holes, 1 x 1 m test units and monitored backhoe trenches be excavated at specific locations in order to better define site boundaries and areas of prior disturbance. These efforts will also serve as comparisons for units excavated within the grids and could show insights into the natural and cultural history of the terrace.

As indicated above, a backhoe, with an archaeological monitor will be used in the area south of the geophysical survey units, where the Forest is proposing to construct the new bunkhouses. In the event that any human remains are encountered all excavation will cease immediately in that vicinity and the University will contact the Forest Service who will coordinate all necessary consultation with the Nez Perce Tribe, SHPO, law enforcement, and other concerned parties.

The results of the test investigations will be reported to the Forest Service and this information will be used to develop a management plan for the site in consultation with the SHPO, the Nez Perce Tribe, and other parties. This process is necessary for the Forest Service to meet responsibilities stipulated under Sections 106 and 110 of the *National Historic Preservation Act* and the Programmatic Agreement (PA) between the Forest Service and the Idaho SHPO.

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The testing is intended to minimize potential effects, maximize information yield from which additional work, as appropriate may be designed.

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Appendix 2

Total Field Magnetometry and Ground Penetrating Radar Investigations at Kelly Forks Work Center, Clearwater National Forest, Idaho

By

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INTRODUCTION

To support archaeological investigation and assessment we completed six grids of total field magnetic surveys and one supporting grid of ground penetrating radar surveys at Kelly Forks Work Center, Clearwater National Forest, Idaho. The target sources for these surveys were prehistoric and historic cultural materials and features. The site sits on a terrace of high energy fluvial deposits. Thus, one expects considerable overlap of geophysical signals from geologic and archaeological sources for both magnetometry and radar. Further complicating the issue for acquisition of magnetic data in particular is the extensive residential and work center development and construction including underground water, sewer, and electric. Several phases of construction disturbed much of the site. This is a very disturbed site, but one which still yields some useful information.

We used total field magnetometry over magnetic gradiometry as we expect significant spectral overlap from geological and archaeological sources. Gradiometry is common in archaeological investigations because measuring the gradient of the magnetic field isolates signals from shallow sources, those with high gradient short wavelength anomalies, at the expense of longer wavelength signals. Tabbagh (2003) noted that, with appropriate filtering, total field observations can be archaeologically advantageous to measuring the vertical gradient of the magnetic field. Collecting total field observations allows a number of filtering possibilities to accentuate signals from particular sources. Separation filtering and edge detection techniques applied to total field data during processing allows more archaeologically meaningful separation and understanding of anomalies (Sheriff et al., in press). The filtering we find most appropriate and successful for separating sources on or near the ground surface from those buried in the shallow subsurface is matched filtering (Syberg, 1972; Phillips, 2001).

We acquired each total field magnetic grid in essentially the same way with the same equipment at each grid. The same is true for data processing. Thus, we first describe the equipment, considerations of experimental design and acquisition, and finally the processing steps for both techniques. This report then presents the results of that process on the data grids one by one. All the grids are in local coordinates, tied to survey pins or a semi-permanent cultural datum such as a concrete pad.

FIELD AND DATA PROCESSING PROCEDURES FOR THE MAGNETIC SURVEYS

We established six rectangular grids (Plate 1) for acquisition of total field magnetic data, which range from 2,250 m^2 to 5,000 m^2 in area, with pre-surveyed stakes, tape measures, and corner stakes such that the diagonals of each grid matched within a few decimeters. Following establishment of a grid, we acquired total field magnetic intensity observations at 10 Hz while walking bidirectional transects spaced one meter apart using a Geometrics G858 Cesium vapor magnetometer holding the sensor roughly 30 cm off the ground. We guided those transects with an observer at each end of the line. The occasional presence of trees or brush added some acquisition noise to our magnetic acquisition; we remove the vast majority of that noise during processing. Unfortunately, very high amplitude magnetic anomalies in much of the area obscure potentially more subtle signals. The sources for these high amplitude anomalies are from historic construction including water systems, a runway, housing, roads, and their associated construction.

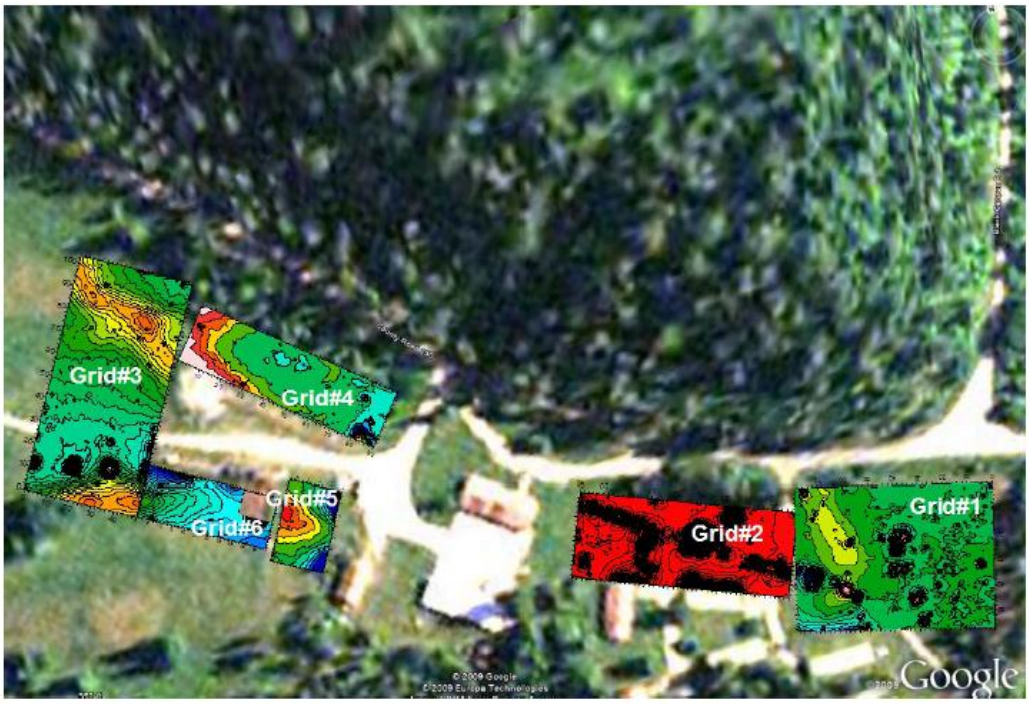


Plate 1. Composite sketch map showing the relative placement of magnetic grids overlaid on a Google Earth image of Kelly Forks Work Center.

We collected our total magnetic field intensity data during a magnetically quiet period as observed by NOAA (NOAA, 2009). The frequency spectrum of diurnal geomagnetic variance is broad. Low frequency components have periods similar to the acquisition time of several field profiles and longer. High frequency components have periods ranging from the time for acquiring a few magnetic observations to that for acquiring a few transects. In the filtering described below, we deal with the possibility of long period geomagnetic variation in combination with that for regional, or geologic, sources. We treat the potential effects of high frequency variance with filtering techniques adapted from the energy and mining industry. This proved successful as is demonstrated by the final maps. The ultimate anomalies of interest have amplitudes of nanoteslas to 100's of nanoteslas.

Our total magnetic field intensity observations, gridded by kriging with four decimeter grid intervals include features at three dominant scales. First, there is experimental and surface noise resulting from acquisition. This corrugation is significant and typical in ground as well as airborne magnetic surveys where observations are acquired at relatively high spatial frequency along more widely spaced transects. Despite the usual efforts to keep the sensor a constant distance from the ground, brush, sticks, logs, rough surfaces, rocks and wind combine to interfere with the operator and impact the distance of the sensor from the ground and vary rates of walking while acquiring observations at 10 Hz. This manifests as linear magnetic anomalies in the direction of acquisition. Urquhart (1988) developed the standard technique in the energy and resources arena for decorrugation filtering. Decorrugating a magnetic map yields a better estimate of anomalies due to other causative sources of greater interest and serves to remove much of the high frequency noise. The second and third scales of magnetic anomalies in this type of study are deeper geologic sources and shallow sources at the

archaeological and/or environmental scale. We often separate these sources into equivalent layers using a matched filtering process as described below.

Decorrugating by Urquhart's (1988) method involves three general steps. The first step uses a low pass frequency filter to separate the grid of data into its short and long wavelength components in the acquisition direction. Next, the resulting long wavelength component of the grid is long-wavelength filtered (again with a low pass frequency filter) in the direction perpendicular to the acquisition direction. It is this direction, perpendicular to acquisition, which contains short wavelength components resulting from variable heights and nonlinear positioning of the sensor during acquisition of the magnetic observations. The low-pass filter removes the short wavelength components perpendicular to the acquisition direction; these short wavelength components result in corrugations observed in the contoured data. This second step yields a smooth long wavelength grid. Finally, add the smooth long wavelength grid to the short wavelength components isolated in the first step. The result is a decorrugated grid.

Iterative experimentation is necessary when separating the grids into short and long wavelength components for decorrugation. The best choice of filter wavelengths is determined by examining successive filtering experiments with increasing wavelengths. If one chooses a long wavelength filter that is too long, then images of the noise will contain too much archaeological or geological information. Examining the decorrugated results allows visual confirmation that you are removing the correct wavelengths. Ultimately, this is subjective image processing and the greater the spectral overlap of signal and noise, the more difficult the decision. We used filter lengths of nine grid samples, on data gridded at 0.40 meter intervals, along and across acquisition lines.

Numerous potential field methods (e.g. Blakely, 1995) exist to attenuate or enhance signals of interest in a magnetic data set. Most of those methods make use of the spatial frequency (or wavenumber) domain following a Fourier transformation of the data. For example, evaluating successive upward continuations (e.g. Jacobsen, 1987) of the total field anomaly to a height of around one to two times the survey's line interval will typically remove the dipolar expression of surface debris at archaeological sites. Upward continuation involves multiplying the power spectrum of the total magnetic field by a filter which decreases exponentially in the spatial frequency domain. Unfortunately, this upward continuation also attenuates high spatial frequency (short wavelength) content beneficial to resolving other features. Thus, we use matched filtering to isolate equivalent potential field layers in the data we acquired.

Matched bandpass filtering is an effective way to separate magnetic anomalies from different depths (e.g., Phillips, 2001). The method is based on equivalent sources (Pedersen, 1991) which are fictional layers, below the observation surface, where the distribution of magnetization produces the observed magnetic field. Spector and Grant (1970) showed that equivalent source layers at different depths yield radially averaged logarithmic power spectra, from gridded magnetic data, with segments of constant slope. These linear segments in the power spectrum represent magnetic sources at similar depths and characterize features at the principal depth ranges of causative sources. Syberg (1972) proposed matching bandpass filters, in the spatial frequency domain, to the characteristic parts of the power spectrum for different features. Filtering the total field magnetic data with the matched bandpass filter extracts the frequencies corresponding to these principal depth ranges. For example, the spectrum of a layer of magnetic dipoles is linear at high spatial frequencies but becomes concave down and achieves a maximum at low spatial frequencies. Fitting a line to the high frequency end of that spectrum and removing that component from the spectrum separates the dipole layer from the remaining signal.

Employing matched bandpass filtering for anomaly separation has a long history (Nabighian et al., 2005) in the application of aeromagnetic data to tectonics, structure, and resource exploration, but not in

archaeology. Anomaly separation by matched bandpass filtering in the spatial frequency domain is successful when the signal (feature) of interest dominates one spectral band of the magnetic field's power spectrum. Generally, there may be a noise layer with low-amplitude high-frequency noise related to acquisition, a layer which corresponds to the surface (or near surface) magnetic sources, and one or more additional layers from deeper magnetic sources. In an archaeological study these may correspond to acquisition and instrument noise, debris on or near the surface, somewhat deeper sources such as foundations or compact living surfaces, and possibly a deeper signal from underlying geological sources. Shallow and deeper magnetic sources dominate the high and low spatial frequency ends of the power spectrum respectively.

The general idea in matched filtering is to fit the radially averaged power spectrum of the total field magnetic data with a series of power spectra corresponding to simple, equivalent layers at the archaeological site. One then uses the equivalent layer information to construct optimal bandpass filters which separate the original magnetic field data into wavelength groups that contain the magnetic anomalies in each equivalent layer. As noted by Spector and Grant (1970) and later workers, the power spectra of these equivalent layers are linear segments in the log power spectrum of the data.

We apply the techniques as described above to each of the data sets acquired for this project. There are subtle variations of empirically determined parameters among the grids, but the process in producing the final maps for interpretation is similar. The successive application of correcting for diurnal variation of the geomagnetic field, filtering to remove corrugation, and then separating the total field observations into equivalent layers yields the final magnetic maps which we interpret below. Sheriff (in review) and Sheriff et al. (in press) further develop these ideas for archaeological applications and draft manuscripts are available on request. In each case we present the final maps which led to the best visualization and/or interpretation of potentially interesting archaeological results.

RESULTS FROM TOTAL FIELD MAGNETIC INVESTIGATION AT GRID#1

Figure 1 shows the total field magnetic intensity (TMI) for grid #1 after decorrugation and removal of the ambient magnetic field value. Very high amplitude and steep gradient anomalies in the central and right hand side of the image dominate the signal and contour scale. These high amplitude signals are not characteristic of geologic sources. Rather, they suggest metallic sources at or near the surface. Some of these sources are known or likely readily observable on the ground. For examples, at x=73, y=38 is from the fire hydrant and associated plumbing which trends up and left (southeast) from the hydrant. The linear anomaly along the upper edge of the image is from the nearby living quarters, demonstrating the impact of residential facilities on magnetic investigations. The large anomalies in the central part of the image (roughly at x= 30 to 40 meters) do not have surface sources though the ground appears disturbed in that area. Due to their high amplitudes and steep gradients, combined with the observation that the anomalies are not connected, they are most likely caused by metallic sources in the shallow subsurface.

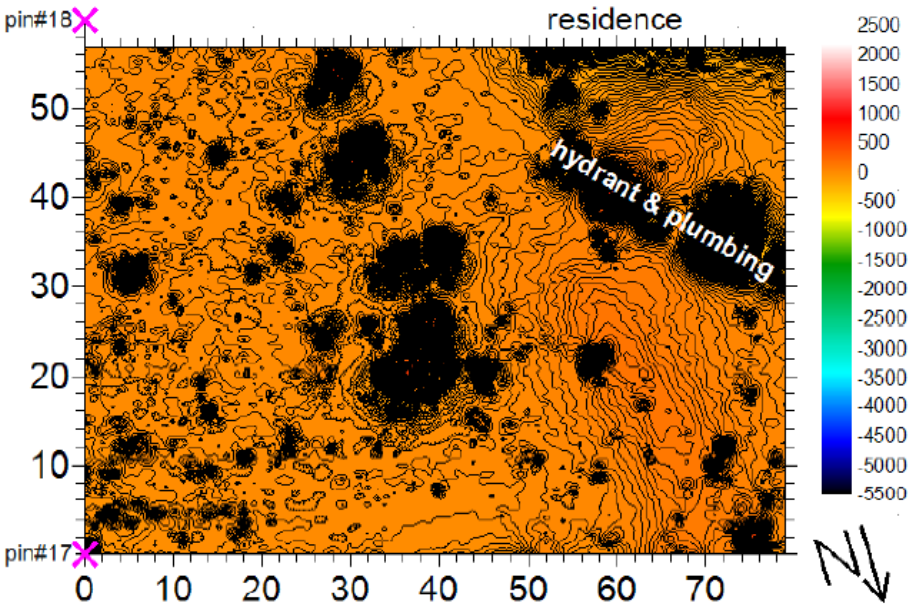


Figure 1. Total magnetic field intensity of Grid#1, after decorrugation and removal of the ambient field value. The position of the known hydrant and associated plumbing is marked, as is the location of a nearby residence which impacts this map. The contour interval is 10 nanotesla (nT); horizontal dimensions are meters. The lower left corner is at survey pin #17 and the eastern (left) edge trends 196.3°, towards pin # 18.

To better isolate more subtle signals from the raw TMI, we removed observations outside the third standard deviation and re-contoured the results (Figure 2). High amplitude signal still dominates the contour scale (Figure 2), but additional features are more readily visible. The dashed magenta lines mark what is probably aligned cobbles/boulders along older trenches or possibly roads. The dashed blue line marks the center of a lower-gradient magnetic high which is geologic in character and scale.

Both the previous figures show the strong anomalies in the central portion of the maps. Because they appear isolated from each other and have very high amplitudes and steep gradients, they may be

buried debris from older iterations of the Kelly Forks work center or its depression era predecessor. As each of these anomalies likely has the same type of source, they are all labeled 'X1' on Figure 3. The dotted magenta lines on Figure 3 show the maxima in the horizontal gradient of these anomalies. Those maxima, the magenta lines, mark the best place to excavate and test the source of the anomalies if they do not appear on recent facilities maps. The unlabelled magenta lines on Figure 3 are related to known sources (T-stake, hydrant, and plumbing) or the edge of the supposed geologic source for the broad magnetic high in the lower right of that image.

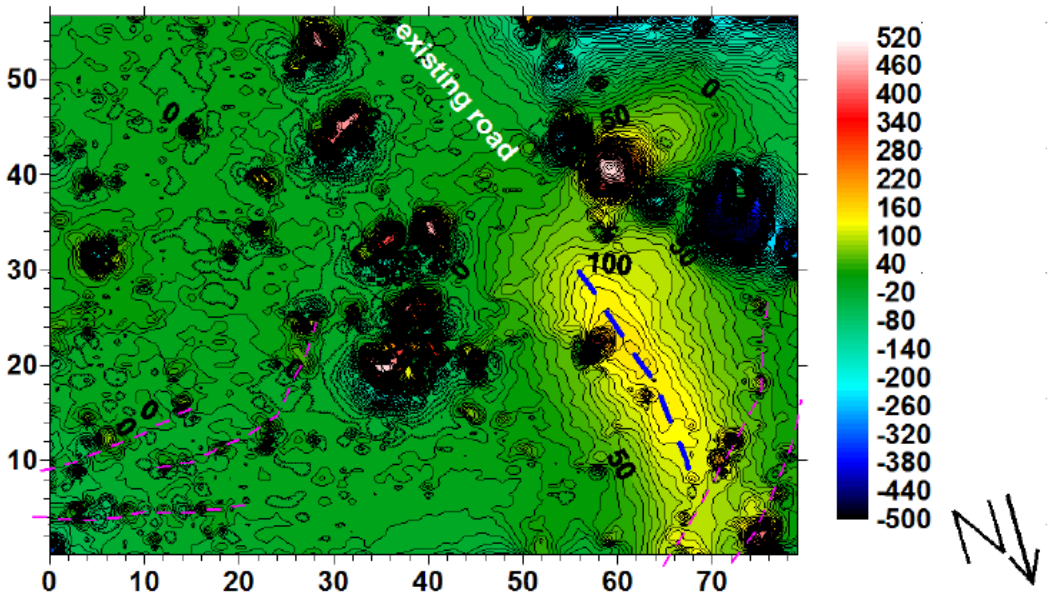


Figure 2. Total magnetic field intensity after removal of observations outside the third standard deviation. Magenta lines mark probable edges of old trenches or roads. The dashed blue line marks a magnetic high which probably has a geologic source. The contour interval is 10 nanotesla (nT); horizontal dimensions are meters. The lower left corner is at survey pin #17 and the eastern (left) edge trends towards pin # 18.

Layer separation, as discussed in the introduction, serves to help isolate additional, smaller sources in the area of Grid#1. To best isolate features beyond those discussed above, we separated an intermediate depth equivalent layer and calculated the analytic signal (Roest et al., 1992) for that layer (Figure 4). The anomalies labeled X2 (Figure 4) all have the same character and all are probably from vertical metal pins or stakes in the shallow subsurface. The three marked to the right have normal magnetization; the lower one on the left has reversed magnetization. That at least one has reversed remanence argues for a metal source. These could be located exactly with a metal detector and excavated with a shovel to determine if they are recent or historic artifacts.

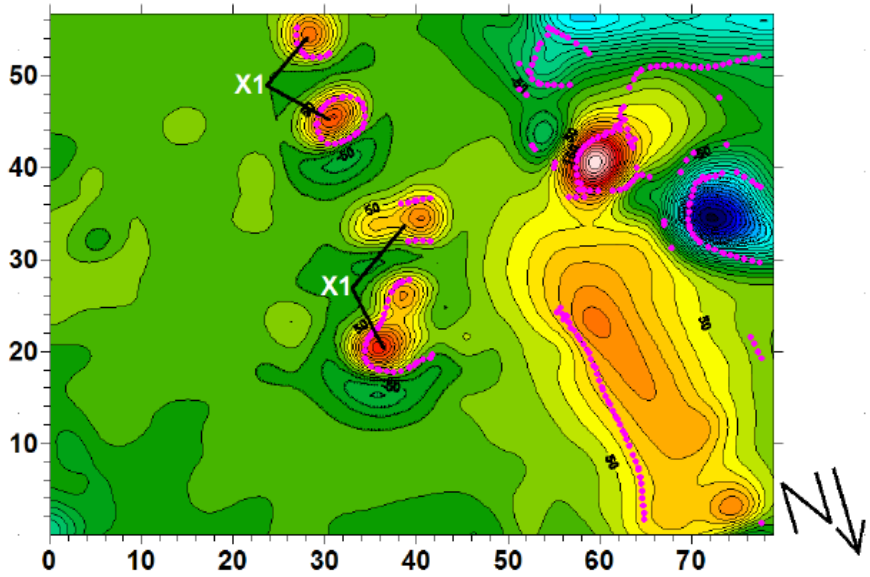


Figure 3. Total magnetic field intensity from a deep equivalent layer. The dashed magenta lines mark the maxima in the horizontal gradient of the sources labelled as X1. Those maxima indicate the best place to excavate to test the features. Those magenta lines in the upper right, not labelled with X's, are from known features. The large high in the lower right probably has a geological source. The contour interval is 20 nanotesla (nT) to help highlight the anomalies; horizontal dimensions are meters. The lower left corner is at survey pin #17 and the eastern (left) edge trends 196.3°, towards pin # 18.

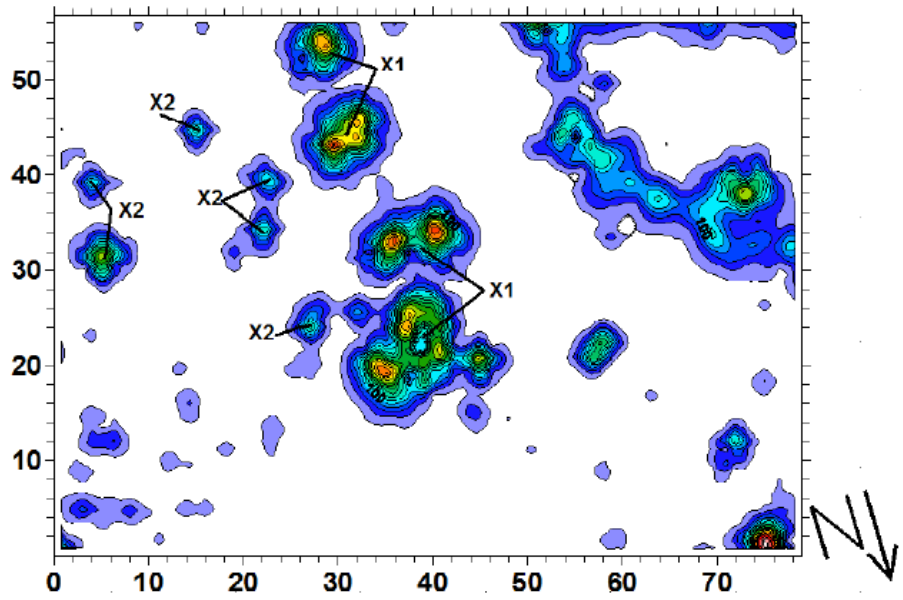


Figure 4. Contour of the analytic signal of an intermediate equivalent layer, Grid #1. The X2's mark the location of a class of similar anomalies, probably from shallow vertical metal stakes or survey pins. horizontal dimensions are meters. The lower left corner is at survey pin #17 and the eastern (left) edge trends 196.3°, towards pin # 18.

RESULTS FROM GROUND PENETRATING RADAR INVESTIGATION AT GRID#1

Following inspection of the magnetic data and surface disruption caused by cultural activity, we collected a detailed grid of ground penetrating radar (GPR) data in the northeast section of magnetic grid #1. This area was the least disturbed and the one grid which did not show a number of interesting features related to cultural activity on the magnetic maps.

We completed the GPR survey with a Mala Ramac unit equipped with a 500 MHz shielded antenna system mounted on a nonmagnetic cart. We collected individual traces every 0.05 meters along 58 parallel 30 meter transects oriented perpendicular to the line connecting survey pins #17 and #18; this line has an azimuth of 16.3° as measured by the surveyor. We set our compass declinations to 15.5° to match this azimuth within Brunton compass accuracy when measuring the easternmost surveyed baseline. The transects are parallel to an azimuth of 106°, and the signal is stacked 8 times for each trace. One half meter separates individual transects in the grids. The central power of reflections, determined by Fourier analysis, occurs at about 315 MHz. Using a velocity of 0.1 meter/nanosecond as determined by measuring several diffraction hyperbolae the dominant wavelength of investigation is about 0.3 meters. Coupling of this wave with the ground occurs in the upper 0.5 meters; good reflections are expected from deeper than the coupling zone.

GPR data requires substantial processing to get the most information out of the data. Typically, individual profiles are analyzed and iteratively processed with different parameters to determine the most suitable filter parameters for the situation. The ensemble of profiles is then batch processed and the data analyzed as a 3D volume. Then, one produces a myriad of time slices to determine the best window lengths and starting times to best bring out reflection features of potential archaeological interest. The sequence of processing steps for each line is:

- Dewow the data with a 1D filter to remove periodic signal related to the fundamental antenna frequency
- Remove the DC datum from each trace to center said trace around zero; electronic drift creates DC shift
- Bandpass filter the data to exclude extraneous noise outside the antenna spectrum using the measured frequency of the GPR response
- Apply a gain (amplification) function to each trace to account for signal loss with depth and time and to optimize imaging of signals from about 2.0 meters and shallower
- Pick an early maximum in the resulting signal and flatten that phase in time. This helps eliminate some of the noise interjected by acquisition over a rough ground surface.
- Migrate the data, using an average velocity determined by examination of diffraction hyperbolae, to place reflections closer to their true position in a depth section
- Implement a running average across several samples and traces to smooth the results and further remove noise.

Completion of the above processing steps yields individual profiles (radargrams) ready for 2D interpretation. Combining the 2D results into a 3D data volume allows the calculation and interpretation of time slices which are map views of the data. Time slices, which typically average signal over 5-10 nanoseconds, are often particularly useful in archaeological studies with subtle signals.

In keeping with the aim of this study to provide results for guidance of ongoing field work, we present the pertinent results below. Figure 5 shows the general orientation of the GPR data volume; 58 profiles parallel the north edge of magnetic grid#1 and are successively offset by 0.5 meters southward into the grid to ultimately cover a 30 x 28.5 meter area. The 500 MHz antenna and subsequent processing yield images of features to a depth of about two meters.

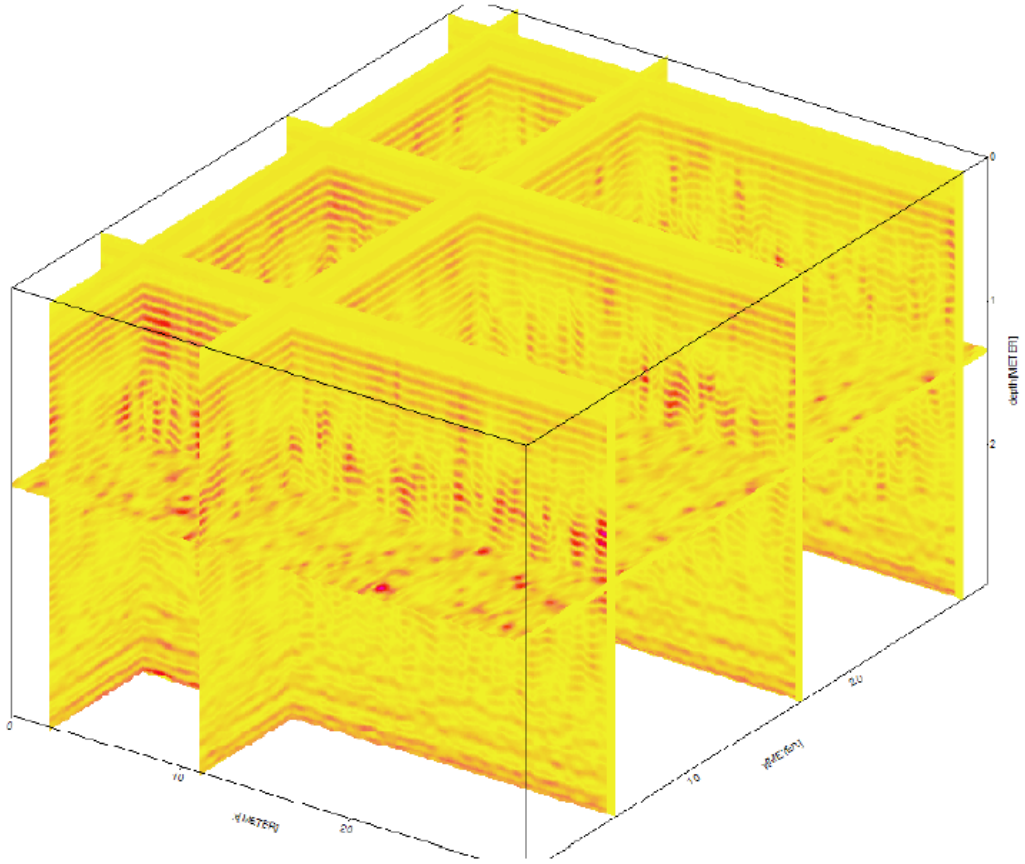


Figure 5. GPR data volume presenting three profiles in the X (E-W) direction, two interpolated profiles in the Y (N-S) direction, and one time slice to show the general geometry of profiles (vertical sections) and time slices (horizontal maps). Warmer (more red) colors depict higher amplitudes.

Ultimately, the best time slice results (Figure 6) are from time slices at a depth of about one meter. The top set of images (Figure 6) start at 22 nanoseconds (ns) into the profiles and sum the absolute value of the reflections over 7 ns. The bottom set of images start at 21 ns and sum the absolute value of the reflections over 8 ns. Using the empirically determined velocity of 0.1 m/ns, both sets of images (top and bottom) start near one meter in depth and integrate about two thirds of a meter of signals. The depths of these sections are not necessarily the depths of the features; these are simply the best time slices we could produce. There is some evidence of the same reflections shallower in the profiles but the time slices are not as good due to interference from surface scatter and shallower reflectors.

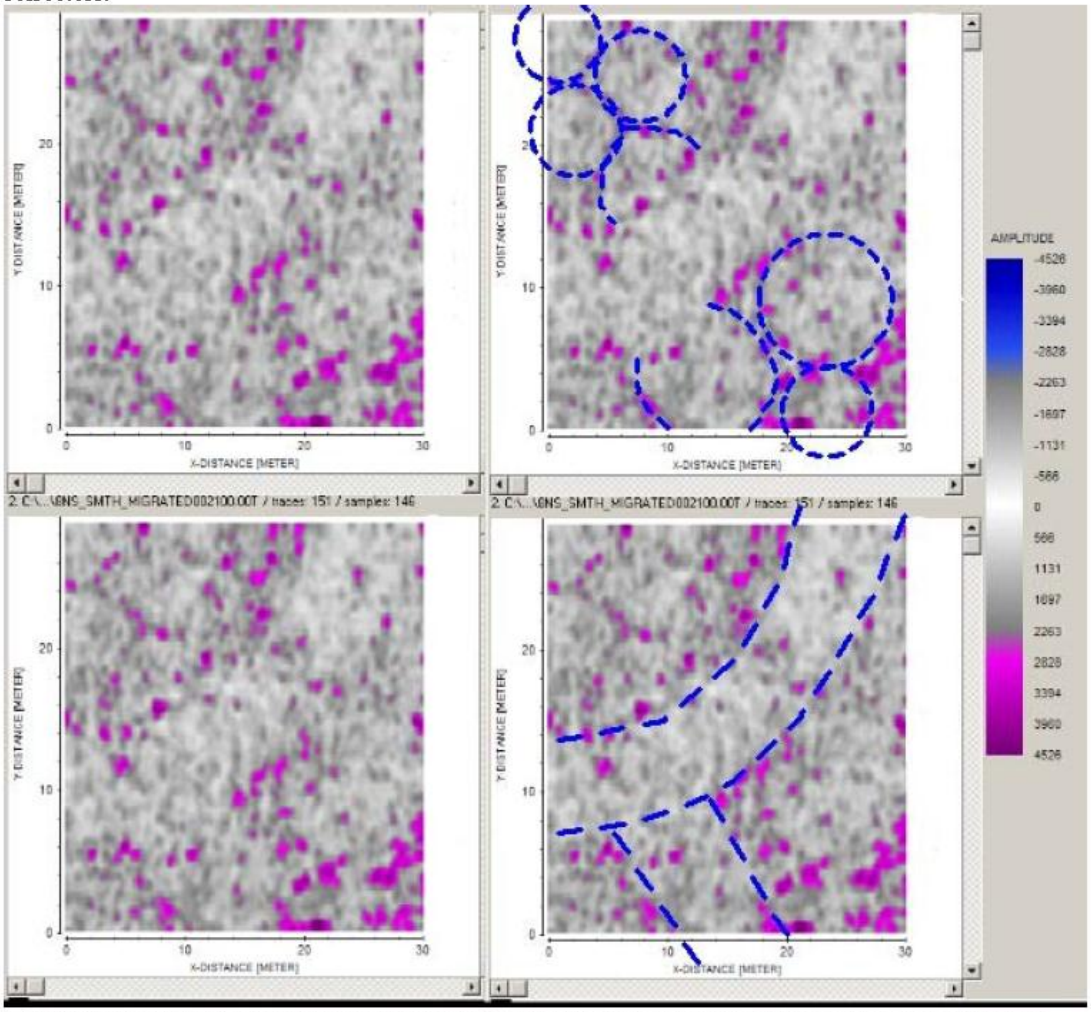


Figure 6. Two time slices (map views of summed amplitudes) from the GPR data volume. The origin (lower left) for these images is at survey pin #17 and the view is with south at the top; the horizontal axis trends 106°. The right hand image set is an interpreted version of the left set. Both images start at just over one meter in depth. The shallowest evidence of the circular features is about 75 cm. The feature marked on the lower right image looks like it could be a trench or old roadbed. Notably fewer reflections than the adjacent areas define the road-like feature which has a distinctly cultural geometry. It shows up slightly earlier (more shallow) than the circular features and truncates them. South is up in this image; the lower left corner is at survey pin #17 and the left (east) edge bears directly towards pin#18 as with magnetic grid#1.

Two classes of interesting reflections are immediately apparent on the time sections presented in Figure 6. Of those two classes, the circular features in the upper right image are the more speculative. However, the high reflection amplitudes interpreted as circular show up on a number of trial time slices and even on some non-summed slices (e.g. the NW corner of Figure 5). They may not be true circles, but they are reflections and their layout, or geometry, is much more cultural in appearance than natural. The circular interpretation at (x=24, y=2) is a bit more prevalent in most time slices than the others. The feature highlighted in the lower right image looks like an old roadway. It is expressed as a change in character as it is a non-natural shaped zone of fewer reflections inside it than outside. The additional high amplitude reflections at the edges of the road could be from rocks pushed to the side during use or construction. The feature is difficult to see in 2D profile (e.g., Figure 7). In some cases it seems to cause some absorption of radar waves, perhaps from concentrated clays, which results in lower amplitude reflections beneath it than in adjacent areas. It does not look like a deep trench in 2D although many profiles across or along it show some disruption of reflectors.

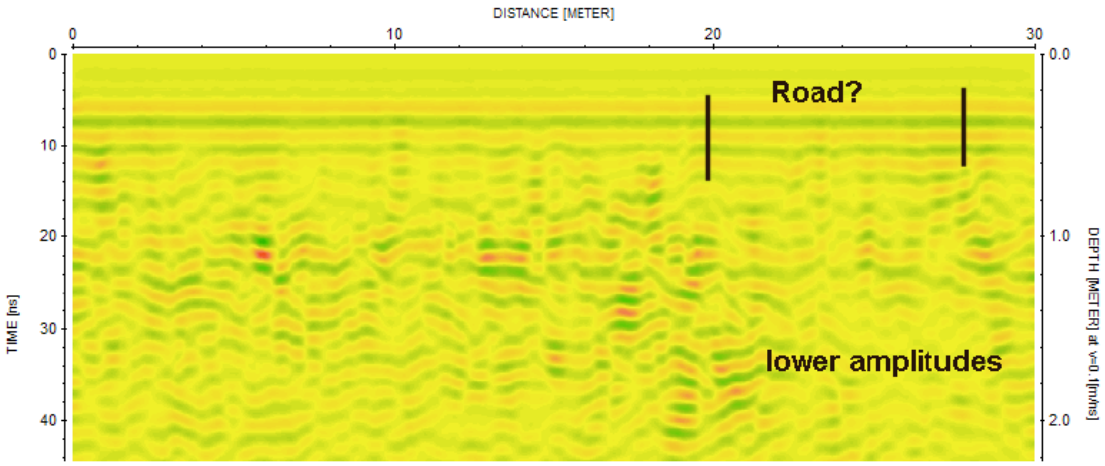


Figure 7. GPR profile #156 at 28 meters in the GPR volume; view is looking south. This is representative of the individual profiles. It shows discontinuous packages of reflectors characteristic of depositional packages in high energy fluvial environments. Diminished reflections beneath the interpeted road could result from a concentration of finer materials on the road bed.

In summary, time slices generated from the GPR volume contain interesting features that are not apparent in the magnetic data in which signal from shallower sources dominates the results. The magnetic data (Grid#1) in the GPR area show what are most likely metal tent spikes and an alignment of rocks from the modern road to the north. The GPR data show what is probably an older road or route to the area of the 1930's camp and some deeper speculative, yet provocative, circular features that may be prehistoric houses.

RESULTS FROM TOTAL FIELD MAGNETIC INVESTIGATION AT GRID#2

The total magnetic field intensity of Grid #2 (Figure 8) is almost completely dominated by magnetic signal from modern plumbing and residences, the amplitude of which dominate the map. The whole grid area is disrupted by relatively recent construction which includes hydrants, a basketball court, manhole cover to water valves, a propane tank, nearby residences, and two modern roads which cross the grid N-S.

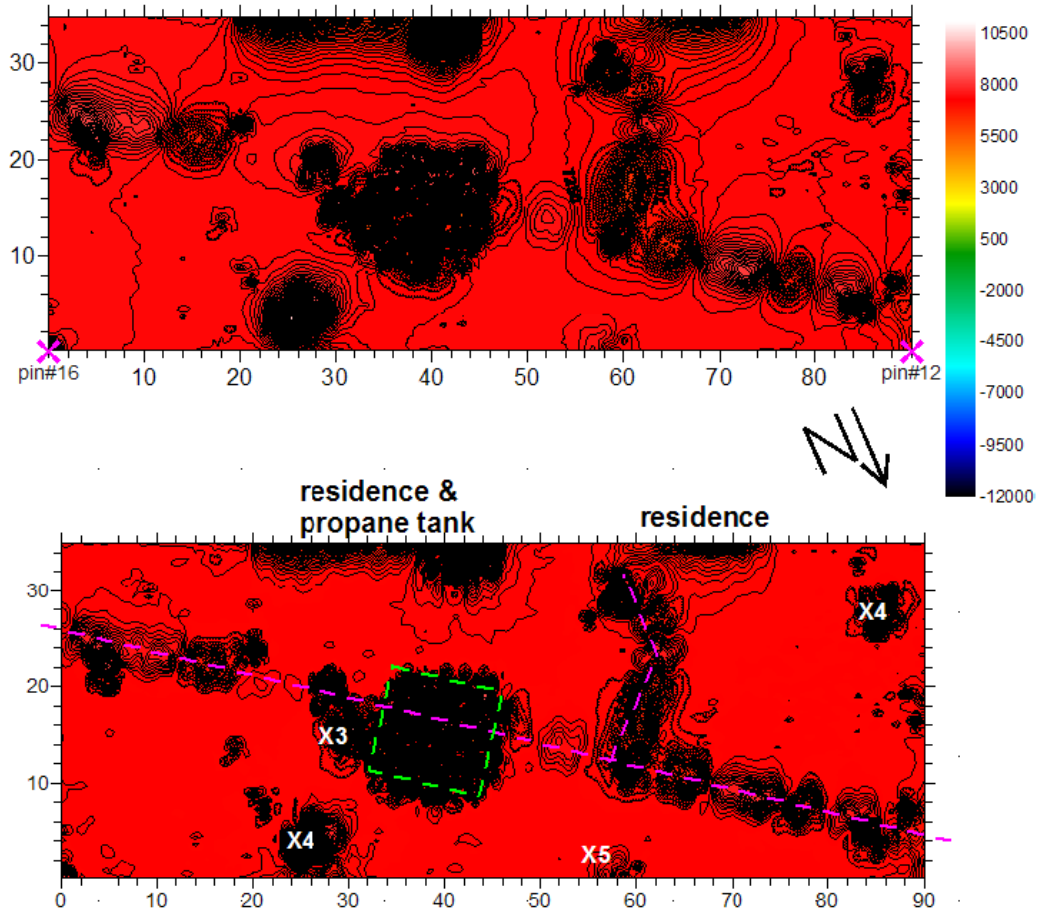


Figure 8. Total magnetic intensity (upper figure) of Grid#2 contoured at 50 nanotesla; horizontal dimensions are meters. On the lower image, dashed magenta lines mark anomalies from the plumbing, the dashed green box the basketball court, and X3 the manhole cover. Neither anomaly marked X4 has an obvious surface source but they have the same character as the others suggesting they are from modern disruption. The lower left (NE) corner coincides with survey point #16; the lower (north edge) trends 293° to pin #12.

On figure 8, the dashed green box is the basketball court, the dashed magenta lines show the plumbing and hydrant system, and X3 marks a manhole housing metal valves and pipes below frost depth. The high gradient anomalies at the upper (southern) edge are from the nearby residences. Neither feature marked X4 has an obvious surface source. However, the X4 at the lower left shows

relatively recent surface disruption from excavation and both have the same character, in amplitude and gradient, as the plumbing features. X5 at the north edge of the grid is near survey pin#15. The other distributed smaller anomalies are independent and probably from surface scatter. One modern, existing gravel road trends through the lower left of the image (Figure 8), the other passes just west of the basketball court.

RESULTS FROM TOTAL FIELD MAGNETIC INVESTIGATION AT GRID#3

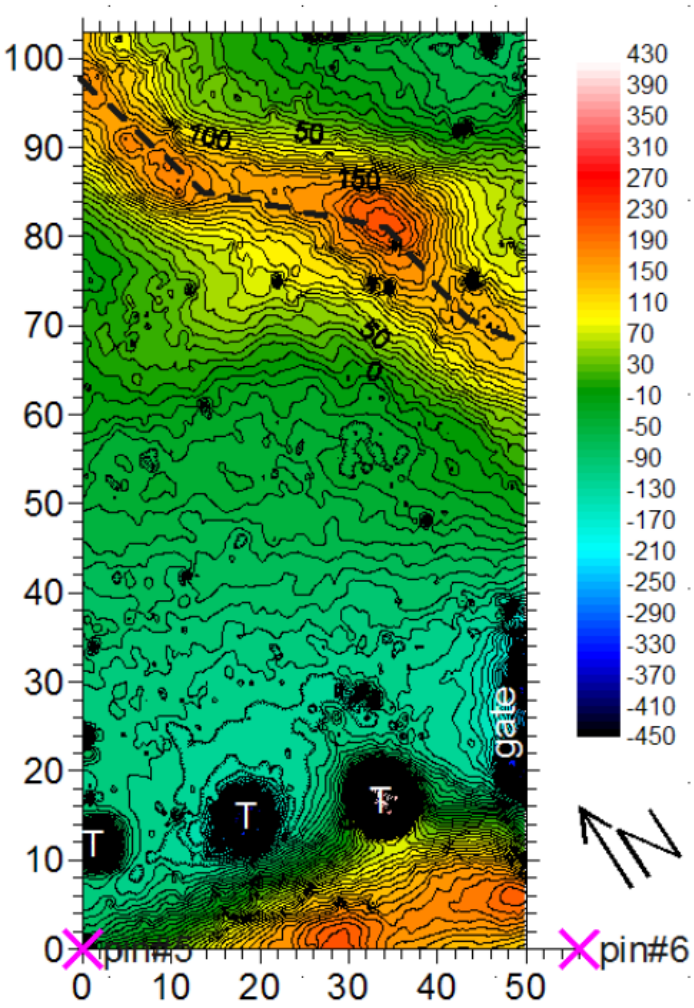


Figure 9. Contoured total magnetic intensity of values for Grid#3 within the first two standard deviations of the mean; results are decorrugated and have had the ambient field value removed. T's mark the locations of T-stakes, and the effect of the steel gate, which is just east of the grid, is labeled. The dashed black line marks a magnetic high discussed in the text. Horizontal dimensions are meters, contour interval is 10 nT. The lower left corner is at survey pin #5 and the western edge trends 33° through survey pin #3.

The total magnetic intensity (TMI) results for Grid#3 (Figure 9) are dominated by the signal from three T-stakes not removed from the ground and partially by the steel gate at the southeastern edge. Consequently, we removed all observations outside the second standard deviation which greatly reduces the impact of the T-stakes (Figure 9) but does not alter the remainder of the data. The dashed black line on Figure 9 follows a narrow magnetic high which trends southeast from the northwest corner across the map. This feature is probably geologic but it does have an enigmatic geometric

pattern to it as well; however, most trenches would probably be straighter. A magnetic high with the same character at the south end of the map continues through grids #5 and #6 (Plate 1).

An old runway runs across this grid somewhere. We assume the runway was partly constructed and partly simply bladed out of existing terrain and expect a broad, low gradient magnetic anomaly from that disturbance. In an effort to find a magnetic signal from that cultural feature, we separated the total field data into three equivalent magnetic layers. We refer to these layers, theoretically corresponding to roughly 6 meters, 1.5 meters, and 0.5 meters deep, as deep, intermediate, and shallow respectively. The deep equivalent layer, which contains the information from deepest and most widely distributed sources, has a subtle magnetic high, marked by dashed magenta lines on Figure 10, which could easily be that of the runway.

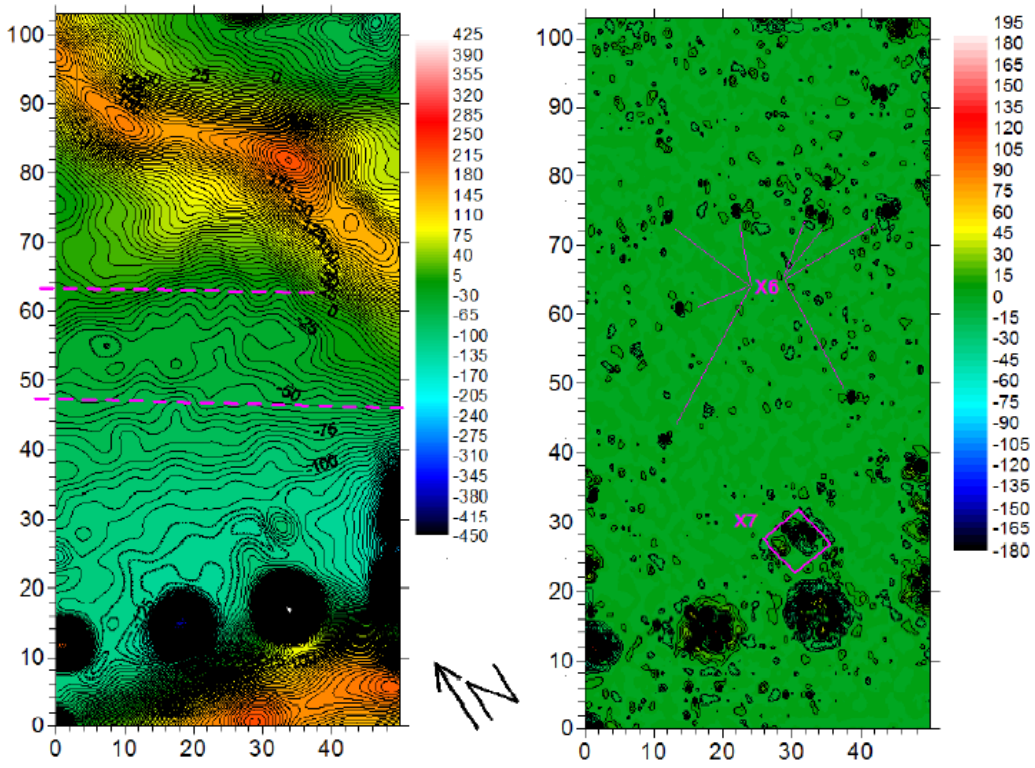


Figure 10. The left image is from Grid#3's deep equivalent source layer; the dashed magenta lines mark the interpreted edge of the old runway. The right image is the remainder after the deep source layer is removed from the total field. On the right image X6 marks anomalies with amplitude greater than 5 nT. Each is from an isolated dipolar source, likely a single rock or piece of metal at or near the surface. X7 marks an area north of a T-stake that has a vague rectilinear shape and is larger than those marked as X6. Horizontal dimensions are meters. The lower left corner is at survey pin # 5 and the western edge trends 33° through survey pin #3.

A number of randomly distributed dipolar sources in the central part of Grid #3 are marked with 'X6' on Figure 10. Their sources are probably individual pieces of old equipment or perhaps rocks. However, during acquisition cobbles on the ground rarely produced much of a magnetic signal. X7 marks a larger, high amplitude anomaly with a near rectangular shape. It may mark a subsurface feature but it is very close to the T-stake and on the existing road. The long magnetic high in the

northern part of the grid, the runway in the central part, and the T-stakes to the south dominate this grid.

RESULTS FROM TOTAL FIELD MAGNETIC INVESTIGATION AT GRID#4

Figure 11 shows the total field intensity for Grid#4 after decorrugation and removal of the ambient field. The origin for Grid#4 is tucked between the helipad and the fence to the west; lines on the first 20 meters or so of this grid start on the constructed helipad. On that figure, the dashed magenta line shows the area generally impacted by the magnetic effects of the helipad. The location of survey pins #2 and #8 are also on the figure; pin#2 is 0.75 meters into the grid on the base line. Thus, this grid does not use a survey pin at its origin. As with the preceding grids, a large magnetic anomaly with high amplitude and steep gradient at the southeast corner dominates the contour scheme. Thus, we removed observations outside the second standard deviation, regridded the data, and present the results in the bottom image of Figure 11 to allow better visualization of the total field data.

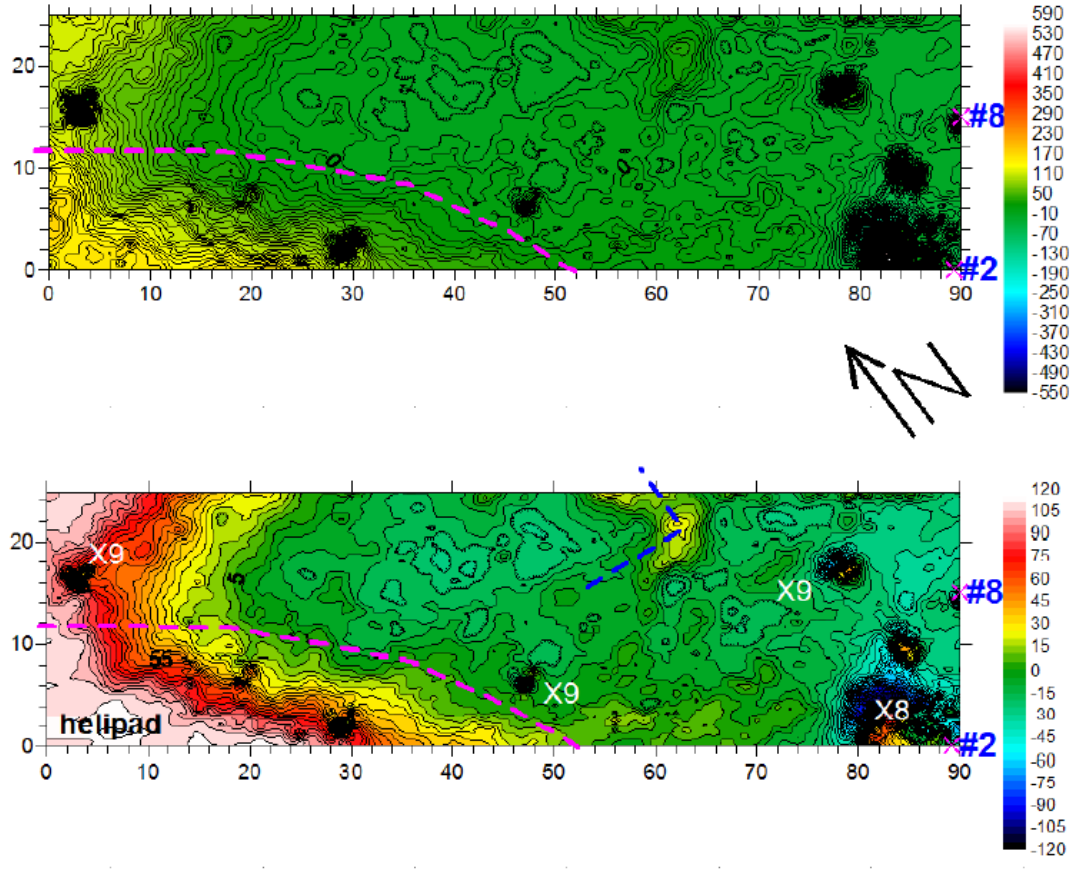


Figure 11. The upper image is the total magnetic intensity following decorrugation and removal of the ambient field value. The lower image is the same after removal of observations outside the second standard deviation; both are contoured at 5 nT. The dashed magenta line shows the approximate edge of the impact of the helipad. X9 marks dipolar anomalies from shallow sources, X8 marks a likely refuse or debris burial. The blue dashed line highlights a suggestive N-S, E-W fabric in these data. Horizontal dimensions are meters; #2 and #8 mark survey pins.

Several anomalies, at various scales, are apparent on the lower image of Figure 11. First, the magnetic high associated with the constructed helipad (dashed magenta line) appears to wrap around the end of the grid to the north-northeast although that area is not part of the constructed helipad surface. The magnetic high is so highly correlated with the helipad that it is difficult to imagine that the pad is not the source for the southern part of the magnetic high. Perhaps the continuation to the north is coincidence or maybe, by happenstance, the helipad is on a geologically scaled anomaly. The dashed blue line marks a rectilinear magnetic high that is consistent with a general E-W, N-S trend in much of the grid which may be natural, or result from bulldozer work during construction of the runway and/or helipad. X8 marks a high amplitude anomaly at the southeast. The size, amplitude, and gradients of X8 suggest a near surface source, perhaps a modern refuse burial. The X9's indicate dipolar anomalies of modest size. Each X9 will have a near surface source which is probably metallic; cobbles in the area were not giving notable magnetic responses during acquisition but there may be some more magnetic cobbles/boulders shed into the alluvium. To help pin point the location of these sources and separate the impact of the longer wavelength features such as the helipad magnetic high, we separated the total field magnetics into equivalent layers for further analysis.

Figure 12 presents the total field magnetics separated into long and short wavelength components, corresponding to deep/distributed and shallow sources respectively. The upper image shows the magnetic field from the deeper equivalent source layer. The lower image shows the magnetic field for the shallower equivalent source layer in which the N-S, E-W trend noted previously is apparent.

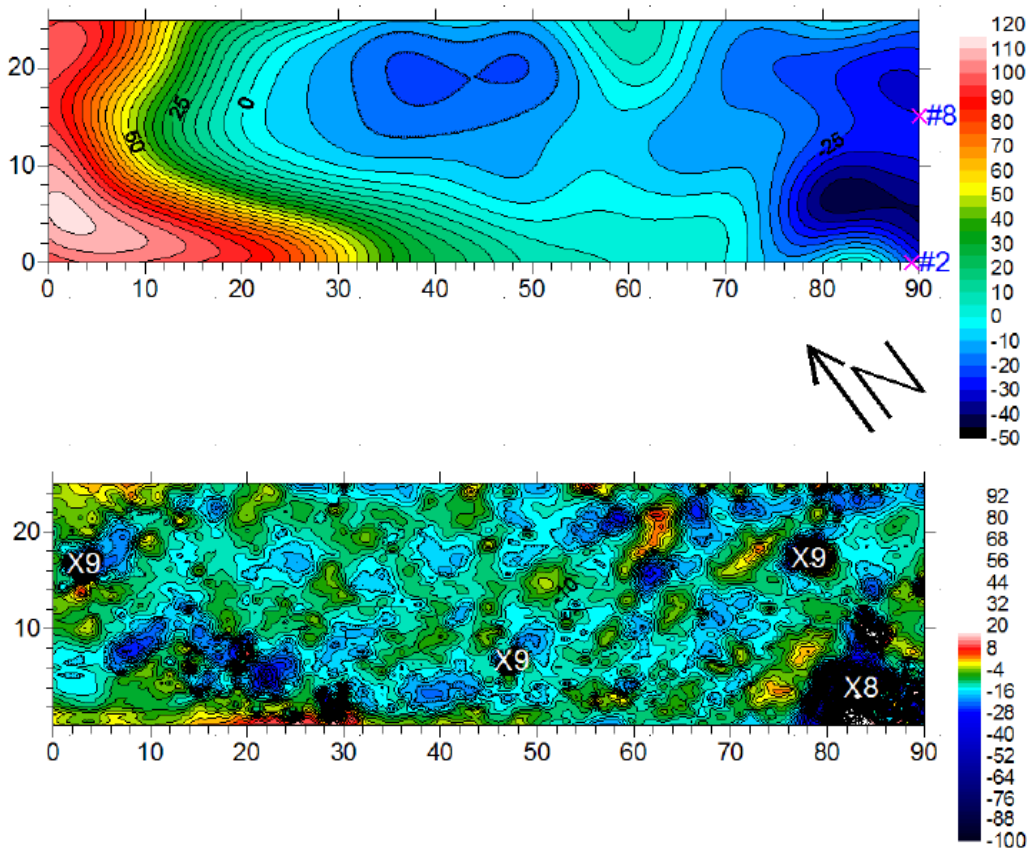


Figure 12. Separation of the total field magnetic intensity of Grid#4 into deep (upper image) and shallow (lower image) layers. Note the compression of the color scale to enhance visualization. X9 marks dipolar anomalies from shallow sources; X8 marks a likely refuse or debris burial. The feint N-S, E-W rectilinear pattern note above is apparent. Horizontal dimensions are meters; #2 and #8 mark survey pins.

Figure 13 shows the magnetic field for the shallower equivalent layer in the upper image and the calculated analytic signal for that field in the lower image. The lower image shows the calculated analytic signal for the upper image. The maximum of the analytic signal is a best estimate at the horizontal location of the source which causes the magnetic anomaly. Thus, the maximum of the analytic signal is the recommended spot for test units to investigate the sources for these anomalies. Those maxima not marked with X8 or X9 are most likely associated with helipad construction.

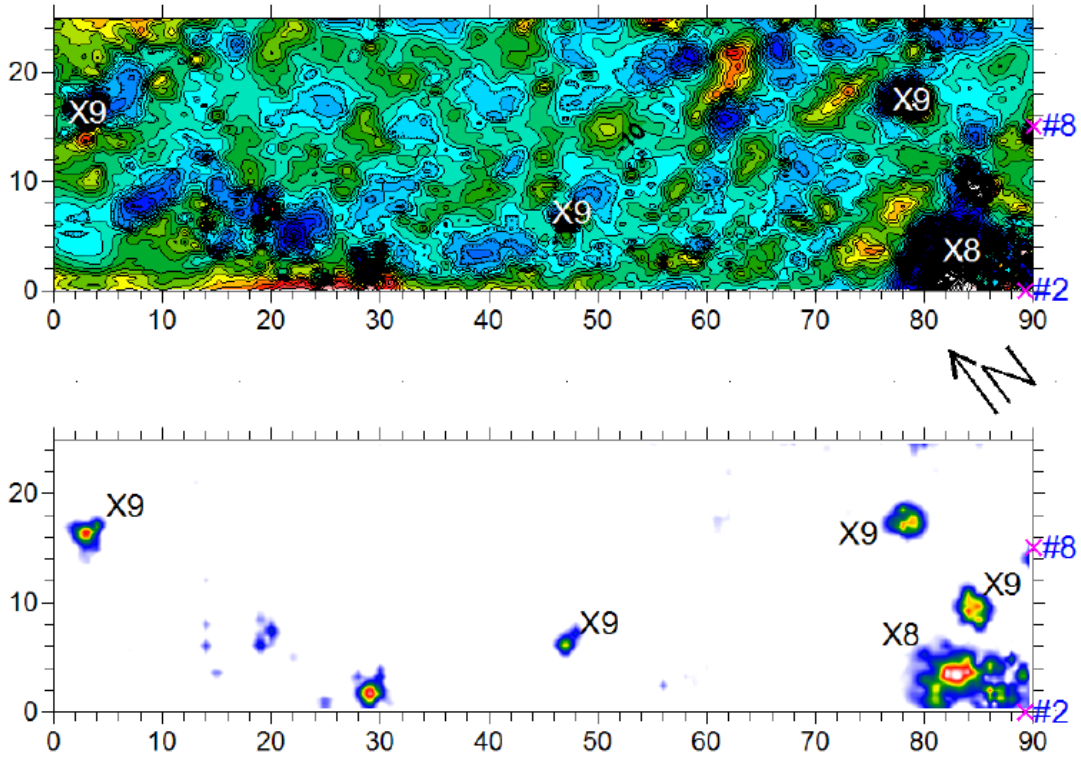


Figure 13. The upper image is equivalent to the previous figure. The lower image shows the calculated analytic signal for the upper image. The maximum of the analytic signal is the recommended location for test units. Those maxima not marked with X8 or X9 are most likely associated with helipad construction. The #2 and #8 markers show location of survey pins; horizontal dimensions are meters.

RESULTS FROM TOTAL FIELD MAGNETIC INVESTIGATION AT GRID#5

The origin for Grid#5 (Figure 14) is at the southeast corner of the unoccupied concrete pad west of the fuel shed and fuel tank and east of the corrals; The meteorological station is 6.5 meters south of the grid. A vertical wooden panel stands within the grid.

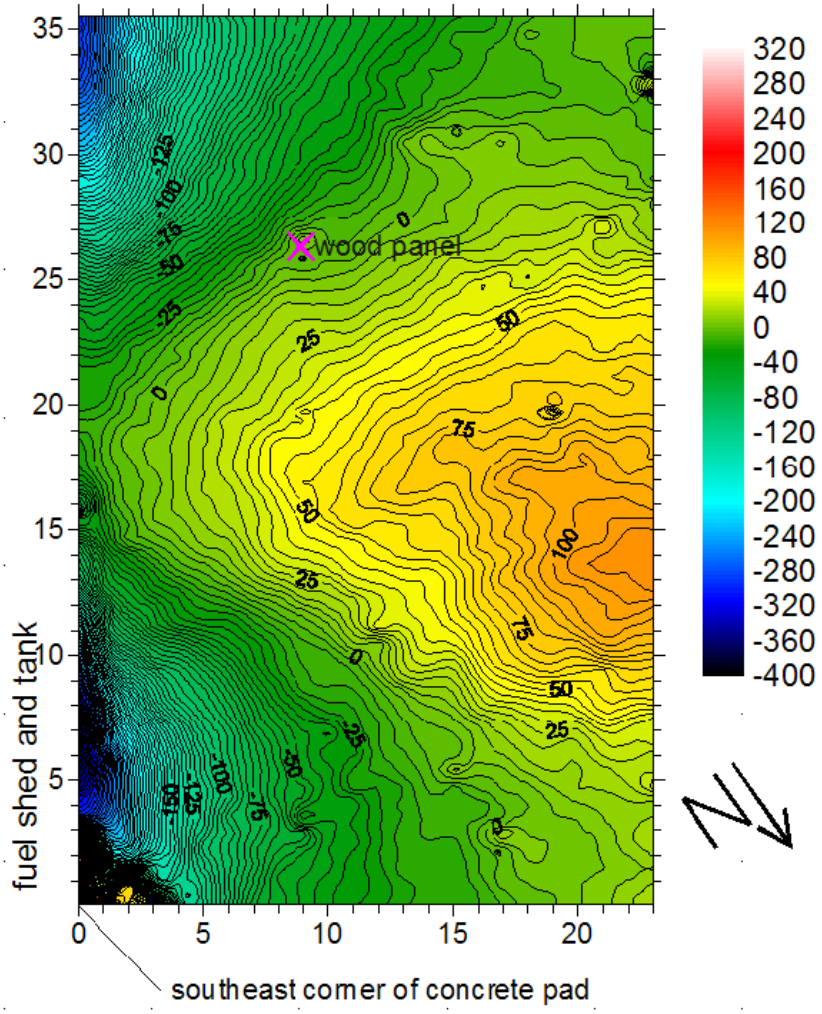


Figure 14. Total magnetic intensity after decorrugation and removal for the ambient field value for Grid#5. The tall axis trends 35° east of north. Horizontal coordinates are meters; contour interval is 5 nanotesla.

Grid5 has a dominant magnetic high trending into the grid from the area of the corrals to the northwest and shows significant impact from the fuel shed and tank to the east (lower left on the figure). To reduce the visual influence of the magnetic high, we removed observations outside the second standard deviation and separated the total field magnetics into equivalent layers for further analysis.

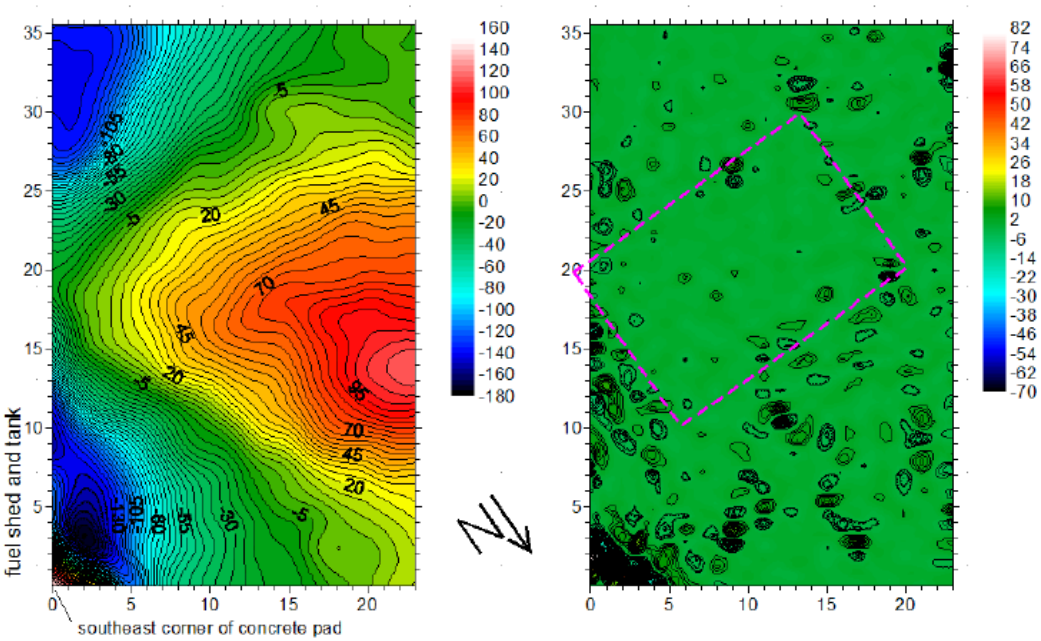


Figure 15. Grid#5 separated into a deep (left) equivalent source layer and shallow (right) layer. The shallow layer is contoured at 1 nT but only anomalies with amplitude greater than two nanotesla are contoured. That is, the -1, 0, and 1 nT contours are omitted. The tall axis trends 35° east of north. Horizontal coordinates are meters. The magenta rectangle marks a speculative guess at what might be a former corral boundary.

The deep equivalent layer (left image, Figure 15) shows the geological scale magnetic high as well as the impact of the concrete pad and fuel complex. The shallow equivalent layer is contoured at 1 nT but excludes anomalies with amplitude less than 2 nT for clarity by omitting the -1, 0, and 1 nT contours. Outside the magenta rectangle, there is no particular pattern evident in the shallow layer's anomalies but there are a number of near surface dipolar sources. Given their character, distribution, and location among constructed features, they probably result from relatively modern debris. There is a relative paucity of distributed shallow magnetic sources within the rectangle, and it is aligned north-south. Speculatively, one must wonder if it marks an older corral outlined with a few buried horseshoes, nails, etc.

RESULTS FROM TOTAL FIELD MAGNETIC INVESTIGATION AT GRID#6

Figure 16 shows magnetic grid#6 after decorrugation, removal of the ambient field, and removal of magnetic observations outside the second standard deviation from the mean. The latter step, removing data outside the second standard deviation, was necessary in this case due to very high amplitude anomalies associated with the steel roofs on the corral sheds, and the metal and other debris stacked and stored across the fence north of the grid.

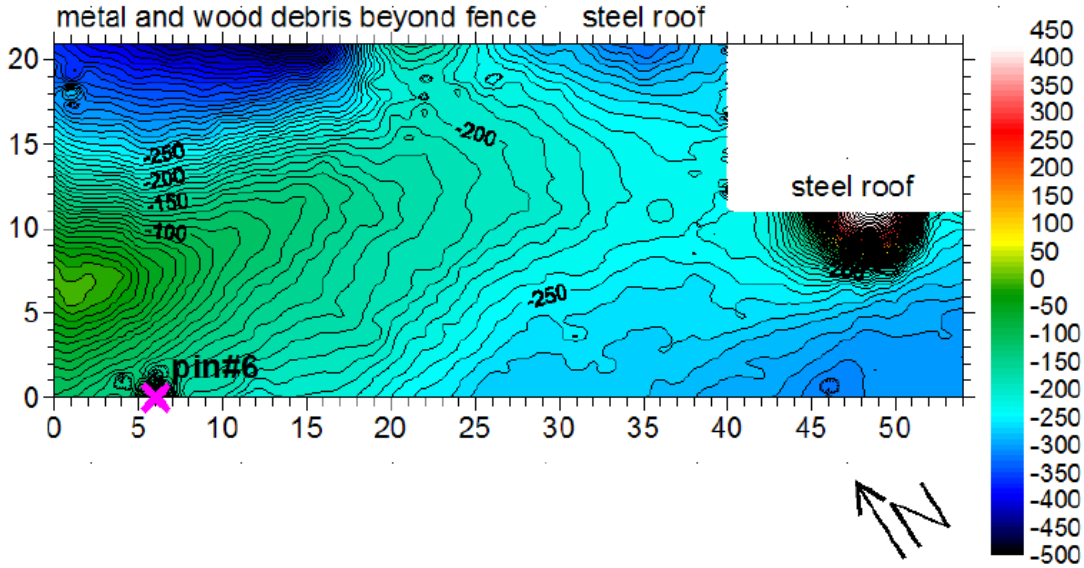


Figure 16. Total field magnetic intensity for Grid #6 following decorrugation, removal of the ambient field, and removal of observations beyond the second standard deviation. The left edge is shared with the southern part of Grid#3, and trends 33°. Fences parallel both segments of the eastern edge and the north edge.

Figure 16 is dominated by an E-W magnetic high and the high amplitude anomalies from the debris and roofs. To search for anomalies beyond the obvious, we separated the total field magnetics into equivalent layers for further analysis (Figure 17). The separation effectively removes the longer wavelength features form the map of total field intensity and isolates a scatter of short wavelength anomalies from near surface sources. Much of the signal in the deeper layer is impact from the roofs, debris and survey pin affecting a broad magnetic high trending through the grid.

The shallower equivalent layer (lower image in Figure 17) is contoured at 1 nT but the -1, 0, and 1 nT contours are omitted to highlight anomalies with amplitude greater than 1 nT. X10 marks a stronger anomaly from what is probably a piece of metal or vertical nail at or near the surface. Smaller anomalies are scattered throughout the grid with a somewhat greater concentration within the magenta semicircle. However, with the long term storage of ranch miscellany just to the north, the anomalies are probably not from sources of archaeological interest.

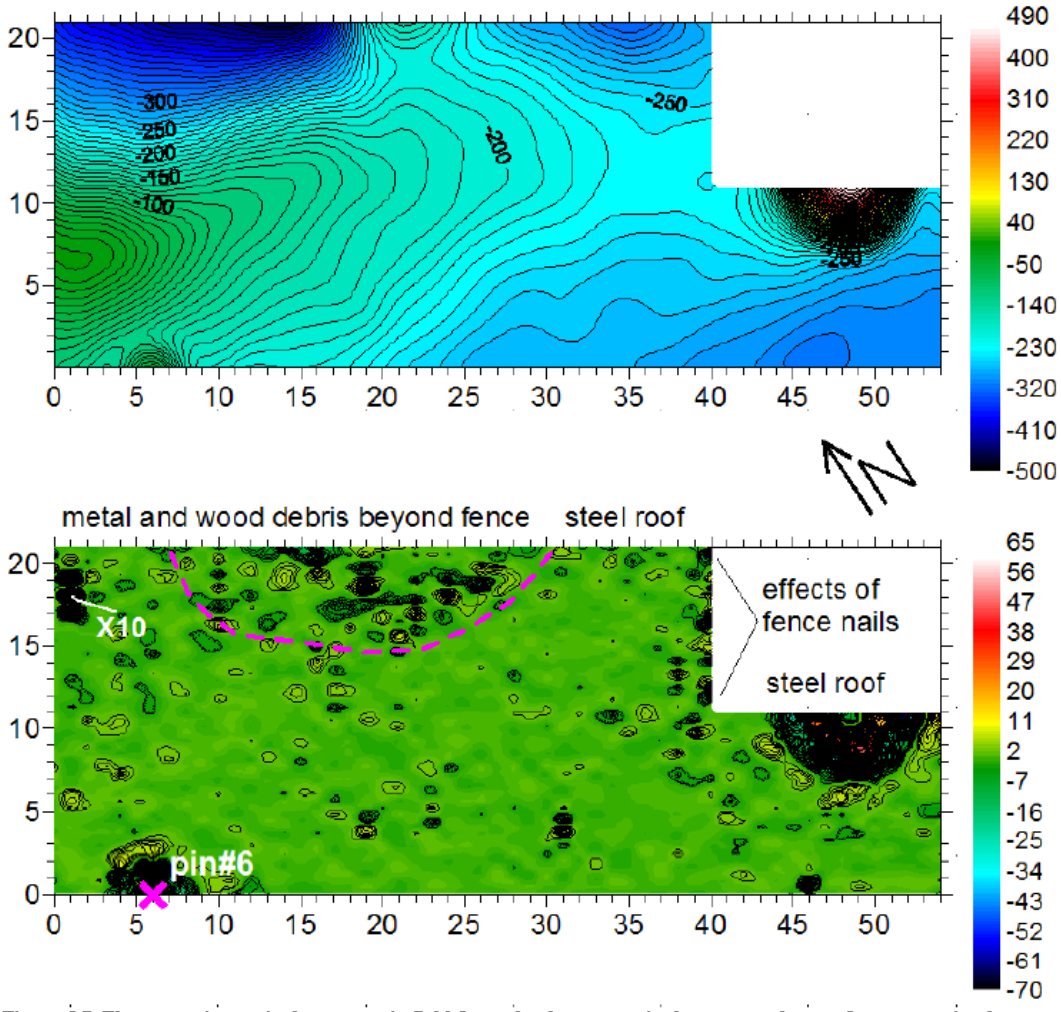


Figure 17. The upper image is the magnetic field from the deeper equivalent source layer after separation by matched filtering; contour interval is 10 nT. Much of the signal in the deeper layer is interference from the roofs, debris, and survey pin affecting a broad magnetic high trending through the grid. The lower image is the magnetic field from the shallower equivalent source layer. The lower image is contoured at 1 nT but the -1, 0, and 1 nT contours are omitted to highlight anomalies with an amplitude greater than 2 nT. X10 marks what is probably a vertical nail or other piece of metal. The magenta line encloses a higher concentration of anomalies from shallow sources, but that area is just south of the long-term debris and junk pile beyond the fence.

SUMMARY

GRID#1

Grid#1 show features in the magnetic data that range from observable plumbing and T-stakes to those of potential archaeological interest.

Features X1 on Figure 3 are worth investigating if they are not on a modern utilities map. Because the anomalies are independent from one another they seem to be isolated pits, possibly debris burial.

Features X2 on Figure 4 are independent dipole sources which are most likely from metal sources near the surface. They should be easily locatable with a metal detector and investigated with a shovel test.

The GPR results from GPR which overlay the northeast corner of magnetic Grid#1 are enticing, though speculative. We could not image the circular features in the magnetic data and they are subtle in a few summed time-slice sections of GPR.

GRID#2

Grid#2 is extremely heavily impacted by modern features and relatively recent construction.

Features X4 on figure 8 do not have readily visible surface sources but have the character of the shallow burials of recent metallic material. They could be tested but are probably due to recent sources.

GRID#3

T-stakes, a steel gate, and a historic runway all contribute interference to more subtle anomalies in Grid#3.

The narrow magnetic high at the north end of Figure 10 is probably geologic as most trenches for utilities would be closer to straight but it does look a bit unnatural. It would be interesting and educational to test it (if it is not on a utility map).

Features X6 are probably near surface metal material which could be checked with a metal detector and shovel.

Feature X7 might be of interest as it comes from two or more adjacent near-surface sources; yet it is on the modern road.

Grid#4

Grid#4 north of the helipad and the road running to that pad shows the result of that construction but still has a few interesting magnetic anomalies.

Feature X8 looks like another shallow burial of modern materials with some metal in the mix.

Features X9 are isolated dipolar sources fairly close to the surface. In general we did not notice any particularly magnetic cobbles during acquisition of our data so the sources might be historic. However, as with the other results, there is a lot of modern construction and that always yields debris.

The dashed blue line on Figure 11 illustrates a feature with rectilinear character and highlights a subtle but pervasive N-S, E-W fabric to the results in the eastern portion of the grid. These may be geologic, related to bulldozing for runway or helipad construction, or other historic work.

Grid#5

Grid#5, near the fuel shed and tank, has a central rectangular area that is somewhat more devoid of randomly distributed magnetic sources than the surrounding area. Speculatively, the dashed magenta rectangle (Figure 15) might mark the boundary of an older corral.

Grid#6

Grid#6, with nearby steel roofs and stock piled materials shows little of potential archaeological interest. The area within the magenta semicircle (Figure 17) has a high concentration of isolated sources than the remainder but, it is close to the stockpiled materials.

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GLOSSARY OF LESSER KNOWN TERMS USED IN THE REPORT

Bandpass filter- A frequency filter that passes a range of selected frequencies and rejects those above and below the pass band.

Corrugation - Artificial anomalies oriented with or perpendicular to survey lines that result from errors in leveling, gridding, survey locations, etc. Decorrugation filtering removes these artifacts.

DC component - The amplitude of the Fourier analysis component at zero frequency.

Dewow – to remove components of a GPR signal that are equal to the central frequency of the antenna.

Dipolar magnetic anomaly – because magnetized material has both positive and negative poles, the resulting anomalies show both highs and lows.

Electrical resistivity - Observation of electric fields caused by current introduced into the ground as a means for studying earth resistivity. The term normally includes only those methods in which a very low frequency or direct current is used to measure the apparent resistivity.

Equivalent layers (or equivalent sources) - fictional layers, below the observation surface, where the distribution of magnetization produces the observed magnetic field. A single layer containing gravity or magnetic sources that yield the same gravity or magnetic field as observed.

Filtering - The attenuation of components of a signal based on some measurable property. Usually implies that the measurable property is frequency, performed mathematically with Fourier transformation.

Fourier transformation – mathematical operation which breaks a spatial signal (such as a magnetic map) into its sine and cosine components as a function of frequency. The Fourier transform is the tool that maps data between the spatial and frequency domains and yields an amplitude versus frequency spectrum.

Frequency filters - A part of a system that discriminates against some of the frequencies entering it.

Frequency spectrum - Amplitude and phase characteristics as a function of frequency for the components of a time or space function.

Gain – A change in signal amplitude (or power) from one point in a circuit (or system) to another, often from system input to output. Gain usually means time invariant unless specified otherwise; think of it as turning up the volume.

Ground penetrating radar (GPR) – GPR is an active source tool in that tuned antennas, typically 250 - 1,000 MHz for archaeological work, transmit and receive radar reflections from subsurface changes in electrical properties. Reflections are plotted as the time to travel down and back up from reflectors.

High gradient – A large first derivative or rate of change of the magnetic field with respect to distance or, in the case of vertical gradient, the vertical. Shallow sources create high gradient anomalies.

Longer wavelength signals – those of lower spatial frequency and typically related to deeper sources.

Low gradient - A small first derivative or rate of change of the magnetic field with respect to distance or, in the case of vertical gradient, the vertical. Deep sources create low gradient anomalies.

Low pass frequency filter – frequency filter which discriminates against high frequencies.

Magnetic gradiometry – technique of measuring the vertical gradient of the total magnetic field. This discriminates against deeper sources.

Matched filtering - A filter that maximizes the output in response to a signal of particular shape. The elements of a matched filter are the elements of the signal in reverse order. Used where the waveform of the signal is known, as in removing a random distribution of magnetic sources from a particular depth.

Noise - Any unwanted signal or a disturbance that does not represent part of a message from a specified source.

Potential field - A field that obeys Laplace's equation, such as magnetic, gravity, or electrical fields. For such fields, the vector field may be expressed as the gradient of some scalar potential

Power spectrum - The power spectrum is the square of the amplitude versus frequency response from the Fourier transform.

Radargrams – A 2D plot of radar reflections where the horizontal axis is distance and the vertical axis is two-way travel time of the radar wave.

Radially averaged logarithmic power spectra – Plot of the 2D Fourier transform after averaging at increasing frequencies to collapse the data into 1D.

Sources – The material, or change in material, at depth that causes a magnetic anomaly.

Spatial frequency – measurement of 1/wavelength of Fourier components of a signal.

Spatial frequency domain – Amplitude versus spatial frequency response of the Fourier transform.

Time slice - A display of the radar reflection amplitude corresponding to a single arrival time (or single depth) for a grid of data points; a horizontal slice or section through a volume of 3D data.

Total field magnetometry – measurement of the strength of the magnetic field at a spot (compare magnetic gradiometry).

Two-way travel time – the time it takes a radar wave to travel down to a reflector and return to the surface.

Upward continuation - Calculation of the potential field at an elevation higher than that at which the field is known.

Wavelength - The distance between successive similar points on two adjacent cycles of a wave, measured perpendicular to the wavefront.

Wavenumber domain - Amplitude versus spatial frequency response of the Fourier transform often plotted as 2*pi/wavelength.

Appendix 3a

Area A Debitage Inventory

Appendix 3a
Area A Debitage Inventory

(1 of 8)

Catalogue No.*	Lot No.	WT (g)	Material
1991AH4.4.1	1	0.16	C
1991AH5.2.1	1	0.62	V
1991AH6.2.1	1	0.52	C
1991AH6.2.3	1	1.3	MC
1991AH8.2.1	1	0.06	C
1991AH8.4.1	1	0.25	MC
1991AH9.3.1	1	0.14	C
1991AH9.3.2	1	0.74	MC
1991AH9.4.1	1	2.16	MC
1991TU-A.1.1	3	0.76	C
1991TU-A.2.1	3	0.36	C
1991TU-A.3.2	2	0.51	C
1991TU-A.4.1	1	0.21	V
1991TU-A.4.2	4	1.3	C
1991TU-A.5.1	2	1.54	C
1991TU-A.5.2	1	0.6	B
1991TU-A.7.1	1	0.14	C
1996K-25.4.1	4	0.22	C
1996K-25.5.1	2	0.02	C
1996K-26.4.1	1	0.16	QC
1996K-26.5.1	1	0.01	C
1996K-27.1.1	1	0.01	C
1996K-27.2.1	1	0.01	V
1996K-27.3.1	1	0.01	C
1996K-27.4.1	1	0.01	C
1996K-28.2.1	1	0.04	C
1996K-29.2.1	1	0.02	C
1996K-29.5.1	1	0.01	C
1996K-30.5.1	2	0.12	C
1.1.1	5	0.39	C
1.1.8	3	0.27	V
1.2.1	5	4.01	C
1.2.2	1	2.07	B
1.2.3	5	5.05	V
1.2.5	1	35.93	MC
1.3.1	1	0.06	C
1.3.2	1	0.11	V
1.3.3	1	0.82	B
1.4.1	2	0.11	C

(2 of 8)

Catalogue No.*	Lot No.	WT (g)	Material
1.4.2	1	0.04	QC
2.1.1	2	1.98	C
2.2.1	3	1.46	C
2.2.2	1	0.74	B
2.2.3	1	26.09	MC
2.2.7	1	0.21	V
2.3.1	2	0.12	C
2.3.2	1	22.19	MC
2.4.1	1	0.22	C
2.5.1	1	0.75	C
2.5.2	1	0.63	MC
2.6.1	1	0.25	C
2.7.1	3	1.11	C
2.7.3	1	1.39	MC
3.1.1	3	0.16	C
3.1.2	1	0.38	V
3.1.2a	1	9.13	V
3.2.1	5	1.08	C
3.3.1	1	0.03	V
3.3.2	1	0.04	C
3.4.1	1	0.07	B
3.4.2	1	0.14	C
3.5.1	1	0.16	C
3.6.1	2	0.19	C
3.7.1	1	0.19	C
3.10.1	4	2.54	C
4.1.1	2	0.34	C
4.1.6	1	1.58	V
4.2.1	3	0.31	C
4.2.2	1	0.02	O
4.3.1	2	0.08	C
4.4.1	1	0.85	C
4.4.3	1	0.26	V
5.1.1	1	0.03	C
5.2.1	8	1.53	C
5.2.9	1	0.16	V
5.3.1	4	0.2	C
5.4.1	5	2.4	C
5.4.2	1	0.08	B

*Items are listed in order by unit and increasing level depth.

Appendix 3a
Area A Debitage Inventory

(3 of 8)

Catalogue No.*	Lot No.	WT (g)	Material
5.4.3	1	0.07	QC
5.5.1	7	0.99	C
5.6.1	3	0.15	C
5.6.2	1	0.55	B
5.7.1	5	0.25	C
5.7.2	1	0.08	O
5.8.1	1	1.24	V
5.8.2	1	1.39	B
2010misc.5[1]	2	0.28	B
6.1.1	1	0.08	C
6.1.2	1	0.93	MC
6.1.9	1	0.11	V
6.2.1	3	0.2	C
6.2.2	2	4.59	MC
6.3.1	2	0.14	C
6.3.2	1	0.66	B
7.2.1	3	1.41	C
7.3.1	1	0.12	C
7.3.2	1	9	MC
7.4.1	2	7.38	C
7.4.2	1	1.27	QC
7.6.1	8	1.57	C
7.6.3	1	0.01	QC
7.6.4	1	0.19	MC
7.7.2	1	1.04	MC
7.7.3	2	0.22	B
7.8.1	5	0.37	C
7.8.2	2	0.12	B
7.8.3	1	0.05	V
7.9.1	2	0.44	C
8.1.1	4	0.31	C
8.1.2a	1	0.06	V
8.1.2b	1	0.19	V
8.1.2c	1	0.1	V
8.2.1	5	0.74	C
8.2.2	1	0.15	B
8.3.1	2	0.28	C

(4 of 8)

Catalogue No.*	Lot No.	WT (g)	Material
8.4.1	5	0.89	C
8.5.1	4	0.66	C
8.6.1	5	64	C
8.7.1	6	0.68	C
8.7.2	1	0.08	V
8.7.3	1	3.72	MC
8.8.1	1	0.01	C
8.9.1	1	0.16	C
8.10.1	2	0.38	C
8.10.2	1	0.29	V
8.11.1	1	0.01	C
8.12.1	3	0.1	C
8.13.1	1	0.03	C
2010misc.7[2]	1	0.11	C
9.1.1	2	0.47	C
9.2.1	6	0.61	C
9.3.1	7	1.14	C
9.3.2	1	0.03	V
9.3.3	1	0.17	B
9.3.4	1	1.1	C
9.4.1	4	1.6	C
9.5.1	2	0.16	C
9.5.2	1	0.04	V
9.6.1	1	0.16	C
9.6.2	2	0.08	V
13.1.1	5	0.65	C
13.2.1	6	1.5	C
13.2.2	1	0.05	QC
13.3.1	4	1.78	C
13.3.2	1	0.07	B
13.4.1	2	0.29	C
13.5.1	6	0.83	C
13.5.2	2	2.78	MC
13.6.1	5	0.34	C
13.6.2	1	0.14	V
13.6.3	1	18.31	MC
13.6.4	1	2.72	MC

*Items are listed in order by unit and increasing level depth.
[1]Recovered in Unit 5 during a 4-wall clean from 0 to 100 cm BD.
[2]Recovered in Unit 8 during a 4-wall clean from 0 to 160 cm BD.

Appendix 3a
Area A Debitage Inventory

(5 of 8)

Catalogue No.*	Lot No.	WT (g)	Material
13.7.1	2	0.19	C
13.7.2	1	10.26	MC
13.8.1	3	0.24	C
13.8.2	2	1.28	V
13.9.1	1	0.71	V
13.10.1	4	0.28	C
13.10.2	2	0.2	B
13.10.3	1	0.08	QC
13.11.1	1	0.06	C
13.11.2	1	0.1	V
13.11.3	1	0.18	B
13.12.1	4	0.23	C
13.12.2	1	0.14	V
13.12.3	1	0.14	B
13.13.1	3	0.03	C
13.14.1	3	0.83	C
13.14.2	1	0.12	V
13.15.1	3	0.16	C
2010misc.9[3]	1	0.14	V
17.1.1	1	0.06	C
17.1.3	1	3.73	MC
17.2.1	1	0.37	C
17.3.1	7	3.73	C
17.4.1	7	0.97	C
17.4.2	1	0.12	QC
17.4.3	1	0.16	MC
17.5.1	1	0.34	C
17.5.2	1	0.03	B
17.5.3	1	0.09	V
17.8.1	1	0.65	MC
18.1.1	2	0.49	C
18.2.1	5	0.46	C
18.2.2	1	0.32	B
18.2.3	1	1.11	MC
18.3.1	7	0.16	C
18.3.2	1	0.01	O
18.3.3	1	0.25	B
18.3.4	1	0.02	QC

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Catalogue No.*	Lot No.	WT (g)	Material
18.4.1	5	0.83	C
18.4.2	1	0.56	MC
18.5.1	10	12.93	C
18.5.3	1	0.07	QC
18.5.4	1	0.43	B
18.6.1	2	0.87	C
18.6.2	1	0.05	V
18.6.3	1	0.23	B
18.7.1	5	5.34	C
18.9.1	4	1.07	C
18.9.2	1	0.03	MC
18.10.1	1	0.15	C
18.10.2	1	0.72	MC
18.12.1	1	0.05	C
18.13.1	2	0.08	C
18.14.1	4	0.25	C
18.15.1	1	0.05	V
18.15.2	1	0.04	B
18.16.1	2	0.24	C
22.2.1	5	0.3	C
22.2.2	2	0.56	V
22.2.3	1	0.89	MC
22.3.1	7	0.56	C
22.3.2	1	0.08	V
22.4.1	7	0.51	C
22.4.2a	1	0.01	O
22.4.2b	1	0.01	O
22.5.1	10	0.46	C
22.5.2	3	0.03	V
22.6.1	8	0.87	C
22.6.2	1	0.02	V
22.7.1	2	0.54	C
23.1.1	3	0.46	C
23.1.2	1	0.03	B
23.1.3	1	0.58	QC
23.2.1	10	2.17	C
23.2.2	1	1.01	B
23.2.3	1	74.97	MC

*Items are listed in order by unit and increasing level depth.
[3]Recovered in Unit 13 during a 4-wall clean from 0 to 30 cm BD.

Appendix 3a
Area A Debitage Inventory

(7 of 8)

Catalogue No.*	Lot No.	WT (g)	Material
23.3.1	7	0.65	C
23.3.2	2	0.61	V
23.3.3	1	0.1	QC
23.3.4	2	5.68	MC
23.4.1	3	0.15	C
23.4.3	1	6.61	MC
23.5.1	9	2.01	C
23.5.2	1	0.12	V
23.5.3	2	0.66	QC
23.5.5	1	0.08	MC
23.6.1	3	0.7	C
23.6.2	1	0.04	V
23.6.3	1	0.16	B
23.6.4	1	1.65	C
23.7.1	2	0.42	C

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Catalogue No.*	Lot No.	WT (g)	Material
23.8.1	5	0.19	C
23.8.2	1	0.37	V
23.9.1	4	0.19	C
23.10.1	3	0.16	C
23.10.2	1	0.06	QC
23.10.3	1	1.76	MC
23.11.1	2	0.05	C
23.12.1	3	0.64	C
23.13.1	1	0.01	C
23.13.2	1	0.1	MC
23.14.1	5	0.29	C
23.15.1	2	0.04	C
23.16.1	1	1.64	C
2010misc.15[4]	1	8.61	MC

*Items are listed in order by unit and increasing level depth.
[4]Surface collection at southwest corner of Unit 23 (N138/W91).

Appendix 3b

Area B Debitage Inventory

Appendix 3b
Area B Debitage Inventory

(1 of 2)

Catalogue No.*	Lot No.	WT (g)	Material
1996K-1.4.1	2	0.09	C
1996K-3.2.1	1	0.03	QC
1996K-3.5.1	1	0.09	MC
1996K-4.3.1	2	0.04	C
1996K-4.3.2	2	0.01	V
1996K-5.3.1	1	0.02	C
1996K-6.5.1	1	0.14	MC
1996K-8.4.1	1	0.03	C
1996K-10.3.1	1	0.42	V
1996K-12.2.1	1	0.06	C
1996K-13.5.1	1	0.13	QC
1996K-20.5.1	1	0.08	B
1996K-22.4.1	1	0.04	C
1996K-23.4.1	1	2.32	C
1996K-23.5.1	2	0.48	C
1996K-31.3.1	1	0.09	C
1996K-31.5.1	1	0.05	V
1996K-32.4.1	4	0.46	C
1996K-32.5.1	1	0.03	C
1996K-33.1.1	1	0.03	C
1996K-34.4.1	1	0.04	V
1996K-34.5.1	3	0.29	V
1996K-35.4.1	1	0.03	V
1996K-35.4.2	1	0.03	QC
1996K-36.1.1	1	0.19	C
1996K-39.1.1	1	0.03	C
1996K-44.5.1	2	0.1	V
1996K-46.5.1	1	0.02	C
1996K-47.4.1	2	0.07	C
1996K-47.5.1	1	0.04	C
199696-A.3.1	3	1.34	C
199696-A.5.1	2	1.15	C
199696-A.5.2	2	0.12	QC

(2 of 2)

Catalogue No.*	Lot No.	WT (g)	Material
199696-A.5.3	1	1.03	MC
199696-A.6.1	3	0.02	C
199696-A.8.1	3	0.04	C
199696-A.9.1	2	0.05	C
199696-A.9.2	2	0.03	V
T1.1.1	2	3.35	B
T1.2.1	1	1.66	B
T2.2.1	1	1.51	V
T2.2.2	1	0.4	C
T2.3.1	1	0.19	V
T3.3.1	1	0.03	C
T4.2.1	1	1.26	C
T5.2.1	1	0.01	C
T5.2.2	1	0.2	QC
2010misc.2	1	0.01	C
2010misc.3	1	1.84	C
10.1.1	2	0.33	C
10.3.1	1	0.03	C
10.3.2	1	8.21	MC
10.4.1	2	0.05	C
10.4.2	1	0.09	QC
10.10.1	1	0.06	C
10.12.1	1	0.14	QC
16.2.2	1	0.03	QC
16.3.1	1	0.28	V
16.3.2	1	0.57	MC
16.4.1	1	0.08	C
16.5.1	2	0.16	C
16.6.1	1	2.51	MC
16.8.1	1	5.58	QC
16.9.1	1	0.21	QC
16.12.1	1	0.06	V
2010misc.11	1	0.2	QC

*Items are listed in order by unit and increasing level depth.
[1]Surface collection near the southwest corner of Trench 5.
[2]Recovered from the backhoe backfill near Trench 5.
[3]Recovered in Unit 16 during a west wall clean from 0 to 130 cm BD.

Appendix 3c

Area D Debitage Inventory

Appendix 3c
Area D Debitage Inventory

(1 of 2)

Catalogue No.*	Lot No.	WT (g)	Material
1981ST-1.2.1	1	5.86	MC
1981ST-2.1.1	1	0.59	C
1981ST-2.2.1	1	0.14	B
1981ST-2.3.1	1	0.56	C
1981ST-3.1.1	2	0.63	C
1981ST-3.2.1	1	0.12	C
1981ST-4.3.1	1	0.03	V
1981ST-6.4.1	1	0.09	C
1981ST-9.1.1	1	0.44	C
1981ST-10.3.1	1	0.04	QC
1981TP-1.1.1	1	0.08	C
1981TP-1.2.1	5	1.61	C
1981TP-1.3.1	1	1.61	C
1981TP-1.3.2	1	0.05	B
1981TP-1.4.1	1	0.08	O
1981TP-1.4.2	1	0.61	MC
1981TP-1.5.1	2	0.91	C
1981TP-1.5.2	1	0.08	O
1981TP-1.6.1	1	0.27	C
1981TP-1.6.2	1	0.11	MC
1981TP-1.7.1	2	0.58	MC
1981TP-2.2.1	1	3.62	MC

(2 of 2)

Catalogue No.*	Lot No.	WT (g)	Material
1981TP-2.4.1	1	0.13	C
1981TP-2.6.1	1	7.98	MC
1981TP-2.7.1	1	1.91	QC
1981TP-2.7.2	1	0.04	MC
1981TP-2.8.1	5	0.66	C
1981TP-2.8.2	1	0.1	V
1981TP-2.8.3	11	50.1	MC
1981Sur.4 (s)[1]	1	1.04	A
1981Sur.6 (s)[1]	6	12.73	C
1981Sur.8 (s)[2]	10	11.35	C
1981Sur.9 (s)[2]	1	0.01	V
1981Sur.10 (s)[2]	1	0.66	B
1981Sur.11 (s)[2]	1	0.72	MC
1981Sur.14 (s)[3]	3	1.67	C
1981Sur.15 (s)[4]	1	0.07	C
1981HelAH1.6.1	1	0.17	B
1981HelAH3.3.1	2	1.89	C
1981HelAH4.7.1	1	0.34	MC
1981HelAH6.3.1	1	0.11	MC
1981HelAH16.1.1	1	0.06	C
1981HelAH17.3.1	1	0.18	C
1987ST8.8.1	1	0.22	C

*Items are listed in order by unit and increasing level depth.
(s) = recovered from surface (September, 1981 grid system, see Figure 82).
[1]Area D surface collection coordinates: 9+00-9+50 W/0+50-1+00 S.
[2] Area D surface collection coordinates: 9+00-9+50 W/0+00-0+50 S.
[3] Area D surface collection coordinates: 8+00-8+50 W/1+00-1+50 S.
[4] Area D surface collection coordinates: 6+50-7+00 W/2+00-2+50 S.

Appendix 3d

Area E Debitage Inventory

Appendix 3d
Area E Debitage Inventory

(1 of 74)

Catalogue No.*	Lot No.	WT (g)	Material
2010misc.27 (s)	4	1.51	C
2012misc.20 (s)[1]	1	6.05	C
2012misc.22 (s)[2]	1	0.38	C
SB.1-5.1 (np)	3	0.19	C
SB.6-10.1 (np)	4	0.14	C
SB.6-10.2 (np)	1	0.01	V
SB.11-15.1 (np)	1	0.69	C
SB.21-25.1 (np)	3	0.41	C
SB.21-25.2 (np)	1	0.02	O
SB.26-30.1 (np)	11	2.92	C
SB.26-30.2 (np)	1	0.04	B
SB.31-35.1 (np)	2	0.42	C
SB.31-35.2 (np)	1	0.03	O
SB.36-40.1 (np)	1	0.27	C
SB.36-40.2 (np)	6	2.32	B
SB.46-50.1 (np)	2	0.04	C
SB.46-50.3 (np)	1	1.62	MC
SB.51-55.1 (np)	2	0.31	C
SB.56-60.1 (np)	1	0.39	C
SB.56-60.2 (np)	1	0.1	A
SB.61-65.1 (np)	1	0.34	B
SB.61-65.2 (np)	2	0.11	A
SB.66-70.1 (np)	1	0.07	C
19.1.1	1	0.02	C
19.2.1	11	4.56	C
19.2.2	1	0.14	MC
19.2.3	1	58.67	MC
19.3.1	9	0.8	C
19.3.2	1	0.03	QC
19.4.1	6	0.6	C
19.4.2	1	0.06	B
19.4.3	1	0.07	V
19.5.1	15	2.14	C
19.5.2	1	0.04	B
19.5.3	3	1.32	MC
19.6.1	7	0.65	C
19.6.2	1	0.05	QC

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Catalogue No.*	Lot No.	WT (g)	Material
19.6.3	2	0.16	V
19.7.1	15	1.95	C
19.7.2	6	0.41	V
19.7.3	5	2.78	MC
19.8.1	32	1.82	C
19.8.2	1	0.22	V
19.8.3	1	0.1	QC
19.8.4	2	9.75	MC
19.8.6	1	2.16	MC
19.9.1	30	1.89	C
19.9.3	1	0.03	O
19.9.4	3	0.68	QC
19.9.5	3	0.1	B
19.9.6	3	32.47	MC
19.10.1	9	1.01	C
19.10.2	1	0.08	QC
19.10.5	1	0.09	V
20.1.1	1	2.37	C
20.1.2	1	0.03	O
20.1.4	2	0.39	MC
20.2.1	7	0.78	C
20.2.2	1	3.5	MC
20.3.1	18	3.06	C
20.3.2	3	0.4	B
20.3.3	1	0.77	QC
20.3.4	2	1.01	MC
20.3.5	1	2.96	MC
20.4.1	7	6.39	C
20.4.2	3	0.08	B
20.5.1	13	2.15	C
20.5.2	1	0.04	B
20.5.3	1	1.32	MC
20.6.1	21	8.47	C
20.6.2	1	0.02	QC
20.6.3	2	2.14	MC
20.7.1	33	1.73	C
20.7.2	3	0.43	V

*Items are listed in order by unit and increasing level depth.
(s) = surface collection.
(np) = non-provenienced item.
[1]Area E surface collection coordinates: N89/W140.
[2]Area E surface collection coordinates: N83/W91.

Appendix 3d
Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
20.7.3	1	0.08	QC
20.7.4	2	18.58	MC
20.8.1	33	4.8	C
20.8.2	1	0.04	V
20.8.3	2	0.35	MC
20.9.1	18	5	C
20.9.2	3	0.18	V
20.9.2a	1	0.02	V
20.9.3	3	0.42	B
20.9.4	5	0.98	QC
20.9.5	4	1.15	MC
20.9.8	1	10.07	MC
20.10.1	24	2.13	C
20.10.2	1	0.03	V
20.10.3	1	0.09	QC
20.10.4	1	0.5	MC
20.11.1	12	0.91	C
20.11.2	2	0.68	V
2010misc.12[3]	5	0.13	C
2010misc.13[3]	1	0.11	B
2010misc.14[3]	1	2.92	MC
2011misc.13[4]	1	1.2	C
21.1.1	3	0.42	C
21.1.2	1	0.13	B
21.1.3	1	0.17	QC
21.2.1	1	4.43	C
21.2.2	1	0.2	V
21.2.3	1	0.14	O
21.3.1	10	1.17	C
21.3.2	1	0.04	V
21.3.3	1	0.19	B
21.4.1	21	2.27	C
21.5.1	17	0.73	C
21.5.2	1	0.3	V
21.5.3	1	0.33	B
21.5.4	3	0.49	QC
21.5.5	1	1.67	C
21.6.1	14	0.56	C
21.6.2	1	0.04	V

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Catalogue No.*	Lot No.	WT (g)	Material
21.6.3	1	0.1	A
21.7.1	29	3.45	C
21.7.2	1	0.04	V
21.7.3	3	0.31	B
21.7.4	1	0.08	QC
21.8.1	40	4.76	C
21.8.2	3	0.17	QC
21.8.3	1	0.35	V
21.8.6	1	0.07	A
24.2.1	9	1.85	C
24.2.2	1	0.06	QC
24.2.3	2	11.72	MC
24.3.1	10	2.59	C
24.3.2	1	0.09	V
24.3.3	1	0.25	QC
24.3.4	1	0.09	A
24.3.5	2	0.43	MC
24.4.1	5	0.29	C
24.5.1	4	1.23	C
24.5.2	2	0.13	V
24.5.3	1	0.06	B
24.5.4	1	1.16	C
24.6.1	11	3.13	C
24.6.2	1	0.12	MC
24.7.1	17	3.35	C
24.7.2	4	0.46	V
24.7.3	2	0.19	QC
24.8.1	22	2.34	C
24.8.2	1	0.08	QC
24.8.3	1	0.03	V
24.8.7	1	1.77	C
24.9.1	40	3.87	C
24.9.2	1	0.01	V
24.9.3	2	0.29	QC
24.9.4	1	15.44	C
24.10.1	6	0.42	C
24.10.2	3	0.27	V
24.10.3	2	9.36	MC
24.10.4	1	7.02	MC

*Items are listed in order by unit and increasing level depth.
[3]Recovered in Unit 20 during a 4-wall clean from 0 to 60 cm BD.
[4]Surface collection at the northeast corner of Unit 20 (N100/W110).

Appendix 3d
Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
2010misc.33[5]	1	0.04	QC
2010misc.34[5]	4	0.23	C
25.1.1	4	0.07	C
25.1.3	2	0.17	B
25.2.1	11	0.97	C
25.2.2	1	0.14	A
25.2.3	4	0.9	B
25.3.1	2	0.08	C
25.3.2	1	0.07	V
25.5.1	8	1.26	C
25.5.2	2	0.38	V
25.5.3	1	0.05	B
25.5.4	3	0.27	QC
25.5.5	3	12.02	MC
25.6.1	14	1.2	C
25.7.1	21	3.07	C
25.7.3	3	0.38	B
25.7.4	1	9.08	MC
25.7.5	2	0.42	QC
25.8.1	29	2.93	C
25.8.2	1	0.08	B
25.8.3	2	0.08	V
25.8.5a	1	0.03	O
25.8.5b	1	0.01	O
25.9.1	16	2.92	C
25.9.2	1	0.01	V
25.9.3	1	0.14	B
25.9.4	2	0.14	QC
25.9.5	1	2.2	MC
25.10.1	21	2.54	C
25.10.2	1	0.07	V
25.10.3	3	0.27	B
25.11.1	18	8.57	C
25.11.2	1	0.2	QC
25.11.3	2	0.29	B

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Catalogue No.*	Lot No.	WT (g)	Material
25.12.1	4	2.48	C
25.12.2	1	0.08	QC
2010misc.35[6]	2	0.06	C
2010misc.36[7]	5	12.4	C
2010misc.37[7]	1	0.03	B
2010misc.38[8]	8	0.38	C
2010misc.39[8]	1	0.13	V
2010misc.40[8]	1	0.07	B
2010misc.41[9]	7	0.56	C
2010misc.42[9]	1	0.02	V
2010misc.42a[9]	1	0.03	V
2010misc. 43[9]	1	0.05	B
26.1.1	6	2.17	C
26.1.3	1	5.25	MC
26.2.1	13	2.11	C
26.2.4	2	34.33	MC
26.3.1	1	0.02	C
26.3.2	1	0.06	V
26.3.3	1	22.37	MC
26.6.1	6	0.3	C
26.6.3	1	0.07	B
26.7.1	3	0.25	C
2010misc.44[10]	22	2.06	C
2010misc.45[10]	5	0.9	V
2010misc.46[10]	1	0.64	B
2010misc.47[10]	3	0.27	A
27.1.1	2	0.7	C
27.2.1	15	1.38	C
27.2.3	2	0.39	QC
27.3.1	9	1.36	C
27.3.2	2	0.39	V
27.3.3	1	4.45	MC
27.4.1	7	0.82	C
27.4.3	1	0.91	MC
27.5.1	4	0.73	C

*Items are listed in order by unit and increasing level depth.
[5]Screened from Units 19 and 24, levels 4-6.
[6]Screened from Units 20 and 25, level 7.
[7]Screened from Units 20 and 25, level 8.
[8]Screened from Units 20 and 25, level 9.
[9]Screened from Units 20 and 25, level 10.
[10]Screened from Unit 26 levels 1-7.

Appendix 3d
Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
28.1.1	6	0.44	C
28.1.2	1	2.44	MC
28.2.1	17	3.25	C
28.2.3	2	0.82	MC
28.3.1	5	0.4	C
28.3.2	1	0.17	V
28.4.1	1	0.22	QC
28.5.1	4	0.77	C
29.1.1	8	2.75	C
29.1.2	1	0.76	QC
29.1.3	1	0.47	MC
29.2.1	9	2.02	C
29.2.3	1	0.56	B
29.2.4	1	0.46	O
29.3.1	7	1.26	C
29.3.3	1	0.06	QC
29.5.1	13	1.55	C
29.5.3	1	4.75	QC
29.5.4	1	0.06	B
29.5.5	2	0.69	MC
29.6.1	16	2.28	C
29.7.1	18	1.74	C
29.7.3	1	0.08	QC
29.7.4	1	10.07	MC
29.8.1	25	5.25	C
29.8.3	2	0.36	QC
29.8.4	1	0.49	MC
29.9.1	10	0.93	C
29.10.1	27	2.57	C
29.10.3	1	0.04	A
29.11.1	23	2.92	C
29.11.3	1	0.18	QC
29.11.4	2	0.22	B
29.11.5	2	2.1	MC
29.12.1	9	23.51	C
29.12.3	4	1.39	QC
29.12.4	3	20.84	MC
29.13.1	10	2.11	C
29.13.3	2	0.15	B
29.13.4	1	0.31	QC
30.1.1	1	0.05	C

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Catalogue No.*	Lot No.	WT (g)	Material
30.2.1	14	1.88	C
30.2.2	1	0.03	V
30.3.1	12	1.66	C
30.3.3	1	0.07	B
30.3.4	1	2.67	MC
30.4.1	13	2.28	C
30.5.1	13	7.23	C
30.6.1	17	2.49	C
30.6.3	1	0.02	B
30.6.4	1	6.04	MC
30.7.1	17	1.6	C
30.7.3	1	0.06	O
30.7.4	1	0.16	QC
30.7.5	6	6.09	MC
30.8.1	18	2.17	C
30.8.2	1	0.09	V
30.9.1	52	5.15	C
30.9.2	1	0.42	O
30.9.3	5	0.39	V
30.9.4	2	0.05	B
30.9.5	1	0.14	QC
30.9.6	1	0.55	A
30.9.7	9	4.68	MC
30.10.1	30	2.97	C
30.10.2	1	0.01	V
30.10.3	2	0.16	B
30.10.4	1	0.02	QC
30.10.6	1	2.14	MC
30.11.1	19	2.58	C
30.11.3	2	0.1	B
30.11.4	1	0.9	QC
30.11.5	1	1.18	MC
31.1.1	6	1.63	C
31.1.2	1	0.01	B
31.1.3	1	0.42	QC
31.2.1	5	1.23	C
31.2.3	2	6.58	MC
31.3.1	6	0.51	C
31.3.3	1	0.04	B
31.4.1	5	0.46	C
31.5.1	11	1.73	C

*Items are listed in order by unit and increasing level depth.

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Catalogue No.*	Lot No.	WT (g)	Material
31.5.3	2	16.6	MC
31.6.1	16	1.7	C
31.6.2	1	0.09	V
31.6.3	1	0.02	B
31.7.1	16	0.91	C
31.7.2	1	0.04	V
31.7.3	1	0.23	QC
31.7.4	4	44.66	MC
31.8.1	25	3.72	C
31.8.3	3	0.1	B
31.8.4	2	0.21	QC
31.8.5	2	13.4	MC
31.9.1	22	3.16	C
31.9.2	1	0.02	V
31.9.3	1	0.05	B
31.10.1	3	1.05	C
31.10.2	1	0.03	B
2010misc.16[11]	2	0.07	C
2010misc.17[12]	1	0.07	C
32.1.1	8	0.36	C
32.1.3	1	0.01	B
32.2.1	11	0.9	C
32.2.2	2	0.25	V
32.2.3	1	0.06	QC
32.3.1	16	1.39	C
32.3.2	1	0.09	V
32.3.3	3	0.26	QC
32.4.1	10	1.31	C
32.4.2	2	0.27	V
32.5.1	21	3.99	C
32.5.3	1	0.24	MC
32.5.4	2	0.05	QC
32.6.1	16	1.5	C
32.6.2	3	0.25	V
32.6.3	3	6.43	B
32.6.4	2	0.06	QC
32.6.5	1	0.11	A

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Catalogue No.*	Lot No.	WT (g)	Material
32.7.1	15	2.08	C
32.7.2	3	1.38	V
32.8.1	6	1.26	C
32.8.2	2	0.27	V
32.8.3	1	4.44	B
32.9.1	2	0.17	C
32.9.2	1	0.36	V
2010misc.18[13]	2	0.39	C
33.1.1	1	0.03	C
33.2.1	13	2.09	C
33.2.4	3	2.91	MC
33.3.1	12	1.79	C
33.3.2	1	0.22	V
33.3.3	1	0.24	MC
33.4.1	8	1.04	C
33.4.2	4	0.5	V
33.5.1	5	0.23	C
33.6.1	11	3.09	C
33.6.2	1	0.44	V
33.6.3	1	0.03	A
33.6.4	1	0.89	QC
33.6.5	2	14.02	MC
33.7.1	3	0.18	C
33.7.2	1	1.66	MC
2010misc.48[14]	5	0.32	C
2010misc.49[14]	1	1.93	MC
34.1.1	5	0.34	C
34.2.1	6	1.62	C
34.2.2	1	0.07	V
34.2.3	1	0.16	B
34.2.4	1	0.23	MC
34.3.1	3	0.24	C
34.3.2	1	27.07	MC
34.4.1	6	0.52	C
34.4.3	1	0.06	B
34.4.4	1	0.11	QC
34.4.5	1	2.65	MC

*Items are listed in order by unit and increasing level depth.
[11]Recovered in Unit 31 during a north wall clean from 0 to 100 cm BD.
[12]Recovered in Unit 31 during a west wall clean from 0 to 100 cm BD.
[13]Recovered in Unit 32 during a 4-wall clean from 0 to 50 cm BD.
[14]Screened from Unit 33, levels 1-7.

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Catalogue No.*	Lot No.	WT (g)	Material
34.5.1	11	1.26	C
34.5.3	1	0.93	MC
34.6.1	7	0.88	C
34.6.2	1	0.04	V
34.6.3	2	2.75	MC
34.6.4	1	13.27	MC
2010misc.50[15]	2	0.15	C
2010misc.51[15]	1	0.56	B
35.1.1	3	0.35	C
35.1.3	1	0.04	B
35.1.4	1	0.29	MC
35.2.1	12	1.92	C
35.2.3	1	0.13	B
35.2.4	1	2.85	MC
35.3.1	11	1.27	C
35.3.4	2	0.15	B
35.4.1	8	0.56	C
35.4.3	2	0.37	MC
35.5.1	11	1.81	C
35.5.3	1	12.51	MC
35.6.1	15	1.92	C
35.6.2	1	1.57	B
35.7.1	12	3.31	C
35.8.1	16	3.13	C
35.8.2	3	4.83	V
35.8.3	3	0.17	B
35.8.4	1	5.04	QC
35.8.5	1	5.82	MC
35.9.1	26	2.54	C
35.9.2	2	0.59	V
35.9.3	1	0.05	B
35.9.4	1	0.3	QC
35.9.6	1	1.08	MC
35.10.1	24	1.4	C
35.10.2	5	0.07	B
35.10.4	2	1.33	MC
35.11.1	28	2.8	C
35.11.2	1	0.03	O
35.11.3	1	0.06	B
35.11.5	1	0.04	QC
35.12.1	3	0.62	C

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Catalogue No.*	Lot No.	WT (g)	Material
36.1.1	14	2.38	C
36.1.2	1	0.04	V
36.1.4	1	0.64	B
36.2.1	12	0.75	C
36.2.2	2	0.23	B
36.2.3	1	0.06	V
36.3.1	3	0.21	C
36.3.3	2	1.32	QC
36.3.5	1	0.86	C
36.4.1	7	0.67	C
36.4.2	2	0.16	B
36.4.4	1	0.04	QC
36.4.5	1	0.2	MC
36.4.6	1	0.17	A
36.5.1	7	0.31	C
36.5.2	1	0.09	V
36.6.1	8	1.29	C
36.6.3	1	0.03	QC
36.6.4	1	7.19	MC
36.7.1	19	1.72	C
36.7.3	1	3.28	MC
36.8.1	20	2.56	C
36.8.2	2	0.1	V
36.8.3	1	0.1	QC
36.8.4	1	0.43	MC
36.8.6	1	112.43	MC
36.8.7	1	29.26	MC
36.8.8	1	17.76	MC
36.8.9	1	0.02	O
36.9.1	24	2.67	C
36.9.2	1	0.1	B
36.9.4	1	0.08	A
36.10.1	22	2.82	C
36.10.2	2	0.13	B
36.10.3	4	0.28	V
36.10.4	2	0.08	QC
36.10.5	1	1.07	MC
36.10.7	1	0.12	O
36.11.1	7	0.26	C
36.12.1	7	0.24	C
36.12.3	1	0.02	QC

*Items are listed in order by unit and increasing level depth.
[15]Screened from Units 27 and 34, levels 1-5.

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Catalogue No.*	Lot No.	WT (g)	Material
2010misc.19[16]	2	0.09	C
2010misc.20[16]	1	1.2	V
2010misc.22[17]	1	0.41	C
37.1.1	1	0.25	C
37.1.2	2	0.2	B
37.2.1	11	0.76	C
37.3.1	10	1.06	C
37.4.1	2	2.9	C
37.4.3	1	0.09	QC
37.5.1	9	0.69	C
37.6.1	3	0.98	C
37.6.3	1	0.31	QC
37.7.1	1	0.14	C
37.8.1	6	0.3	C
37.9.1	10	0.91	C
37.9.3	1	0.04	QC
37.10.1	25	3.88	C
37.10.2	4	1.27	V
37.10.3	1	0.49	B
37.10.4	1	0.47	QC
37.11.1	40	10.14	C
37.11.2	2	0.11	B
37.11.4	3	1	QC
38.1.1	3	0.21	C
38.2.1	4	0.91	C
38.2.2	1	75.26	MC
38.3.1	1	0.03	C
38.3.2	1	0.66	B
38.4.1	3	0.21	C
38.5.1	2	0.24	C
38.6.1	5	1.14	C
38.7.1	11	1.98	C
38.7.2	1	0.65	V
38.8.1	39	3.14	C
38.8.2	3	0.7	B
38.9.1	26	6.91	C
38.9.4	1	61.63	MC
38.10.1	34	3.89	C
38.10.3	1	2.77	MC

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Catalogue No.*	Lot No.	WT (g)	Material
38.11.1	20	1.56	C
38.11.2	1	0.13	V
38.11.3	1	0.07	B
38.11.4	1	0.01	QC
38.12.1	27	3.68	C
38.12.2	1	0.09	V
38.12.3	2	0.76	QC
38.12.4	2	2.64	MC
38.13.1	17	4.8	C
38.13.3	1	0.05	QC
38.14.1	8	2.62	C
38.15.1	3	0.42	C
38.15.2	2	1.35	B
38.16.1	1	0.19	C
39.1.1	14	1.19	C
39.1.3	1	3.49	MC
39.2.1	11	3.11	C
39.3.1	8	0.96	C
39.3.3	1	0.04	QC
39.4.1	3	4.65	C
39.4.2	1	0.05	V
39.4.3	1	3.86	A
39.5.1	9	4.3	C
39.5.2	2	1.77	V
39.6.1	7	1.32	C
39.6.2	1	0.06	QC
39.7.1	12	1.34	C
39.7.2	1	0.03	V
39.7.3	1	0.04	QC
39.8.1	24	2.56	C
39.8.2	1	0.06	B
39.8.4	1	9.33	MC
39.9.1	8	0.48	C
39.9.2	3	0.3	V
39.9.3	1	0.1	QC
39.9.6	1	0.11	A
39.10.1	18	3.6	C
39.10.2	1	0.13	O
39.10.4	2	0.29	QC

*Items are listed in order by unit and increasing level depth.
[16]Recovered in Unit 36 during a south wall clean from 0 to 120 cm BD.
[17] Recovered in Unit 36 during a west wall clean from 0 to 120 cm BD.

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
39.11.1	8	0.9	C
39.12.1	6	0.44	C
39.12.2	1	2.3	QC
39.13.1	7	1.8	C
39.13.2	1	0.72	QC
39.14.1	6	0.51	C
39.14.3	1	0.15	QC
39.15.1	5	0.3	C
39.16.1	5	0.22	C
2010misc.23[18]	2	0.07	C
2010misc.24[19]	1	0.02	C
40.1.1	4	0.37	C
40.2.1	9	1.4	C
40.3.1	5	0.58	C
40.4.1	4	4.28	C
40.5.1	10	3.42	C
40.6.1	9	1.79	C
40.7.1	2	0.19	C
40.8.1	3	0.18	C
40.9.1	6	1.67	C
40.10.1	7	1.55	C
40.10.2	1	0.25	B
40.11.1	3	0.14	C
40.12.1	2	0.3	C
40.13.1	1	0.8	C
41.1.1	3	0.37	C
41.2.1	5	0.37	C
41.2.3	1	0.21	MC
41.3.1	3	0.39	C
41.4.1	3	0.59	C
41.4.2	1	3.4	MC
41.5.1	2	0.17	C
41.6.1	3	0.27	C
41.6.2	2	6.07	MC
41.7.1	1	0.17	MC
41.8.1	1	0.87	V
41.10.1	1	0.27	QC
42.1.1	1	0.09	C

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Catalogue No.*	Lot No.	WT (g)	Material
42.1.2	1	1.56	QC
42.2.1	3	0.17	C
42.3.1	4	0.97	C
42.3.2	1	0.11	B
42.4.1	1	0.09	C
42.4.2	1	0.32	MC
42.5.1	7	0.4	C
42.6.1	10	1.52	C
42.7.1	17	5.6	C
42.8.1	13	5.7	C
42.8.3	1	1.35	MC
42.9.1	24	3.58	C
42.10.1	29	4.18	C
42.10.3	1	0.1	QC
42.11.1	18	2.33	C
42.12.1	23	1.92	C
42.12.3	1	0.01	A
42.12.4	1	0.25	QC
42.13.1	27	2.03	C
42.13.2	1	0.06	QC
42.14.1	7	2.59	C
42.14.2	1	0.09	B
42.15.1	8	2.42	C
42.16.1	3	2.24	C
42.16.3	1	4.66	A
42.16.4	3	24.56	MC
42.17.1	7	0.43	C
42.17.2	2	0.07	QC
42.18.1	2	0.32	C
42.18.2	1	0.54	MC
42.19.1	3	0.4	C
2010misc.25[20]	1	0.18	C
43.1.1	5	2.86	C
43.2.1	3	0.71	C
43.2.2	2	0.09	V
43.2.3	5	4.86	MC
43.3.1	9	3.48	C
43.3.3	5	4.04	MC

*Items are listed in order by unit and increasing level depth.

[18] Recovered in Unit 39 during a west wall clean from 0 to 160 cm BD.

[19] Recovered in Unit 39 during a south wall clean from 0 to 160 cm BD.

[20] Recovered in Unit 42 during a 4-wall clean from 60 to 80 cm BD.

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Catalogue No.*	Lot No.	WT (g)	Material
43.4.1	5	5.89	C
43.4.2	1	1.36	V
43.4.3	3	0.57	MC
43.5.1	3	0.69	C
43.5.2	1	0.16	B
43.5.3	1	13.01	MC
43.6.1	4	0.34	C
43.6.2	5	8.71	MC
43.6.3	1	0.27	QC
43.7.1	12	3.34	C
43.7.3	1	0.24	QC
43.8.1	3	0.91	C
43.8.2	2	1.54	A
43.9.1	7	5.12	C
44.1.1	3	0.25	C
44.1.2	1	1.02	MC
44.2.1	2	0.11	C
44.3.1	4	0.45	C
44.4.1	1	0.08	B
44.6.1	1	0.03	C
45.1.1	3	1.75	C
45.2.1	11	1.76	C
45.3.1	9	3.15	C
45.4.1	7	13.97	C
45.4.2	1	0.02	QC
45.5.1	4	0.19	C
46.1.1	6	4.1	C
46.1.2	1	0.29	A
46.2.1	12	1.45	C
46.2.2	1	0.06	V
46.2.3	1	2.4	A
46.3.1	9	0.63	C
46.4.1	11	0.96	C
46.4.2	1	0.45	V
46.4.3	1	0.09	A
46.5.1	16	2.31	C
46.5.2	2	0.07	V
46.5.3	1	0.26	MC
46.6.1	9	1.31	C
46.6.2	2	0.43	V
46.6.3	1	1.31	MC

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Catalogue No.*	Lot No.	WT (g)	Material
46.7.1	21	1.44	C
46.7.2	1	0.03	V
46.7.3	1	0.06	B
46.7.4	1	0.6	MC
46.8.1	19	1.34	C
46.8.2	1	0.01	O
46.8.3	1	0.01	V
46.8.4	1	0.13	B
46.8.5	1	0.34	A
46.8.6	2	0.24	QC
46.8.7	2	6	MC
46.9.1	12	1.53	C
46.9.2	4	0.39	V
46.9.3	1	3.81	MC
47.1.1	3	0.38	C
47.1.2	1	0.06	B
47.2.1	12	0.95	C
47.2.2	5	2.16	B
47.2.3	2	5.71	MC
47.3.1	10	8.06	C
47.3.2	3	0.35	B
47.3.3	1	0.36	QC
47.3.4	1	0.11	MC
47.4.1	5	0.42	C
47.4.2	2	0.26	B
47.4.3	2	0.48	MC
47.5.1	4	0.25	C
47.6.1	12	2.12	C
47.6.2	13	27.28	MC
47.7.1	24	2.58	C
47.7.2	1	0.04	B
47.7.3	9	7.61	MC
47.8.1	27	3.3	C
47.8.2	2	0.21	B
47.8.3	9	33.65	MC
47.9.1	18	1.62	C
47.9.2	1	0.03	B
47.9.3	1	0.09	QC
47.9.4	1	0.14	MC
47.10.1	25	4.27	C
47.10.2	2	0.06	V

*Items are listed in order by unit and increasing level depth.

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Catalogue No.*	Lot No.	WT (g)	Material
47.10.3	1	0.03	B
47.10.4	1	0.03	QC
47.10.5	3	0.8	MC
47.10.6	1	12.03	MC
47.11.1	5	0.55	C
47.11.2	1	5.19	QC
47.11.3	1	1.58	MC
48.1.1	5	1.07	C
48.2.1	6	0.59	C
48.2.2	1	0.06	O
48.2.3	1	0.11	V
48.2.4	1	0.04	B
48.2.5	1	2.27	MC
48.3.1	15	1.66	C
48.3.2	1	0.07	B
48.3.3	2	0.26	MC
48.4.1	7	2.14	C
48.4.2	1	0.02	O
48.4.3	1	0.79	B
48.5.1	3	0.09	C
48.5.2	2	0.66	QC
48.6.1	6	0.57	C
48.6.2	1	0.05	B
48.6.3	2	0.85	MC
48.7.1	12	0.72	C
48.7.2	1	0.08	V
48.7.3	2	8.18	MC
48.8.1	34	1.83	C
48.8.2	2	0.91	MC
48.9.1	29	3.05	C
48.9.2	1	0.17	O
48.9.3	2	1.02	V
48.9.4	1	0.06	B
48.9.5	1	0.03	QC
48.9.6	1	1.1	MC
48.10.1	19	8.68	C
48.10.2	3	0.15	V
48.10.3	1	0.05	QC
48.10.4	2	20.65	MC

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Catalogue No.*	Lot No.	WT (g)	Material
48.11.1	6	1.29	C
48.11.2	2	5.39	MC
2011misc.2[21]	1	0.03	QC
2012misc.19[22]	1	0.66	C
49.1.1	8	1.19	C
49.2.1	9	2.02	C
49.2.2	1	0.33	QC
49.2.3	4	0.36	MC
49.3.1	3	0.23	C
49.3.2	3	4.66	MC
49.4.1	8	0.82	C
49.4.2	1	0.03	V
49.4.3	1	0.06	QC
49.5.1	9	0.7	C
49.5.2	1	0.11	QC
49.5.3	4	1.74	MC
49.6.1	20	5.88	C
49.6.2	1	3.35	B
49.6.3	1	0.02	MC
49.7.1	11	3.06	C
49.7.2	2	0.24	QC
49.7.3	3	0.46	MC
49.8.1	20	1.61	C
49.8.2	1	0.1	V
49.8.3	1	0.43	B
49.8.4	2	0.35	QC
49.8.5	2	0.12	MC
49.9.1	25	2.5	C
49.9.2	2	0.04	V
49.9.3	1	0.01	QC
49.9.4	5	0.88	MC
49.10.1	20	4.94	C
49.10.2	1	0.07	V
49.10.3	1	0.05	MC
49.11.1	17	2.3	C
49.11.2	2	0.05	V
49.11.3	1	0.04	B
49.11.4	2	0.37	A
49.11.5	1	1.24	QC

*Items are listed in order by unit and increasing level depth.
[21]Recovered in Unit 48 during a 4-wall clean from 40 to 80 cm BD.
[22] Surface collection at the northeast corner of Unit 48 (N110/W89).

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
49.11.6	9	2.84	MC
49.12.1	10	2.03	C
49.12.2	1	0.02	B
49.12.3	3	0.16	QC
49.12.4	2	0.88	MC
50.1.1	4	0.54	C
50.1.2	1	1.25	QC
50.2.1	11	1.36	C
50.2.2	5	2.04	B
50.2.3	5	2.81	MC
50.3.1	4	0.54	C
50.3.2	1	0.03	B
50.3.3	1	0.76	QC
50.3.4	2	1.62	MC
50.4.1	20	1.51	C
50.4.2	2	0.08	B
50.4.3	2	0.47	MC
50.5.1	10	0.53	C
50.6.1	18	2.8	C
50.6.3	8	13.91	MC
50.7.1	36	2.18	C
50.7.2	1	0.03	O
50.7.4	8	0.99	MC
50.8.1	20	2.26	C
50.8.3	1	0.29	B
50.8.4	1	0.18	A
50.8.5	1	0.89	MC
50.9.1	18	2.9	C
50.9.2	1	0.08	V
50.9.3	1	0.05	B
50.9.4	1	0.07	A
50.10.1	15	3.79	C
50.10.2	1	0.01	O
50.10.3	1	0.25	QC
50.10.4	5	4.58	MC
50.11.1	9	0.98	C
50.11.2	1	0.14	A
50.11.3	1	0.21	QC
50.11.4	1	0.31	MC
51.1.1	8	2.02	C
51.1.2	1	0.08	MC

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Catalogue No.*	Lot No.	WT (g)	Material
51.2.1	23	1.26	C
51.2.2	6	0.61	V
51.2.3	1	0.07	QC
51.2.4	2	2.75	MC
51.3.1	20	2.26	C
51.3.2	1	0.12	B
51.4.1	7	0.63	C
51.4.2	1	0.05	QC
51.5.1	8	2.55	C
51.5.2	1	0.02	QC
51.6.1	10	0.46	C
51.6.2	1	0.1	MC
51.7.1	22	3.14	C
51.7.2	1	0.22	MC
51.8.1	14	1.93	C
51.8.2	1	0.24	MC
51.9.1	15	0.77	C
51.9.2	1	0.05	B
51.9.3	6	8.25	MC
51.10.1	14	3.14	C
51.10.2	1	0.04	V
51.10.3	1	0.1	B
51.10.4	2	0.78	MC
51.11.1	1	0.34	QC
52.1.1	8	0.58	C
52.1.2	1	0.05	B
52.1.3	1	0.1	MC
52.2.1	9	0.6	C
52.2.2	3	2.68	QC
52.2.3	3	0.93	MC
52.3.1	9	1.63	C
52.3.2	4	0.49	V
52.3.3	1	0.02	B
52.4.1	12	1.13	C
52.4.2	1	0.12	QC
52.4.3	5	2.61	MC
52.5.1	10	3.71	C
52.5.2	2	0.09	V
52.5.3	1	0.02	B
52.5.4	1	0.26	MC
52.6.1	5	1.05	C

*Items are listed in order by unit and increasing level depth.

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
52.6.2	11	19.79	MC
52.7.1	13	0.83	C
52.7.2	1	0.09	B
52.7.3	1	0.18	QC
52.7.4	5	0.68	MC
52.8.1	21	2.73	C
52.8.2	1	0.07	QC
52.8.3	6	0.76	MC
52.9.1	15	1.21	C
52.9.2	4	0.26	V
52.9.3	2	0.06	B
52.9.4	5	4.83	MC
52.10.1	25	1.89	C
52.10.2	1	0.07	V
52.10.3	1	0.03	B
52.10.4	3	0.36	MC
52.11.1	18	5.03	C
52.11.2	1	0.05	V
52.11.2a	1	1.23	V
52.11.3	1	0.01	B
52.11.4	1	0.95	QC
52.11.5	3	1.39	MC
52.12.1	7	1.59	C
52.12.2	1	0.12	V
52.12.3	4	1.45	MC
53.2.1	4	1.49	C
53.3.1	5	0.88	C
53.4.1	4	0.33	C
53.4.2	1	0.03	O
53.4.3	1	0.7	MC
53.5.1	3	0.57	C
53.6.1	12	0.8	C
53.6.2	1	0.11	V
53.6.3	3	0.59	QC
53.7.1	12	1.2	C
53.7.2	1	0.02	B
53.7.3	3	0.24	QC
53.8.1	17	0.92	C
53.8.2	1	0.06	B
53.8.3	2	1.53	QC
53.9.1	21	3.49	C

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Catalogue No.*	Lot No.	WT (g)	Material
53.9.2	6	0.99	QC
53.9.3	1	5.28	MC
53.10.1	41	3.87	C
53.10.3	1	0.18	A
53.11.1	30	4.24	C
53.11.2	1	0.07	V
53.11.3	1	0.03	A
53.11.4	1	0.07	QC
53.11.5	3	0.63	MC
53.12.1	34	5.04	C
53.12.2	2	0.48	B
53.13.1	27	2.2	C
53.13.2	1	0.12	V
53.13.3	2	0.73	MC
53.14.1	19	4.57	C
53.15.1	10	0.75	C
53.15.2	1	0.03	B
53.15.3	1	0.42	MC
53.16.1	3	0.23	C
53.17.1	9	0.69	C
53.18.1	4	0.42	C
53.19.1	5	0.22	C
53.20.1	3	0.2	C
54.1.1	1	0.22	C
54.1.2	1	2.28	B
54.2.1	2	0.17	C
54.2.2	10	32.31	MC
54.3.1	5	0.35	C
54.3.2	1	0.02	V
54.3.3	1	2.08	MC
54.4.1	2	0.17	C
54.7.1	1	0.12	C
55.1.1	5	0.46	C
55.1.2	1	0.21	MC
55.2.1	10	1.27	C
55.2.2	3	0.51	B
55.2.3	1	1.52	QC
55.3.1	9	1.45	C
55.3.2	3	0.53	B
55.4.1	12	1.2	C
55.4.2	1	0.04	B

*Items are listed in order by unit and increasing level depth.

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
55.5.1	10	0.55	C
55.5.2	1	5.55	V
55.5.3	1	0.05	QC
55.5.4	3	0.6	MC
55.6.1	14	2.06	C
55.6.2	1	0.08	B
55.6.3	2	0.25	QC
55.6.4	5	2.03	MC
55.6.5	1	36	MC
55.7.1	21	1.76	C
55.7.2	2	0.61	QC
55.7.3	8	4.61	MC
55.8.1	24	2.5	C
55.8.2	4	0.43	V
55.8.3	2	0.31	QC
55.8.4	7	9.05	MC
55.9.1	21	3.67	C
55.9.2	1	0.03	V
55.9.3	2	0.1	B
55.9.4	1	0.06	A
55.9.5	2	0.46	QC
55.9.6	6	0.85	MC
55.10.1	15	1.59	C
55.10.2	1	0.07	B
55.10.3	2	21.78	MC
55.11.1	3	0.11	C
2011misc.3[23]	1	0.17	C
56.2.1	2	0.05	C
56.3.1	5	0.97	C
56.4.1	1	0.22	C
56.5.1	4	6.25	C
56.6.1	5	1.69	C
56.7.1	1	0.14	C
56.8.1	6	0.37	C
56.9.1	22	6.73	C
59.9.2	1	0.72	B
56.10.1	36	2.36	C
56.10.2	2	0.15	V
56.10.3	1	0.04	B
56.10.4	1	1.06	MC

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Catalogue No.*	Lot No.	WT (g)	Material
56.10.10	1	71.94	MC
56.11.1	31	6.09	C
56.11.2	2	0.07	V
56.11.3	2	0.17	B
56.11.4	2	0.7	QC
56.11.5	1	2.4	MC
56.12.1	31	3.22	C
56.12.2	1	0.06	QC
56.13.1	20	6.6	C
56.13.2	1	0.07	QC
56.13.3	2	4.18	MC
56.14.1	23	6.52	C
56.14.2	1	0.07	V
56.14.3	4	1.67	QC
56.15.1	16	2.67	C
56.16.1	17	1.02	C
56.16.2	1	0.07	B
56.16.3	1	20.09	MC
56.17.1	5		C
56.18.1	8	4.41	C
56.19.1	4	0.62	C
56.20.1	1	0.03	C
57.1.1	9	0.95	C
57.1.2	1	0.2	B
57.1.3	2	18.18	MC
57.2.1	9	0.49	C
57.2.2	2	0.11	B
57.2.3	1	0.07	MC
57.3.1	13	1.09	C
57.3.2	3	1.19	B
57.3.3	2	0.37	QC
57.3.4	4	0.64	MC
57.4.1	8	0.66	C
57.4.2	1	0.41	V
57.4.3	2	0.2	QC
57.5.1	10	1.22	C
57.5.2	2	0.1	B
57.5.3	2	0.29	MC
57.6.1	15	1.24	C
57.7.1	18	3.12	C

*Items are listed in order by unit and increasing level depth.
[23]Recovered in Unit 55 during a south wall collapse from 25 to 62 cm BD.

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
57.7.2	1	0.19	V
57.7.3	3	0.15	B
57.7.4	2	6.11	MC
57.7.5	1	4.38	MC
57.8.1	32	0.47	C
57.8.2	1	1.59	B
57.8.3	1	0.46	QC
57.8.4	2	3.03	MC
57.9.1	37	4.69	C
57.9.2	1	0.03	O
57.9.3	2	0.06	V
57.9.4	2	0.1	B
57.9.5	5	0.78	QC
57.9.6	1	0.12	MC
57.10.1	14	2.19	C
57.10.2	1	0.15	V
57.10.3	2	0.06	QC
57.11.1	8	0.65	C
57.11.2	1	0.04	QC
58.4.1	1	0.04	C
58.6.1	1	0.04	C
58.6.2	1	0.13	QC
58.6.3	1	1.51	B
58.7.1	6	0.77	C
58.8.1	11	1.8	C
58.8.2	1	0.05	QC
58.8.3	2	0.44	MC
58.9.1	19	3.36	C
58.9.2	2	1.12	B
58.10.1	26	6.75	C
58.10.2	1	0.03	V
58.10.2a	1	0.08	V
58.10.3	1	0.19	MC
58.11.1	27	9.8	C
58.11.2	1	0.17	V
58.12.1	28	2.54	C
58.12.2	1	0.2	B
58.12.3	1	0.33	MC
58.13.1	57	6.27	C
58.13.2	2	0.1	V

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Catalogue No.*	Lot No.	WT (g)	Material
58.13.3	1	2.03	A
58.13.4	1	0.07	QC
58.13.5	1	0.09	MC
58.14.1	16	1.42	C
58.14.2	1	0.01	V
58.15.1	32	2.75	C
58.15.2	1	0.02	B
58.15.3	4	0.64	QC
58.15.4	1	0.6	MC
58.15.5	1	62.7	MC
58.16.1	17	1.46	C
58.16.2	1	0.33	QC
58.16.3	1	14.59	MC
58.17.1	13	0.67	C
58.17.2	1	0.06	V
58.18.1	7	0.54	C
58.18.2	1	0.01	V
58.19.1	9	2.45	C
58.19.2a	1	0.99	V
58.19.2b	1	0.37	V
58.19.3	1	0.82	QC
2011misc.10[24]	2	0.04	C
59.1.1	16	1.83	C
59.1.2	2	0.09	V
59.1.3	2	0.14	B
59.1.4	3	13.3	MC
59.2.1	9	4.32	C
59.2.2	1	0.06	B
59.2.3	2	0.45	MC
59.3.1	6	0.45	C
59.3.2	1	0.12	B
59.3.3	1	0.15	MC
59.4.1	5	1.59	C
59.4.2	1	0.01	V
59.4.3	2	0.1	B
59.4.4	1	0.16	QC
59.5.1	5	0.38	C
59.5.2	1	0.06	V
59.5.3	1	0.07	B
59.5.4	3	0.27	MC

*Items are listed in order by unit and increasing level depth.
[24]Recovered in Unit 58 during a 4-wall clean from 0 to 100 cm BD.

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
59.6.1	16	2.01	C
59.6.2	1	0.02	B
59.6.3	1	0.52	A
59.6.4	1	0.06	QC
59.6.5	8	2	MC
59.7.1	24	2.58	C
59.7.2	2	0.08	V
59.7.3	3	0.39	B
59.7.4	1	0.18	A
59.7.5	2	0.05	QC
59.7.6	10	1.54	MC
59.8.1	17	2.32	C
59.8.2	4	0.23	V
59.8.3	1	0.04	O
59.8.4	1	0.14	B
59.8.5	1	0.96	QC
59.8.6	4	0.55	MC
59.9.1	19	2.95	C
59.9.2	2	0.42	V
59.9.3	9	3.39	MC
59.10.1	10	0.69	C
59.10.2	1	0.07	V
59.10.3	1	1.28	A
59.10.4	4	3.81	MC
59.10.5	1	137.04	MC
59.11.1	29	2.45	C
59.11.2	2	0.24	B
59.11.3	10	3.46	MC
59.11.5	1	3.33	MC
59.12.1	3	0.37	C
59.12.2	1	0.17	V
59.12.3	4	14.75	MC
60.1.1	6	0.47	C
60.1.2	2	0.18	B
60.2.1	16	0.7	C
60.2.2	4	0.34	B
60.2.3	1	2.29	MC
60.3.1	14	2.11	C
60.4.1	18	3.38	C
60.4.2	3	0.11	B
60.4.3	2	2.91	MC

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Catalogue No.*	Lot No.	WT (g)	Material
60.5.1	15	2.06	C
60.5.2	1	0.05	V
60.5.3	4	1.88	B
60.6.1	31	3.76	C
60.6.2	2	0.08	V
60.6.3	5	0.21	B
60.6.4	1	0.16	QC
60.7.1	23	2.09	C
60.7.2	2	0.88	B
60.7.3	1	0.12	MC
60.8.1	17	2.01	C
60.8.2	1	0.03	O
60.8.3	1	0.08	V
60.8.4	2	0.13	MC
60.9.1	24	1.55	C
60.9.2	2	21.03	MC
60.10.1	9	3.84	C
60.10.2	2	0.65	QC
60.10.3	2	0.14	A
60.11.1	12	0.92	C
60.11.2	2	1.26	QC
60.11.3	1	0.39	B
60.12.1	3	2.66	C
60.12.2	1	0.03	QC
61.2.1	13	3.53	C
61.3.1	6	0.41	C
61.4.1	2	0.44	C
61.5.1	4	1.03	C
61.6.1	4	1.17	C
61.6.2	1	0.05	V
61.6.3	1	1.13	B
61.6.4	1	0.06	QC
61.6.5	4	9.22	MC
61.7.1	7	1.29	C
61.7.2	1	0.05	B
61.7.3	1	0.55	QC
61.7.4	4	1.27	MC
61.8.1	20	15.31	C
61.8.2	1	0.09	MC
61.9.1	3	0.51	C
61.10.1	7	0.43	C

*Items are listed in order by unit and increasing level depth.

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
61.10.2	1	3.18	QC
61.10.3	4	4.2	MC
61.11.1	4	0.3	C
62.1.1	8	1.36	C
62.1.2	1	0.06	V
62.2.1	2	1.56	C
62.2.2	1	0.02	B
62.3.1	12	0.77	C
62.3.2	2	0.12	QC
62.4.1	6	0.52	C
62.4.2	1	0.02	QC
62.5.1	14	1.25	C
62.5.2	2	2.35	MC
62.6.1	10	0.75	C
62.6.2	1	0.18	QC
62.6.3	1	3.05	MC
62.7.1	11	1.18	C
62.7.2	1	0.01	V
62.7.3	1	0.17	QC
62.8.1	51	7.84	C
62.8.2	2	0.06	V
62.8.3	1	2.57	MC
62.9.1	40	2.71	C
62.9.2	1	0.06	V
62.9.3	1	0.06	B
62.9.4	2	0.23	QC
62.9.5	5	8.44	MC
62.10.1	23	3.18	C
62.10.2	2	0.08	B
62.10.3	2	0.11	QC
62.10.4	1	0.23	MC
62.10.7	1	2.62	C
62.11.1	20	2.18	C
62.11.2	1	0.05	QC
63.1.1	1	0.07	C
63.2.1	9	1.62	C
63.2.2	2	0.09	B
63.2.3	1	2.2	MC
63.3.1	5	0.39	C
63.4.1	7	1.66	C
63.5.1	4	0.52	C

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Catalogue No.*	Lot No.	WT (g)	Material
63.6.1	9	1.28	C
63.6.2	1	0.12	QC
63.7.1	12	2.8	C
63.8.1	12	0.84	C
63.8.3	1	0.15	QC
63.9.1	19	2.58	C
63.9.2	2	0.46	QC
63.10.1	14	2.55	C
63.10.2	1	0.03	QC
64.1.1	3	0.16	C
64.2.1	6	2.6	C
64.2.2	1	0.04	QC
64.3.1	4	0.22	C
64.3.2	1	0.02	O
64.3.3	2	0.22	MC
64.4.1	2	0.03	C
64.4.2	1	3.28	B
64.5.1	2	0.37	C
64.6.1	3	0.39	C
64.6.2	1	0.06	V
64.7.1	8	0.56	C
64.7.2	1	0.63	V
64.7.3	1	0.22	B
64.8.1	13	5.72	C
64.8.2	1	0.15	QC
64.8.3	4	32.52	MC
64.9.1	24	3.44	C
64.9.2	3	0.35	V
64.9.3	1	0.14	QC
64.10.1	54	6.67	C
64.10.2a	1	0.05	V
64.10.2b	1	0.01	V
64.10.3	2	0.07	B
64.10.4	2	0.15	QC
64.10.5	4	2.84	MC
64.11.1	26	1.72	C
64.11.2	1	0.03	B
64.11.3	1	0.85	MC
64.12.1	25	3.56	C
64.12.2	1	0.45	B
64.12.3	2	0.84	MC

*Items are listed in order by unit and increasing level depth.

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Catalogue No.*	Lot No.	WT (g)	Material
64.13.1	24	2.62	C
64.13.2	1	0.18	B
64.13.3	1	0.12	QC
64.13.4	1	0.1	MC
64.14.1	20	4.38	C
64.14.2	1	0.22	B
64.14.3	1	0.12	QC
64.14.4	2	95.7	MC
64.15.1	18	1.4	C
64.15.2	1	0.1	B
64.15.3	1	0.03	V
64.15.4	2	0.02	QC
64.16.1	13	1.91	C
64.16.2	1	1.87	MC
64.17.1	7	0.9	C
64.17.2	1	25.08	MC
64.18.1	2	0.35	C
64.19.1	6	1.2	C
64.19.2	1	0.08	V
2011misc.11[25]	1	25.68	MC
64.19.3	1	1.3	QC
65.1.1	9	0.73	C
65.1.2	4	0.99	B
65.1.3	1	0.08	MC
65.1.4	1	6.46	MC
65.2.1	22	1.66	C
65.2.2	12	3.73	B
65.2.3	3	0.51	MC
65.3.1	14	3.4	C
65.3.2	10	5.34	B
65.4.1	10	3.36	C
65.4.2	2	0.74	B
65.4.3	1	0.02	MC
65.5.1	16	0.86	C
65.5.2	1	0.11	V
65.5.3	7	0.31	B
65.5.4	2	0.25	MC

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Catalogue No.*	Lot No.	WT (g)	Material
65.6.1	11	0.75	C
65.6.2	5	0.77	B
65.6.3	1	0.14	MC
65.7.1	15	1.01	C
65.7.2	4	1.13	B
65.7.3	1	0.32	A
65.7.4	1	0.39	QC
65.8.1	33	2.27	C
65.8.2	2	0.1	V
65.8.3	5	0.4	B
65.8.4	1	0.04	QC
65.8.5	2	0.32	MC
65.9.1	25	3.69	C
65.9.2	17	3.21	B
65.9.3	3	0.22	QC
65.10.1	12	2.46	C
65.10.2	1	0.11	B
65.10.3	1	220	MC
65.11.1	10	1.69	C
65.11.2	2	0.06	V
65.11.3	2	0.25	B
65.11.4	4	9.44	MC
65.12.1	19	4.47	C
65.12.2	2	3.23	QC
65.12.3	2	2.68	MC
2011misc.4[26]	7	0.71	C
2011misc.5[26]	6	0.5	B
2012misc.23[27]	1	0.21	C
2012misc.24[28]	1	4.21	B
66.1.1	14	4.43	C
66.2.1	11	0.91	C
66.2.2	2	0.28	B
66.3.1	9	0.46	C
66.4.1	11		C
66.5.1	14	5.33	C
66.5.2	2	10.62	MC
66.6.1	18	9.35	C

*Items are listed in order by unit and increasing level depth.
[25]Recovered in Unit 64 during a north wall collapse from 100 to 118 cm BD.
[26]Recovered in Unit 65 during a 4-wall clean from 0 to 70 cm BD.
[27]Surface collection at the southwest corner of Unit 65 (N108/W102).
[28]Surface collection at the southeast corner of Unit 65 (N108/W101).

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Catalogue No.*	Lot No.	WT (g)	Material
66.6.2	3	0.05	V
66.6.3	2	0.17	QC
66.6.4	2	1.83	MC
66.7.1	16	1.67	C
66.7.2	2	0.1	V
66.7.3	1	0.05	B
66.7.4	1	0.8	QC
66.7.5	2	0.64	MC
66.8.1	25	1.59	C
66.8.2	1	0.27	B
66.8.3	1	0.11	QC
66.8.4	2	2.39	MC
66.9.1	20	2.91	C
66.9.2	1	0.01	V
66.9.3	1	0.03	B
66.9.4	3	12.89	QC
66.10.1	34	4.03	C
66.10.2	3	0.28	QC
66.11.1	9	2.18	C
2011misc.6[29]	2	0.11	C
2011misc.7[29]	1	0.36	MC
67.1.1	3	0.65	C
67.1.2	2	0.31	B
67.1.3	1	0.76	QC
67.2.1	9	0.98	C
67.2.2	5	0.93	B
67.2.3	2	1.25	MC
67.3.1	15	1.77	C
67.3.2	7	0.82	B
67.3.3	4	23.36	MC
67.4.1	18	0.98	C
67.4.2	10	1.14	B
67.4.3	1	0.16	QC
67.4.4	1	0.34	MC
67.5.1	5	0.22	C
67.5.2	1	0.05	V
67.5.3	5	0.41	B
67.5.4	1	0.12	MC
67.6.1	14	1.52	C
67.6.2	1	0.05	B

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Catalogue No.*	Lot No.	WT (g)	Material
67.6.3	9	15.66	MC
67.7.1	23	3.4	C
67.7.2	1	0.05	V
67.7.3	3	0.13	B
67.7.4	7	1.51	MC
67.8.1	26	3.71	C
67.8.2	3	0.25	V
67.8.3	2	0.05	B
67.8.4	5	1.44	MC
67.9.1	15	1.68	C
67.9.2	1	0.26	QC
67.9.3	1	0.01	V
67.9.4	2	0.4	B
67.9.5	3	1.38	MC
67.10.1	5	1.79	C
67.10.2	1	0.06	B
67.10.3	1	0.17	QC
67.10.4	7	22.63	MC
67.11.1	14	0.68	C
67.11.2	1	0.04	O
67.11.3	1	0.04	B
67.11.4	1	0.04	QC
67.11.5	1	0.04	MC
67.11.7	1	2.65	MC
68.1.1	2	0.36	C
68.2.1	1	0.1	C
68.3.1	1	0.04	C
68.4.1	3	0.22	C
68.4.2	1	0.1	B
68.4.3	1	0.09	QC
68.5.1	2	0.07	C
68.6.1	7	0.36	C
68.6.2	1	0.04	B
68.7.1	11	2.27	C
68.7.2	1	0.02	V
68.7.3	1	0.05	B
68.7.4	1	0.01	O
68.7.5	1	0.05	MC
68.8.1	8	1.37	C
68.9.1	21	2.23	C

*Items are listed in order by unit and increasing level depth.
[29]Recovered in Unit 66 during a 4-wall clean from 0 to 30 cm BD.

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Catalogue No.*	Lot No.	WT (g)	Material
68.9.2	2	0.22	V
68.10.1	9	1.8	C
68.10.2	1	1.45	B
68.10.3	2	32.54	MC
69.3.1	3	0.32	C
69.4.1	1	0.28	C
69.5.1	1	0.1	C
69.6.1	4	0.57	C
69.6.2	1	3.32	MC
69.7.1	3	0.27	C
69.8.1	4	0.84	C
69.9.1	6	0.29	C
69.9.2	1	0.05	QC
69.9.3	1	0.15	MC
69.10.1	20	3.96	C
69.10.2	1	0.07	QC
70.1.1	18	1.88	C
70.1.2	2	0.07	B
70.2.1	19	1.74	C
70.2.2	1	0.01	B
70.3.1	7	0.59	C
70.3.2	3	0.21	B
70.4.1	9	1.33	C
70.4.2	1	0.01	V
70.4.3	1	0.05	B
70.5.1	11	0.58	C
70.5.2	1	0.88	QC
70.6.1	18	4.31	C
70.6.2	1	0.25	V
70.6.3	4	0.15	B
70.6.4	1	0.13	QC
70.6.5	2	1.32	MC
70.6.7	1	0.55	C
70.7.1	22	3.26	C
70.7.2	1	0.19	V
70.7.3	1	0.83	B
70.7.4	1	0.09	QC
70.7.5	2	5.21	MC
70.7.8	1	1.05	C
70.8.1	16	0.86	C
70.9.1	30	2.24	C

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Catalogue No.*	Lot No.	WT (g)	Material
70.9.2	1	0.05	B
70.9.3	1	0.41	QC
70.9.4	1	1.81	MC
70.10.1	14	1.96	C
70.10.2	1	0.32	C
71.1.1	4	0.71	C
71.1.2	1	0.05	V
71.1.3	1	1.57	B
71.2.1	9	0.98	C
71.2.2	3	0.28	V
71.2.3	2	0.26	B
71.2.4	1	0.13	A
71.2.5	1	0.44	MC
71.3.1	6	9.51	C
71.3.2	1	0.09	B
71.3.3	2	1.26	MC
71.4.1	7	3.77	C
71.4.2	1	0.26	B
71.4.3	2	8.59	MC
71.5.1	5	0.96	C
71.5.2	3	0.45	V
71.5.3	1	0.04	B
71.5.4	2	0.44	QC
71.5.5	1	5.67	MC
71.6.1	11	0.83	C
71.6.2	3	0.25	V
71.6.3	4	2.18	QC
71.6.4	3	1.11	MC
71.7.1	20	4.27	C
71.7.2	1	0.17	V
71.7.3	2	0.08	B
71.7.4	1	0.01	QC
71.7.5	9	2.81	MC
71.8.1	8	0.54	C
71.8.2	1	0.1	V
71.8.3	2	0.11	QC
71.8.4	1	0.14	B
71.8.5	4	3.78	MC
71.9.1	11	2.1	C
71.9.2	1	0.12	V
71.9.3	3	0.22	B

*Items are listed in order by unit and increasing level depth.

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Catalogue No.*	Lot No.	WT (g)	Material
71.9.4	1	0.03	QC
71.9.5	8	2.4	MC
71.10.1	9	3.5	C
71.10.2	4	2.48	V
71.10.3	2	0.57	QC
71.10.4	6	2.1	MC
71.11.1	7	2.46	C
71.11.2	1	0.02	V
71.11.3	1	0.39	B
71.11.4	5	8.52	MC
71.12.1	7	0.5	C
71.12.2	3	0.18	V
71.12.3	7	1.22	MC
72.1.1	17	2.28	C
72.1.2	3	0.15	B
72.1.3	2	0.92	MC
72.2.1	16	1.53	C
72.2.2	1	0.43	V
72.2.3	2	0.34	B
72.2.4	3	1.22	MC
72.3.1	14	1.46	C
72.3.2	6	3.97	B
72.3.3	1	0.19	MC
72.4.1	18	1.23	C
72.4.2	2	0.05	V
72.4.3	4	0.15	B
72.4.4	2	0.27	QC
72.4.5	1	3.74	MC
72.5.1	14	2.53	C
72.5.2	3	0.26	V
72.5.3	2	0.73	B
72.6.1	20	0.98	C
72.6.2	1	0.03	V
72.6.3	3	0.61	B
72.6.4	1	0.09	QC
72.6.5	3	0.55	MC
72.7.1	18	2.69	C
72.7.2	1	0.03	V
72.7.3	3	0.63	B
72.7.4	2	0.62	QC
72.7.5	2	0.59	MC

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Catalogue No.*	Lot No.	WT (g)	Material
72.8.1	33	4.94	C
72.8.2	3	0.5	B
72.8.3	2	0.53	A
72.8.4	1	0.23	QC
72.8.5	2	0.13	MC
72.9.1	29	3.58	C
72.9.2	1	0.03	B
72.9.3	4	0.91	QC
72.9.4	7	10.33	MC
72.10.1	17	1.42	C
72.10.2	4	0.17	V
72.10.3	3	0.78	B
72.10.4	2	0.57	QC
72.10.5	1	0.06	MC
72.11.1	21	3.85	C
72.11.2	2	0.16	QC
72.11.3	1	0.5	MC
72.12.1	12	2.19	C
72.12.2	3	0.54	B
72.12.3	2	1.63	MC
73.1.1	5	0.26	C
73.1.2	2	0.17	V
73.1.3	1	0.13	A
73.1.4	1	0.33	MC
73.2.1	9	0.6	C
73.2.2	2	0.24	V
73.2.3	1	0.03	B
73.2.4	2	5.42	MC
73.3.1	7	0.93	C
73.3.2	1	0.16	A
73.3.3	2	5.2	MC
73.4.1	2	0.72	C
73.4.2	2	0.2	V
73.4.3	1	0.25	A
73.5.1	5	1.05	C
73.5.2	1	0.13	V
73.5.3	1	0.02	B
73.5.4	3	6.81	MC
73.6.1	14	0.73	C
73.6.2	6	0.27	V
73.6.3	2	0.36	MC

*Items are listed in order by unit and increasing level depth.

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Catalogue No.*	Lot No.	WT (g)	Material
73.6.4	1	19.07	MC
73.7.1	18	3.85	C
73.7.2	2	0.12	V
73.7.2a	1	0.05	V
73.7.3	2	0.66	B
73.7.4	1	0.04	QC
73.7.5	4	1.65	MC
73.8.1	11	2.05	C
73.8.2	1	0.08	V
73.8.3	1	0.04	QC
73.8.4	14	3	MC
73.9.1	8	1.48	C
73.9.2	2	0.33	V
73.9.3	1	0.58	QC
73.9.4	4	1.54	B
73.9.5	6	1.85	MC
73.9.6	1	0.89	C
73.10.1	4	2.34	C
73.10.2	1	0.11	B
73.10.3	5	8.45	MC
73.10.4	1	8.83	MC
73.11.1	4	0.43	C
73.11.2	1	0.02	O
73.11.3a	1	0.13	V
73.11.3b	1	0.11	V
73.11.4	1	0.01	B
73.11.5	1	0.21	QC
73.11.6	2	11.72	MC
73.12.1	8	1.1	C
73.12.2	1	0.14	V
73.12.3	1	0.18	QC
73.12.4	3	4.85	MC
74.1.1	2	0.15	C
74.1.2	6	1.2	B
74.2.1	20	2.54	C
74.2.2	10	0.94	B
74.2.3	3	7.47	MC
74.3.1	14	2.22	C
74.3.2	8	1.12	B
74.4.1	10	0.79	C
74.4.2	3	0.13	V

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Catalogue No.*	Lot No.	WT (g)	Material
74.4.3	5	1.38	B
74.4.4	3	2.3	MC
74.5.1	5	0.44	C
74.5.2	4	1.02	B
74.5.3	3	0.75	MC
74.6.1	8	1.14	C
74.6.2	2	0.28	B
74.6.3	1	0.08	QC
74.6.4	3	0.29	MC
74.7.1	15	8.13	C
74.7.2	2	0.13	V
74.7.3	2	0.12	B
74.7.4	3	1.29	MC
74.8.1	23	1.96	C
74.8.2a	1	0.01	O
74.8.2.b	1	0.01	O
74.8.3	1	0.01	V
74.8.4	1	0.08	B
74.8.5	7	2.64	MC
74.9.1	18	1.23	C
74.9.2	3	0.22	B
74.9.3	4	2.8	MC
74.10.1	12	1.8	C
74.10.2	1	0.06	B
74.10.3	1	0.09	QC
74.10.4	2	0.99	MC
74.11.1	7	1.41	C
74.11.2	1	0.01	B
74.11.3	1	0.02	QC
74.11.4	1	0.63	MC
74.12.1	6	0.52	C
74.12.2	2	0.16	B
74.12.3	1	14.39	MC
75.1.1	5	0.61	C
75.1.2	2	0.35	B
75.1.3	3	20.85	MC
75.2.1	10	1.42	C
75.2.2	2	0.47	B
75.2.3	1	0.2	QC
75.2.4	1	0.22	MC
75.3.1	12	0.35	C

*Items are listed in order by unit and increasing level depth.

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Catalogue No.*	Lot No.	WT (g)	Material
75.3.2	1	0.06	B
75.3.3	1	0.06	V
75.4.1	6	0.36	C
75.4.2	1	0.09	B
75.5.1	5	0.36	C
75.5.2	1	0.06	V
75.5.3	1	0.13	B
75.5.4	1	0.03	QC
75.6.1	7	0.57	C
75.6.2	1	1.71	MC
75.7.1	13	2.4	C
75.7.2	1	0.08	B
75.7.3	1	0.36	QC
75.7.4	1	0.04	MC
75.8.1	25	2.37	C
75.8.2	3	0.71	B
75.8.3	2	0.21	MC
75.8.4	1	0.02	QC
75.8.6	1	0.46	C
75.9.1	35	1.45	C
75.9.2	1	0.05	QC
75.9.3	1	0.1	MC
75.10.1	24	1.87	C
75.10.2	3	0.32	QC
75.11.1	14	1.23	C
75.11.2	1	0.03	B
75.11.3	1	0.23	MC
2011misc.8[30]	2	0.05	C
2011misc.9[30]	1	7.49	MC
76.1.1	7	4.99	C
76.2.1	4	1.44	C
76.3.1	11	1.71	C
76.3.2	2	0.16	QC
76.4.1	5	0.59	C
76.4.2	2	0.08	QC
76.4.3	1	0.17	B
76.4.4	1	8.5	MC

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Catalogue No.*	Lot No.	WT (g)	Material
76.4.5	1	68.78	MC
76.5.1	6	0.68	C
76.5.2	1	1.01	V
76.6.1	6	0.68	C
76.7.1	7	1.24	C
76.8.1	13	2.14	C
76.8.2	2	0.16	QC
76.9.1	20	6.14	C
76.9.2	1	0.03	V
76.9.3	1	0.21	B
76.10.1	6	0.54	C
76.10.2	1	0.02	QC
76.11.1	22	2.23	C
76.11.2	1	0.01	V
76.11.3	2	26.86	MC
76.12.1	13	1.27	C
76.12.2	1	1.59	QC
2012misc.3[31]	1	3.18	MC
2012misc.4[32]	1	0.12	C
2012misc.5[33]	1	0.03	C
77.1.1	3	1.79	C
77.1.2	1	0.33	B
77.2.1	6	0.26	C
77.3.1	6	0.4	C
77.4.1	2	0.1	C
77.4.2	1	0.04	B
77.5.1	9	1.79	C
77.5.2	1	0.23	B
77.6.1	1	0.03	C
77.6.2	1	0.01	QC
77.7.1	12	1.01	C
77.8.1	19	5.28	C
77.8.2	1	0.38	MC
77.8.3	1	14.99	C
77.9.1	24	6.37	C
77.9.2	1	0.03	B
77.9.3	2	4.5	MC

*Items are listed in order by unit and increasing level depth.
[30]Recovered in Unit 75 during a 4-wall clean from 0 to 60 cm BD.
[31]Recovered in Unit 76 during a south wall clean from 0 to 80 cm BD.
[32]Recovered in Unit 76 during a west wall clean from 0 to 80 cm BD.
[33]Recovered in Unit 76 during an east wall clean from 0 to 80 cm BD.

Appendix 3d
Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
77.10.1	29	3.45	C
77.10.2	1	0.82	V
77.10.3	1	0.04	QC
77.10.4	2	0.24	B
77.10.5	1	0.56	MC
77.11.1	37	5.03	C
77.11.2	1	0.02	B
77.11.3	1	0.06	QC
77.12.1	42	5.26	C
77.12.2	1	0.15	V
77.12.3	1	0.27	B
77.12.4	1	5.7	MC
77.13.1	24	3.7	C
77.13.3	2	0.18	B
77.14.1	18	2.89	C
77.14.2	1	0.05	V
77.14.3	1	0.04	B
77.15.1	8	0.71	C
77.16.1	5	1.16	C
77.17.1	4	0.14	C
77.17.4	1	6.75	MC
78.1.1	2	0.2	C
78.2.1	2	0.1	C
78.3.1	2	0.09	C
78.4.1	5	1.16	C
78.5.1	2	0.62	C
78.7.1	2	0.12	C
78.8.1	3	2.87	C
78.8.2	1	1.07	MC
78.9.1	2	0.4	C
78.10.1	22	2.11	C
78.10.2	1	3.55	MC
78.11.1	50	16.5	C
78.11.2	1	0.12	B
78.11.3	6	4.46	QC
78.11.4	6	5.77	MC
78.11.8	1	4.27	MC
78.12.1	7	1.86	C
78.12.2	1	0.11	QC

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Catalogue No.*	Lot No.	WT (g)	Material
2012misc.17[34]	1	0.69	QC
79.1.1	12	0.47	C
79.1.2	3	0.5	B
79.1.3	2	1.22	MC
79.2.1	26	3.64	C
79.2.2	2	0.34	MC
79.3.1	18	1.72	C
79.3.2	3	0.68	B
79.3.3	1	0.2	QC
79.3.4	7	101.09	MC
79.4.1	21	1.86	C
79.4.2	5	1.9	B
79.4.3	3	0.14	QC
79.4.4	1	0.27	MC
79.5.1	6	0.5	C
79.5.2	1	0.26	B
79.5.3	1	3.33	MC
79.6.1	15	1.6	C
79.6.2	2	0.13	V
79.6.3	2	0.72	QC
79.6.4	3	2.93	MC
79.7.1	25	2.23	C
79.7.2	5	0.45	V
79.7.3	3	0.81	B
79.7.4	2	0.1	QC
79.7.5	4	0.66	MC
79.8.1	36	4.22	C
79.8.2	1	0.06	B
79.8.3	2	0.26	QC
79.8.4	2	0.33	MC
79.8.7	1	12.11	MC
79.9.1	11	0.86	C
79.9.2	1	0.11	B
79.9.3	1	0.52	QC
79.9.4	1	6.46	MC
79.10.1	13	3.93	C
79.10.2	2	0.33	V
79.10.3	2	0.08	B
79.10.4	3	2.26	MC

*Items are listed in order by unit and increasing level depth.
[34]Surface collection at the southeast corner of Unit 78 (N106/W86).

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
79.11.1	3	1.31	C
2012misc.21[35]	1	0.02	C
80.1.1	4	0.11	C
80.1.2	2	0.11	MC
80.2.1	5	0.19	C
80.2.2	1	0.03	O
80.2.3	1	1.38	MC
80.3.1	3	0.19	C
80.5.1	4	4.53	C
80.5.2	1	2.01	MC
80.6.1	2	0.11	C
80.7.1	1	0.1	C
80.8.1	3	0.21	C
80.10.1	34	3.81	C
80.10.2	1	0.02	V
80.10.3	1	0.11	QC
80.10.4	1	3.33	MC
80.11.1	35	4.58	C
80.11.2	3	0.31	V
80.11.3	1	1.32	B
80.11.4	2	0.21	QC
80.11.5	3	17.42	MC
80.11.9	1	3.17	C
80.12.1	1	2.05	MC
80.12.2	1	13.63	MC
2012misc.7[36]	1	0.05	B
81.1.1	20	1.6	C
81.1.2	1	0.04	V
81.1.3	2	0.72	B
81.1.4	2	1.81	MC
81.2.1	13	2.46	C
81.2.2	9	1.15	B
81.2.3	1	1.32	QC
81.2.4	2	2.56	MC
81.3.1	14	0.87	C
81.3.2	4	0.32	B
81.4.1	8	0.31	C
81.4.2	5	1.97	B
81.5.1	2	0.05	C

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Catalogue No.*	Lot No.	WT (g)	Material
81.5.2	1	0.18	B
81.5.3	1	0.08	MC
81.6.1	8	0.64	C
81.6.2	3	0.33	QC
81.6.3	3	8.22	MC
81.6.4	1	1.22	C
81.7.1	34	3.32	C
81.7.2	3	0.43	B
81.7.3	5	24.8	MC
81.8.1	33	14.26	C
81.8.2	1	0.2	V
81.8.3	2	0.37	QC
81.8.4	3	0.15	B
81.9.1	19	1.09	C
81.9.2	1	0.01	V
81.9.3	1	0.09	QC
81.9.4	5	1.05	B
81.9.5	2	0.66	MC
81.10.1	20	2.26	C
81.10.2	1	0.11	V
81.10.3	4	0.26	B
81.10.4	3	0.33	QC
81.10.5	1	0.44	MC
81.11.1	5	0.41	C
81.11.2	1	1.11	MC
82.1.1	4	0.79	C
82.2.1	8	2.02	C
82.3.1	7	2.28	C
82.4.1	1	0.04	C
82.4.2	1	0.06	MC
82.5.1	5	0.36	C
82.6.1	2	0.22	C
82.7.1	1	0.26	MC
82.9.1	5	4.29	C
82.9.2	1	0.06	QC
82.10.1	7	1.61	C
82.10.2	1	0.28	QC
82.11.1	42	6.95	C
82.11.2	2	0.17	V

*Items are listed in order by unit and increasing level depth.
[35]Surface collection at the southwest corner of Unit 79 (N107/W98).
[36]Recovered in Unit 80 during a 4-wall clean from 0 to 30 cm BD.

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
82.11.3	2	0.34	B
82.11.4	3	0.36	QC
82.11.5	3	1.11	MC
82.11.15	1	3.66	C
2012misc.1[37]	5	0.57	C
2012misc.2[37]	1	0.73	MC
83.1.1	3	0.9	C
83.2.1	5	0.57	C
83.2.2	1	2.23	B
83.3.1	6	1.58	C
83.4.1	7	0.25	C
83.5.1	4	0.37	C
83.6.1	4	0.44	C
83.6.2	1	0.16	MC
83.7.1	2	0.2	C
83.7.2	2	0.07	B
83.7.3	1	4.54	MC
83.8.1	16	1.41	C
83.8.4	1	0.51	C
83.9.1	37	3.85	C
83.9.2	3	1.32	V
83.10.1	43	4.12	C
83.10.2	1	0.01	V
83.10.3	1	0.07	B
83.10.5	1	0.88	C
83.11.1	12	1.14	C
83.12.1	19	1.53	C
83.12.2	1	0.1	B
83.12.3	1	0.32	MC
83.13.1	12	7.08	C
83.14.1	5	0.24	C
83.14.2	2	0.6	QC
83.15.1	3	0.27	C
83.16.1	3	0.62	C
2012misc.8[38]	1	0.1	C
2012misc.9[39]	1	0.07	C

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Catalogue No.*	Lot No.	WT (g)	Material
2012misc.10[40]	1	0.08	C
84.1.1	6	0.32	C
84.1.2	1	0.6	MC
84.2.1	6	1.6	C
84.2.2	2	0.55	MC
84.3.1	4	3.09	C
84.4.1	4	0.86	C
84.5.1	1	0.01	C
84.6.1	5	0.19	C
84.8.1	1	0.15	C
84.9.1	11	0.75	C
84.9.2	1	0.05	B
84.9.3	1	0.4	MC
84.10.1	38	13.41	C
84.10.2	3	2.7	B
84.10.3	5	1.66	QC
84.10.4	5	3.37	MC
84.11.1	32	4.99	C
84.11.2	4	0.24	B
84.11.3	3	1.52	QC
84.12.1	2	0.16	C
84.12.2	1	0.12	O
2012misc.25[41]	1	60.68	MC
85.1.1	7	0.53	C
85.1.2	1	1.63	MC
85.2.1	13	1.32	C
85.2.2	1	0.03	V
85.2.3	1	0.14	QC
85.2.4	1	0.12	B
85.3.1	6	0.77	C
85.3.2	1	0.11	B
85.3.3	1	0.18	QC
85.3.4	2	0.57	MC
85.4.1	3	0.58	C
85.4.2	1	0.01	O
85.4.3	1	0.02	B

*Items are listed in order by unit and increasing level depth.
[37]Recovered in Unit 82 during a 4-wall clean from 0 to 25 cm BD.
[38]Recovered in Unit 83 during an east wall collapse from 10 to 39 cm BD.
[39]Recovered in Unit 83 during an east wall collapse from 60 to 81 cm BD.
[40]Screened from Unit 83, levels 7-9.
[41]Surface collection at the southeast corner of Unit 84 (N105/W86).

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
85.5.1	12	1.45	C
85.5.2	1	70.01	B
85.5.3	3	0.24	MC
85.6.1	21	3.06	C
85.6.2	1	0.01	QC
85.7.1	7	0.93	C
85.7.2	1	0.27	QC
85.7.3	2	0.08	MC
85.8.1	12	2.37	C
85.8.2	1	0.26	B
85.8.3	2	2.7	MC
85.9.1	19	1.05	C
85.9.2	2	0.12	QC
85.9.3	2	0.2	MC
85.9.4	1	2.18	QC
85.10.1	15	6.04	C
85.10.2	2	0.28	B
85.10.3	2	0.85	MC
85.11.1	5	0.4	C
85.11.2	1	0.17	QC
85.11.3	1	0.13	MC
85.12.1	8	2.01	C
85.12.2	2	0.39	QC
86.1.1	18	4.44	C
86.2.1	5	0.98	C
86.3.1	2	0.11	C
86.4.1	1	0.04	C
86.5.1	2	0.12	C
86.6.1	10	2.73	C
86.6.2	1	0.05	QC
86.7.1	25	3.57	C
86.7.2	1	0.76	MC
86.8.1	41	4.9	C
86.8.2	1	0.01	O
86.8.3	2	0.15	B
86.8.4	1	0.11	QC
86.8.5	2	0.11	MC
86.9.1	47	3.78	C
86.9.2	1	0.2	A
86.9.3	1	0.95	QC
86.9.4	3	15.16	MC

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Catalogue No.*	Lot No.	WT (g)	Material
86.10.1	28	2.55	C
86.10.2	1	0.69	B
86.10.3	1	1	MC
86.11.1	33	4.18	C
86.12.1	6	0.44	C
86.12.2	1	11.13	MC
87.1.1	9	1.66	C
87.1.2	3	0.82	B
87.1.3	1	3.03	MC
87.2.1	7	0.7	C
87.2.2	3	0.2	B
87.2.3	3	14.16	MC
87.3.1	5	0.25	C
87.3.2	1	0.05	V
87.3.3	3	5.06	B
87.3.4	1	0.18	MC
87.4.1	10	2.39	C
87.4.2	1	0.06	V
87.4.3	1	0.03	B
87.4.4	2	0.47	QC
87.4.5	3	26.18	MC
87.5.1	9	2.29	C
87.5.2	1	2.8	A
87.5.3	2	0.72	MC
87.6.1	8	0.35	C
87.6.2	1	0.05	O
87.6.3	1	0.05	V
87.6.4	1	0.11	B
87.6.5	1	0.4	MC
87.7.1	11	1.28	C
87.7.2	2	0.12	V
87.7.3	1	2.15	MC
87.8.1	4	0.42	C
87.8.2	2	0.25	B
87.8.3	1	0.31	MC
87.9.1	17	0.89	C
87.9.2	1	0.5	QC
87.9.3	2	0.64	MC
87.10.1	8	3.04	C
87.11.1	6	0.29	C
87.11.2	1	0.11	QC

*Items are listed in order by unit and increasing level depth.

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
88.1.1	3	0.16	C
88.2.1	18	1.87	C
88.2.2	5	0.37	B
88.2.3	8	2.42	MC
88.2.4	4	0.32	QC
88.3.1	11	0.61	C
88.3.2	1	0.03	V
88.3.3	4	1.57	B
88.3.4	1	0.54	MC
88.3.6	1	1.99	C
88.4.1	10	0.62	C
88.4.2	5	0.3	B
88.5.1	12	5.55	C
88.5.2	5	0.49	B
88.5.3	2	0.2	QC
88.5.4	2	0.29	MC
88.5.5	1	2	B
88.6.1	4	0.39	C
88.6.2	1	0.1	B
88.7.1	20	4.12	C
88.7.2	1	0.12	B
88.7.3	2	0.21	MC
88.8.1	24	2.67	C
88.8.2	1	0.56	QC
88.8.3	1	5.43	MC
88.9.1	21	2.7	C
88.9.2	4	0.13	QC
88.10.1	19	1.67	C
88.10.2	1	0.33	B
88.10.3	2	1.43	MC
88.11.1	1	0.01	C
88.11.2	1	0.07	B
89.1.1	6	0.76	C
89.1.2	2	0.49	B
89.1.3	1	0.12	QC
89.1.4	1	3.37	MC
89.2.1	3	1.58	C
89.2.2	1	0.07	QC
89.2.3	1	0.04	MC
89.3.1	7	0.46	C
89.3.2	1	0.64	B

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Catalogue No.*	Lot No.	WT (g)	Material
89.3.3	4	1.82	MC
89.4.1	6	0.36	C
89.4.2	1	0.24	B
89.4.3	1	0.24	QC
89.4.4	1	3.71	MC
89.5.1	9	2.72	C
89.5.2	1	0.01	V
89.5.3	2	0.51	MC
89.6.1	4	0.61	C
89.6.2	1	0.43	O
89.6.3	1	0.1	B
89.6.4	2	1.92	MC
89.7.1	6	0.21	C
89.7.2	2	0.14	V
89.7.3	1	0.02	B
89.7.4	7	4.27	MC
89.8.1	4	0.92	C
89.8.2	1	0.08	MC
89.9.1	15	1.67	C
89.9.2	1	3.83	V
89.9.3	5	2.44	MC
89.9.7	1	3.12	C
89.10.1	4	0.98	C
89.10.2	2	0.23	V
89.10.3	1	0.09	QC
89.10.4	5	48	MC
89.11.1	1	0.01	C
90.1.1	4	0.91	C
90.2.1	1	0.26	C
90.3.1	2	0.3	C
90.3.2	1	0.05	B
90.4.1	2	0.06	C
90.5.1	2	0.16	C
90.7.1	1	0.08	C
90.8.1	4	0.42	C
90.8.2	1	0.01	V
90.9.1	8	0.95	C
90.10.1	23	1.82	C
90.10.2	2	0.58	B
90.10.3	1	0.33	QC
90.10.4	1	0.18	A

*Items are listed in order by unit and increasing level depth.

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
90.10.5	2	0.22	MC
90.11.1	35	5.91	C
90.11.2	1	0.01	QC
90.11.3	1	0.01	B
90.12.1	3	0.57	C
91.1.1	1	0.04	C
91.1.2	1	0.2	QC
91.2.1	9	1.18	C
91.2.2	1	0.25	B
91.3.1	4	1.92	C
91.3.2	1	2.21	QC
91.4.1	3	0.72	C
91.4.2	2	0.14	QC
91.5.1	3	0.74	C
91.6.1	1	0.02	C
91.7.1	4	0.46	C
91.7.2	1	0.04	B
91.7.3	1	0.04	QC
91.7.4	1	0.61	MC
91.8.1	3	2.43	C
91.8.2	1	0.18	B
91.9.1	16	3.55	C
91.9.2	1	0.18	V
91.9.3	1	0.03	B
91.9.4	1	0.2	QC
91.9.5	1	2.17	MC
91.9.6	1	1.81	QC
91.10.1	19	2.65	C
91.10.2	1	0.51	QC
91.10.3	2	0.32	MC
91.11.1	20	4.14	C
91.11.2	1	0.01	O
91.11.3	1	0.08	B
91.11.5	1	21.1	MC
91.12.1	12	1.46	C
91.12.2	1	0.12	QC
92.1.1	6	0.35	C
92.1.2	1	0.06	QC
92.2.1	5	0.32	C
92.3.1	9	1.23	C
92.3.2	1	0.95	B

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Catalogue No.*	Lot No.	WT (g)	Material
92.4.1	4	0.37	C
92.4.2	3	0.98	QC
92.5.1	3	0.1	C
92.6.1	3	0.23	C
92.7.1	6	0.49	C
92.7.2	1	2.81	MC
92.8.1	20	6.12	C
92.8.2	1	1.35	MC
92.9.1	16	2.69	C
92.9.2	1	0.02	O
92.9.3	1	0.12	MC
92.10.1	18	1.55	C
92.10.2	1	0.12	V
92.10.3	2	0.58	B
92.10.4	1	1.36	MC
92.10.5	1	0.06	QC
92.11.1	23	4.1	C
92.11.2	1	0.02	V
92.12.1	4	0.31	C
93.1.1	9	1	C
93.1.2	1	0.02	O
93.1.3	2	0.36	B
93.2.1	5	1.46	C
93.3.1	3	0.09	C
93.4.1	7	0.38	C
93.6.1	1	2.05	C
93.8.1	1	0.22	C
93.9.1	3	0.1	C
93.10.1	16	2.04	C
93.10.2	1	0.04	V
93.10.3	2	0.25	QC
93.10.4	2	0.16	B
93.10.5	3	3.92	MC
93.11.1	31	6.87	C
93.11.2	1	0.05	V
93.11.3	2	0.13	B
93.11.4	2	0.41	MC
93.12.1	1	0.06	C
94.1.1	7	1.08	C
94.1.2	4	1.11	MC
94.2.1	7	0.5	C

*Items are listed in order by unit and increasing level depth.

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
94.2.2	2	0.08	V
94.2.3	2	0.44	QC
94.2.4	3	3.84	MC
94.3.1	6	0.6	C
94.3.2	1	0.06	V
94.3.3	1	0.03	B
94.3.4	1	0.26	QC
94.4.1	3	3.21	C
94.4.2	1	0.18	MC
94.5.1	8	1.35	C
94.5.2	1	0.08	V
94.5.3	3	4.61	MC
94.6.1	11	1.64	C
94.6.2	1	0.21	V
94.6.3	1	0.12	B
94.6.4	6	2.14	MC
94.7.1	13	5.82	C
94.7.2	2	0.13	V
94.7.3	4	58.15	MC
94.8.1	7	0.59	C
94.8.2	2	8.18	MC
94.9.1	12	1	C
94.9.2	1	0.21	B
94.9.3	3	5.18	MC
94.9.4	1	10.03	MC
94.10.1	14	2.53	C
94.10.2	1	0.1	V
94.10.3	2	0.28	MC
94.11.1	5	0.48	C
94.11.2	2	4.51	MC
95.1.1	14	1.11	C
95.1.2	4	0.71	B
95.1.3	1	0.04	QC
95.1.4	2	4.81	MC
95.2.1	14	1.79	C
95.2.2	1	0.4	QC
95.2.3	7	0.9	B
95.2.4	3	14.24	MC
95.3.1	10	0.59	C
95.3.2	1	0.07	V
95.3.3	5	1.58	B

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Catalogue No.*	Lot No.	WT (g)	Material
95.3.4	2	0.26	MC
95.4.1	9	1.14	C
95.4.2	1	0.08	V
95.4.3	3	0.43	B
95.4.4	2	0.48	MC
95.4.5	1	0.06	QC
95.4.6	1	1.54	MC
95.5.1	8	2.75	C
95.5.2	1	0.06	V
95.5.3	1	1.48	B
95.6.1	11	2.38	C
95.6.2	2	0.1	V
95.6.3	2	0.19	B
95.6.4	5	15.32	MC
95.6.5	1	46.29	MC
95.7.1	17	1.78	C
95.7.2	4	5.46	MC
95.7.5	1	52.88	MC
95.8.1	25	3.64	C
95.8.2	1	0.03	B
95.8.3	1	0.74	QC
95.8.4	1	0.21	MC
95.9.1	24	1.87	C
95.9.2	1	0.11	V
95.9.3	7	0.67	QC
95.10.1	12	2.97	C
95.10.2a	1	0.14	O
95.10.2b	1	0.02	O
95.10.3	1	0.02	V
95.10.4	4	1.08	MC
95.11.1	4	0.34	C
95.11.2	1	0.13	MC
96.1.1	4	0.28	C
96.1.2	1	0.18	B
96.1.3	1	3.14	MC
96.2.1	26	3.49	C
96.2.2	1	0.62	B
96.2.3	1	0.86	V
96.2.4	3	2.71	MC
96.2.5	1	0.06	QC
96.3.1	8	1.33	C

*Items are listed in order by unit and increasing level depth.

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Catalogue No.*	Lot No.	WT (g)	Material
96.3.2	1	0.01	O
96.3.3	1	0.71	B
96.3.4	2	0.4	MC
96.3.6	1	6.83	MC
96.4.1	12	0.89	C
96.4.2	4	0.64	B
96.4.3	6	22.91	MC
96.4.4	1	0.87	C
96.5.1	11	0.64	C
96.5.2	1	0.03	QC
96.5.3	2	0.26	B
96.6.1	10	0.82	C
96.6.2	1	0.16	B
96.6.3	6	0.89	MC
96.6.4	1	0.42	MC
96.7.1	1	0.29	C
96.7.2	1	0.29	QC
96.7.3	4	4.11	MC
96.8.1	12	3	C
96.8.2	2	4.57	MC
96.8.3	1	0.04	QC
97.1.1	11	0.74	C
97.1.2	1	0.09	B
97.2.1	13	1.88	C
97.3.1	7	2.22	C
97.4.1	8	1.13	C
97.4.2	1	0.07	B
97.5.1	11	1.47	C
97.5.2	1	0.14	B
97.5.3	1	0.03	QC
97.6.1	8	0.93	C
97.6.2	1	0.13	QC
97.6.3	1	0.05	B
97.6.4	1	1.23	C
97.6.5	1	44.54	MC
97.7.1	9	0.5	C
97.7.2	1	0.01	O
97.7.3	1	0.05	B
97.8.1	21	2.06	C
97.8.2	3	0.3	QC
97.8.3	2	0.71	V

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Catalogue No.*	Lot No.	WT (g)	Material
97.9.1	11	1.64	C
97.9.2	1	0.4	QC
97.9.3	1	0.13	B
97.10.1	37	3.17	C
97.10.2	1	0.03	O
97.10.3	1	0.03	V
97.10.4	2	0.08	B
97.10.5	2	0.09	QC
97.10.6	1	13.33	MC
97.11.1	14	5.35	C
97.11.2	1	0.09	V
97.11.3	4	1.88	QC
97.12.1	9	0.76	C
98.1.1	1	0.05	V
98.2.1	4	0.33	C
98.2.2	1	0.48	MC
98.3.1	11	3.15	C
98.3.2	1	3.48	MC
98.4.1	5	0.91	C
98.5.1	4	0.07	C
98.6.1	4	0.21	C
98.7.1	3	0.33	C
98.8.1	7	0.77	C
98.8.2	1	1.01	B
98.9.1	16	2.68	C
98.9.2	1	8.14	MC
98.10.1	23	8.23	C
98.10.2	1	6.87	MC
98.10.3	1	0.16	QC
98.11.1	30	3.53	C
98.11.2	3	0.27	B
98.11.3	2	0.52	QC
98.12.1	9	2.99	C
99.1.1	11	1.36	C
99.1.2	1	0.04	QC
99.1.3	7	18.71	MC
99.2.1	4	0.14	C
99.2.2	1	0.07	V
99.2.3	1	0.04	QC
99.2.4	3	1.13	MC
99.3.1	7	0.48	C

*Items are listed in order by unit and increasing level depth.

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
99.3.2	1	1.4	V
99.3.3	1	0.04	B
99.3.4	1	0.28	QC
99.3.5	3	1.37	MC
99.4.1	15	2.67	C
99.4.2	3	0.1	V
99.4.3	2	0.21	B
99.4.4	1	0.49	MC
99.5.1	14	2.19	C
99.5.2	1	0.06	MC
99.6.1	10	0.69	C
99.6.2	1	0.14	QC
99.6.3	1	2.87	MC
99.7.1	7	0.95	C
99.8.1	4	0.36	C
99.8.2	2	1.2	MC
99.9.1	6	0.35	C
99.9.2	2	2.74	MC
99.10.1	5	0.39	C
99.10.2	1	0.07	MC
99.10.3	1	1.63	C
99.10.4	1	8.38	MC
99.11.1	5	0.28	C
99.11.2	3	0.78	MC
2012misc.11[42]	3	0.16	C
2012misc.18[43]	1	0.48	C
100.1.1	1	0.03	C
100.2.1	5	2.65	C
100.3.1	4	0.82	C
100.3.2	1	9.75	MC
100.4.1	2	0.19	C
100.4.2	1	1.01	MC
100.5.1	3	0.29	C
100.6.1	8	0.88	C
100.8.1	14	0.76	C
100.9.1	26	2.33	C
100.9.2	1	0.16	B
100.9.3	1	0.22	QC

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Catalogue No.*	Lot No.	WT (g)	Material
100.9.4	1	2.46	MC
100.9.8	1	8.83	MC
100.9.9	1	1.02	C
100.10.1	24	5.49	C
100.10.2	2	0.56	QC
100.10.3	2	0.79	B
100.11.1	18	6.25	C
100.11.2	1	0.19	V
100.11.3	1	0.03	B
100.11.4	2	0.3	MC
100.11.5	1	1.42	C
100.12.1	32	8.09	C
100.12.2	2	0.13	QC
100.13.1	19	5.79	C
100.13.2	1	0.25	V
100.13.3	4	0.4	B
100.13.5	1	1.48	C
100.14.1	13	2.02	C
100.14.2	1	0.13	MC
100.14.3	1	0.07	QC
100.15.1	13	1.67	C
100.15.2	1	0.02	B
100.15.3	1	0.46	MC
100.15.4	1	3.88	MC
100.16.1	7	1.53	C
100.16.2	1	19.4	MC
100.16.3	1	12.5	MC
100.17.1	3	0.08	C
100.17.4	1	11.58	MC
2012misc.12[44]	1	0.1	C
101.1.1	8	0.66	C
101.1.2	2	1.38	B
101.1.3	3	1.57	MC
101.2.1	8	1.24	C
101.2.2	1	0.13	QC
101.2.3	3	0.8	MC
101.3.1	7	0.51	C
101.3.2	1	0.05	B

*Items are listed in order by unit and increasing level depth.
[42]Recovered in Unit 99 during a 4-wall clean from 0 to 30 cm BD.
[43]Surface collection at the southwest corner of Unit 99 (N115/W91).
[44]Recovered in Unit 100 during a northwest corner collapse from 0 to 90 cm BD.

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
101.3.3	2	1.44	MC
101.4.1	7	0.67	C
101.4.2	1	0.88	V
101.4.3	2	1.55	MC
101.5.1	6	1.38	C
101.5.2	2	0.48	V
101.5.3	7	5.41	MC
101.5.4	1	2.3	C
101.6.1	7	0.75	C
101.6.2	2	17.24	MC
101.6.3	1	0.39	QC
101.7.1	12	1.81	C
101.7.2	1	0.04	V
101.7.3	2	0.5	MC
101.7.4	1	4.7	MC
101.8.1	12	1	C
101.8.2	2	16	V
101.8.3	7	1.8	MC
101.9.1	3	0.25	C
101.9.2	3	1.48	MC
101.10.1	1	0.03	C
101.10.2	1	0.08	V
101.10.3	1	0.26	B
101.10.4	4	8.58	MC
101.11.1	3	0.27	C
101.11.2	1	0.22	MC
102.1.1	3	0.46	C
102.2.1	4	1.42	C
102.2.2	1	0.02	V
102.2.3	1	0.24	QC
102.3.1	5	0.74	C
102.3.2	2	0.6	QC
102.3.3	1	1.56	MC
102.3.4	1	4.24	B
102.4.1	13	2.04	C
102.4.2	1	0.17	V
102.5.1	3	0.23	C
102.5.2	1	0.02	V
102.7.1	9	1.05	C

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Catalogue No.*	Lot No.	WT (g)	Material
102.7.2	1	0.16	MC
102.8.1	23	3.67	C
102.8.2	1	0.19	V
102.8.3	1	0.27	B
102.8.4	1	0.07	QC
102.9.1	8	4.51	C
102.9.2	1	6.23	MC
102.10.1	7	1.87	C
102.10.2	2	0.38	V
102.10.3	1	0.22	B
102.11.1	14	0.95	C
102.11.2	1	0.26	B
102.11.3	1	0.16	MC
102.12.1	9	0.52	C
102.13.1	17	3.71	C
102.14.1	7	0.45	C
102.15.1	3	0.22	C
102.16.1	4	0.22	C
103.1.1	23	3.63	C
103.1.2	1	0.03	V
103.1.3	1	0.63	B
103.1.4	1	0.04	QC
103.1.5	5	2.39	MC
103.2.1	3	0.18	C
103.2.2	1	0.24	B
103.2.3	4	1.7	MC
103.3.1	2	0.14	C
103.3.2	1	0.18	QC
103.3.3	1	81.23	MC
103.4.1	7	1.03	C
103.4.2	2	0.94	B
103.4.3	2	0.66	MC
103.5.1	7	3.13	C
103.5.2	1	0.05	QC
103.5.3	1	0.92	MC
103.6.1	10	1.9	C
103.6.2	4	0.49	B
103.6.3	1	0.11	V
103.6.4	1	0.3	QC

*Items are listed in order by unit and increasing level depth.

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Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
103.6.5	4	7.33	MC
103.7.1	23	1.85	C
103.7.2	1	0.06	V
103.7.3	3	0.36	B
103.7.4	3	1.06	QC
103.7.5	6	3.33	MC
103.8.1	14	2.3	C
103.8.2	3	0.17	V
103.8.3	5	3.56	MC
103.8.6	1	0.04	QC
103.9.1	9	0.99	C
103.9.2	1	0.06	V
103.9.3	2	0.45	B
103.9.4	1	12.16	MC
103.10.1	2	0.59	C
103.10.2	3	0.51	MC
103.11.1	4	0.94	C
103.11.2	2	32.34	MC
104.1.1	6	1.44	C
104.1.2	2	1.06	MC
104.1.3	1	5.55	C
104.2.1	4	0.54	C
104.2.2	1	1.35	MC
104.2.3	1	2.35	C
104.3.1	10	0.68	C
104.3.2	1	0.08	B
104.4.1	4	0.19	C
104.4.2	1	0.15	V
104.4.3	1	0.49	B
104.5.1	6	0.28	C
104.6.1	8	0.77	C
104.6.2	1	0.03	QC
104.6.3	1	0.09	MC
104.7.1	15	1.27	C
104.7.2	1	0.53	MC
104.8.1	22	2.57	C
104.8.2	1	0.24	V
104.8.3	2	0.81	MC
104.9.1	14	2.36	C
104.9.2	2	0.05	QC
104.9.3	1	1.36	C

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Catalogue No.*	Lot No.	WT (g)	Material
104.10.1	25	6.28	C
104.10.2	1	0.02	O
104.10.3	1	0.16	MC
104.11.1	17	1.15	C
104.12.1	10	1.21	C
104.12.2	2	0.21	V
104.12.3	2	0.28	B
104.13.1	19	1.89	C
104.13.2	1	0.04	V
104.14.1	8	1.79	C
104.15.1	6	0.36	C
104.17.1	2	0.77	C
105.1.1	1	0.03	C
105.1.2	1	0.3	B
105.1.3	2	1.03	MC
105.2.1	6	0.76	C
105.2.2	2	0.49	B
105.2.3	1	0.04	MC
105.3.1	9	1.06	C
105.3.2	1	0.1	MC
105.4.1	6	0.27	C
105.5.1	4	0.78	C
105.6.1	8	4.62	C
105.6.2	1	0.08	B
105.6.3	1	0.27	MC
105.7.1	5	0.11	C
105.7.2	1	1.08	MC
105.8.1	9	0.62	C
105.8.2	1	0.05	O
105.8.3	1	0.13	MC
105.9.1	25	1.72	C
105.9.2	1	0.03	O
105.9.3	1	0.01	V
105.9.4	1	0.27	B
105.9.5	2	1.12	QC
105.9.6	4	7	MC
105.9.9	1	190.86	MC
105.10.1	37	3.63	C
105.10.2	2	0.11	B
105.10.3	3	4.4	MC
105.10.4	1	3.33	C

*Items are listed in order by unit and increasing level depth.

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Catalogue No.*	Lot No.	WT (g)	Material
105.11.1	10	1.83	C
105.11.2	1	0.04	O
105.12.1	1	0.36	C
2012misc.13[45]	1	0.03	C
106.1.1	9	0.96	C
106.1.2	1	0.11	B
106.1.3	1	0.63	MC
106.1.4	1	2.23	MC
106.2.1	8	2.06	C
106.2.2	2	0.18	QC
106.2.3	1	0.04	MC
106.3.1	17	3.84	C
106.3.2	4	0.22	B
106.3.3	8	2.21	MC
106.4.1	12	1.11	C
106.5.1	12	1.43	C
106.5.2	3	0.38	B
106.5.3	3	10.99	MC
106.6.1	5	2.02	C
106.6.2	2	0.37	QC
106.6.3	2	4.39	MC
106.7.1	4	0.5	C
106.7.2	1	0.14	V
106.7.3	3	0.09	B
106.7.4	2	0.9	MC
106.8.1	3	0.14	C
106.8.2	2	16.8	MC
106.9.1	6	0.62	C
106.9.2	1	0.36	V
106.9.3	1	0.61	B
106.9.4	2	0.97	MC
106.10.1	8	0.7	C
106.10.2	1	0.03	B
106.10.3	1	0.69	QC
106.10.4	2	5.14	MC
107.1.1	4	0.37	C
107.2.1	13	4.21	C
107.2.2	2	0.68	B
107.3.1	7	0.64	C
107.3.2	2	0.17	B

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Catalogue No.*	Lot No.	WT (g)	Material
107.3.3	2	1.17	MC
107.4.1	4	0.19	C
107.5.1	6	0.78	C
107.5.2	1	0.01	QC
107.6.1	5	0.49	C
107.6.2	1	0.84	QC
107.7.1	8	0.46	C
107.8.1	8	1.03	C
107.8.2	1	0.02	O
107.8.3	1	0.19	V
107.8.4	1	0.08	QC
107.9.1	20	1.63	C
107.9.2	1	0.03	O
107.9.3	3	0.23	V
107.9.4	2	0.29	QC
107.10.1	12	1.18	C
107.10.2	1	0.02	V
107.10.3	2	1.34	MC
107.11.1	14	0.97	C
107.11.2	1	0.04	O
107.11.3	1	0.01	B
107.11.4	1	0.03	MC
107.12.1	6	2.27	C
107.12.2	1	0.01	V
107.12.3	1	0.13	QC
107.12.4	2	0.71	MC
108.1.1	5	1.13	C
108.2.1	7	1.35	C
108.2.2	1	0.02	QC
108.3.1	12	1.34	C
108.3.2	1	0.06	B
108.3.3	1	0.07	MC
108.4.1	9	2.89	C
108.5.1	11	0.78	C
108.5.2	1	0.56	MC
108.6.1	10	0.52	C
108.7.1	11	0.59	C
108.8.1	22	2.5	C
108.8.2	1	0.01	O
108.8.3	1	0.01	B

*Items are listed in order by unit and increasing level depth.
[45]Recovered in Unit 105 during an east wall collapse from 60 to 95 cm BD.

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Catalogue No.*	Lot No.	WT (g)	Material
108.8.4	1	0.66	QC
108.9.1	20	1.23	C
108.9.2	1	2.56	C
108.10.1	23	1.2	C
108.10.2	1	0.05	V
108.11.1	23	3.76	C
108.11.2	2	0.14	QC
108.11.3	1	0.17	V
108.12.1	19	2.18	C
108.12.2	1	0.03	V
108.13.1	7	0.72	C
108.13.2	1	0.34	QC
108.14.1	12	0.57	C
108.14.2	1	0.23	B
108.15.1	13	1.07	C
108.15.2	1	0.01	V
108.16.1	2	0.05	C
109.1.1	5	0.2	C
109.1.2	1	0.06	QC
109.2.1	8	1.64	C
109.2.2	1	0.15	QC
109.2.3	1	0.3	MC
109.3.1	5	0.38	C
109.3.2	2	0.13	B
109.3.3	1	0.09	QC
109.4.1	12	1.98	C
109.4.2	1	0.09	QC
109.5.1	9	0.6	C
109.6.1	7	1.33	C
109.6.2	1	0.08	B
109.7.1	6	1.84	C
109.7.2	1	0.03	QC
109.8.1	14	2.03	C
109.8.2	2	0.25	MC
109.9.1	25	3.18	C
109.9.2	1	0.04	QC
109.9.3	1	6.58	MC
109.10.1	24	4.21	C
109.10.2	2	0.16	B

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Catalogue No.*	Lot No.	WT (g)	Material
109.10.3	1	0.11	QC
109.10.4	1	0.19	MC
109.10.5	1	68.51	MC
109.11.1	4	1.03	C
109.11.2	1	0.91	MC
110.1.1	6	3.7	C
110.1.2	1	0.11	B
110.1.3	1	0.05	MC
110.2.1	7	1.99	C
110.2.2	2	0.12	B
110.2.3	2	0.68	QC
110.2.4	1	0.16	MC
110.3.1	10	1.73	C
110.3.2	1	0.14	B
110.4.1	16	5.01	C
110.4.2	1	0.07	O
110.4.3	1	2.79	MC
110.5.1	11	2.4	C
110.5.2	1	0.07	V
110.5.3	1	5.31	MC
110.6.1	6	0.22	C
110.6.2	1	0.14	B
110.6.3	1	19.68	MC
110.7.1	9	0.61	C
110.9.1	7	0.53	C
110.9.2	1	1.46	B
110.9.3	1	0.64	MC
110.9.4	1	47.54	MC
110.10.1	19	3.91	C
110.10.2	1	0.07	B
110.10.3	3	1.34	MC
110.11.1	10	2.78	C
110.11.2	1	0.22	QC
110.12.1	1	0.19	C
2012misc.15[46]	1	0.04	C
2012misc.16[47]	1	0.18	QC
111.1.1	15	3.39	C
111.1.2	1	0.47	MC
111.2.1	3	0.12	C

*Items are listed in order by unit and increasing level depth.
[46]Recovered in Unit 110 during a northeast wall collapse from 0 to 38 cm BD.
[47]Recovered in Unit 110 during a northeast corner collapse from 90 to 109 cm BD.

Appendix 3d
Area E Debitage Inventory

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Catalogue No.*	Lot No.	WT (g)	Material
111.3.1	3	0.17	C
111.4.1	3	0.3	C
111.5.1	7	0.62	C
111.5.2	1	2.7	MC
111.5.4	1	12.6	MC
111.6.1	6	0.77	C
111.6.2	1	0.61	C
111.7.1	20	2.61	C
111.7.2	1	3.66	MC
111.7.4	1	4.04	MC
111.7.5	1	2.2	MC
111.8.1	32	5.12	C
111.8.2	1	0.03	B
111.8.3	1	50.27	MC
111.8.9	1	19.17	MC
111.8.10	1	2.84	MC
111.9.1	28	4.57	C
111.9.5	1	9.41	MC
111.10.1	15	3	C
111.10.2	2	0.1	B
111.11.1	12	1.52	C
111.11.2	2	1.74	B
111.11.3	1	0.47	QC
111.11.4	1	0.02	V
111.12.1	2	0.78	C
112.1.1	9	2.13	C
112.1.2	1	0.46	MC
112.2.1	10	1.03	C
112.2.2	2	0.35	B
112.2.3	2	0.24	QC
112.2.4	6	6.57	MC
112.3.1	14	1.52	C
112.3.2	1	0.42	QC
112.3.3	1	0.08	MC
112.3.4	1	9.39	MC
112.3.5	1	26.69	MC
112.3.6	1	13.63	MC
112.4.1	9	0.57	C
112.4.2	1	0.03	B
112.4.3	3	0.68	MC
112.5.1	1	0.06	QC

(72 of 74)

Catalogue No.*	Lot No.	WT (g)	Material
112.5.2	1	0.39	MC
112.5.4	1	1.62	C
112.6.1	4	0.79	C
112.6.2	1	0.12	QC
112.6.3	1	0.18	MC
112.6.4	1	6.13	MC
112.6.5	1	0.92	C
112.7.1	13	1.9	C
112.7.2	1	0.07	V
112.7.3	1	0.17	B
112.8.1	8	3.65	C
112.8.2	3	0.79	MC
112.8.6	1	0.23	MC
112.8.7	1	7.2	MC
112.9.1	5	1.59	C
112.9.2	1	0.14	B
112.9.3	2	1.02	MC
112.10.1	6	1.12	C
112.10.2	3	4.22	MC
112.10.3	1	5.74	MC
112.11.1	4	0.28	C
113.1.1	10	1.1	C
113.1.2	1	0.04	QC
113.2.1	12	1.08	C
113.2.2	1	0.1	QC
113.2.3	3	0.27	MC
113.3.1	1	0.06	C
113.3.2	1	13.72	MC
113.4.1	4	0.17	C
113.4.2	2	1.33	MC
113.5.1	19	2.42	C
113.5.2	1	0.25	B
113.5.3	5	0.91	MC
113.6.1	2	0.18	V
113.6.2	3	0.24	B
113.6.3	2	0.51	MC
113.7.1	10	0.67	C
113.7.2	3	2.5	MC
113.7.4	1	35.12	MC
113.8.1	14	2.42	C
113.8.2	1	0.02	V

*Items are listed in order by unit and increasing level depth.

Appendix 3d
Area E Debitage Inventory

(73 of 74)

Catalogue No.*	Lot No.	WT (g)	Material
113.8.3	1	0.13	B
113.8.4	7	12.31	MC
113.8.5	1	9.96	A
113.9.1	4	1.3	C
113.9.2	2	0.15	V
113.9.3	2	0.36	B
113.9.4	1	0.45	MC
113.10.1	4	0.21	C
113.10.2	2	0.26	B
113.11.1	4	6.07	C
113.11.2	3	0.54	B
113.11.3	1	0.07	V
113.11.4	4	1.45	MC
113.11.5	1	2.03	C
113.11.6	1	1.55	V
113.11.7	1	4.64	MC
113.12.1	4	0.53	C
113.12.2	1	0.38	V
113.12.4	1	6.18	MC
DA1.1.1	2	0.35	C
DA1.1.2	2	0.56	A
DA1.1.3	3	0.18	V
DA1.1.4a	1	0.05	O
DA1.1.4b	1	0.03	O
DA1.2.1	4	0.69	C

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Catalogue No.*	Lot No.	WT (g)	Material
DA1.2.2	1	1.07	A
DA1.2.3	1	0.04	V
DA1.3.1	6	0.83	C
DA1.3.2	1	0.14	B
DA1.3.3	2	3.1	V
DA1.3.5	3	9.61	MC
DA1.4.1	2	0.09	C
DA1.4.2	2	0.05	V
DA1.4.4	1	7.54	MC
DA1.5.1	1	0.01	C
DA1.6.1	1	0.02	O
DA2.1.1	8	2.25	C
DA2.1.3	2	0.07	MC
DA2.2.1	2	2.17	C
DA2.2.2	3	0.61	B
DA2.2.3	1	2.51	V
DA2.3a.1	8	1.51	C
DA2.3b.1	3	0.58	C
DA2.3b.3	1	0.08	B
DA2.4.1	6	1.43	C
DA2.4.3	1	0.18	B
DA2.4.4	1	4.09	MC
DA2.5.1	1	0.03	C
DA2.5.2	2	0.23	V

*Items are listed in order by unit and increasing level depth.

Appendix 3e

Debitage Size Grade Analysis Results and Unit Inventories

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 1 (0-10 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
					1									**1**
	i/c	cx												
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 42 Level 1 Total			**1**		**1**									**2**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 2 (10-20 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
							1							**1**
	f/c	cx												
						1								**1**
	i/c	cx												
									1					**1**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 42 Level 2 Total						**1**	**1**		**1**					**3**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 3 (20-30 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			2											**2**
	f/c	cx												
	i/c	cx												
						1		1						**2**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
						1								**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 42 Level 3 Total			**2**			**2**		**1**						**5**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 4 (30-40 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
	i/c	cx												
					1									**1**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
						1								**1**
	f/c	cx												
	i/c	cx												
Unit 42 Level 4 Total					**1**	**1**								**2**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 5 (40-50 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
								1	1					**2**
	i/c	cx												
						1	2		2					**5**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 42 Level 5 Total						**1**	**2**	**1**	**3**					**7**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 6 (50-60 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
				1					1					**2**
	f/c	cx												
						1			2					**3**
	i/c	cx												
				1	1			1	2					**5**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 42 Level 6 Total				**2**	**1**	**1**		**1**	**5**					**10**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 7 (60-70 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1	2										**3**
	f/c	cx												
					1		1	2	1					**5**
	i/c	cx												
				1		1	3	4						**9**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 42 Level 7 Total			**1**	**3**	**1**	**1**	**4**	**6**	**1**					**17**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 8 (70-80 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx	1[a]											**1**
			2											**2**
	f/c	cx												
							1	1	2					**4**
	i/c	cx												
				1	1	1	2	1						**6**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
			1											**1**
	f/c	cx												
	i/c	cx												
Unit 42 Level 8 Total			**4**	**1**	**1**	**1**	**3**	**2**	**2**					**14**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]10%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 9 (80-90 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			3	3		2			1					**9**
	f/c	cx												
				1				2						**3**
	i/c	cx												
					1	3	5	1	2					**12**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 42 Level 9 Total			**3**	**4**	**1**	**5**	**5**	**3**	**3**					**24**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 10 (90-100 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			3	3										**6**
	f/c	cx												
						1	2	2	3	1	1			**10**
	i/c	cx												
			1	3	1		2	1	4	1				**13**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
									1					**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 42 Level 10 Total			**4**	**6**	**1**	**1**	**4**	**3**	**8**	**2**	**1**			**30**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 11 (100-110 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1				1							**2**
	f/c	cx												
					1		2		1			1		**5**
	i/c	cx												
			1	2	1	2	4		1					**11**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 42 Level 11 Total			**2**	**2**	**2**	**2**	**7**		**2**			**1**		**18**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 12 (110-120 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
						1								**1**
	f/c	cx												
							1	2	3					**6**
	i/c	cx												
			1	2	1	4	3		5					**16**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
					1									**1**
A	s	cx												
	f/c	cx												
											1			**1**
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 42 Level 12 Total			**1**	**2**	**2**	**5**	**4**	**2**	**8**		**1**			**25**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 13 (120-130 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
					1		1							**2**
	f/c	cx												
						1	1	2	4	2	1			**11**
	i/c	cx												
			2	1		3	3	2	2	1				**14**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
								1						**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 42 Level 13 Total			**2**	**1**	**1**	**4**	**5**	**5**	**6**	**3**	**1**			**28**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 14 (130-140 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
								1	2					**3**
	i/c	cx												
			1				2	1						**4**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
						1								**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 42 Level 14 Total			**1**			**1**	**2**	**2**	**2**					**8**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 15 (140-150 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1											**1**
	f/c	cx												
											1			**1**
	i/c	cx												
			2		1	1	1	1						**6**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 42 Level 15 Total			**3**		**1**	**1**	**1**	**1**			**1**			**8**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 16 (150-160 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1											**1**
	f/c	cx												
						1								**1**
	i/c	cx												
						1								**1**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
			1											**1**
	i/c	cx												
MC	s	cx	1[a]											**1**
	f/c	cx												
	i/c	cx												
			2											**2**
Unit 42 Level 16 Total			**5**			**2**								**7**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]40%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 17 (160-170 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
									2					**2**
	i/c	cx												
				1			1	2	1					**5**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
										1				**1**
	i/c	cx												
									1					**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 42 Level 17 Total				**1**			**1**	**2**	**4**	**1**				**9**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 18 (170-180 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
								1		1				**2**
	i/c	cx												
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
				1										**1**
Unit 42 Level 18 Total				**1**				**1**		**1**				**3**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 42, Level 19 (180-190 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
								2						**2**
	i/c	cx												
			1											**1**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 42 Level 19 Total			**1**					**2**						**3**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 46, Level 1 (0-10 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx					1[c]							**1**
	i/c	cx	2[a]		1[b]									**3**
				1		1								**2**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
				1										**1**
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 46 Level 1 Total			**2**	**2**	**1**	**1**	**1**							**7**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]10%, 30%; [b]30%; [c]10%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 46, Level 2 (10-20 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
				1										**1**
	f/c	cx												
							1	1						**2**
	i/c	cx		1[a]										**1**
				1	1		4		2					**8**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
							1							**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx	1[b]											**1**
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 46 Level 2 Total			**1**	**3**	**1**		**6**	**1**	**2**					**14**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]20%; [b]10%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 46, Level 3 (20-30 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								1						**1**
	f/c	cx												
						1			2					**3**
	i/c	cx												
						2		1	2					**5**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 46 Level 3 Total						**3**		**2**	**4**					**9**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 46, Level 4 (30-40 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx	1[a]											**1**
	f/c	cx												
								1	2	2				**5**
	i/c	cx												
							2	2		1				**5**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
				1										**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
								1						**1**
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 46 Level 4 Total			**1**	**1**			**2**	**4**	**2**	**3**				**13**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]50%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 46, Level 5 (40-50 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
									1					**1**
	f/c	cx												
					1			1	2		1			**5**
	i/c	cx		1[a]										**1**
			1			1	2	2	3					**9**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
										1				**1**
	i/c	cx												
								1						**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
				1										**1**
	f/c	cx												
	i/c	cx												
Unit 46 Level 5 Total			**1**	**2**	**1**	**1**	**2**	**4**	**6**	**1**	**1**			**19**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]5%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 46, Level 6 (50-60 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
								2	2					**4**
	i/c	cx	1[a]			1[b]	1[c]							**3**
									2					**2**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
				1			1							**2**
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx	1[d]											**1**
Unit 46 Level 6 Total			**2**	**1**		**1**	**2**	**2**	**4**					**12**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]5%; [b]50%; [c]90%; [d]10%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 46, Level 7 (60-70 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx					1[a]							**1**
									1					**1**
	f/c	cx												
							3	2	2	2				**9**
	i/c	cx												
			1				3	3	3					**10**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
									1					**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
								1						**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
			1											**1**
	f/c	cx												
	i/c	cx												
Unit 46 Level 7 Total			**2**				**7**	**6**	**7**	**2**				**24**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]50%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 46, Level 8 (70-80 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
						1								**1**
	f/c	cx		1[a]										**1**
								1	3	2				**6**
	i/c	cx						1[b]						**1**
						2	1	4	2	1				**10**
O	s	cx												
	f/c	cx												
										1				**1**
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
									1					**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
					1									**1**
QC	s	cx												
	f/c	cx						1[c]						**1**
						1								**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
MC	s	cx												
										1				**1**
	f/c	cx												
	i/c	cx												
								1						**1**
Unit 46 Level 8 Total			**1**	**1**	**1**	**4**	**1**	**8**	**6**	**5**				**27**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]5%; [b]50%; [c]80%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 46, Level 9 (80-90 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx					1[a]							**1**
					1									**1**
	f/c	cx												
									1		1			**2**
	i/c	cx												
					4		2		2					**8**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
							1	1			1			**3**
	i/c	cx												
					1									**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
Unit 46 Level 9 Total			**1**		**6**		**4**	**1**	**3**		**2**			**17**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]40%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 50, Level 1 (0-10 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
					1									**1**
	i/c	cx												
					1	1		1						**3**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
			1											**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 50 Level 1 Total			**1**		**2**	**1**		**1**						**5**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 50, Level 2 (10-20 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
							1							**1**
	f/c	cx												
				1				1	1					**3**
	i/c	cx												
			2			1	1	3						**7**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
							1							**1**
	f/c	cx												
	i/c	cx												
			2	1				1						**4**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
						1								**1**
	f/c	cx												
	i/c	cx												
			2					2						**4**
Unit 50 Level 2 Total			**6**	**2**		**2**	**3**	**7**	**1**					**21**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 50, Level 3 (20-30 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
				1				2	1					**4**
	i/c	cx												
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
									1					**1**
QC	s	cx												
	f/c	cx												
				1										**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
			2											**2**
Unit 50 Level 3 Total			**2**	**2**				**2**	**2**					**8**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 50, Level 4 (30-40 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								1						**1**
	f/c	cx												
						1		5	2	3				**11**
	i/c	cx												
				2		3		1	1	1				**8**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
						1	1							**2**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
						1								**1**
	f/c	cx												
	i/c	cx												
						1								**1**
Unit 50 Level 4 Total				**2**		**7**	**1**	**7**	**3**	**4**				**24**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 50, Level 5 (40-50 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
							3	2	3					**8**
	i/c	cx												
						1	1							**2**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 50 Level 5 Total						**1**	**4**	**2**	**3**					**10**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 50, Level 6 (50-60 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1											**1**
	f/c	cx												
						1	2	2	2	2				**9**
	i/c	cx												
				3		3	1		1					**8**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
			1			2		1						**4**
	f/c	cx												
	i/c	cx	1[a]											**1**
			1		1			1						**3**
Unit 50 Level 6 Total			**4**	**3**	**1**	**6**	**3**	**4**	**3**	**2**				**26**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]50%

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 50, Level 7 (60-70 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
				1					2					**3**
	f/c	cx												
				1		1		2	9	2				**15**
	i/c	cx												
				2		3	4	4	5					**18**
O	s	cx												
	f/c	cx												
								1						**1**
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
								1						**1**
	f/c	cx												
	i/c	cx												
				2			2	2	1					**7**
Unit 50 Level 7 Total				**6**		**4**	**6**	**10**	**17**	**2**				**45**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 50, Level 8 (70-80 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								2						**2**
	f/c	cx												
					2		2	1	1	1				**7**
	i/c	cx												
			1		4	2	3	1						**11**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
						1								**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
				1										**1**
	i/c	cx												
MC	s	cx												
			1											**1**
	f/c	cx												
	i/c	cx												
Unit 50 Level 8 Total			**2**	**1**	**6**	**3**	**5**	**4**	**1**	**1**				**23**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 50, Level 9 (80-90 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1											**1**
	f/c	cx												
							1	2	4	1	1			**9**
	i/c	cx												
			1	1		2	2	1	1					**8**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
						1								**1**
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
								1						**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
						1								**1**
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 50 Level 9 Total			**2**	**1**		**4**	**3**	**4**	**5**	**1**	**1**			**21**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 50, Level 10 (90-100 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
						1								**1**
	f/c	cx	1[a]											**1**
				1			2	1	1	1				**6**
	i/c	cx												
				3		3			1					**7**
O	s	cx												
	f/c	cx												
	i/c	cx												
								1						**1**
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
								1						**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
			1											**1**
	f/c	cx												
	i/c	cx												
			2	1				1						**4**
Unit 50 Level 10 Total			**4**	**5**		**4**	**2**	**4**	**2**	**1**				**22**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]30%

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 50, Level 11 (100-110 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
							1	1	1					**3**
	i/c	cx												
			1				2	2	1					**6**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
					1									**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
								1						**1**
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
				1										**1**
Unit 50 Level 11 Total			**1**	**1**	**1**		**3**	**4**	**2**					**12**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 51, Level 1 (0-10 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
				1										**1**
	f/c	cx												
			1							1	1			**3**
	i/c	cx												
						2		1	1					**4**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
							1							**1**
Unit 51 Level 1 Total			**1**	**1**		**2**	**1**	**1**	**1**	**1**	**1**			**9**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 51, Level 2 (10-20 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
						1			2					**3**
	f/c	cx												
							1	1	3	3				**8**
	i/c	cx			1[a]									**1**
						2	3	3	3					**11**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
							1						1	**2**
	i/c	cx												
			1			1	1	1						**4**
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
							1							**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
							1							**1**
	f/c	cx												
	i/c	cx												
			1											**1**
Unit 51 Level 2 Total			**2**		**1**	**4**	**8**	**5**	**8**	**3**			**1**	**32**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]15%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 51, Level 3 (20-30 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1											**1**
	f/c	cx												
							1	2	1	1	3		1	**9**
	i/c	cx												
			3				3		2	1	1			**10**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
						1								**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 51 Level 3 Total			**4**			**1**	**4**	**2**	**3**	**2**	**4**		**1**	**21**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 51, Level 4 (30-40 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
									1	1				**2**
	i/c	cx												
						2		1	2					**5**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 51 Level 4 Total						**2**		**1**	**4**	**1**				**8**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 51, Level 5 (40-50 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
			1	1						2				**4**
	i/c	cx												
				1		2	1							**4**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
								1						**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 51 Level 5 Total			**1**	**2**		**2**	**1**	**1**		**2**				**9**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 51, Level 6 (50-60 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
								2		3				**5**
	i/c	cx												
							1	2		2				**5**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
							1							**1**
Unit 51 Level 6 Total							**2**	**4**		**5**				**11**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 51, Level 7 (60-70 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx	1[a]											**1**
	f/c	cx												
				1		1	1	2		3				**8**
	i/c	cx				1[b]								**1**
				2	1	3	3	2		1				**12**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
						1								**1**
Unit 51 Level 7 Total			**1**	**3**	**1**	**6**	**4**	**4**		**4**				**23**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]20%; [b]10%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 51, Level 8 (70-80 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx				1[a]								**1**
							2			3				**5**
	i/c	cx												
			2	1		1	3	1						**8**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
					1									**1**
Unit 51 Level 8 Total			**2**	**1**	**1**	**2**	**5**	**1**		**3**				**15**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]10%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 51, Level 9 (80-90 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
										5	1			**6**
	i/c	cx												
				1		1	2	2		3				**9**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
							1							**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
			1	1				1						**3**
	f/c	cx												
	i/c	cx	1[a]											**1**
			1		1									**2**
Unit 51 Level 9 Total			**3**	**2**	**1**	**1**	**3**	**3**		**8**	**1**			**22**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]20%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 51, Level 10 (90-100 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx	1[a]											**1**
						1	1	1	1	1				**5**
	i/c	cx	1[b]											**1**
					1	2	3	1						**7**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
						1								**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx		1[c]										**1**
			1											**1**
	f/c	cx												
	i/c	cx												
Unit 51 Level 10 Total			**3**	**1**	**1**	**4**	**4**	**2**	**2**	**1**				**18**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]20%; [b]70%; [c]5%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 51, Level 11 (100-110 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
	i/c	cx												
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
						1								**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 51 Level 11 Total						**1**								**1**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 52, Level 1 (0-10 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
							1	2						**3**
	i/c	cx												
						1	1	3						**5**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
								1						**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
							1							**1**
Unit 52 Level 1 Total						**1**	**3**	**6**						**10**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 52, Level 2 (10-20 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
							1	1						**2**
	i/c	cx												
						3	2	2						**7**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
			1	1										**2**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
									1					**1**
	f/c	cx												
	i/c	cx												
			1		1									**2**
Unit 52 Level 2 Total			**2**	**1**	**1**	**3**	**3**	**3**	**2**					**15**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 52, Level 3 (20-30 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
			1			1								**2**
	i/c	cx												
			1	2	1		1	1	1					**7**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
					1		1							**2**
	i/c	cx												
							1		1					**2**
B	s	cx												
	f/c	cx												
	i/c	cx												
									1					**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 52 Level 3 Total			**2**	**2**	**2**	**1**	**3**	**1**	**3**					**14**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 52, Level 4 (30-40 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
							1	2	1	1				**5**
	i/c	cx												
				2	1		4							**7**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx	1[a]											**1**
	f/c	cx												
	i/c	cx												
			1	1			1		1					**4**
Unit 52 Level 4 Total			**2**	**3**	**1**		**6**	**2**	**3**	**1**				**18**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]30%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 52, Level 5 (40-50 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx	1[a]											**1**
	f/c	cx												
				1					1					**2**
	i/c	cx												
			1	1		2	1		2					**7**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
							1							**1**
	i/c	cx												
								1						**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
									1					**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
							1							**1**
Unit 52 Level 5 Total			**2**	**2**		**2**	**3**	**1**	**4**					**14**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]50%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 52, Level 6 (50-60 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
							1	1	1					**3**
	i/c	cx												
			1			1								**2**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
									1					**1**
	f/c	cx												
			1									1		**2**
	i/c	cx												
			5				2		1					**8**
Unit 52 Level 6 Total			**7**			**1**	**3**	**1**	**3**			**1**		**16**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 52, Level 7 (60-70 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
				1			2	3						**6**
	i/c	cx												
						1	2	4						**7**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
							1							**1**
QC	s	cx												
	f/c	cx												
							1							**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
						1								**1**
	f/c	cx												
	i/c	cx												
						1		1	2					**4**
Unit 52 Level 7 Total				**1**		**3**	**6**	**8**	**2**					**20**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 52, Level 8 (70-80 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
				1					1					**2**
	f/c	cx												
				1			2		1					**4**
	i/c	cx												
			1	5		2	3		4					**15**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
								1						**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx			1[a]									**1**
			1											**1**
	f/c	cx							1[b]					**1**
	i/c	cx												
						1	1	1						**3**
Unit 52 Level 8 Total			**2**	**7**	**1**	**3**	**6**	**2**	**7**					**28**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]20%; [b]60%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 52, Level 9 (80-90 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
						1								**1**
	f/c	cx												
				1		3	2	1	2	1				**10**
	i/c	cx												
						2	1	1						**4**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
									1	1				**2**
	i/c	cx												
				1			1							**2**
B	s	cx												
	f/c	cx												
	i/c	cx												
								2						**2**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
			1											**1**
	f/c	cx						1[a]						**1**
									1					**1**
	i/c	cx												
						1			1					**2**
Unit 52 Level 9 Total			**1**	**2**		**7**	**4**	**5**	**5**	**2**				**26**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]70%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 52, Level 10 (90-100 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
							1	4	4	1				**10**
	i/c	cx												
				2	1	1	4	5	2					**15**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
							1							**1**
B	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx				1[a]								**1**
	f/c	cx												
	i/c	cx												
						1	1							**2**
Unit 52 Level 10 Total				**2**	**1**	**3**	**7**	**9**	**7**	**1**				**30**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]30%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 52, Level 11 (100-110 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx	1[a]											**1**
	f/c	cx												
						1		3	1	1				**6**
	i/c	cx												
			2	1		4		2	2					**11**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
			1											**1**
B	s	cx												
	f/c	cx												
										1				**1**
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
					1									**1**
	f/c	cx												
	i/c	cx												
			1						1					**2**
Unit 52 Level 11 Total			**6**	**1**	**1**	**5**		**5**	**5**	**2**				**25**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]10%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 52, Level 12 (110-120 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
			1											**1**
	i/c	cx												
			1			2		3						**6**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
				1										**1**
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
							1							**1**
	i/c	cx	1[a]											**1**
			2											**2**
Unit 52 Level 12 Total			**5**	**1**		**2**	**1**	**3**						**12**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]10%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 57, Level 1 (0-10 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
							1	1	2					**4**
	i/c	cx												
				1		1	1	2						**5**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
					1									**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
			1					1						**2**
Unit 57 Level 1 Total			**1**	**1**	**1**	**1**	**2**	**4**	**2**					**12**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 57, Level 2 (10-20 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
					1			3		1				**5**
	i/c	cx												
								3	1					**4**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
											1			**1**
	i/c	cx												
						1								**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
								1						**1**
	f/c	cx												
	i/c	cx												
Unit 57 Level 2 Total					**1**	**1**		**7**	**1**	**1**	**1**			**12**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 57, Level 3 (20-30 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
						1			2	2				**5**
	i/c	cx												
						3	1	1	2	1				**8**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
					1					1				**2**
	i/c	cx												
			1											**1**
QC	s	cx												
	f/c	cx												
				1			1							**2**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
							1		1					**2**
	f/c	cx												
	i/c	cx		1[a]										**1**
							1							**1**
Unit 57 Level 3 Total			**1**	**2**	**1**	**4**	**4**	**1**	**5**	**4**				**22**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]15%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 57, Level 4 (30-40 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
						1				1				**2**
	f/c	cx												
			1					1	2					**4**
	i/c	cx												
			1					1						**2**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
			1											**1**
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
						1								**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 57 Level 4 Total			**3**			**2**		**2**	**3**	**1**				**11**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 57, Level 5 (40-50 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1											**1**
	f/c	cx												
							2	1	1					**4**
	i/c	cx												
			1					1	3					**5**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
							1							**1**
	i/c	cx												
								1						**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx		1[a]										**1**
Unit 57 Level 5 Total			**2**	**1**			**3**	**3**	**5**					**14**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]40%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 57, Level 6 (50-60 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1											**1**
	f/c	cx												
				1			2		2	1				**6**
	i/c	cx												
				2			1	1	4					**8**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 57 Level 6 Total			**1**	**3**			**3**	**1**	**6**	**1**				**15**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 57, Level 7 (60-70 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
			1				1	2	2	3				**9**
	i/c	cx												
			1				3	3	1	1				**9**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
				1										**1**
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
							2	1						**3**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx	1[a]											**1**
			1	1										**2**
Unit 57 Level 7 Total			**4**	**2**			**6**	**6**	**3**	**4**				**25**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]30%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 57, Level 8 (70-80 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1											**1**
	f/c	cx												
			1			1	1	3	2	2	1			**11**
	i/c	cx												
			3	2	1	1	3	4	5	1				**20**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
QC	s	cx												
	f/c	cx												
			1											**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx	1[a]											**1**
			1											**1**
Unit 57 Level 8 Total			**9**	**2**	**1**	**2**	**4**	**7**	**7**	**3**	**1**			**36**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]10%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 57, Level 9 (80-90 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
				2										**2**
	f/c	cx												
			1			2	1	2	1	4	1			**12**
	i/c	cx												
			1	4		2	2	7	4	3				**23**
O	s	cx												
	f/c	cx												
	i/c	cx												
							1							**1**
V	s	cx												
	f/c	cx												
												1		**1**
	i/c	cx												
								1						**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
							1	1						**2**
QC	s	cx												
	f/c	cx												
					1				2					**3**
	i/c	cx												
						1		1						**2**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx				1[a]								**1**
	f/c	cx												
	i/c	cx												
Unit 57 Level 9 Total			**2**	**6**	**1**	**6**	**5**	**12**	**7**	**7**	**1**	**1**		**48**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]20%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 57, Level 10 (90-100 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1											**1**
	f/c	cx												
			1				1	1	1	2				**6**
	i/c	cx												
			2				1	4						**7**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
				1										**1**
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
										1				**1**
	i/c	cx												
								1						**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 57 Level 10 Total			**4**	**1**			**2**	**6**	**1**	**3**				**17**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 57, Level 11 (100-110 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
								1		1				**2**
	i/c	cx												
					2	1	1	1	1					**6**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
								1						**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 57 Level 11 Total					**2**	**1**	**1**	**3**	**1**	**1**				**9**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 58, Level 4 (30-40 cm BD)*

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
							1							**1**
	i/c	cx												
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 58 Level 4 Total							**1**							**1**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
*Debitage was not recovered in levels 1-3 (0-30 cm BD).

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 58, Level 6 (50-60 cm BD)*

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
	i/c	cx												
								1						**1**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
QC	s	cx												
	f/c	cx												
							1							**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 58 Level 6 Total			**1**				**1**	**1**						**3**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
*Debitage was not recovered in levels 5 (40-50 cm BD).

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 58, Level 7 (60-70 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
						1				1				**2**
	i/c	cx												
				1				2	1					**4**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 58 Level 7 Total				**1**		**1**		**2**	**1**	**1**				**6**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 58, Level 8 (70-80 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								1						**1**
	f/c	cx												
				1				1	1					**3**
	i/c	cx												
			1	1			1	2		2				**7**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
							1							**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
				1	1									**2**
Unit 58 Level 8 Total			**1**	**3**	**1**		**2**	**4**	**1**	**2**				**14**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 58, Level 9 (80-90 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
						1								**1**
	f/c	cx												
				1			1	1	2	1				**6**
	i/c	cx												
			2			2	4	2	1	1				**12**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
			1		1									**2**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 58 Level 9 Total			**3**	**1**	**1**	**3**	**5**	**3**	**3**	**2**				**21**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 58, Level 10 (90-100 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx	1[a]											**1**
							1		2					**3**
	f/c	cx												
			2				2	2						**6**
	i/c	cx												
			3			2	6	2	3					**16**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
								1						**1**
	i/c	cx												
							1							**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
								1						**1**
	f/c	cx												
	i/c	cx												
Unit 58 Level 10 Total			**6**			**2**	**10**	**6**	**5**					**29**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]50%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 58, Level 11 (100-110 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
							1							**1**
	f/c	cx												
			1	2			1	1	2	3				**10**
	i/c	cx												
			4	1	1	2	3	1	3	1				**16**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
						1								**1**
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 58 Level 11 Total			**5**	**3**	**1**	**3**	**5**	**2**	**5**	**4**				**28**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 58, Level 12 (110-120 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
				1					3					**4**
	f/c	cx												
							2	1	4	1				**8**
	i/c	cx												
			2	2		1	1	4	6					**16**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
					1									**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
Unit 58 Level 12 Total			**3**	**3**	**1**	**1**	**3**	**5**	**13**	**1**				**30**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 58, Level 13 (120-130 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1			1			1	4		1		**8**
	f/c	cx												
			1	2		1	3	4	1	5	1			**18**
	i/c	cx												
			3	4		4	5	6	5	4				**31**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
							1	1						**2**
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
								1						**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
MC	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
Unit 58 Level 13 Total			**6**	**6**		**6**	**9**	**12**	**8**	**13**	**1**	**1**		**62**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 58, Level 14 (130-140 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
							1							**1**
	f/c	cx												
						1			1		2			**4**
	i/c	cx												
			1	1		1	3	3	2					**11**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
											1			**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 58 Level 14 Total			**1**	**1**		**2**	**4**	**3**	**3**		**3**			**17**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 58, Level 15 (140-150 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
						1			1					**2**
	f/c	cx												
			1					1	3	3				**8**
	i/c	cx												
			1	2	2	5	3	3	5	1				**22**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
									1					**1**
QC	s	cx												
	f/c	cx												
									1			1		**2**
	i/c	cx												
			1				1							**2**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
			1	1										**2**
Unit 58 Level 15 Total			**4**	**3**	**2**	**6**	**4**	**4**	**11**	**4**		**1**		**39**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 58, Level 16 (150-160 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
										1				**1**
	f/c	cx												
			1				1	2	1		1			**6**
	i/c	cx												
			1			3	3	1	2					**10**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
					1									**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
Unit 58 Level 16 Total			**3**		**1**	**3**	**4**	**3**	**3**	**1**	**1**			**19**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 58, Level 17 (160-170 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								1			1			**2**
	f/c	cx												
							1		1	2				**4**
	i/c	cx												
						2		3		2				**7**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
						1								**1**
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 58 Level 17 Total						**3**	**1**	**4**	**1**	**4**	**1**			**14**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 58, Level 18 (170-180 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								1						**1**
	f/c	cx												
				1			1		1					**3**
	i/c	cx												
					1			1	1					**3**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
											1			**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 58 Level 18 Total				**1**	**1**		**1**	**2**	**2**		**1**			**8**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 58, Level 19 (180-190 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
										1				**1**
	f/c	cx												
			1											**1**
	i/c	cx												
			1	2		1	1	2						**7**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
			2											**2**
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx	1[a]											**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 58 Level 19 Total			**5**	**2**		**1**	**1**	**2**		**1**				**12**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]10%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 63, Level 1 (0-10 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
						1								**1**
	i/c	cx												
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 63 Level 1 Total						**1**								**1**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 63, Level 2 (10-20 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
			1					1						**2**
	i/c	cx												
			2	1			1	2	1					**7**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
							1		1					**2**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
Unit 63 Level 2 Total			**4**	**1**			**2**	**3**	**2**					**12**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 63, Level 3 (20-30 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								1						**1**
	f/c	cx												
	i/c	cx												
						2		2						**4**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 63 Level 3 Total						**2**		**3**						**5**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 63, Level 4 (30-40 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
					1									**1**
	f/c	cx		1[b]										**1**
									1					**1**
	i/c	cx	1[a]		1[c]									**2**
							1	1						**2**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 63 Level 4 Total			**1**	**1**	**2**		**1**	**1**	**1**					**7**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]80%; [b]90%; [c]90%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 63, Level 5 (40-50 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
								1	1					**2**
	i/c	cx												
				1		1								**2**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 63 Level 5 Total				**1**		**1**		**1**	**1**					**4**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 63, Level 6 (50-60 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
									1					**1**
	f/c	cx												
					1				1	1				**3**
	i/c	cx												
			1			1	2			1				**5**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
						1								**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 63 Level 6 Total			**1**		**1**	**2**	**2**		**2**	**2**				**10**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 63, Level 7 (60-70 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1						1					**2**
	f/c	cx												
				1				1		1	1			**4**
	i/c	cx						1[a]						**1**
				1		2		2						**5**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 63 Level 7 Total			**1**	**2**		**2**		**4**	**1**	**1**	**1**			**12**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]60%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 63, Level 8 (70-80 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
						1		2	1					**4**
	i/c	cx												
						1	1	4	2					**8**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
								1						**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 63 Level 8 Total						**2**	**1**	**7**	**3**					**13**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 63, Level 9 (80-90 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								1						**1**
	f/c	cx												
				2				1	3					**6**
	i/c	cx												
				4		2		5	1					**12**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
				2										**2**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 63 Level 9 Total				**8**		**2**		**7**	**4**					**21**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 63, Level 10 (90-100 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1						1		1			**3**
	f/c	cx												
						1								**1**
	i/c	cx												
					4	3	2		1					**10**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
										1				**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 63 Level 10 Total			**1**		**4**	**4**	**2**		**2**	**1**	**1**			**15**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 72, Level 1 (0-10 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
						1				1				**2**
	f/c	cx												
							1	2	1					**4**
	i/c	cx												
			2	1		4		2	2					**11**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
								1						**1**
	i/c	cx												
								1	1					**2**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
				1										**1**
	f/c	cx												
	i/c	cx												
			1											**1**
Unit 72 Level 1 Total			**3**	**2**		**5**	**1**	**6**	**4**	**1**				**22**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 72, Level 2 (10-20 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
				1			1							**2**
	f/c	cx												
									2	1				**3**
	i/c	cx												
				2		2	3	3	1					**11**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
			1						1					**2**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
				1										**1**
	f/c	cx												
	i/c	cx												
			1						1					**2**
Unit 72 Level 2 Total			**3**	**4**		**2**	**4**	**3**	**5**	**1**				**22**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 72, Level 3 (20-30 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								1	1					**2**
	f/c	cx												
			1				1							**2**
	i/c	cx												
				1	1	3	2	3						**10**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
							1		1					**2**
	i/c	cx												
			1					1	2					**4**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
						1								**1**
Unit 72 Level 3 Total			**2**	**1**	**1**	**4**	**4**	**5**	**4**					**21**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 72, Level 4 (30-40 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1						1			1		**3**
	f/c	cx												
								2	1	2				**5**
	i/c	cx												
						1	2	4	3					**10**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
										1				**1**
	i/c	cx												
									1					**1**
B	s	cx												
										1				**1**
	f/c	cx												
								1				1		**2**
	i/c	cx												
								1						**1**
QC	s	cx												
	f/c	cx												
								1						**1**
	i/c	cx												
						1								**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
			1											**1**
	f/c	cx												
	i/c	cx												
Unit 72 Level 4 Total			**2**			**2**	**2**	**9**	**6**	**4**		**2**		**27**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 72, Level 5 (40-50 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
							1		1					**2**
	f/c	cx												
						1		2	1					**4**
	i/c	cx												
			2			1	1	3	1					**8**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
						1			1					**2**
	i/c	cx												
								1						**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
			1		1									**2**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 72 Level 5 Total			**3**		**1**	**3**	**2**	**6**	**4**					**19**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 72, Level 6 (50-60 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								2	1					**3**
	f/c	cx												
					1	1	1	2	1	1				**7**
	i/c	cx												
						1	4	5						**10**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
									1					**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
			1				1	1						**3**
QC	s	cx												
	f/c	cx												
							1							**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
				1										**1**
	f/c	cx												
	i/c	cx												
					1	1								**2**
Unit 72 Level 6 Total			**1**	**1**	**2**	**3**	**7**	**10**	**3**	**1**				**28**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 72, Level 7 (60-70 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								1						**1**
	f/c	cx												
				1		1			2	3				**7**
	i/c	cx												
			1	2		1		5	1					**10**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
B	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
			1				1							**2**
QC	s	cx												
					1									**1**
	f/c	cx												
								1						**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
				1		1								**2**
Unit 72 Level 7 Total			**2**	**4**	**1**	**3**	**1**	**7**	**5**	**3**				**26**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 72, Level 8 (70-80 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								2	3					**5**
	f/c	cx												
			1	1			1	4	1					**8**
	i/c	cx												
			1	2		3	3	4	7					**20**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
			1				2							**3**
QC	s	cx												
	f/c	cx												
					1									**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
			1											**1**
	i/c	cx												
						1								**1**
MC	s	cx												
	f/c	cx												
							1							**1**
	i/c	cx												
							1							**1**
Unit 72 Level 8 Total			**4**	**3**	**1**	**4**	**8**	**10**	**11**					**41**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 72, Level 9 (80-90 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								2						**2**
	f/c	cx												
							1	1	4	1				**7**
	i/c	cx												
			2		1	3	3	5	6					**20**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
QC	s	cx												
	f/c	cx												
							1	1		1				**3**
	i/c	cx												
				1										**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
									1					**1**
	f/c	cx												
						1								**1**
	i/c	cx												
			1	1	1		1		1					**5**
Unit 72 Level 9 Total			**3**	**2**	**2**	**4**	**6**	**9**	**13**	**2**				**41**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 72, Level 10 (90-100 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
				1			1	1	2	1				**6**
	i/c	cx												
				1	1		4	1	3	1				**11**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
								2						**2**
	i/c	cx												
							1	1						**2**
B	s	cx												
	f/c	cx												
								1						**1**
	i/c	cx												
			1				1							**2**
QC	s	cx												
	f/c	cx												
										1				**1**
	i/c	cx												
						1								**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
Unit 72 Level 10 Total			**1**	**2**	**1**	**1**	**7**	**6**	**6**	**3**				**27**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 72, Level 11 (100-110 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
					1				2					**3**
	f/c	cx												
			2	1				1	1	1				**6**
	i/c	cx												
			1	1	3		2	1	4					**12**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
								1			1			**2**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
Unit 72 Level 11 Total			**4**	**2**	**4**		**2**	**3**	**7**	**1**	**1**			**24**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 72, Level 12 (110-120 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx	1[a]											**1**
								1	1					**2**
	f/c	cx												
							1			2				**3**
	i/c	cx												
				1	1		2	1		1				**6**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
								1	1					**2**
	i/c	cx												
			1											**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
											1			**1**
	i/c	cx												
			1											**1**
Unit 72 Level 12 Total			**3**	**1**	**1**		**3**	**3**	**2**	**3**	**1**			**17**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]50%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 87, Level 1 (0-10 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
							1							**1**
	f/c	cx												
				1				1		1	1			**4**
	i/c	cx												
			1	1			1		1					**4**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
											1			**1**
	i/c	cx												
			1			1								**2**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx	1[a]											**1**
	f/c	cx												
	i/c	cx												
Unit 87 Level 1 Total			**3**	**2**		**1**	**2**	**1**	**1**	**1**	**2**			**13**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]20%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 87, Level 2 (10-20 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
					1	1			2					**4**
	i/c	cx												
						2			1					**3**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
							2		1					**3**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
			1											**1**
	f/c	cx												
	i/c	cx	1[a]											**1**
			1											**1**
Unit 87 Level 2 Total			**3**		**1**	**3**	**2**		**4**					**13**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]40%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 87, Level 3 (20-30 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								1						**1**
	f/c	cx												
									1		1			**2**
	i/c	cx												
						1	1							**2**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
								1						**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
			2		1									**3**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
							1							**1**
Unit 87 Level 3 Total			**2**		**1**	**1**	**2**	**2**	**1**		**1**			**10**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 87, Level 4 (30-40 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
				1										**1**
	f/c	cx												
								1						**1**
	i/c	cx												
			1	1	2	3	1							**8**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
					1									**1**
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
								1						**1**
QC	s	cx												
	f/c	cx				1[a]								**1**
	i/c	cx												
						1								**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
				1										**1**
	f/c	cx												
	i/c	cx												
			1	1										**2**
Unit 87 Level 4 Total			**2**	**4**	**3**	**5**	**1**	**2**						**17**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]60%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 87, Level 5 (40-50 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
				1				1	1					**3**
	i/c	cx												
			2	1				1	2					**6**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx	1[a]											**1**
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
				1			1							**2**
Unit 87 Level 5 Total			**3**	**3**			**1**	**2**	**3**					**12**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]70%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 87, Level 6 (50-60 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
									1					**1**
	f/c	cx												
							1	1	1					**3**
	i/c	cx												
							2		2					**4**
O	s	cx												
	f/c	cx												
								1						**1**
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
								1						**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
					1									**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
						1								**1**
	f/c	cx												
	i/c	cx												
Unit 87 Level 6 Total					**1**	**1**	**3**	**3**	**4**					**12**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 87, Level 7 (60-70 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
				1										**1**
	f/c	cx												
								1		1				**2**
	i/c	cx												
					1	2		1	4					**8**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
							1		1					**2**
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
Unit 87 Level 7 Total			**1**	**1**	**1**	**2**	**1**	**2**	**5**	**1**				**14**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 87, Level 8 (70-80 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
								1						**1**
	i/c	cx												
			1					2						**3**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
				1			1							**2**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
			1											**1**
	f/c	cx												
	i/c	cx												
Unit 87 Level 8 Total			**2**	**1**			**1**	**3**						**7**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 87, Level 9 (80-90 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								2	1					**3**
	f/c	cx												
				1			1		1			1		**4**
	i/c	cx												
					1	1		4	4					**10**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx		1[a]										**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
									1					**1**
	f/c	cx												
	i/c	cx												
			1											**1**
Unit 87 Level 9 Total			**1**	**2**	**1**	**1**	**1**	**6**	**7**			**1**		**20**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]20%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 87, Level 10 (90-100 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
											1			**1**
	f/c	cx												
								1	1		1			**3**
	i/c	cx	1[a]		1[b]									**2**
						1		1						**2**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 87 Level 10 Total			**1**		**1**	**1**		**2**	**1**		**2**			**8**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]40%; [b]80%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 87, Level 11 (100-110 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
									1					**1**
	f/c	cx												
							1		1					**2**
	i/c	cx												
					1				2					**3**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 87 Level 11 Total					**1**		**1**		**5**					**7**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 88, Level 1 (0-10 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
								1	1					**2**
	i/c	cx												
							1							**1**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 88 Level 1 Total							**1**	**1**	**1**					**3**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 88, Level 2 (10-20 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
						1			1					**2**
	f/c	cx												
							1	1	2	2			1	**7**
	i/c	cx												
			1		2	1	3	2						**9**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
							1		1					**2**
	i/c	cx												
					2			1						**3**
QC	s	cx												
	f/c	cx												
								1	1	1				**3**
	i/c	cx												
								1						**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
			1					1						**2**
	f/c	cx												
									1					**1**
	i/c	cx	1[a]											**1**
				1			1	2						**4**
Unit 88 Level 2 Total			**3**	**1**	**4**	**2**	**6**	**9**	**6**	**3**			**1**	**35**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]50%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 88, Level 3 (20-30 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
									1					**1**
	f/c	cx												
			1					1	1					**3**
	i/c	cx												
				1			2	3	2					**8**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
								1						**1**
	i/c	cx												
B	s	cx												
	f/c	cx												
							1		1					**2**
	i/c	cx												
			1	1										**2**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
Unit 88 Level 3 Total			**3**	**2**			**3**	**5**	**5**					**18**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 88, Level 4 (30-40 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
				1			2	2	4					**9**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
								1	1					**2**
	i/c	cx												
						2			1					**3**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 88 Level 4 Total				**1**		**2**	**2**	**3**	**7**					**15**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 88, Level 5 (40-50 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
			1	1				3						**5**
	i/c	cx												
			3					4						**7**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
			1				1		1					**3**
	i/c	cx												
				1			2							**3**
QC	s	cx												
	f/c	cx												
										1				**1**
	i/c	cx												
							1							**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx		1[a]										**1**
									1					**1**
	f/c	cx												
	i/c	cx												
Unit 88 Level 5 Total			**5**	**3**			**4**	**7**	**2**	**1**				**22**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]20%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 88, Level 6 (50-60 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
						1		1						**2**
	i/c	cx												
				1				1						**2**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
						1								**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 88 Level 6 Total				**1**		**2**		**2**						**5**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 88, Level 7 (60-70 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								1	1					**2**
	f/c	cx												
			2			1		1		1				**5**
	i/c	cx	1[a]											**1**
			2	2		1	2	3	2					**12**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
					1									**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
					1									**1**
	i/c	cx												
							1							**1**
Unit 88 Level 7 Total			**5**	**2**	**2**	**2**	**3**	**5**	**3**	**1**				**23**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]15%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 88, Level 8 (70-80 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								1			1			**2**
	f/c	cx												
			1	1			1	3	1	1	1			**9**
	i/c	cx												
				1		2	3	4	3					**13**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
				1										**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx	1[a]											**1**
Unit 88 Level 8 Total			**2**	**3**		**2**	**4**	**8**	**4**	**1**	**2**			**26**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]15%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 88, Level 9 (80-90 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								1						**1**
	f/c	cx												
				1					2	2				**5**
	i/c	cx												
			2	2	1	4	2	1	3					**15**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
								2			1			**3**
	i/c	cx												
									1					**1**
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 88 Level 9 Total			**2**	**3**	**1**	**4**	**2**	**4**	**6**	**2**	**1**			**25**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 88, Level 10 (90-100 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
									2					**2**
	f/c	cx												
						1	1	1	1	2				**6**
	i/c	cx												
			1			4	2		4					**11**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
				1										**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
								1						**1**
	i/c	cx												
			1											**1**
Unit 88 Level 10 Total			**2**	**1**		**5**	**3**	**2**	**7**	**2**				**22**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 88, Level 11 (100-110 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
										1				**1**
	i/c	cx												
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
							1							**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 88 Level 11 Total							**1**			**1**				**2**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 96, Level 1 (0-10 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
							1							**1**
	i/c	cx												
						1	1	1						**3**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
								1						**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx	1[a]											**1**
Unit 96 Level 1 Total			**1**			**1**	**2**	**2**						**6**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]50%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 96, Level 2 (10-20 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
								1						**1**
	f/c	cx			1[a]									**1**
								1	1	3				**5**
	i/c	cx												
			2		2	3	3	8		1				**19**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
B	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
QC	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
			1											**1**
	f/c	cx												
	i/c	cx												
				1		1								**2**
Unit 96 Level 2 Total			**5**	**1**	**3**	**4**	**3**	**10**	**2**	**4**				**32**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]40%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 96, Level 3 (20-30 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
			1						2					**3**
	i/c	cx												
				1	1	2			1					**5**
O	s	cx												
	f/c	cx												
	i/c	cx												
										1				**1**
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
			1											**1**
	f/c	cx												
	i/c	cx												
			1				1							**2**
Unit 96 Level 3 Total			**4**	**1**	**1**	**2**	**1**		**3**	**1**				**13**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 96, Level 4 (30-40 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx		1[a]										**1**
								1	3					**4**
	i/c	cx						1[b]						**1**
			1			2	1		3					**7**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
								1						**1**
	i/c	cx												
				2			1							**3**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
				1										**1**
	f/c	cx												
									1					**1**
	i/c	cx												
			3	1										**4**
Unit 96 Level 4 Total			**4**	**5**		**2**	**2**	**3**	**7**					**23**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]50%; [b]30%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 96, Level 5 (40-50 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
						1				1		1		**3**
	i/c	cx												
				1		2	1	1	3					**8**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
						1		1						**2**
QC	s	cx												
	f/c	cx												
										1				**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 96 Level 5 Total				**1**		**4**	**1**	**2**	**3**	**2**		**1**		**14**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 96, Level 6 (50-60 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
							1					1		**2**
	i/c	cx												
			1		1		2	1	2	1				**8**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
				1										**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
						1								**1**
	f/c	cx												
									1					**1**
	i/c	cx												
			1			1	2	1						**5**
Unit 96 Level 6 Total			**2**	**1**	**1**	**2**	**5**	**2**	**3**	**1**		**1**		**18**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 96, Level 7 (60-70 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
			1											**1**
	i/c	cx												
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
				1										**1**
	f/c	cx												
	i/c	cx												
			1	1		1								**3**
Unit 96 Level 7 Total			**2**	**2**		**1**			**1**					**6**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 96, Level 8 (70-80 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
							1		1					**2**
	f/c	cx												
				1		1		2						**4**
	i/c	cx	1[a]											**1**
			1	1		2		1						**5**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
									1					**1**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx	1[b]											**1**
	f/c	cx												
	i/c	cx												
					1									**1**
Unit 96 Level 8 Total			**3**	**2**	**1**	**3**	**1**	**3**	**2**					**15**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]10%; [b]40%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 105, Level 1 (0-10 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
								1						**1**
	i/c	cx												
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
			1			1								**2**
Unit 105 Level 1 Total			**2**			**1**		**1**						**4**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 105, Level 2 (10-20 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx	1[a]											**1**
									1					**1**
	i/c	cx												
						1	1	1	1					**4**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
				1										**1**
	i/c	cx												
					1									**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
								1						**1**
	f/c	cx												
	i/c	cx												
Unit 105 Level 2 Total			**1**	**1**	**1**	**1**	**1**	**2**	**2**					**9**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]60%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 105, Level 3 (20-30 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
								1	2	1				**4**
	i/c	cx												
			1		1	2			1					**5**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
							1							**1**
Unit 105 Level 3 Total			**1**		**1**	**2**	**1**	**1**	**3**	**1**				**10**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 105, Level 4 (30-40 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
								1	2					**3**
	i/c	cx												
							2		1					**3**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 105 Level 4 Total							**2**	**1**	**3**					**6**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 105, Level 5 (40-50 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1											**1**
	f/c	cx												
									1					**1**
	i/c	cx												
			1				1							**2**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 105 Level 5 Total			**2**				**1**		**1**					**4**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 105, Level 6 (50-60 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1											**1**
	f/c	cx												
			1		1			1	1					**4**
	i/c	cx	1[a]											**1**
			1				1							**2**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
					1									**1**
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
					1									**1**
Unit 105 Level 6 Total			**4**		**3**		**1**	**1**	**1**					**10**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]10%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 105, Level 7 (60-70 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
									1		2			**3**
	i/c	cx												
								1	1					**2**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx	1[a]											**1**
	f/c	cx												
	i/c	cx												
Unit 105 Level 7 Total			**1**					**1**	**2**		**2**			**6**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]50%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 105, Level 8 (70-80 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
				1					1					**2**
	i/c	cx												
				1			1	2	3					**7**
O	s	cx												
	f/c	cx												
						1								**1**
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
							1							**1**
Unit 105 Level 8 Total				**2**		**1**	**2**	**2**	**4**					**11**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 105, Level 9 (80-90 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
					1	2	3	1	5					**12**
	i/c	cx												
				2		3	3	4	1					**13**
O	s	cx												
	f/c	cx												
	i/c	cx												
							1							**1**
V	s	cx												
	f/c	cx												
										1				**1**
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
			1											**1**
QC	s	cx												
	f/c	cx												
			1					1						**2**
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx	1[a]											**1**
	f/c	cx												
							1							**1**
	i/c	cx												
			1	1	1									**3**
Unit 105 Level 9 Total			**4**	**3**	**2**	**5**	**8**	**6**	**6**	**1**				**35**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]20%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 105, Level 10 (90-100 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
			1					2	2					**5**
	f/c	cx												
						1	2	5	2	2	2			**14**
	i/c	cx												
			3	1		4	2	4	5					**19**
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
						1			1					**2**
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
			1											**1**
	f/c	cx												
	i/c	cx	1[a]											**1**
			1											**1**
Unit 105 Level 10 Total			**7**	**1**		**6**	**4**	**11**	**10**	**2**	**2**			**43**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]30%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 105, Level 11 (100-110 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx	1[a]											**1**
	f/c	cx												
							1	1	2					**4**
	i/c	cx												
				1	1	1		2						**5**
O	s	cx												
	f/c	cx												
							1							**1**
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 105 Level 11 Total			**1**	**1**	**1**	**1**	**2**	**3**	**2**					**11**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)
approximate cortex surface area: [a]20%.

Appendix 3e
Debitage Size Grade Analysis, Unit and Depth Level Inventory

Unit 105, Level 12 (110-120 cm BD)

Material	Condition and Type	Cortex	Screen Size (mm)											Totals
			8	6.7	6.3	5.6	4.75	4	3.35	2.8	2.36	2	< 2	
C	s	cx												
	f/c	cx												
				1										**1**
	i/c	cx												
O	s	cx												
	f/c	cx												
	i/c	cx												
V	s	cx												
	f/c	cx												
	i/c	cx												
B	s	cx												
	f/c	cx												
	i/c	cx												
QC	s	cx												
	f/c	cx												
	i/c	cx												
A	s	cx												
	f/c	cx												
	i/c	cx												
MC	s	cx												
	f/c	cx												
	i/c	cx												
Unit 105 Level 12 Total				**1**										**1**

(s = shatter; f/c = fragmented / controlled; i/c = intact / controlled)

Appendix 4a

Beta Analytic Laboratory Report – December, 2010
*Note: These dates were recalibrated in 2012 and are included in Appendix Naa.

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. . . Delivered On-time

Darden Hood
President

Ronald Hatfield
Christopher Patrick
Deputy Directors

December 10, 2010

Dr. Robert Lee Sappington
University of Idaho
Department of Sociology/
Anthropology/Justice Studies
P.O. Box 441110
Moscow, ID 83844-1110
USA

RE: Radiocarbon Dating Results For Samples 10CW34 F4.13.6.1, 10CW34 8.12.2, 10CW34 24.8.5, 10CW34 30.9.11, 10CW34 32.7.4, 10CW34 33.3.4, 10CW34 37.7.2, 10CW34 39.5.3, 10CW34 41.9.1, 10CW34 42.18.3

Dear Dr. Sappington:

Enclosed are the radiocarbon dating results for ten samples recently sent to us. They each provided plenty of carbon for accurate measurements and all the analyses proceeded normally. As usual, the method of analysis is listed on the report with the results and calibration data is provided where applicable.

As always, no students or intern researchers who would necessarily be distracted with other obligations and priorities were used in the analyses. We analyzed them with the combined attention of our entire professional staff.

If you have specific questions about the analyses, please contact us. We are always available to answer your questions.

The cost of analysis was previously invoiced. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

Sincerely,

Darden Hood
Digital signature on file

BETA ANALYTIC INC.
DR. M.A. TAMERS and MR. D.G. HOOD
4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305-667-5167 FAX:305-663-0964
beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Dr. Robert Lee Sappington — **Report Date: 12/10/2010**

University of Idaho — **Material Received: 11/12/2010**

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 288076	1030 +/- 40 BP	-22.8 o/oo	1060 +/- 40 BP
SAMPLE : 10CW34 F4.13.6.1			
ANALYSIS : Radiometric-Standard delivery (with extended counting)			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 890 to 1030 (Cal BP 1060 to 920)			
Beta - 288077	5670 +/- 40 BP	-23.8 o/oo	5690 +/- 40 BP
SAMPLE : 10CW34 8.12.2			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 4610 to 4450 (Cal BP 6560 to 6400)			
Beta - 288078	1370 +/- 40 BP	-21.9 o/oo	1420 +/- 40 BP
SAMPLE : 10CW34 24.8.5			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal AD 570 to 660 (Cal BP 1380 to 1280)			
Beta - 288079	5120 +/- 40 BP	-22.9 o/oo	5150 +/- 40 BP
SAMPLE : 10CW34 30.9.11			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 4040 to 4010 (Cal BP 5990 to 5960) AND Cal BC 4000 to 3940 (Cal BP 5950 to 5890) Cal BC 3860 to 3810 (Cal BP 5810 to 5760)			

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

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beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Dr. Robert Lee Sappington **Report Date: 12/10/2010**

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 288080 SAMPLE : 10CW34 32.7.4 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 6380 to 6210 (Cal BP 8330 to 8160)	7370 +/- 40 BP	-23.6 o/oo	7390 +/- 40 BP
Beta - 288081 SAMPLE : 10CW34 33.3.4 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1670 to 1780 (Cal BP 280 to 160) AND Cal AD 1790 to 1960 (Cal BP 160 to 0)	110 +/- 40 BP	-24.3 o/oo	120 +/- 40 BP
Beta - 288082 SAMPLE : 10CW34 37.7.2 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 4050 to 3960 (Cal BP 6000 to 5900)	5200 +/- 40 BP	-24.8 o/oo	5200 +/- 40 BP
Beta - 288083 SAMPLE : 10CW34 39.5.3 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1660 to 1960 (Cal BP 290 to 0)	140 +/- 40 BP	-24.8 o/oo	140 +/- 40 BP

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

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REPORT OF RADIOCARBON DATING ANALYSES

Dr. Robert Lee Sappington **Report Date: 12/10/2010**

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 288084	7790 +/- 40 BP	-24.7 o/oo	7790 +/- 40 BP
SAMPLE : 10CW34 41.9.1			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 6680 to 6560 (Cal BP 8630 to 8510) AND Cal BC 6550 to 6520 (Cal BP 8500 to 8470)			
Beta - 288085	10680 +/- 50 BP	-25.3 o/oo	10680 +/- 50 BP
SAMPLE : 10CW34 42.18.3			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 10870 to 10720 (Cal BP 12820 to 12670)			

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-22.8:lab. mult=1)

Laboratory number: **Beta-288076**

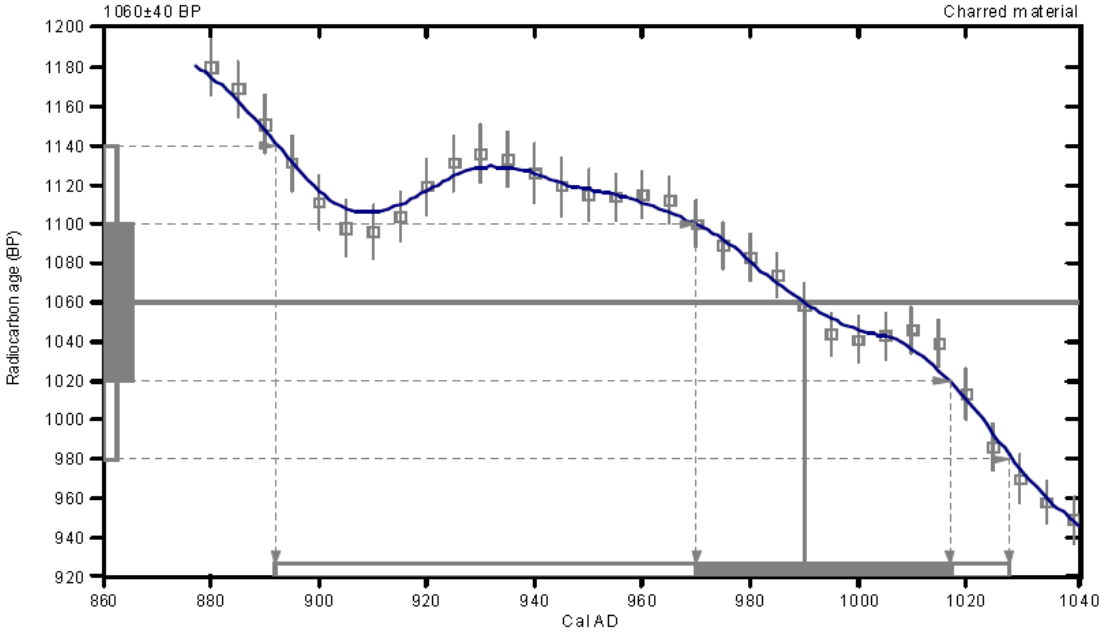
Conventional radiocarbon age: **1060±40 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 890 to 1030 (Cal BP 1060 to 920)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 990 (Cal BP 960)

1 Sigma calibrated result: (68% probability) Cal AD 970 to 1020 (Cal BP 980 to 930)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.8:lab. mult=1)

Laboratory number: **Beta-288077**

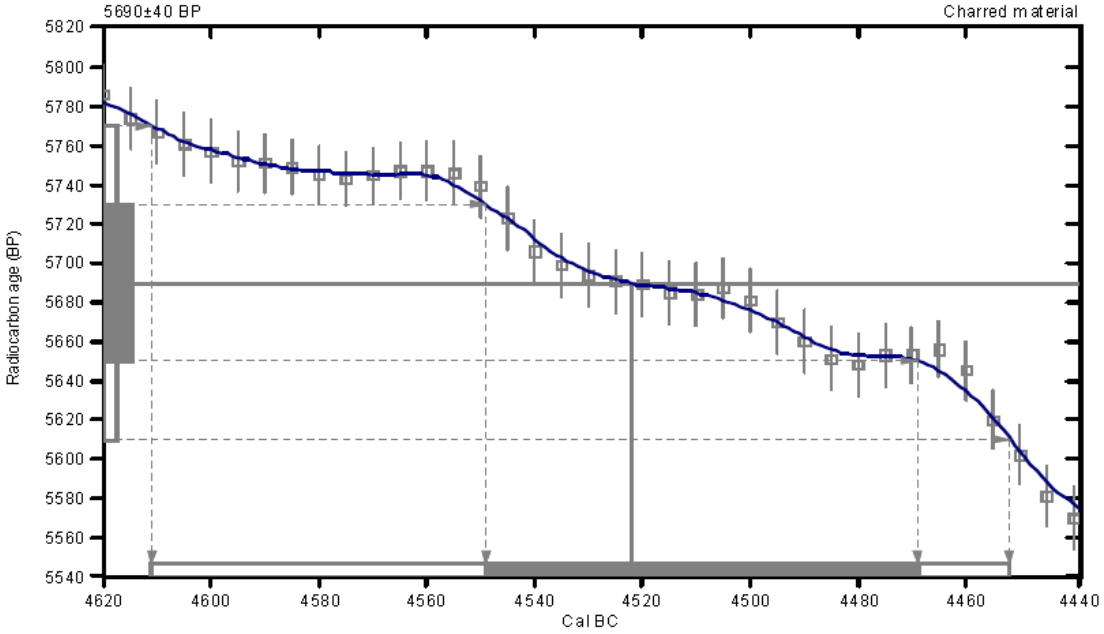
Conventional radiocarbon age: **5690±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 4610 to 4450 (Cal BP 6560 to 6400)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 4520 (Cal BP 6470)

1 Sigma calibrated result: (68% probability) Cal BC 4550 to 4470 (Cal BP 6500 to 6420)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-21.9:lab. mult=1)

Laboratory number: **Beta-288078**

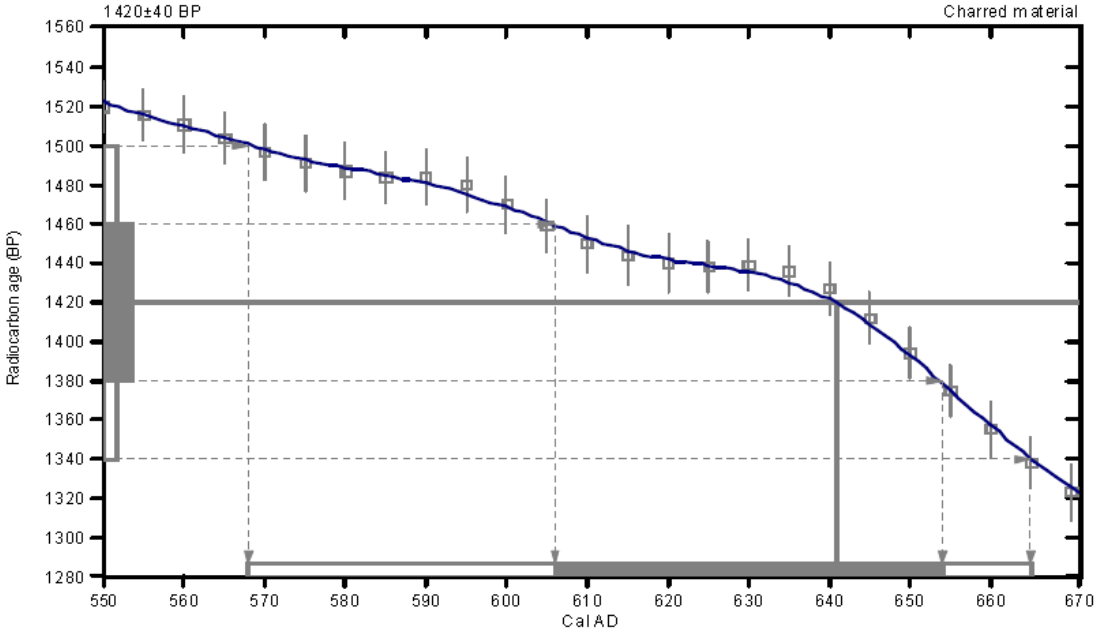
Conventional radiocarbon age: **1420±40 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 570 to 660 (Cal BP 1380 to 1280)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 640 (Cal BP 1310)

1 Sigma calibrated result: (68% probability) Cal AD 610 to 650 (Cal BP 1340 to 1300)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-22.9:lab. mult=1)

Laboratory number: Beta-288079

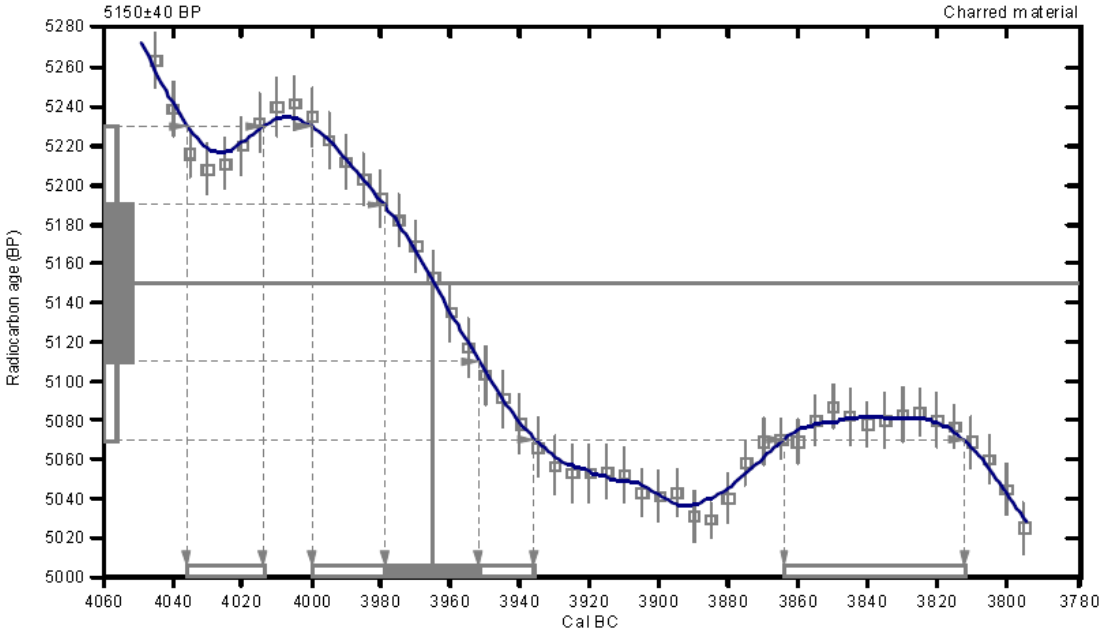
Conventional radiocarbon age: 5150±40 BP

2 Sigma calibrated results: Cal BC 4040 to 4010 (Cal BP 5990 to 5960) and
(95% probability) Cal BC 4000 to 3940 (Cal BP 5950 to 5890) and
Cal BC 3860 to 3810 (Cal BP 5810 to 5760)

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 3960 (Cal BP 5920)

1 Sigma calibrated result: (68% probability) Cal BC 3980 to 3950 (Cal BP 5930 to 5900)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.6:lab. mult=1)

Laboratory number: **Beta-288080**

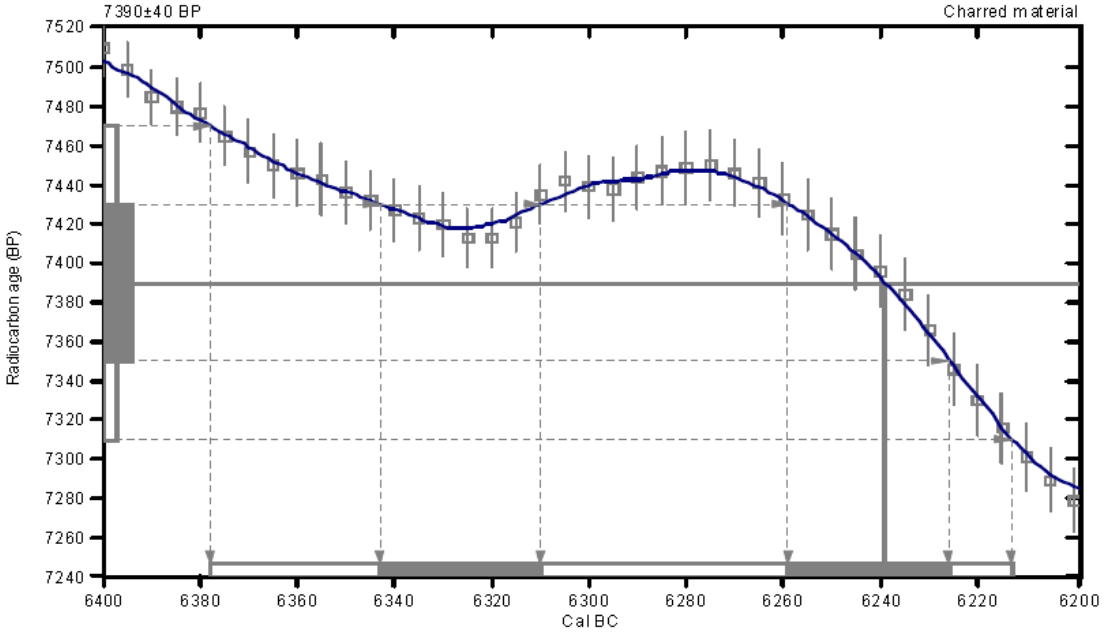
Conventional radiocarbon age: **7390±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 6380 to 6210 (Cal BP 8330 to 8160)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 6240 (Cal BP 8190)

1 Sigma calibrated results: (68% probability) Cal BC 6340 to 6310 (Cal BP 8290 to 8260) and Cal BC 6260 to 6230 (Cal BP 8210 to 8180)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.3 :lab. mult=1)

Laboratory number: **Beta-288081**

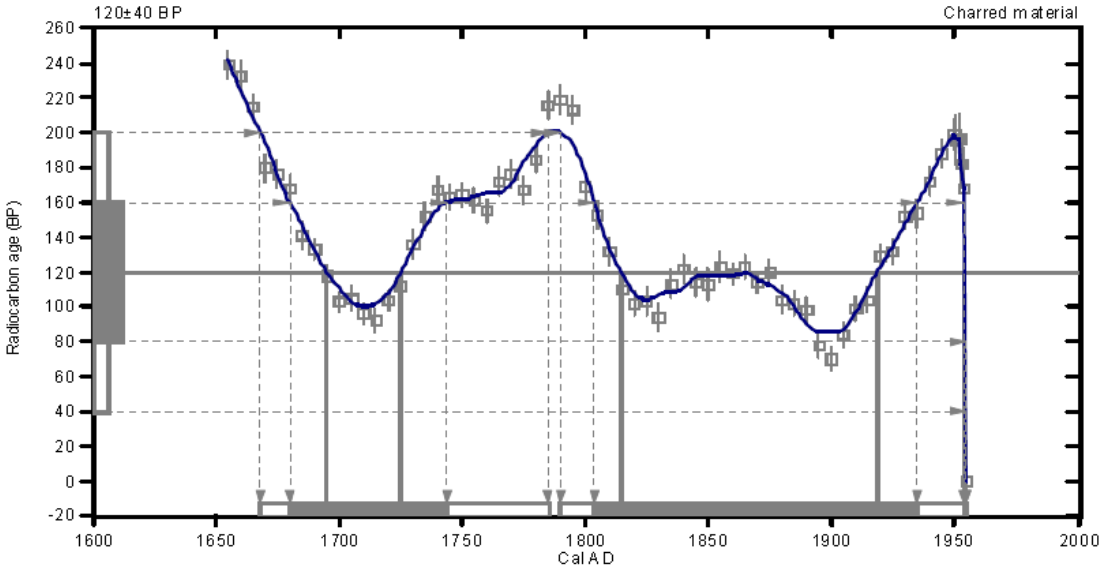
Conventional radiocarbon age: **120±40 BP**

2 Sigma calibrated results: **Cal AD 1670 to 1780 (Cal BP 280 to 160) and**
(95% probability) **Cal AD 1790 to 1960 (Cal BP 160 to 0)**

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal AD 1700 (Cal BP 260) and
Cal AD 1720 (Cal BP 220) and
Cal AD 1820 (Cal BP 140) and
Cal AD 1920 (Cal BP 30) and
Cal AD 1950 (Cal BP 0)

1 Sigma calibrated results: (68% probability) Cal AD 1680 to 1740 (Cal BP 270 to 210) and
Cal AD 1800 to 1940 (Cal BP 150 to 20) and
Cal AD 1950 to 1960 (Cal BP 0 to 0)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.8:lab. mult=1)

Laboratory number: **Beta-288082**

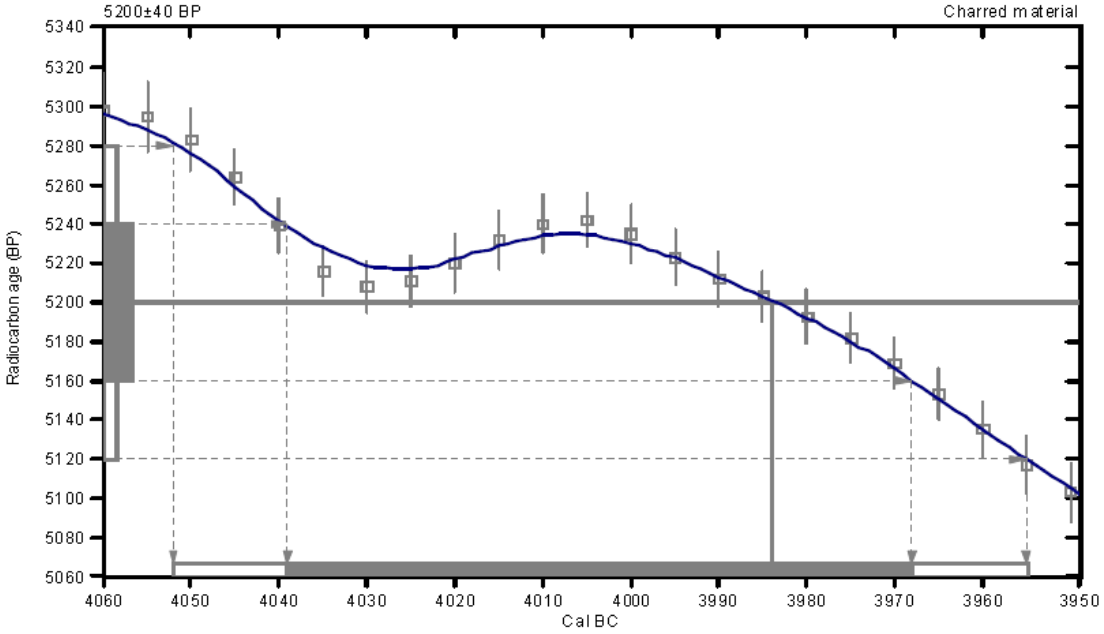
Conventional radiocarbon age: **5200±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 4050 to 3960 (Cal BP 6000 to 5900)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 3980 (Cal BP 5930)

1 Sigma calibrated result: (68% probability) Cal BC 4040 to 3970 (Cal BP 5990 to 5920)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.8:lab. mult=1)

Laboratory number: **Beta-288083**

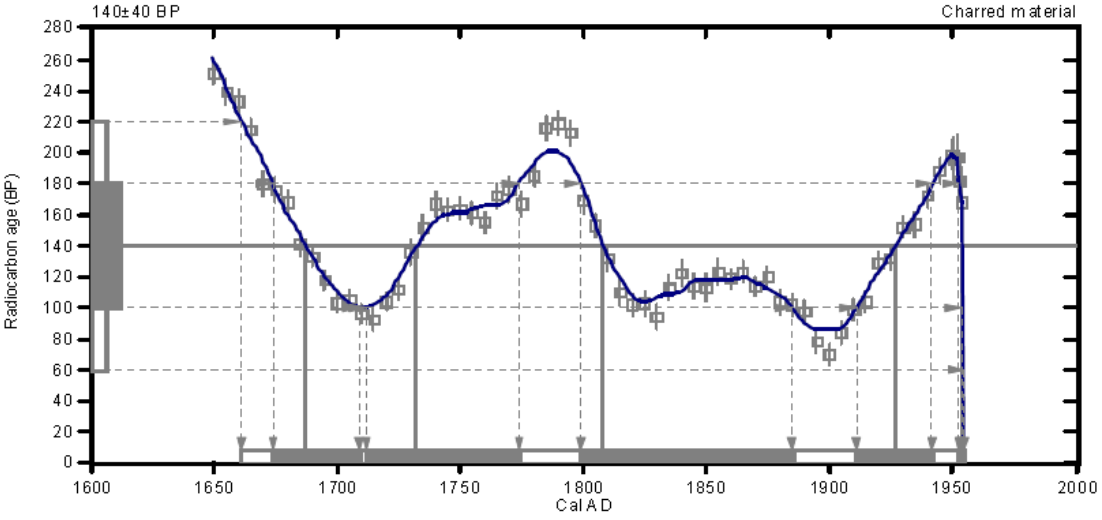
Conventional radiocarbon age: **140±40 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 1660 to 1960 (Cal BP 290 to 0)**

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal AD 1690 (Cal BP 260) and
Cal AD 1730 (Cal BP 220) and
Cal AD 1810 (Cal BP 140) and
Cal AD 1930 (Cal BP 20) and
Cal AD 1950 (Cal BP 0)

1 Sigma calibrated results: (68% probability) Cal AD 1670 to 1710 (Cal BP 280 to 240) and
Cal AD 1710 to 1770 (Cal BP 240 to 180) and
Cal AD 1800 to 1880 (Cal BP 150 to 60) and
Cal AD 1910 to 1940 (Cal BP 40 to 10) and
Cal AD 1950 to 1950 (Cal BP 0 to 0)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.7 :lab. mult=1)

Laboratory number: **Beta-288084**

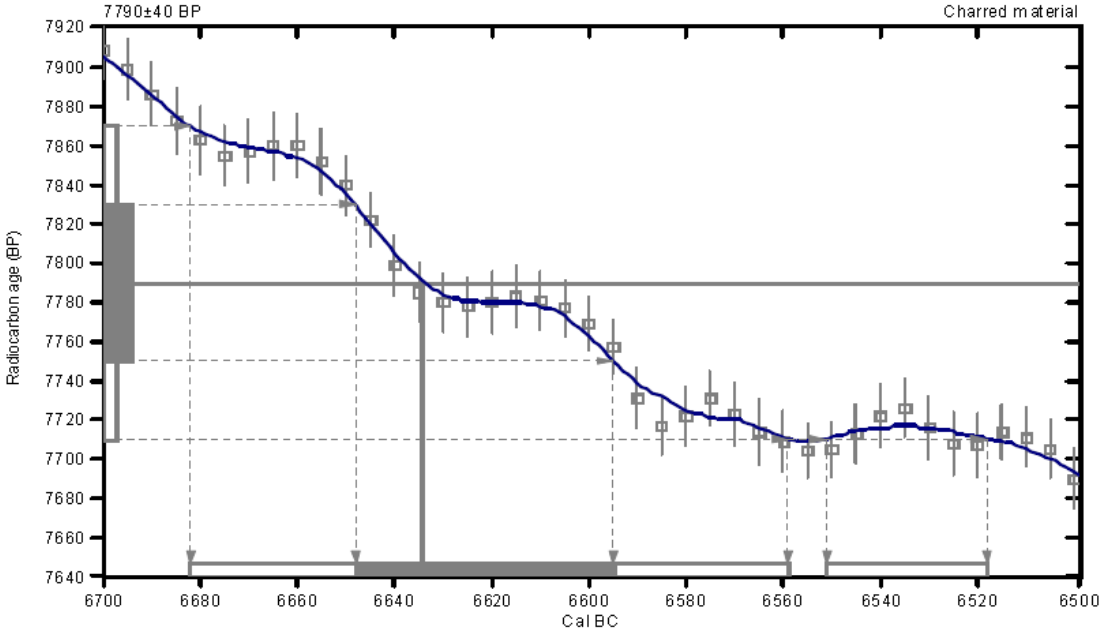
Conventional radiocarbon age: **7790±40 BP**

2 Sigma calibrated results: **Cal BC 6680 to 6560 (Cal BP 8630 to 8510) and**
(95% probability) **Cal BC 6550 to 6520 (Cal BP 8500 to 8470)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 6630 (Cal BP 8580)

1 Sigma calibrated result: (68% probability) Cal BC 6650 to 6600 (Cal BP 8600 to 8540)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.3:lab. mult=1)

Laboratory number: **Beta-288085**

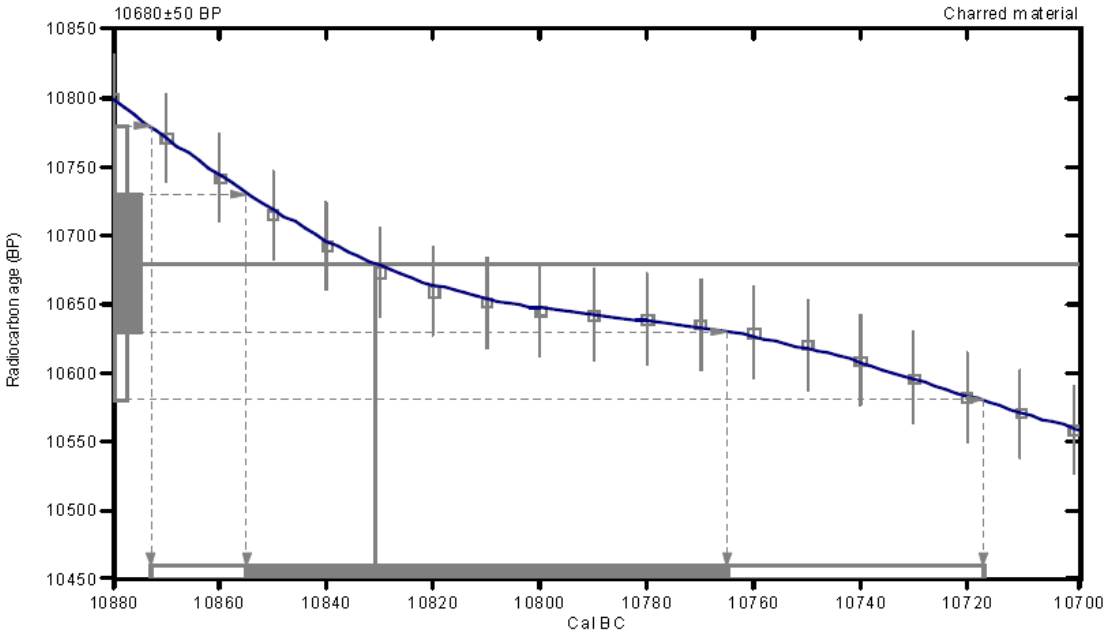
Conventional radiocarbon age: **10680±50 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 10870 to 10720 (Cal BP 12820 to 12670)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 10830 (Cal BP 12780)

1 Sigma calibrated result: (68% probability) Cal BC 10860 to 10760 (Cal BP 12800 to 12720)



References:

Database used

INTCAL04

Calibration Database

INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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Appendix 4b

Beta Analytic Recalibrated Samples #288076-288085 – January, 2012

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-22.8:lab. mult=1)

Laboratory number: **Beta-288076**

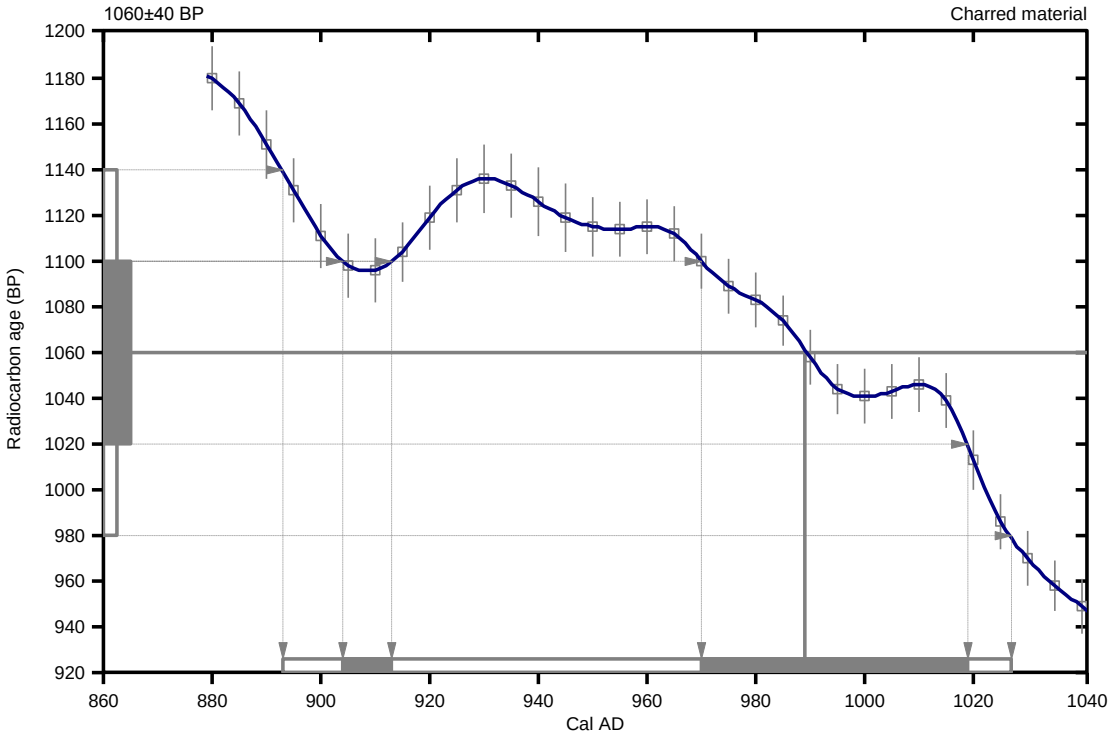
Conventional radiocarbon age[1]: **1060±40 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 890 to 1030 (Cal BP 1060 to 920)**

[1] C13/C12 ratio estimated

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal AD 990 (Cal BP 960)
1 Sigma calibrated results: (68% probability)	Cal AD 900 to 910 (Cal BP 1050 to 1040) and Cal AD 970 to 1020 (Cal BP 980 to 930)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-23.8:lab. mult=1)

Laboratory number: **Beta-288077**

Conventional radiocarbon age[1]: **5690±40 BP**

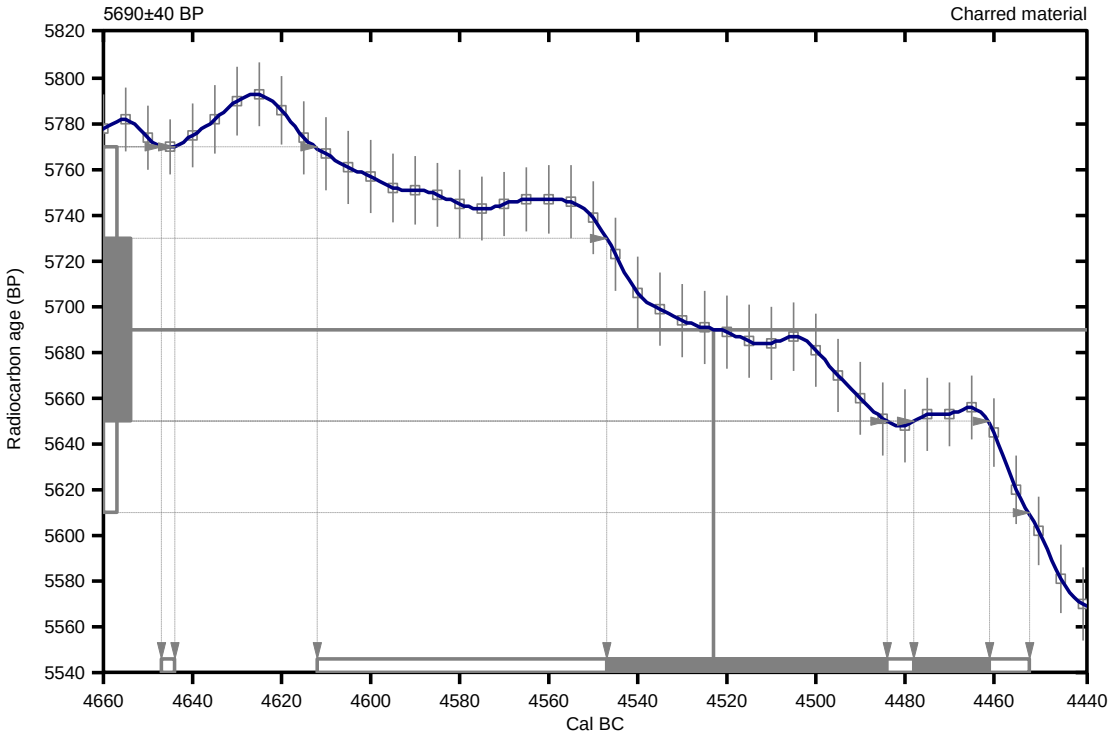
2 Sigma calibrated results: **Cal BC 4650 to 4640 (Cal BP 6600 to 6590) and**
(95% probability) **Cal BC 4610 to 4450 (Cal BP 6560 to 6400)**

[1] C13/C12 ratio estimated

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 4520 (Cal BP 6470)

1 Sigma calibrated results: Cal BC 4550 to 4480 (Cal BP 6500 to 6430) and
(68% probability) Cal BC 4480 to 4460 (Cal BP 6430 to 6410)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-21.9:lab. mult=1)

Laboratory number: **Beta-288078**

Conventional radiocarbon age[1]: **1420±40 BP**

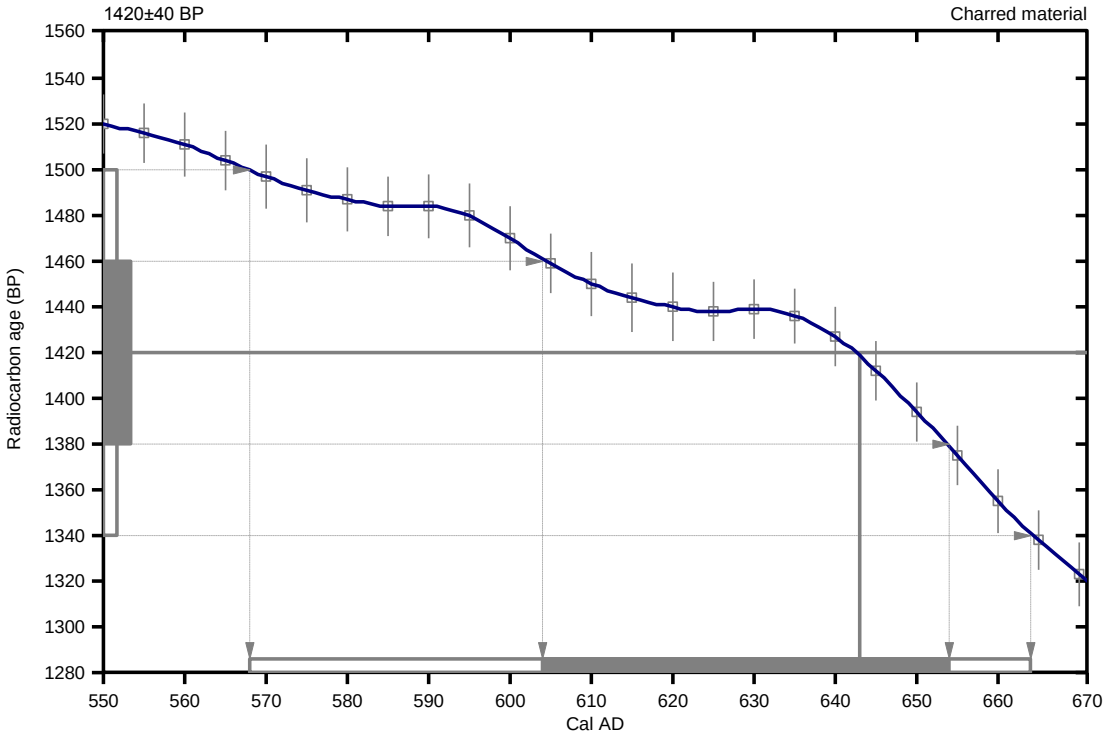
2 Sigma calibrated result: (95% probability) **Cal AD 570 to 660 (Cal BP 1380 to 1290)**

[1] C13/C12 ratio estimated

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 640 (Cal BP 1310)

1 Sigma calibrated result: (68% probability) Cal AD 600 to 650 (Cal BP 1350 to 1300)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-22.9:lab. mult=1)

Laboratory number: **Beta-288079**

Conventional radiocarbon age[1]: **5150±40 BP**

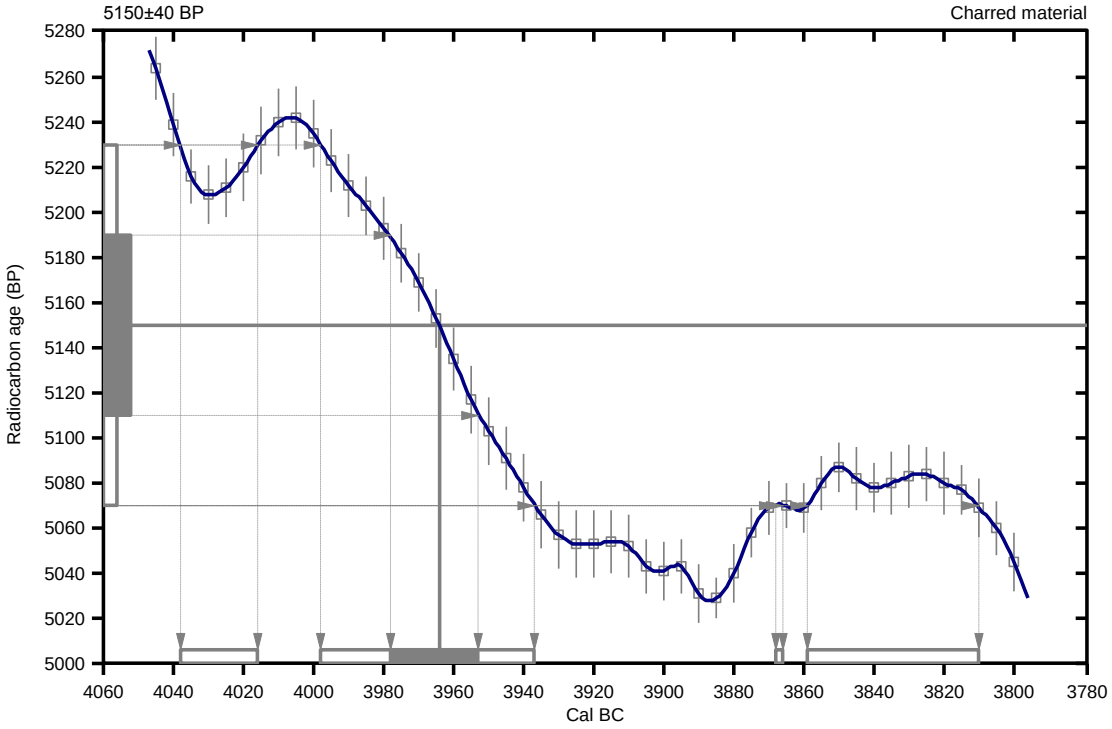
2 Sigma calibrated results: (95% probability) **Cal BC 4040 to 4020 (Cal BP 5990 to 5970) and Cal BC 4000 to 3940 (Cal BP 5950 to 5890) and Cal BC 3870 to 3870 (Cal BP 5820 to 5820) and Cal BC 3860 to 3810 (Cal BP 5810 to 5760)**

[1] C13/C12 ratio estimated

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 3960 (Cal BP 5910)

1 Sigma calibrated result: (68% probability) Cal BC 3980 to 3950 (Cal BP 5930 to 5900)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-23.6:lab. mult=1)

Laboratory number: **Beta-288080**

Conventional radiocarbon age[1]: **7390±40 BP**

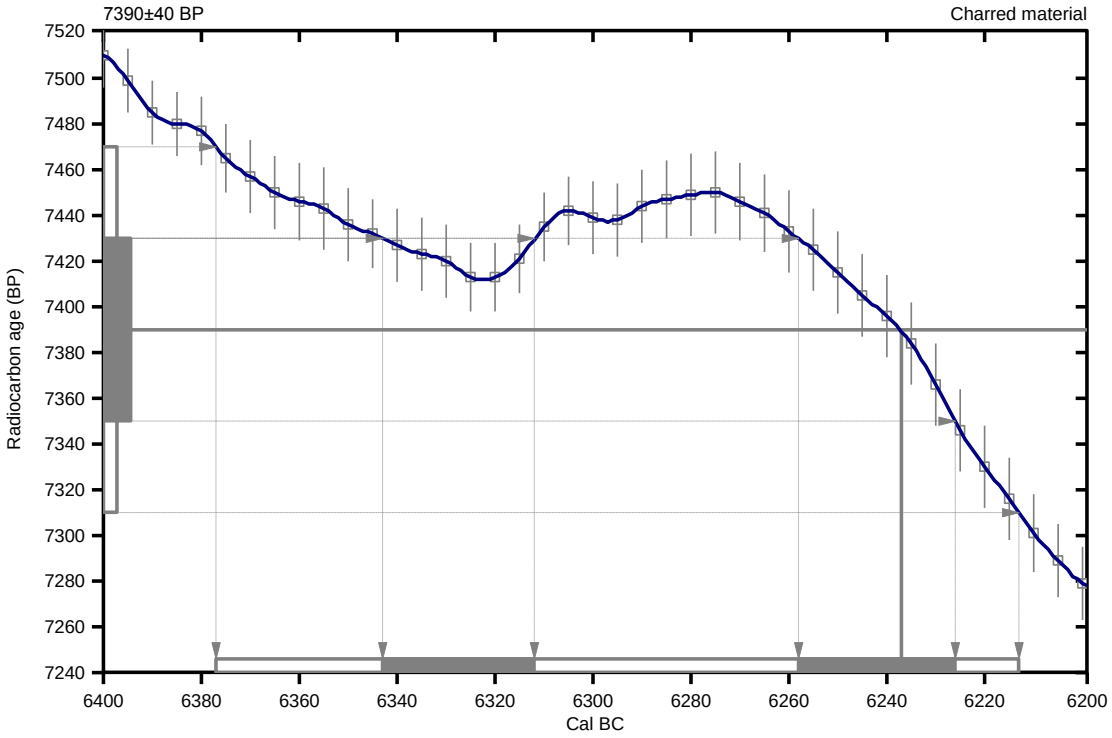
2 Sigma calibrated result: (95% probability) **Cal BC 6380 to 6210 (Cal BP 8330 to 8160)**

[1] C13/C12 ratio estimated

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 6240 (Cal BP 8190)

1 Sigma calibrated results: (68% probability) Cal BC 6340 to 6310 (Cal BP 8290 to 8260) and Cal BC 6260 to 6230 (Cal BP 8210 to 8180)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-24.3:lab. mult=1)

Laboratory number: **Beta-288081**

Conventional radiocarbon age[1]: **120±40 BP**

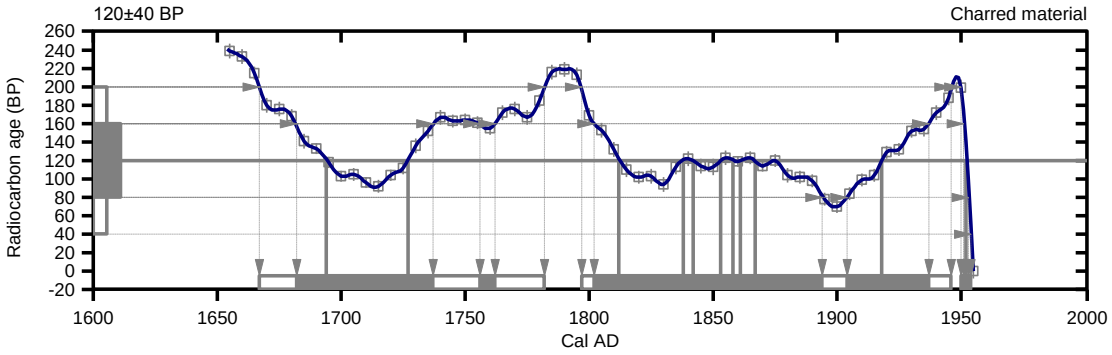
2 Sigma calibrated results: **Cal AD 1670 to 1780 (Cal BP 280 to 170) and**
(95% probability) **Cal AD 1800 to 1950 (Cal BP 150 to 0) and**
Cal AD 1950 to 1950 (Cal BP 0 to 0)

[1] C13/C12 ratio estimated

Intercept data

Intercepts of radiocarbon age with calibration curve:
Cal AD 1690 (Cal BP 260) and
Cal AD 1730 (Cal BP 220) and
Cal AD 1810 (Cal BP 140) and
Cal AD 1840 (Cal BP 110) and
Cal AD 1840 (Cal BP 110) and
Cal AD 1850 (Cal BP 100) and
Cal AD 1860 (Cal BP 90) and
Cal AD 1860 (Cal BP 90) and
Cal AD 1870 (Cal BP 80) and
Cal AD 1920 (Cal BP 30) and
Cal AD 1950 (Cal BP 0)

1 Sigma calibrated results: Cal AD 1680 to 1740 (Cal BP 270 to 210) and
(68% probability) Cal AD 1760 to 1760 (Cal BP 190 to 190) and
Cal AD 1800 to 1890 (Cal BP 150 to 60) and
Cal AD 1900 to 1940 (Cal BP 50 to 10) and
Cal AD 1950 to 1950 (Cal BP 0 to 0)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-24.8:lab. mult=1)

Laboratory number: **Beta-288082**

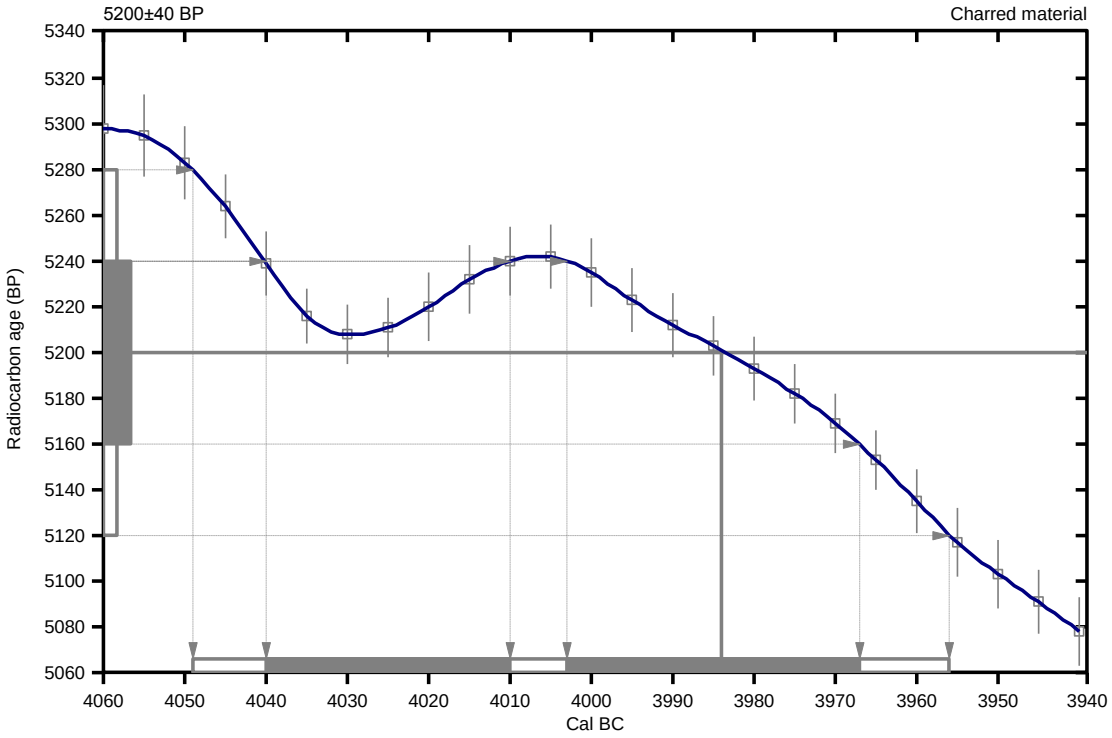
Conventional radiocarbon age[1]: **5200±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 4050 to 3960 (Cal BP 6000 to 5910)**

[1] C13/C12 ratio estimated

Intercept data

Intercept of radiocarbon age with calibration curve:	Cal BC 3980 (Cal BP 5930)
1 Sigma calibrated results: (68% probability)	Cal BC 4040 to 4010 (Cal BP 5990 to 5960) and Cal BC 4000 to 3970 (Cal BP 5950 to 5920)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-24.8:lab. mult=1)

Laboratory number: **Beta-288083**

Conventional radiocarbon age[1]: **140±40 BP**

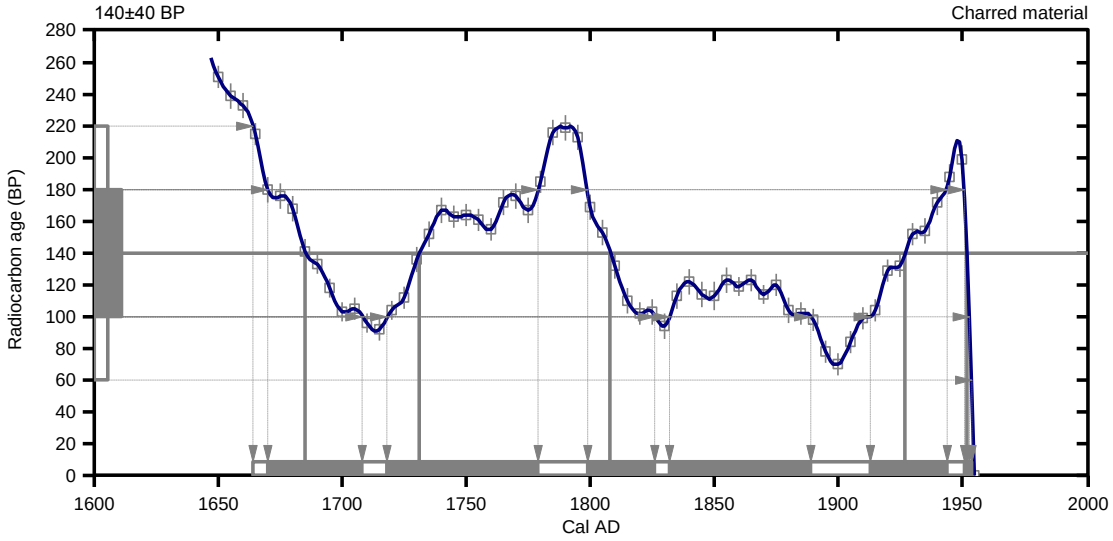
2 Sigma calibrated result: (95% probability) **Cal AD 1660 to 1950 (Cal BP 290 to 0)**

[1] C13/C12 ratio estimated

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal AD 1680 (Cal BP 260) and
Cal AD 1730 (Cal BP 220) and
Cal AD 1810 (Cal BP 140) and
Cal AD 1930 (Cal BP 20) and
Cal AD 1950 (Cal BP 0)

1 Sigma calibrated results: (68% probability) Cal AD 1670 to 1710 (Cal BP 280 to 240) and
Cal AD 1720 to 1780 (Cal BP 230 to 170) and
Cal AD 1800 to 1830 (Cal BP 150 to 120) and
Cal AD 1830 to 1890 (Cal BP 120 to 60) and
Cal AD 1910 to 1940 (Cal BP 40 to 10) and
Cal AD 1950 to 1950 (Cal BP 0 to 0)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-24.7:lab. mult=1)

Laboratory number: **Beta-288084**

Conventional radiocarbon age[1]: **7790±40 BP**

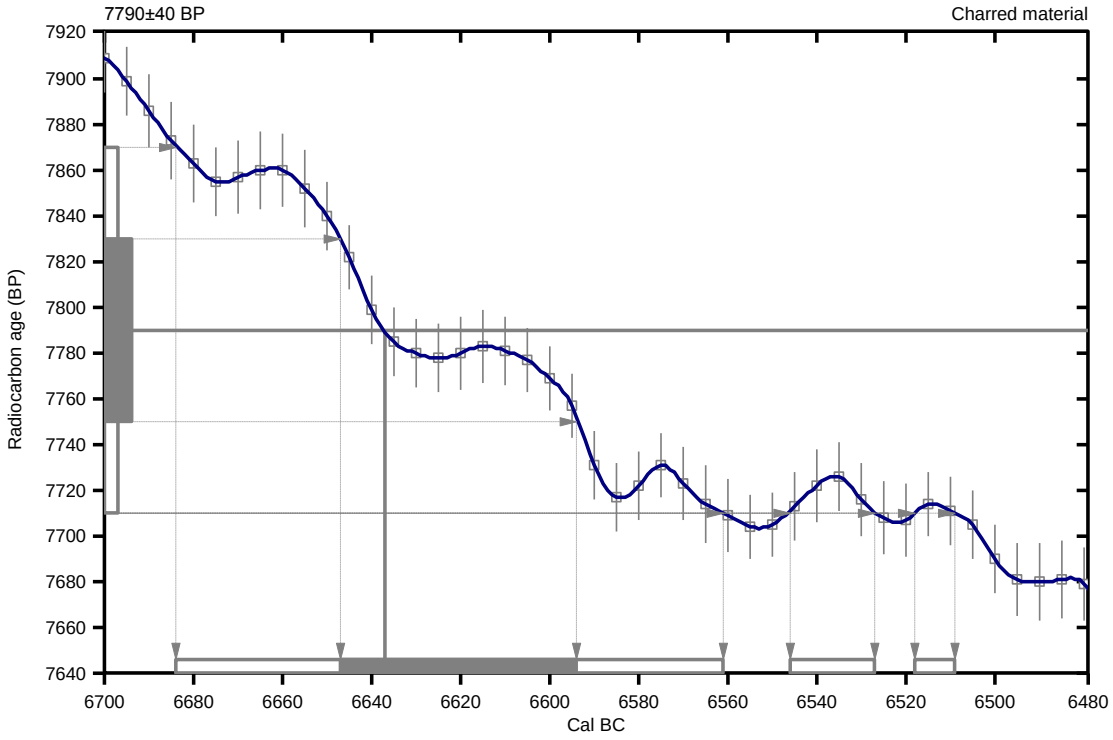
2 Sigma calibrated results: (95% probability) **Cal BC 6680 to 6560 (Cal BP 8630 to 8510) and Cal BC 6550 to 6530 (Cal BP 8500 to 8480) and Cal BC 6520 to 6510 (Cal BP 8470 to 8460)**

[1] C13/C12 ratio estimated

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 6640 (Cal BP 8590)

1 Sigma calibrated result: (68% probability) Cal BC 6650 to 6590 (Cal BP 8600 to 8540)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: est. C13/C12=-25.3:lab. mult=1)

Laboratory number: **Beta-288085**

Conventional radiocarbon age[1]: **10680±50 BP**

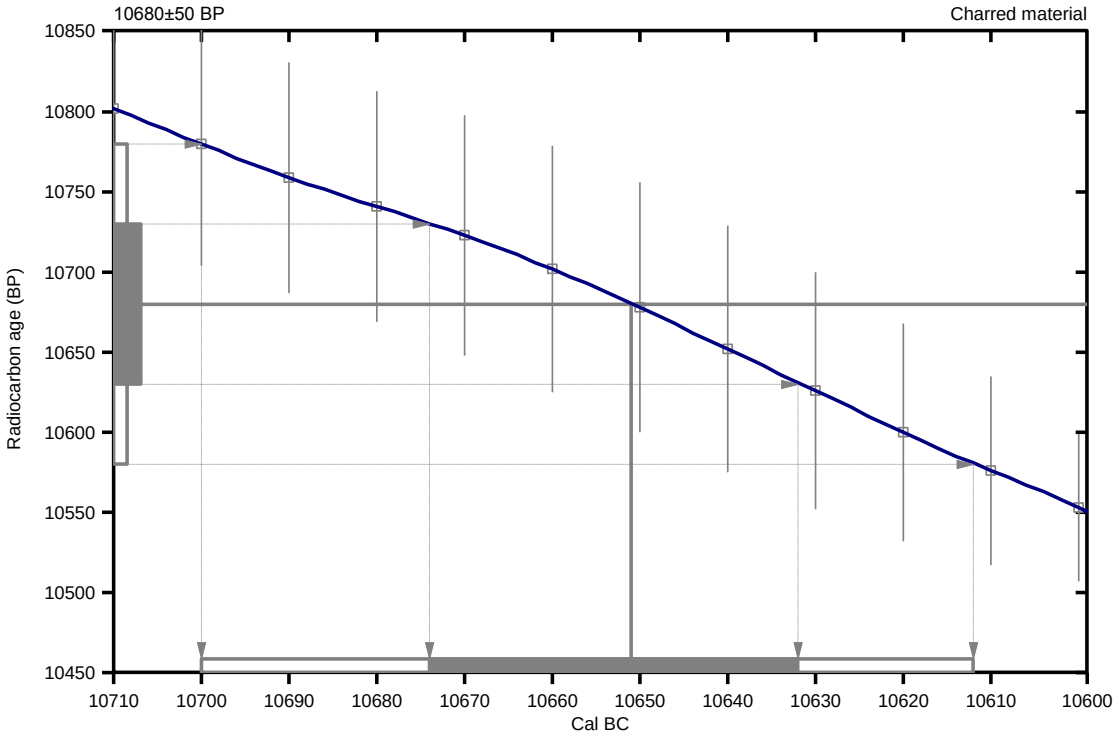
2 Sigma calibrated result: (95% probability) **Cal BC 10700 to 10610 (Cal BP 12650 to 12560)**

[1] C13/C12 ratio estimated

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 10650 (Cal BP 12600)

1 Sigma calibrated result: (68% probability) Cal BC 10670 to 10630 (Cal BP 12620 to 12580)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

Beta Analytic Radiocarbon Dating Laboratory

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Appendix 4c

Beta Analytic Laboratory Report – January, 2012

Beta Analytic Inc.
4985 SW 74 Court
Miami, Florida 33155 USA
Tel: 305 667 5167
Fax: 305 663 0964
Beta@radiocarbon.com
www.radiocarbon.com

Consistent Accuracy . . .
. . . Delivered On-time

Darden Hood
President

Ronald Hatfield
Christopher Patrick
Deputy Directors

January 20, 2012

Dr. Robert Lee Sappington
University of Idaho
Department of Sociology/Anthropology/
Justice Studies
P.O. Box 441110
Moscow, ID 83844-1110
USA

RE: Radiocarbon Dating Results For Samples 10CW34 50.9.10, 10CW34 51.10.7, 10CW34 52.8.23, 10CW34 52.12.4, 10CW34 57.9.13, 10CW34 58.10.6, 10CW34 58.15.9, 10CW34 58.17.3, 10CW34 72.11.6, 10CW34 75.11.4

Dear Dr. Sappington:

Enclosed are the radiocarbon dating results for ten samples recently sent to us. They each provided plenty of carbon for accurate measurements and all the analyses proceeded normally. As usual, the method of analysis is listed on the report with the results and calibration data is provided where applicable.

As always, no students or intern researchers who would necessarily be distracted with other obligations and priorities were used in the analyses. We analyzed them with the combined attention of our entire professional staff.

If you have specific questions about the analyses, please contact us. We are always available to answer your questions.

The cost of analysis was previously invoiced. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

Sincerely,

Darden Hood
Digital signature on file

BETA ANALYTIC INC.
DR. M.A. TAMERS and MR. D.G. HOOD
4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305-667-5167 FAX:305-663-0964
beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Dr. Robert Lee Sappington — **Report Date: 1/20/2012**

University of Idaho — **Material Received: 1/6/2012**

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 313686	7920 +/- 40 BP	-23.8 o/oo	7940 +/- 40 BP
SAMPLE : 10CW34 50.9.10			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 7040 to 6680 (Cal BP 8990 to 8630) AND Cal BC 6660 to 6660 (Cal BP 8610 to 8610)			
Beta - 313687	6950 +/- 40 BP	-23.3 o/oo	6980 +/- 40 BP
SAMPLE : 10CW34 51.10.7			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 5980 to 5940 (Cal BP 7930 to 7890) AND Cal BC 5930 to 5750 (Cal BP 7880 to 7700)			
Beta - 313688	7900 +/- 40 BP	-25.0 o/oo	7900 +/- 40 BP
SAMPLE : 10CW34 52.8.23			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 7030 to 6960 (Cal BP 8980 to 8910) AND Cal BC 6950 to 6930 (Cal BP 8900 to 8880) Cal BC 6920 to 6880 (Cal BP 8870 to 8830) AND Cal BC 6840 to 6640 (Cal BP 8790 to 8600)			
Beta - 313689	7160 +/- 40 BP	-22.4 o/oo	7200 +/- 40 BP
SAMPLE : 10CW34 52.12.4			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 6200 to 6190 (Cal BP 8150 to 8140) AND Cal BC 6180 to 6180 (Cal BP 8130 to 8120) Cal BC 6150 to 6150 (Cal BP 8100 to 8100) AND Cal BC 6100 to 6000 (Cal BP 8050 to 7950)			

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

BETA ANALYTIC INC.
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MIAMI, FLORIDA, USA 33155
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beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Dr. Robert Lee Sappington **Report Date: 1/20/2012**

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 313690 SAMPLE : 10CW34 57.9.13 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 7180 to 7050 (Cal BP 9130 to 9000)	8080 +/- 40 BP	-22.8 o/oo	8120 +/- 40 BP
Beta - 313691 SAMPLE : 10CW34 58.10.6 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 5980 to 5950 (Cal BP 7920 to 7900) AND Cal BC 5920 to 5740 (Cal BP 7870 to 7690)	6930 +/- 40 BP	-23.1 o/oo	6960 +/- 40 BP
Beta - 313692 SAMPLE : 10CW34 58.15.9 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 9120 to 9070 (Cal BP 11070 to 11020) AND Cal BC 9060 to 9010 (Cal BP 11010 to 10960) Cal BC 8910 to 8900 (Cal BP 10860 to 10850) AND Cal BC 8840 to 8700 (Cal BP 10790 to 10650) AND Cal BC 8670 to 8660 (Cal BP 10620 to 10600)	9460 +/- 40 BP	-23.3 o/oo	9490 +/- 40 BP
Beta - 313693 SAMPLE : 10CW34 58.17.3 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 7610 to 7570 (Cal BP 9560 to 9520)	8560 +/- 40 BP	-24.0 o/oo	8580 +/- 40 BP

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

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REPORT OF RADIOCARBON DATING ANALYSES

Dr. Robert Lee Sappington **Report Date: 1/20/2012**

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 313694 SAMPLE : 10CW34 72.11.6 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 5840 to 5670 (Cal BP 7790 to 7620)	6840 +/- 40 BP	-23.2 o/oo	6870 +/- 40 BP
Beta - 313695 SAMPLE : 10CW34 75.11.4 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 6000 to 5840 (Cal BP 7950 to 7790)	6990 +/- 40 BP	-22.7 o/oo	7030 +/- 40 BP

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.8:lab. mult=1)

Laboratory number: **Beta-313686**

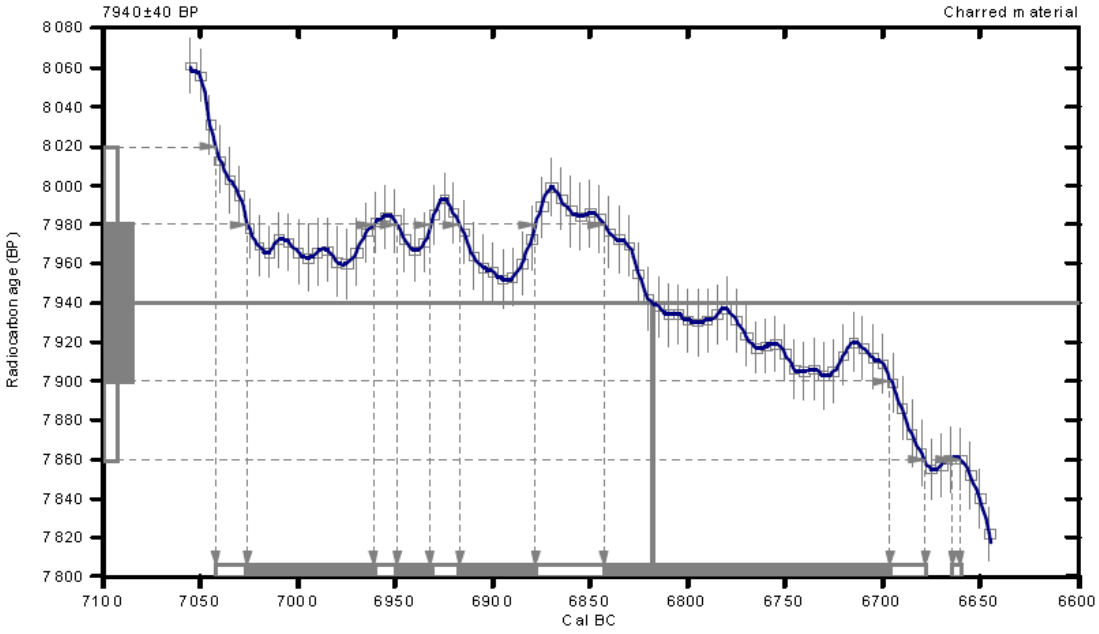
Conventional radiocarbon age: **7940±40 BP**

2 Sigma calibrated results: **Cal BC 7040 to 6680 (Cal BP 8990 to 8630) and**
(95% probability) **Cal BC 6660 to 6660 (Cal BP 8610 to 8610)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 6820 (Cal BP 8770)

1 Sigma calibrated results: Cal BC 7030 to 6960 (Cal BP 8980 to 8910) and
(68% probability) Cal BC 6950 to 6930 (Cal BP 8900 to 8880) and
Cal BC 6920 to 6880 (Cal BP 8870 to 8830) and
Cal BC 6840 to 6700 (Cal BP 8790 to 8650)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.3:lab. mult=1)

Laboratory number: **Beta-313687**

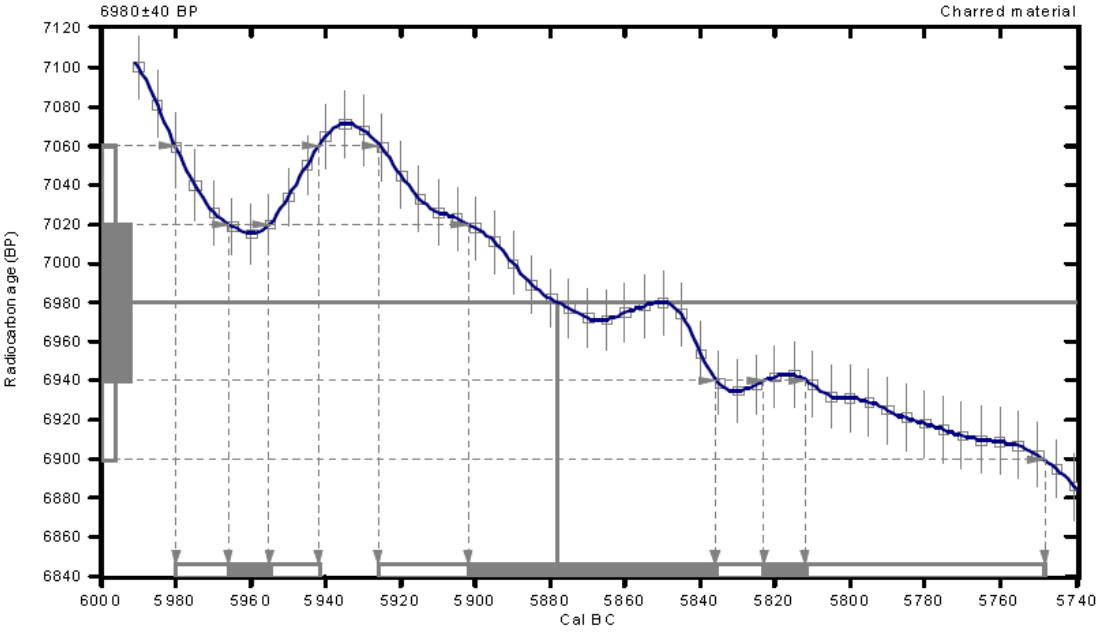
Conventional radiocarbon age: **6980±40 BP**

2 Sigma calibrated results: **Cal BC 5980 to 5940 (Cal BP 7930 to 7890) and**
(95% probability) **Cal BC 5930 to 5750 (Cal BP 7880 to 7700)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 5880 (Cal BP 7830)

1 Sigma calibrated results: Cal BC 5970 to 5960 (Cal BP 7920 to 7900) and
(68% probability) Cal BC 5900 to 5840 (Cal BP 7850 to 7790) and
Cal BC 5820 to 5810 (Cal BP 7770 to 7760)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

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Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25:lab. mult=1)

Laboratory number: **Beta-313688**

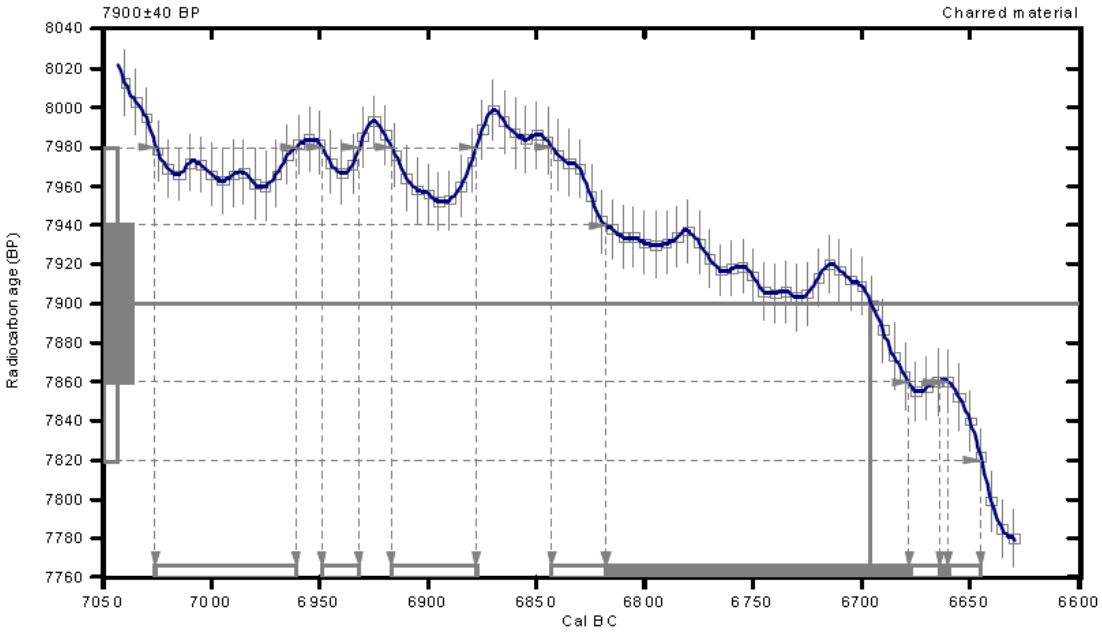
Conventional radiocarbon age: **7900±40 BP**

2 Sigma calibrated results: **Cal BC 7030 to 6960 (Cal BP 8980 to 8910) and**
(95% probability) **Cal BC 6950 to 6930 (Cal BP 8900 to 8880) and**
Cal BC 6920 to 6880 (Cal BP 8870 to 8830) and
Cal BC 6840 to 6640 (Cal BP 8790 to 8600)

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 6700 (Cal BP 8650)

1 Sigma calibrated results: Cal BC 6820 to 6680 (Cal BP 8770 to 8630) and
(68% probability) Cal BC 6660 to 6660 (Cal BP 8610 to 8610)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-22.4:lab. mult=1)

Laboratory number: **Beta-313689**

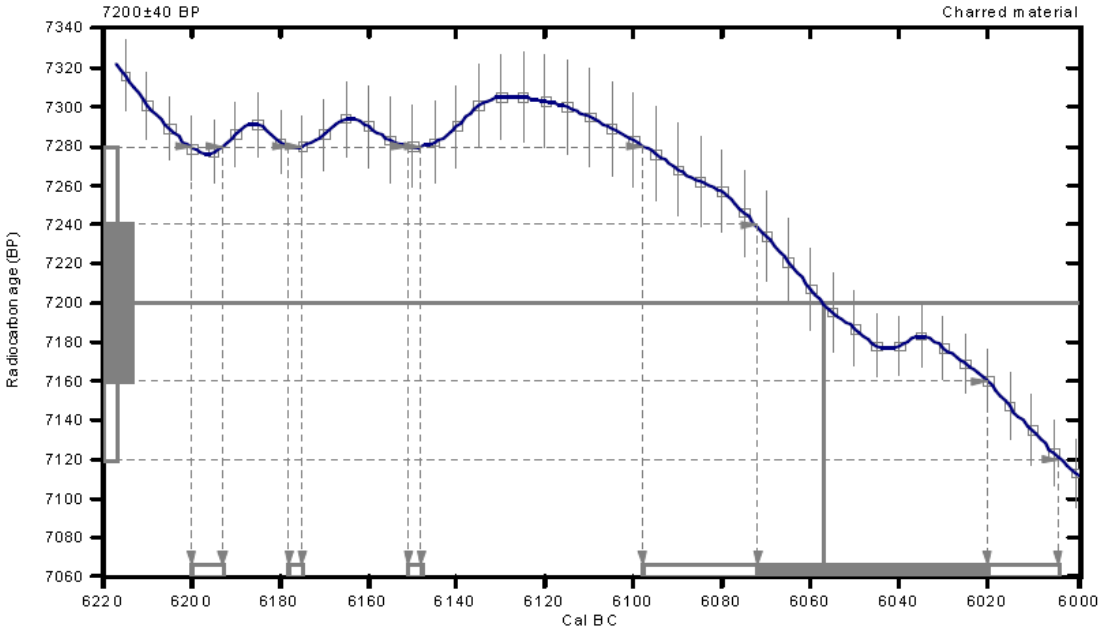
Conventional radiocarbon age: **7200±40 BP**

2 Sigma calibrated results: **Cal BC 6200 to 6190 (Cal BP 8150 to 8140) and**
(95% probability) **Cal BC 6180 to 6180 (Cal BP 8130 to 8120) and**
Cal BC 6150 to 6150 (Cal BP 8100 to 8100) and
Cal BC 6100 to 6000 (Cal BP 8050 to 7950)

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 6060 (Cal BP 8010)

1 Sigma calibrated result: (68% probability) Cal BC 6070 to 6020 (Cal BP 8020 to 7970)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-22.8:lab. mult=1)

Laboratory number: **Beta-313690**

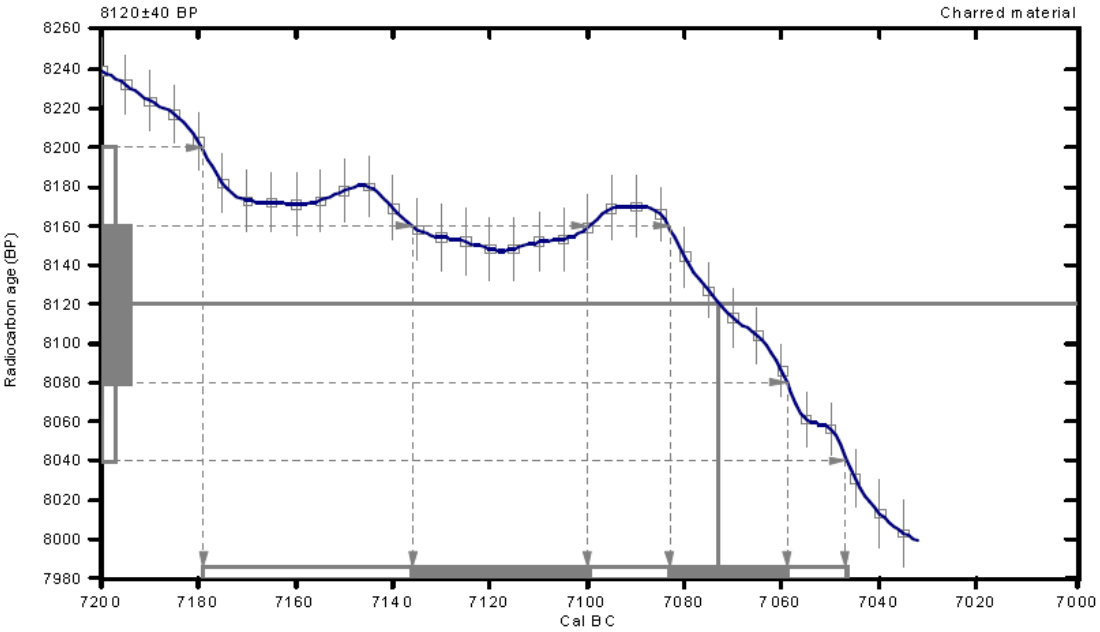
Conventional radiocarbon age: **8120±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 7180 to 7050 (Cal BP 9130 to 9000)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 7070 (Cal BP 9020)

1 Sigma calibrated results: (68% probability) Cal BC 7140 to 7100 (Cal BP 9090 to 9050) and Cal BC 7080 to 7060 (Cal BP 9030 to 9010)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

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Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.1:lab. mult=1)

Laboratory number: **Beta-313691**

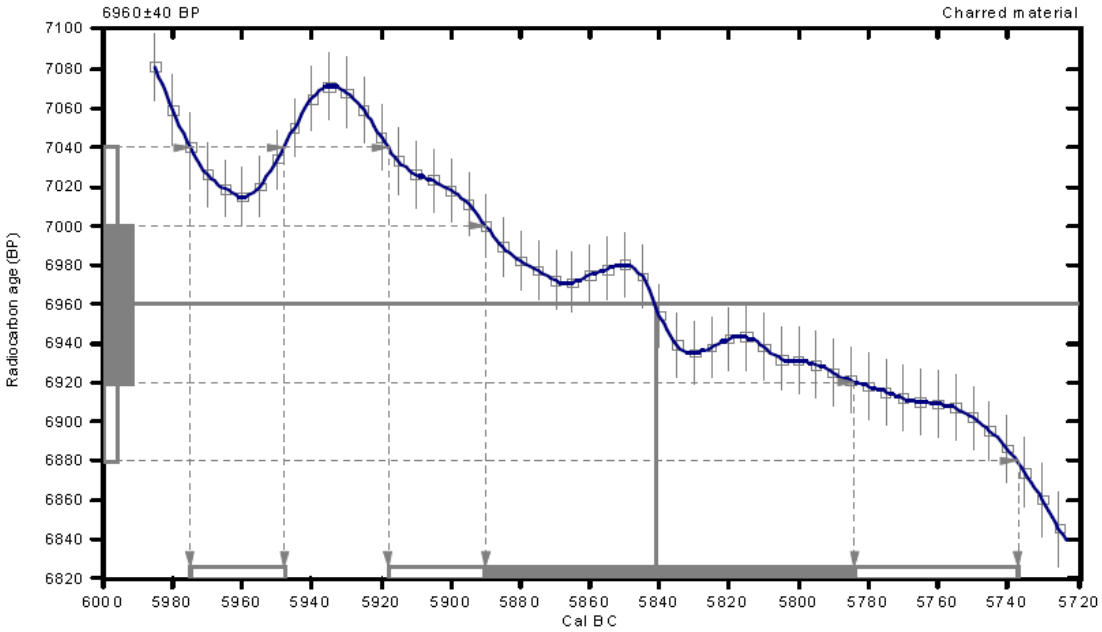
Conventional radiocarbon age: **6960±40 BP**

2 Sigma calibrated results: **Cal BC 5980 to 5950 (Cal BP 7920 to 7900) and**
(95% probability) **Cal BC 5920 to 5740 (Cal BP 7870 to 7690)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 5840 (Cal BP 7790)

1 Sigma calibrated result: (68% probability) Cal BC 5890 to 5780 (Cal BP 7840 to 7730)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.3:lab. mult=1)

Laboratory number: Beta-313692

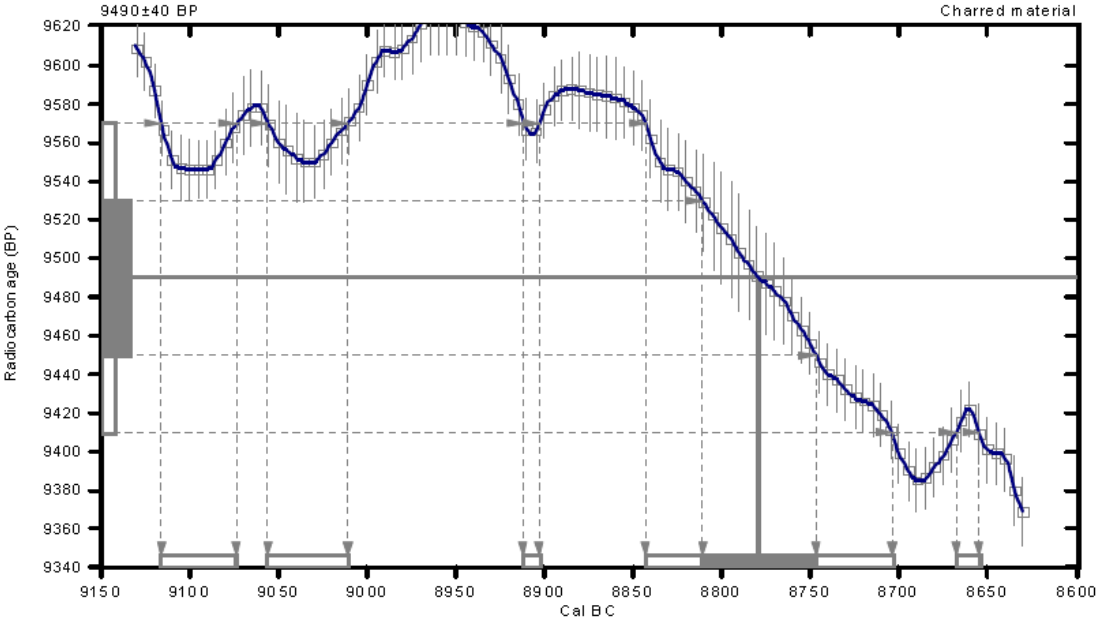
Conventional radiocarbon age: 9490±40 BP

2 Sigma calibrated results: (95% probability)
Cal BC 9120 to 9070 (Cal BP 11070 to 11020) and
Cal BC 9060 to 9010 (Cal BP 11010 to 10960) and
Cal BC 8910 to 8900 (Cal BP 10860 to 10850) and
Cal BC 8840 to 8700 (Cal BP 10790 to 10650) and
Cal BC 8670 to 8660 (Cal BP 10620 to 10600)

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 8780 (Cal BP 10730)

1 Sigma calibrated result: (68% probability) Cal BC 8810 to 8750 (Cal BP 10760 to 10700)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

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Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24:lab. mult=1)

Laboratory number: **Beta-313693**

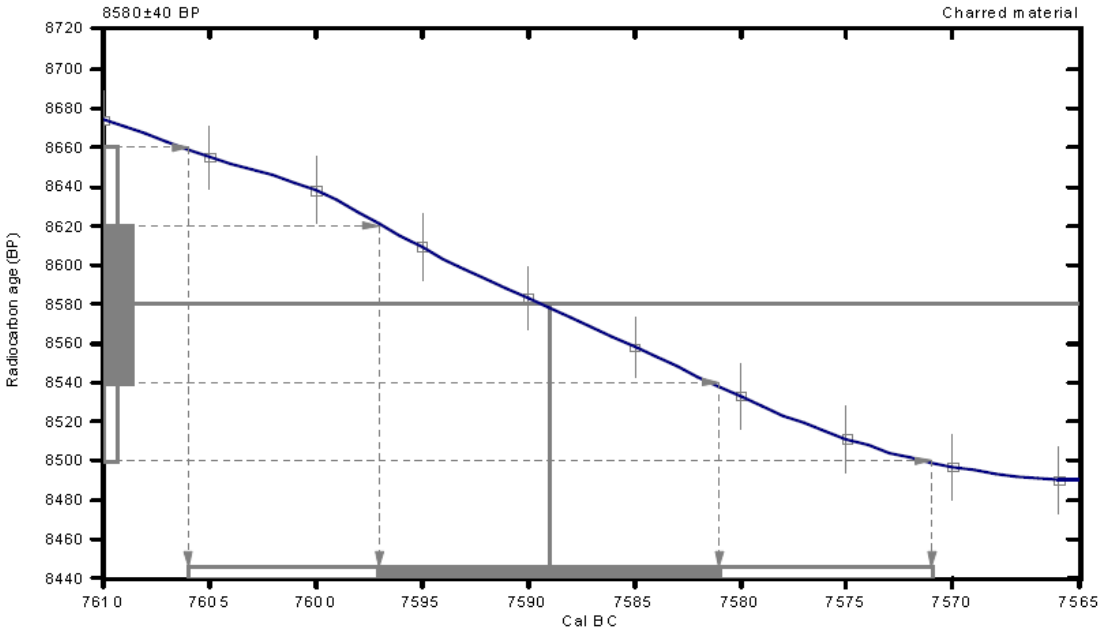
Conventional radiocarbon age: **8580±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 7610 to 7570 (Cal BP 9560 to 9520)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 7590 (Cal BP 9540)

1 Sigma calibrated result: (68% probability) Cal BC 7600 to 7580 (Cal BP 9550 to 9530)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.2:lab. mult=1)

Laboratory number: **Beta-313694**

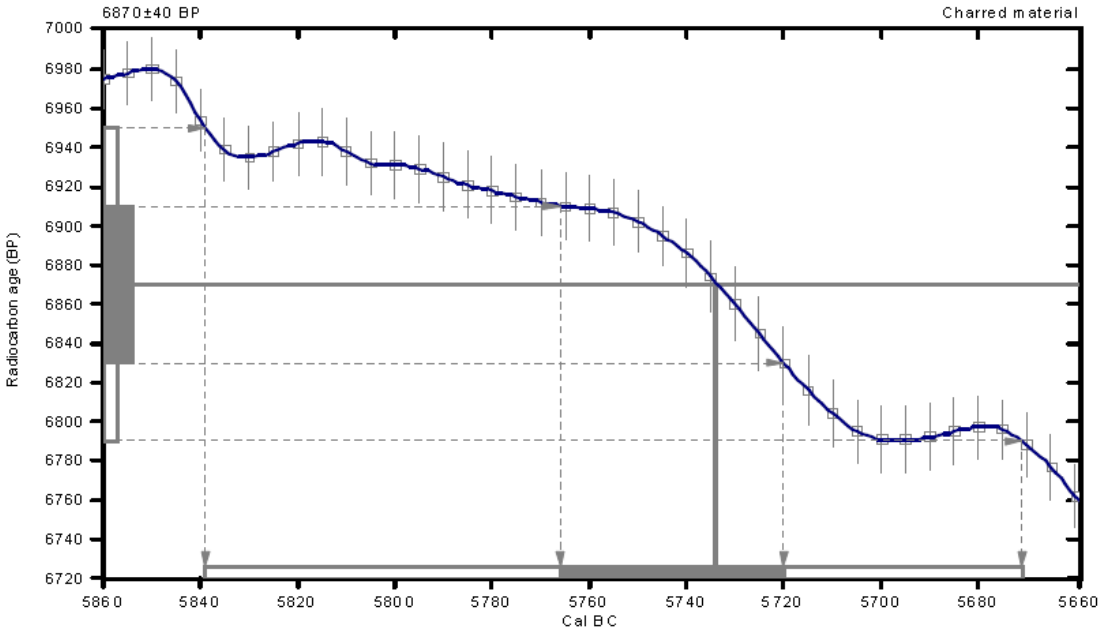
Conventional radiocarbon age: **6870±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 5840 to 5670 (Cal BP 7790 to 7620)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 5730 (Cal BP 7680)

1 Sigma calibrated result: (68% probability) Cal BC 5770 to 5720 (Cal BP 7720 to 7670)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-22.7:lab. mult=1)

Laboratory number: **Beta-313695**

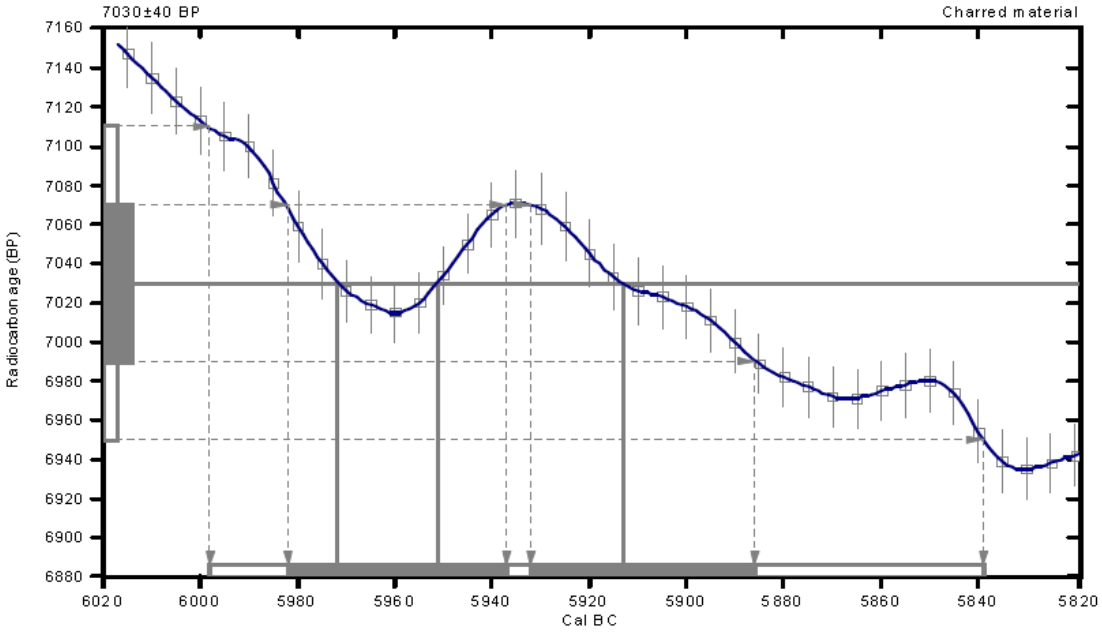
Conventional radiocarbon age: **7030±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 6000 to 5840 (Cal BP 7950 to 7790)**

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal BC 5970 (Cal BP 7920) and Cal BC 5950 (Cal BP 7900) and Cal BC 5910 (Cal BP 7860)

1 Sigma calibrated results: (68% probability) Cal BC 5980 to 5940 (Cal BP 7930 to 7890) and Cal BC 5930 to 5890 (Cal BP 7880 to 7840)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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Appendix 4d

Beta Analytic Laboratory Report – December, 2012

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Tel: 305 667 5167
Fax: 305 663 0964
Beta@radiocarbon.com
www.radiocarbon.com

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Darden Hood
President

Ronald Hatfield
Christopher Patrick
Deputy Directors

December 6, 2012

Dr. Robert Lee Sappington
University of Idaho
Department of Sociology/Anthropology/Justice Studies
P.O. Box 441110
Moscow, ID 83844-1110
USA

RE: Radiocarbon Dating Results For Samples 10CW34 88.11.3, 10CW34 94.9.9, 10CW34 97.12.2, 10CW34 100.19.1, 10CW34 104.13.4, 10CW34 105.9.12

Dear Dr. Sappington:

Enclosed are the radiocarbon dating results for six samples recently sent to us. They each provided plenty of carbon for accurate measurements and all the analyses proceeded normally. As usual, the method of analysis is listed on the report with the results and calibration data is provided where applicable.

As always, no students or intern researchers who would necessarily be distracted with other obligations and priorities were used in the analyses. We analyzed them with the combined attention of our entire professional staff.

If you have specific questions about the analyses, please contact us. We are always available to answer your questions.

The cost of analysis was previously invoiced. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

Sincerely,

Darden Hood
Digital signature on file

BETA ANALYTIC INC.
DR. M.A. TAMERS and MR. D.G. HOOD
4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305-667-5167 FAX:305-663-0964
beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Dr. Robert Lee Sappington — **Report Date: 12/6/2012**

University of Idaho — **Material Received: 11/30/2012**

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 336970	7620 +/- 30 BP	-22.6 o/oo	7660 +/- 30 BP
SAMPLE : 10CW34 88.11.3			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 6590 to 6580 (Cal BP 8540 to 8530) AND Cal BC 6570 to 6540 (Cal BP 8520 to 8490) Cal BC 6530 to 6450 (Cal BP 8480 to 8400)			
Beta - 336971	7900 +/- 40 BP	-23.3 o/oo	7930 +/- 40 BP
SAMPLE : 10CW34 94.9.9			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 7040 to 6650 (Cal BP 8990 to 8600)			
Beta - 336972	7700 +/- 40 BP	-23.3 o/oo	7730 +/- 40 BP
SAMPLE : 10CW34 97.12.2			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 6640 to 6470 (Cal BP 8590 to 8420)			
Beta - 336973	11790 +/- 40 BP	-25.5 o/oo	11780 +/- 40 BP
SAMPLE : 10CW34 100.19.1			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid			
2 SIGMA CALIBRATION : Cal BC 11790 to 11540 (Cal BP 13740 to 13490)			

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

BETA ANALYTIC INC.
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beta@radiocarbon.com

REPORT OF RADIOCARBON DATING ANALYSES

Dr. Robert Lee Sappington **Report Date: 12/6/2012**

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 336974 SAMPLE : 10CW34 104.13.4 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 6430 to 6240 (Cal BP 8380 to 8190)	7450 +/- 40 BP	-23.2 o/oo	7480 +/- 40 BP
Beta - 336975 SAMPLE : 10CW34 105.9.12 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal BC 2840 to 2810 (Cal BP 4790 to 4760) AND Cal BC 2670 to 2560 (Cal BP 4620 to 4510) Cal BC 2530 to 2490 (Cal BP 4480 to 4440)	4060 +/- 30 BP	-24.5 o/oo	4070 +/- 30 BP

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "*". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-22.6:lab. mult=1)

Laboratory number: **Beta-336970**

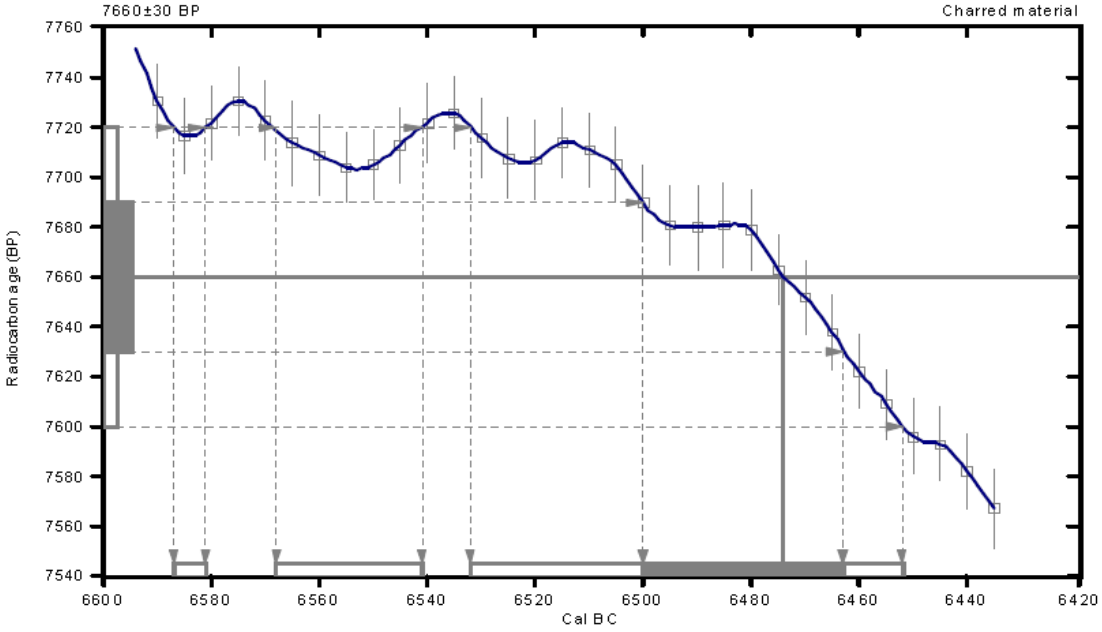
Conventional radiocarbon age: **7660±30 BP**

2 Sigma calibrated results: (95% probability) **Cal BC 6590 to 6580 (Cal BP 8540 to 8530) and Cal BC 6570 to 6540 (Cal BP 8520 to 8490) and Cal BC 6530 to 6450 (Cal BP 8480 to 8400)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 6470 (Cal BP 8420)

1 Sigma calibrated result: (68% probability) Cal BC 6500 to 6460 (Cal BP 8450 to 8410)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.3:lab. mult=1)

Laboratory number: **Beta-336971**

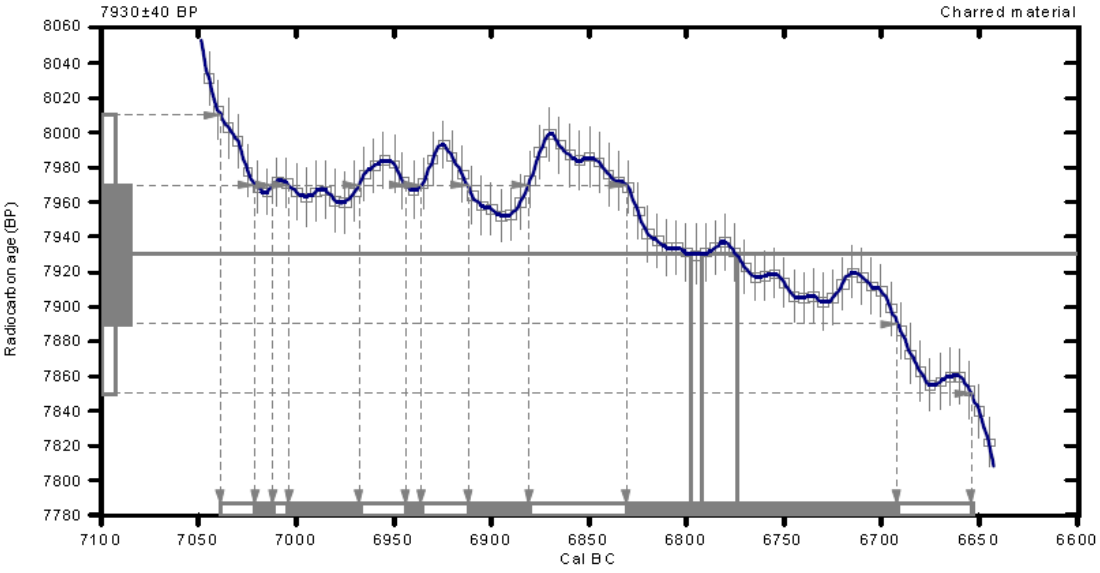
Conventional radiocarbon age: **7930±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 7040 to 6650 (Cal BP 8990 to 8600)**

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal BC 6800 (Cal BP 8750) and
Cal BC 6790 (Cal BP 8740) and
Cal BC 6770 (Cal BP 8720)

1 Sigma calibrated results: (68% probability) Cal BC 7020 to 7010 (Cal BP 8970 to 8960) and
Cal BC 7000 to 6970 (Cal BP 8950 to 8920) and
Cal BC 6940 to 6940 (Cal BP 8890 to 8890) and
Cal BC 6910 to 6880 (Cal BP 8860 to 8830) and
Cal BC 6830 to 6690 (Cal BP 8780 to 8640)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.3:lab. mult=1)

Laboratory number: **Beta-336972**

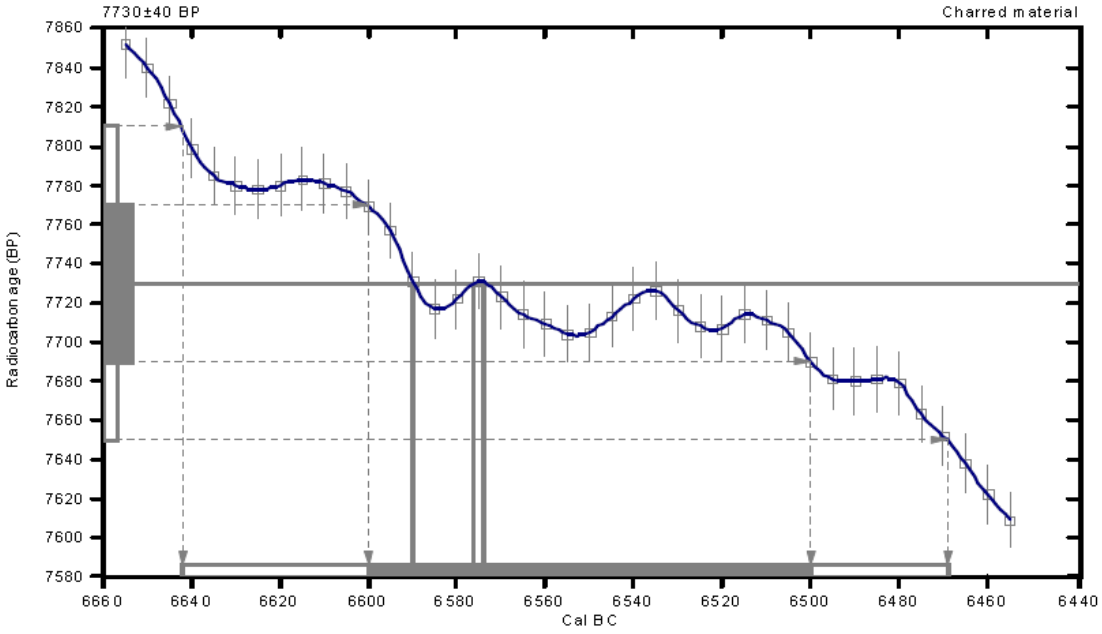
Conventional radiocarbon age: **7730±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 6640 to 6470 (Cal BP 8590 to 8420)**

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal BC 6590 (Cal BP 8540) and
Cal BC 6580 (Cal BP 8530) and
Cal BC 6570 (Cal BP 8520)

1 Sigma calibrated result: (68% probability) Cal BC 6600 to 6500 (Cal BP 8550 to 8450)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.5:lab. mult=1)

Laboratory number: **Beta-336973**

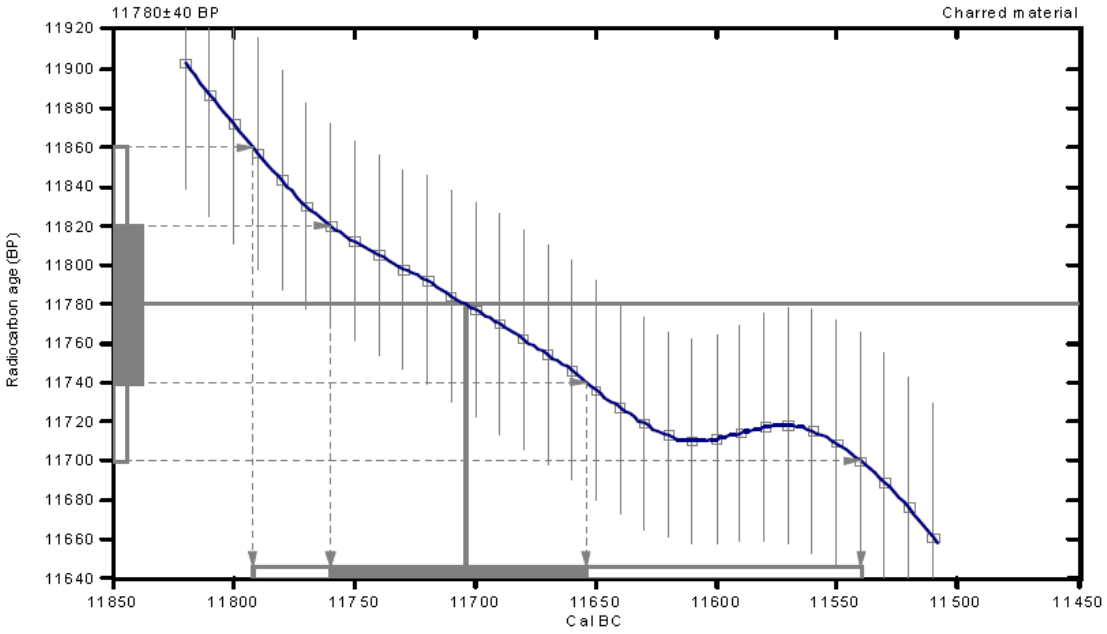
Conventional radiocarbon age: **11780±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 11790 to 11540 (Cal BP 13740 to 13490)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 11700 (Cal BP 13650)

1 Sigma calibrated result: (68% probability) Cal BC 11760 to 11650 (Cal BP 13710 to 13600)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.2:lab. mult=1)

Laboratory number: **Beta-336974**

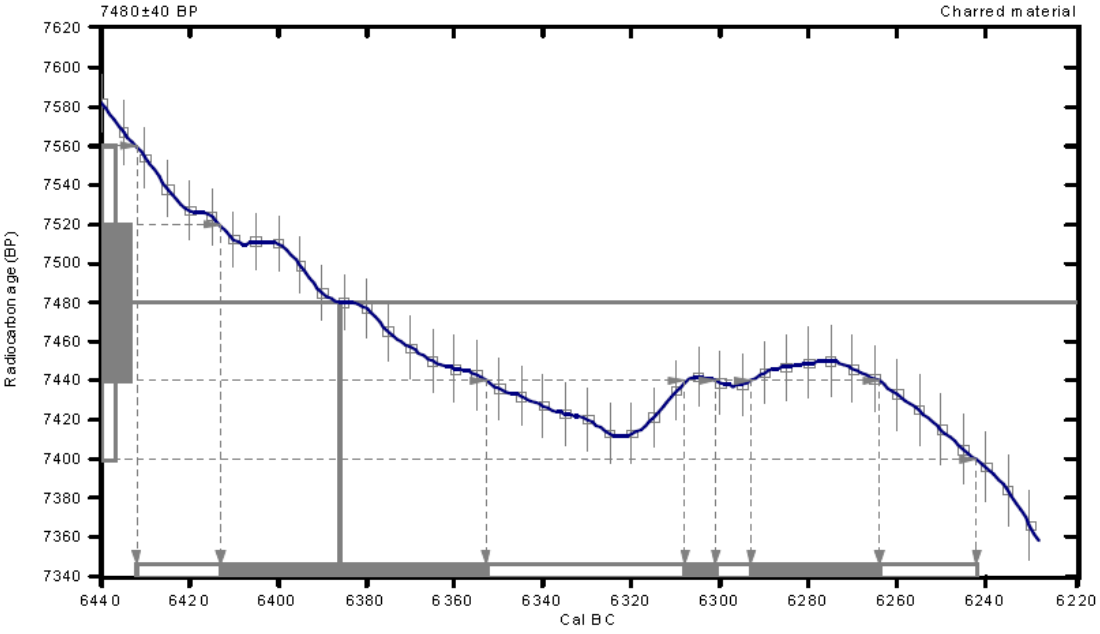
Conventional radiocarbon age: **7480±40 BP**

2 Sigma calibrated result: (95% probability) **Cal BC 6430 to 6240 (Cal BP 8380 to 8190)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 6390 (Cal BP 8340)

1 Sigma calibrated results: (68% probability) Cal BC 6410 to 6350 (Cal BP 8360 to 8300) and Cal BC 6310 to 6300 (Cal BP 8260 to 8250) and Cal BC 6290 to 6260 (Cal BP 8240 to 8210)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.5:lab. mult=1)

Laboratory number: **Beta-336975**

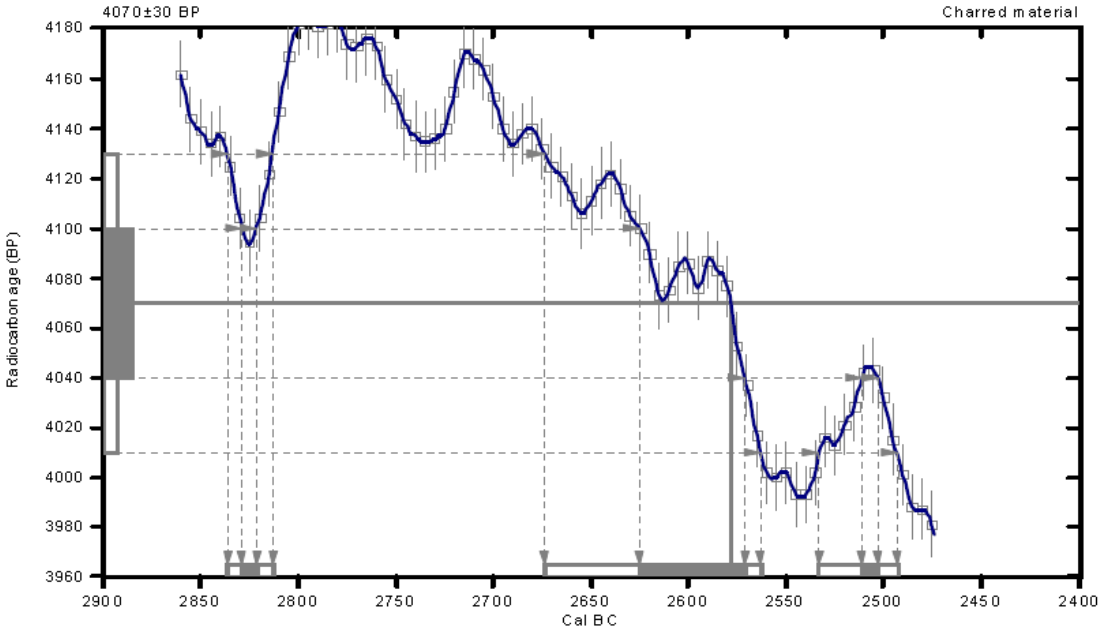
Conventional radiocarbon age: **4070±30 BP**

2 Sigma calibrated results: **Cal BC 2840 to 2810 (Cal BP 4790 to 4760) and**
(95% probability) **Cal BC 2670 to 2560 (Cal BP 4620 to 4510) and**
Cal BC 2530 to 2490 (Cal BP 4480 to 4440)

Intercept data

Intercept of radiocarbon age with calibration curve: Cal BC 2580 (Cal BP 4530)

1 Sigma calibrated results: Cal BC 2830 to 2820 (Cal BP 4780 to 4770) and
(68% probability) Cal BC 2620 to 2570 (Cal BP 4580 to 4520) and
Cal BC 2510 to 2500 (Cal BP 4460 to 4450)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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Appendix 5

Results of X-Ray Fluorescence Analysis, Obsidian and Vitrophyre, 2010-2012

By

Craig E. Skinner

Northwest Research Obsidian Studies Laboratory

Corvallis, OR

Appendix 5

Adjustments, Changes, and Unlisted Items for NWROSL Results Report

Adjustments and changes to catalogue designations:

Page No.	Specimen No.	Adjustments/Changes
A-2	22	Catalogue no. correction: 1981TP-1.4.1
A-2	23	Catalogue no. correction: 1981TP-1.5.2
A-2	32	Catalogue no. changed due to termination of a feature: 36.8.9
A-2	33	Catalogue no. correction: T2.2.1
A-2	27	13.12.2 (reported as unknown obsidian) is catalogued as vitrophyre
A-2	29	20.9.2a (reported as unknown obsidian) is catalogued as vitrophyre
A-2	30	25.9.2 (reported as unknown obsidian) is catalogued as vitrophyre

Unlisted Items which were submitted but too small for analysis:

Page No.	Specimen No.	Catalogue No.	Material
A-1	1	4.2.2	O
A-1	7	22.4.2a	O
A-1	8	22.4.2b	O
A-1	10	25.8.5b	O
A-2	28	16.12.1	V
A-2	31	2010misc.42a	V
A-3	6	74.8.2b	O
A-4	3	85.4.2	O
A-4	13	97.7.2	O
Total Unlisted		**N = 9**	

Results of X-Ray Fluorescence Analysis

Northwest Research Obsidian Studies Laboratory

Table A-1. Results of XRF Studies: Kelly Forks Work Center Site (10-CW-34), Clearwater County, Idaho

Site	Specimen No.	Catalog No.	Trace Element Concentrations									Ratios		Geochemical Source
			Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe^2O^{3T}	Fe:Mn	Fe:Ti	
10-CW-34	2	5.7.2	119	130	68	297	18	NM	NM	NM	NM	58.6	63.3	Indian Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	3	18.3.2	115	117	54	261	15	NM	NM	NM	NM	60.2	46.8	Indian Creek *
			± 5	9	4	7	2	NM	NM	NM	NM			
10-CW-34	4	19.9.3	234	20	43	69	36	NM	NM	NM	NM	6.8	21.4	Timber Butte *
			± 5	9	4	7	2	NM	NM	NM	NM			
10-CW-34	5	20.1.2	109	125	64	270	16	NM	NM	NM	NM	57.7	33.8	Indian Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	6	21.2.3	217	20	45	64	36	NM	NM	NM	NM	6.9	42.6	Timber Butte *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	9	25.8.5a	108	30	52	107	11	NM	NM	NM	NM	20.3	18.6	Glass Buttes 1? *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	11	29.2.4	105	156	30	94	13	NM	NM	765	NM	15.9	82.3	Gregory Creek *
			± 4	9	4	7	2	NM	NM	26	NM			
10-CW-34	12	30.7.3	217	19	40	63	37	NM	NM	NM	NM	7.3	28.6	Timber Butte *
			± 5	9	4	7	2	NM	NM	NM	NM			
10-CW-34	13	30.9.2	304	7	212	296	293	NM	NM	4	NM	51.6	123.6	Big Southern Butte *
			± 5	9	4	7	2	98	32	23	0.14			
10-CW-34	14	35.11.2	98	173	24	78	12	NM	NM	NM	NM	14.6	31.1	Gregory Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	15	36.10.7	93	164	23	88	12	NM	NM	NM	NM	13.6	92.6	Gregory Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	16	39.10.2	103	117	57	270	16	NM	NM	NM	NM	66.3	73.0	Indian Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	17	DA1.1.4a	81	144	22	76	12	NM	NM	NM	NM	12.1	39.4	Gregory Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	18	DA1.1.4b	97	162	24	80	15	NM	NM	NM	NM	13.2	40.2	Gregory Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	19	DA1.6.1	107	122	61	258	16	NM	NM	NM	NM	66.6	44.7	Indian Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			

All trace element values reported in parts per million; ± = analytical uncertainty estimate (in ppm). Iron content reported as weight percent oxide.
NA = Not available; ND = Not detected; NM = Not measured; * = Small sample; FGV = Fine-grained volcanic specimen.

Northwest Research Obsidian Studies Laboratory

Table A-1. Results of XRF Studies: Kelly Forks Work Center Site (10-CW-34), Clearwater County, Idaho

Site	Specimen No.	Catalog No.	Trace Element Concentrations									Ratios		Geochemical Source
			Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe^2O^{3T}	Fe:Mn	Fe:Ti	
10-CW-34	20	SB.21-25.2	102	169	25	75	15	NM	NM	NM	NM	12.0	24.9	Gregory Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	21	SB.31-35.2	115	128	61	268	18	NM	NM	NM	NM	64.1	58.6	Indian Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	22	1081TP-1.4.1	115	124	62	280	17	NM	NM	NM	NM	56.5	62.3	Indian Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	23	1081TP-1.5.2	88	161	26	79	15	NM	NM	NM	NM	13.4	64.0	Gregory Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	24	T2.3.1	167	8	34	139	16	NM	NM	NM	NM	59.6	53.6	Montana Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	25	8.1.2a	206	7	26	159	18	NM	NM	NM	NM	32.7	57.1	Montana Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	26	13.11.2	186	9	25	151	20	NM	NM	NM	NM	32.4	61.1	Montana Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	27	13.12.2	157	50	27	161	15	NM	NM	NM	NM	51.4	66.4	Unknown Obsidian A *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	29	20.9.2a	167	53	29	157	15	NM	NM	NM	NM	42.2	25.6	Unknown Obsidian A *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	30	25.9.2	165	47	29	150	14	NM	NM	NM	NM	45.8	31.4	Unknown Obsidian A *
			± 5	9	4	7	2	NM	NM	NM	NM			
10-CW-34	32	F11.36.8.3	242	18	44	63	34	NM	NM	NM	NM	7.0	23.6	Timber Butte *
			± 5	9	4	7	2	NM	NM	NM	NM			
10-CW-34	33	2.2.1	150	6	32	136	12	812	154	11	1.05	56.1	43.0	Unknown Vitrophyre A
			± 4	9	4	7	2	98	32	23	0.14			
10-CW-34	34	3.1.2a	164	7	20	153	20	1059	335	44	1.32	32.8	40.9	Unknown Vitrophyre A
			± 4	9	4	7	2	99	32	25	0.14			
10-CW-34	35	8.10.2	194	7	17	176	24	NM	NM	NM	NM	57.3	74.3	Unknown Vitrophyre A *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	1	49.9a	193	18	42	63	36	178	409	44	0.27	7.4	59.0	Timber Butte
			± 4	9	4	7	2	97	33	26	0.14			

All trace element values reported in parts per million; ± = analytical uncertainty estimate (in ppm). Iron content reported as weight percent oxide.
NA = Not available; ND = Not detected; NM = Not measured; * = Small sample; FGV = Fine-grained volcanic specimen.

Northwest Research Obsidian Studies Laboratory

Table A-1. Results of XRF Studies: Kelly Forks Work Center Site (10-CW-34), Clearwater County, Idaho

Site	Specimen No.	Catalog No.	Trace Element Concentrations									Ratios		Geochemical Source
			Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe^2O^{3T}	Fe:Mn	Fe:Ti	
10-CW-34	2	59.8.3	216	55	49	321	59	NM	NM	NM	NM	NM	NM	Bear Gulch
			± 5	9	4	7	2	NM	NM	NM	NM			
10-CW-34	3	73.11.2	238	20	45	62	31	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 5	9	4	7	2	NM	NM	NM	NM			
10-CW-34	4	60.8.2	105	175	21	89	11	NM	NM	NM	NM	NM	NM	Gregory Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	5	74.8/2a	235	23	43	67	31	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 5	9	4	7	2	NM	NM	NM	NM			
10-CW-34	7	50.7.2	230	20	43	63	38	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 5	9	4	7	2	NM	NM	NM	NM			
10-CW-34	8	50.10.2	241	21	42	65	34	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 5	9	4	7	2	NM	NM	NM	NM			
10-CW-34	9	67.11.2	244	24	44	67	36	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	10	57.9.2	221	22	40	62	29	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 5	9	4	7	2	NM	NM	NM	NM			
10-CW-34	11	53.4.2	212	21	43	68	34	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 5	9	4	7	2	NM	NM	NM	NM			
10-CW-34	12	64.3.2	227	21	43	60	32	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 5	9	4	7	2	NM	NM	NM	NM			
10-CW-34	13	68.7.4	247	21	40	61	34	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 5	9	4	7	2	NM	NM	NM	NM			
10-CW-34	14	46.8.2	222	19	46	56	26	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 5	9	4	7	2	NM	NM	NM	NM			
10-CW-34	15	48.2.2	102	176	26	80	9	NM	NM	NM	NM	NM	NM	Gregory Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	16	48.4.2	118	133	61	288	16	NM	NM	NM	NM	NM	NM	Indian Creek *
			± 4	9	4	7	2	NM	NM	NM	NM			
10-CW-34	17	48.9.2	188	17	39	64	31	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 4	9	4	7	2	NM	NM	NM	NM			

All trace element values reported in parts per million; ± = analytical uncertainty estimate (in ppm). Iron content reported as weight percent oxide.
NA = Not available; ND = Not detected; NM = Not measured; * = Small sample; FGV = Fine-grained volcanic specimen.

Northwest Research Obsidian Studies Laboratory

Table A-1. Results of XRF Studies: Kelly Forks Work Center Site (10-CW-34), Clearwater County, Idaho

Site	Specimen No.	Catalog No.	Trace Element Concentrations									Ratios		Geochemical Source
			Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	Fe^2O^{3T}	Fe:Mn	Fe:Ti	
10-CW-34	1	80.2.2	100	172	25	75	10	NM	NM	NM	NM	NM	NM	Gregory Creek *
			± 2	2	1	2	1	NM	NM	NM	NM			
10-CW-34	2	84.12.2	217	18	48	54	40	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 1	0	1	1	1	NM	NM	NM	NM			
10-CW-34	4	86.8.2	225	19	41	51	32	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 2	1	1	1	1	NM	NM	NM	NM			
10-CW-34	5	87.6.2	128	143	69	297	19	NM	NM	NM	NM	NM	NM	Indian Creek *
			± 1	1	1	2	1	NM	NM	NM	NM			
10-CW-34	6	89.6.2	177	46	48	312	62	NM	NM	NM	NM	NM	NM	Bear Gulch *
			± 1	1	1	1	1	NM	NM	NM	NM			
10-CW-34	7	91.11.2	207	18	41	48	32	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 2	1	1	1	1	NM	NM	NM	NM			
10-CW-34	8	92.9.2	130	61	23	98	8	NM	NM	NM	NM	NM	NM	Whitewater Ridge *
			± 2	1	1	2	1	NM	NM	NM	NM			
10-CW-34	9	93.1.2	92	164	23	72	12	NM	NM	NM	NM	NM	NM	Gregory Creek *
			± 2	2	1	1	1	NM	NM	NM	NM			
10-CW-34	10	95.10.2a	91	167	25	78	11	NM	NM	NM	NM	NM	NM	Gregory Creek *
			± 1	1	1	1	1	NM	NM	NM	NM			
10-CW-34	11	95.10.2b	215	16	42	49	34	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 2	1	1	1	1	NM	NM	NM	NM			
10-CW-34	12	96.3.2	246	20	44	52	35	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 2	1	1	1	1	NM	NM	NM	NM			
10-CW-34	14	97.10.2	363	2	217	333	289	NM	NM	NM	NM	NM	NM	Big Southern Butte *
			± 3	1	2	2	2	NM	NM	NM	NM			
10-CW-34	15	104.10.2	197	51	45	298	56	NM	NM	NM	NM	NM	NM	Bear Gulch *
			± 2	1	1	2	2	NM	NM	NM	NM			
10-CW-34	16	105.8.2	91	167	24	76	12	NM	NM	NM	NM	NM	NM	Gregory Creek *
			± 1	1	1	1	1	NM	NM	NM	NM			
10-CW-34	17	105.9.2	222	19	48	54	38	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 2	1	1	1	1	NM	NM	NM	NM			

All trace element values reported in parts per million; ± = analytical uncertainty estimate (in ppm). Iron content reported as weight percent oxide.
NA = Not available; ND = Not detected; NM = Not measured; * = Small sample; FGV = Fine-grained volcanic specimen.

Northwest Research Obsidian Studies Laboratory

Table A-1. Results of XRF Studies: Kelly Forks Work Center Site (10-CW-34), Clearwater County, Idaho

Site	Specimen No.	Catalog No.	Trace Element Concentrations									Ratios		Geochemical Source
			Rb	Sr	Y	Zr	Nb	Ti	Mn	Ba	$Fe^{2}O^{3T}$	Fe:Mn	Fe:Ti	
10-CW-34	18	105.11.2	351	2	221	339	301	NM	NM	NM	NM	NM	NM	Big Southern Butte *
			± 2	0	2	2	2	NM	NM	NM	NM			
10-CW-34	19	107.8.2	358	3	213	327	291	NM	NM	NM	NM	NM	NM	Big Southern Butte *
			± 3	1	2	2	2	NM	NM	NM	NM			
10-CW-34	20	107.9.2	372	2	226	342	297	NM	NM	NM	NM	NM	NM	Big Southern Butte *
			± 2	1	2	2	2	NM	NM	NM	NM			
10-CW-34	21	107.11.2	232	20	46	51	36	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 2	1	1	1	1	NM	NM	NM	NM			
10-CW-34	22	108.8.2	225	19	41	47	32	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 2	1	1	1	2	NM	NM	NM	NM			
10-CW-34	23	110.4.2	226	19	47	56	38	NM	NM	NM	NM	NM	NM	Timber Butte *
			± 2	1	1	1	1	NM	NM	NM	NM			

All trace element values reported in parts per million; ± = analytical uncertainty estimate (in ppm). Iron content reported as weight percent oxide.
NA = Not available; ND = Not detected; NM = Not measured; * = Small sample; FGV = Fine-grained volcanic specimen.

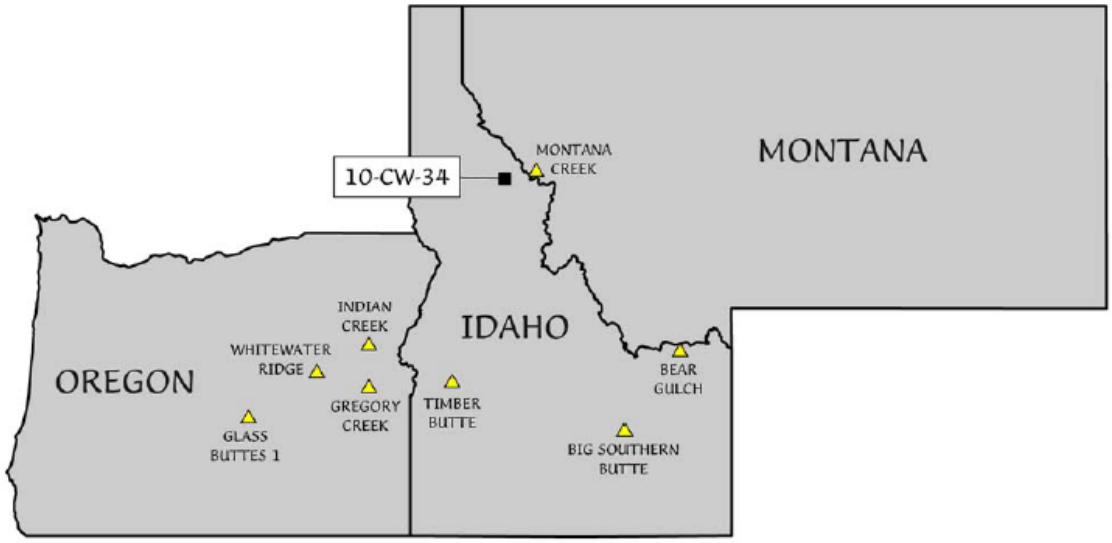


Figure 1. Locations of the project site and the identified sources of obsidian.

Table 1. Summary of results of trace element analysis of obsidian artifacts from 10-CW-34.

PROJECT SITE	N=	PERCENTAGE
Bear Gulch	3	4.5
Big Southern Butte	5	7.6
Glass Buttes 1?	1	1.5
Gregory Creek	13	19.7
Indian Creek	9	13.6
Montana Creek	3	4.5
Timber Butte	25	37.9
Unknown Obsidian A	3	4.5
Unknown Vitrophyre A	3	4.5
Whitewater Ridge	1	1.5
TOTAL	**66**	**99.8**

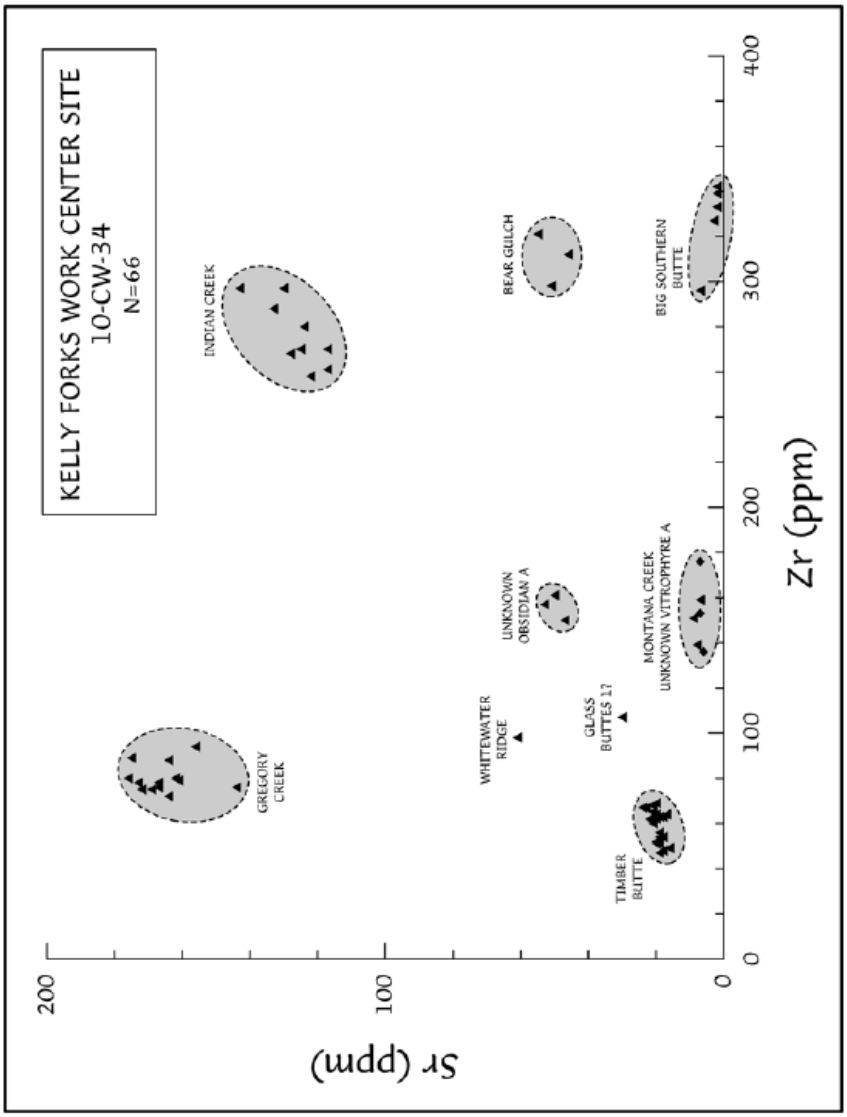


Figure 2. Scatterplot of zirconium (Zr) plotted versus strontium (Sr) for all analyzed artifacts.

Appendix 6a

Results of Protein Residue Analysis, March, 2011

By

Laboratory of Archaeological Science

California State University

Bakersfield, CA

Protein Residue Analysis of 34 Artifacts and One Soil Sample from Kelly Forks Work Center Site on the Clearwater National Forest

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(LAS-289)

Introduction

The use of chemical and molecular biological techniques in the analysis of archaeological materials can provide significant new information for the interpretation of their use. The identification of organic residue from lithic and ceramics artifacts, coprolites and soils have provided archaeologists with specific data regarding prehistoric exploitation of animals and plants. Although ancient protein residues may not be preserved in their original form, linear epitopes are generally conserved which can be identified by immunological methods (Abbas et al. 1994).

Immunological methods have been used to identify plant and animal residues on flaked and groundstone lithic artifacts (Allen et al. 1995; Gerlach et al. 1996; Henrikson et al. 1998; Hyland et al. 1990; Kooyman et al. 1992; Newman 1990, 1995; Petraglia et al. 1996; Shanks et al.1999; Yohe et al. 1991) and in Chumash paint pigment (Scott et al. 1996). Plant remains on artifacts also been identified through chemical (opal phytoliths), and morphological (use-wear), studies (Hardy and Garufi 1998; Jahren et al. 1997, Sobolik 1996). Plant and animal residues on ceramic artifacts have been identified through the use of gas-liquid chromatography, high performance liquid chromatography and mass spectrometry (Bonfield and Heron 1995; Evershed et al. 1992; Evershed and Tuross, 1996; Heron et al. 1991, Patrick et al. 1985). Serological methods have been used to determine blood groups in skeletal and soft tissue remains (Heglar 1972; Lee et al. 1989) and in the detection of hemoglobin from 4500-year-old bones (Ascenzi et al. 1985). Human leukocyte antigen (HLA) and deoxyribonucleic acid (DNA) determinations made on human and animal skeletal and soft tissue remains have demonstrated genetic relationships and molecular evolutionary distances (Hänni et al. 1995; Hansen and Gurtler 1983; Lowenstein 1985, 1986; Pääbo 1985, 1986, 1989; Pääbo et al. 1989). Successful identification of residues on stone tools, dated between 35-60,000 B.P., has been made by DNA analysis (Hardy et al. 1997), while recently, residues on surgical implements from the American Civil War were identified by immunological and DNA analysis (Newman et al. 1998). A recent study demonstrated the viability of identifiable immunoglobulin G in 1.6 million-year-old fossil bones from Venta Micena, Spain, (Torres et al. 2002). Horse exploitation was identified by immunological analysis of residues retained on Clovis points dated to ca. 11,200 B.P. (Kooyman et al. 2001).

The use of forensic techniques in the investigation of archaeological materials is appropriate as both disciplines deal with residues that have undergone changes, either deliberate or natural. Criminals habitually endeavor to remove bloodstains by such means as laundering, scrubbing with bleach, etc. yet; such degraded samples are still identified by immunological methods (Lee and De Forest 1976; Milgrom and Campbell 1970; Shinomiya et al. 1978, among others). Similarly it has been shown that immunological methods can be successfully applied to ancient human cremations (Cattaneo et al. 1992). Forensic wildlife laboratories use immunological techniques in their investigation of hunting violations and illegal trade, often from contaminated evidence (Bartlett and Davidson 1992; Guglich et al. 1993; Mardini 1984; McClymont et al. 1982). Immunological methods are also used to test the purity of food products such as canned luncheon meat and sausage, products which have undergone considerable degradation (Ashoor et al. 1988; Berger et al. 1988; King 1984). Thus the age and degradation of protein does not preclude detection (Gaensslen 1983:225).

Materials and Methods

The method of analysis used in this study of archaeological residues is cross-over immunoelectrophoresis (CIEP). Prior to the introduction of DNA fingerprinting this test was used by forensic laboratories to identify trace residues from crime scenes. Minor adaptations to the original method were made following procedures used by the Royal Canadian Mounted Police Serology Laboratory, Ottawa (1983). The solution used to remove possible residues is five percent ammonium hydroxide which is the most effective extractant for old and denatured proteins without interfering with subsequent testing (Dorrill and Whitehead 1979; Kind and Cleevely 1969). Artifacts are placed in shallow plastic dishes and 0.5 ml of five percent ammonia solution applied directly to each. Initial disaggregation is carried out by floating the dish and contents in an ultrasonic cleaning bath for five minutes. Extraction is continued by placing the dish and contents on a rotating mixer for thirty minutes. For large ground stone items, such as metates, stone bowls, etc., the ammonium hydroxide is applied directly to the worked surface, agitated periodically with a sterile orangewood stick, and allowed to sit for one half hour. The resulting solution is drawn off, placed in a numbered, sterile plastic vial and stored at -20°C prior to testing. In the case of soil samples, one gram is placed in a vial and 0.5 ml of 1 M Tris buffer solution ($H_2NC[CH_2OH]_3$) is used instead of ammonium hydroxide. The vial is placed in a rotating mixer overnight. The resulting solution is drawn off, placed in a numbered, vial and stored at -20°C prior to testing.

A series of paired wells is punched into an agarose gel. Approximately 2 µl. of antiserum is placed into one well and the same amount of the unknown sample extract is placed in the other. An electric current is then passed through the gel. The antiserum and unknown sample migrate through the gel and come into contact. If there is protein in the unknown which corresponds with the antiserum, an antigen-antibody reaction occurs and the protein precipitates out in a specific pattern. The precipitant is detected when the gel is pressed, dried and stained. Control positives are run simultaneously with all the unknown samples. Sterile equipment and techniques are used throughout the analysis.

The Samples

Thirty-four artifacts and one soil sample were submitted for immunological analysis by the University of Idaho. Residue was removed from the artifacts as discussed above. The residue was tested against a suite of plant and animal antisera (Table 1). Animal antisera provided by Cappel Research and Lampire Biomedical, and plant antisera produced at the University of Calgary, provide family level identification only. The relationship of antisera to some of the possible species identified is shown in Table 2.

Results

Thirteen samples had positive reactions against various antisera. Three artifacts reacted with bovine antiserum, four reacted with guinea pig, three positive reactions with human and seven samples tested positive for rabbit. Twenty-two samples had no positive reaction (Table 3). The absence of identifiable proteins on an artifact may be due to poor preservation of protein, insufficient protein, or that they were not in contact with any of the organisms included in the available antisera.

TABLE 1: ANTISERA USED IN ANALYSIS

Animal Antiserum	Source	Plant Antiserum	Source
Alligator	Cappel Research	Amaranth	University of Calgary
Bear	"	Camas	"
Bovine	"	Capparid	"
Camel	Lampire Biomedical	Mallow	"
Cat	Cappel Research	Mesquite	"
Chicken	"	Walnut	"
Deer	"	Walnut	"
Elephant	Lampire Biomedical		
Horse	"		
Human	Cappel Research		
Rabbit	"		
Rat	"		
Sheep	"		
Swine	"		
Triops	"		
Trout/Salmon	Lampire		

TABLE 2: POSSIBLE SPECIES IDENTIFIED

Antiserum to:	**Reacts with:**
Alligator	alligator, crocodile
Bear	black, grizzly, etc
Bovine	bison, cow, musk ox
Camel	all camelids (New & Old world)
Cat	bobcat, cougar, lynx, etc.
Chicken	quail, grouse, & other gallinaceous fowl
Deer	deer, elk, moose
Elephantidae	elephant, mammoth
Horse	horse, donkey, kiang, etc.
Human	Human
Rabbit	rabbit, hare, pika
Rat	all rat & mouse species
Sheep	bighorn & other sheep
Triops	Triops
Trout	trout and salmon species
Amaranthaceae	amaranth, pigweed, *quelite*, etc.
Camas	camas, wild hyacinth
Capparidaeceae	beeplant, bladderpod, stinkweed, etc.
Malvaceae	Mallows
Mesquite	mesquite, palo verde, other legumes
Walnut	walnut, hickory

TABLE 3: RESULTS

LAS-289 #	Site	Prov/ Inventory Code	Artifact	Results
Soil	Grid-1	13.5.11	Soil Sample	Human
1	Grid-1	5.2.2	Corner-notched point fragment	Human, Rabbit
2	Grid-1	8.9.2	Flake tool	Negative
3	Grid-1	13.8.3	Biface fragment	Rabbit
4	Grid-1	17.3.3	Side-notched (Avonlea) point	Negative
5	Grid-1	18.10.3	Flake tool	Negative
6	Grid-1	22.2.5	Flake tool	Guinea-pig, Rabbit
7	Grid-1	22.5.4	Flake tool	Bovine, Human
8	Grid-1	23.4.2	Flake tool	Rabbit
9	Stockpile Area	20.11.3	Biface fragment	Bovine
10	Stockpile Area	21.1.4	Side-notched point	Bovine, guinea-pig
11	Stockpile Area	21.8.5	Flake tool	Rabbit
12	Stockpile Area	24.8.6	Flake tool	Negative
13	Stockpile Area	25.3.3	Point/preform fragment	Negative
14	Stockpile Area	29.8.5	Flake tool	Negative
15	Stockpile Area	30.8.3	Point/preform fragment	Guinea-pig
16	Stockpile Area	30.10.5	Flake tool	Negative
17	Stockpile Area	31.3.5	Flake tool	Negative
18	Stockpile Area	31.7.5	Cascade point	Negative
19	Stockpile Area	33.2.2	Side-notched point	Negative
20	Stockpile Area	34.2.5	Flake tool	Negative
21	Stockpile Area	37.10.6	Flake tool	Negative
22	Stockpile Area	37.11.5	Flake tool	Negative
23	Stockpile Area	38.2.3	Flake tool	Negative
24	Stockpile Area	38.9.5	Preform	Negative
25	Stockpile Area	38.12.5	Windust point base	Negative
26	Stockpile Area	38.12.7	Flake tool	Guinea-pig
27	Stockpile Area	38.14.3	Flake tool	Rabbit
28	Stockpile Area	39.5.4	Flake tool	Negative
29	Stockpile Area	39.6.4	Side-notched projectile point	Negative
30	Stockpile Area	39.8.5	Flake tool	Rabbit

31	Stockpile Area	39.10.5	Flake tool	Negative
32	Stockpile Area	40.11.2	Flake tool	Negative
33	Stockpile Area	42.9.3	Flake tool	Negative
34	Stockpile Area	42.9.4	Flake tool	Negative

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Appendix 6b

Results of Protein Residue Analysis, August, 2011

By

Laboratory of Archaeological Science

California State University

Bakersfield, CA

Protein Residue Analysis of Thirty-two Artifacts and Two Soil Samples From Kelly Forks Work Center Site (10CW34) In the Clearwater National Forest

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(LAS-305)

Introduction

The use of chemical and molecular biological techniques in the analysis of archaeological materials can provide significant new information for the interpretation of their use. The identification of organic residue from lithic and ceramics artifacts, coprolites and soils have provided archaeologists with specific data regarding prehistoric exploitation of animals and plants. Although ancient protein residues may not be preserved in their original form, linear epitopes are generally conserved which can be identified by immunological methods (Abbas et al. 1994).

Immunological methods have been used to identify plant and animal residues on flaked and groundstone lithic artifacts (Allen et al. 1995; Gerlach et al. 1996; Henrikson et al. 1998; Hyland et al. 1990; Kooyman et al. 1992; Newman 1990, 1995; Petraglia et al. 1996; Shanks et al.1999; Yohe et al. 1991) and in Chumash paint pigment (Scott et al. 1996). Plant remains on artifacts also been identified through chemical (opal phytoliths), and morphological (use-wear), studies (Hardy and Garufi 1998; Jahren et al. 1997, Sobolik 1996). Plant and animal residues on ceramic artifacts have been identified through the use of gas-liquid chromatography, high performance liquid chromatography and mass spectrometry (Bonfield and Heron 1995; Evershed et al. 1992; Evershed and Tuross, 1996; Heron et al. 1991, Patrick et al. 1985). Serological methods have been used to determine blood groups in skeletal and soft tissue remains (Heglar 1972; Lee et al. 1989) and in the detection of hemoglobin from 4500-year-old bones (Ascenzi et al. 1985). Human leukocyte antigen (HLA) and deoxyribonucleic acid (DNA) determinations made on human and animal skeletal and soft tissue remains have demonstrated genetic relationships and molecular evolutionary distances (Hänni et al. 1995; Hansen and Gurtler 1983; Lowenstein 1985, 1986; Pääbo 1985, 1986, 1989; Pääbo et al. 1989). Successful identification of residues on stone tools, dated between 35-60,000 B.P., has been made by DNA analysis (Hardy et al. 1997), while recently, residues on surgical implements from the American Civil War were identified by immunological and DNA analysis (Newman et al. 1998). A recent study demonstrated the viability of identifiable immunoglobulin G in 1.6 million-year-old fossil bones from Venta Micena, Spain, (Torres et al. 2002). Horse exploitation was identified by immunological analysis of residues retained on Clovis points dated to ca. 11,200 B.P. (Kooyman et al. 2001).

The use of forensic techniques in the investigation of archaeological materials is appropriate as both disciplines deal with residues that have undergone changes, either deliberate or natural. Criminals habitually endeavor to remove bloodstains by such means as laundering, scrubbing with bleach, etc. yet; such degraded samples are still identified by immunological methods (Lee and De Forest 1976; Milgrom and Campbell 1970; Shinomiya et al. 1978, among others). Similarly it has been shown that immunological methods can be successfully applied to ancient human cremations (Cattaneo et al. 1992). Forensic wildlife laboratories use immunological techniques in their investigation of hunting violations and illegal trade, often from contaminated evidence (Bartlett and Davidson 1992; Guglich et al. 1993; Mardini 1984; McClymont et al. 1982). Immunological methods are also used to test the purity of food products such as canned luncheon meat and sausage, products which have undergone considerable degradation (Ashoor et al. 1988; Berger et al. 1988; King 1984). Thus the age and degradation of protein does not preclude detection (Gaensslen 1983:225).

Materials and Methods

The method of analysis used in this study of archaeological residues is cross-over immunoelectrophoresis (CIEP). Prior to the introduction of DNA fingerprinting this test was used by forensic laboratories to identify trace residues from crime scenes. Minor adaptations to the original method were made following procedures used by the Royal Canadian Mounted Police Serology Laboratory, Ottawa (1983). The solution used to remove possible residues is five percent ammonium hydroxide which is the most effective extractant for old and denatured proteins without interfering with subsequent testing (Dorrill and Whitehead 1979; Kind and Cleevely 1969). Artifacts are placed in shallow plastic dishes and 0.5 ml of five percent ammonia solution applied directly to each. Initial disaggregation is carried out by floating the dish and contents in an ultrasonic cleaning bath for five minutes. Extraction is continued by placing the dish and contents on a rotating mixer for thirty minutes. For large ground stone items, such as metates, stone bowls, etc., the ammonium hydroxide is applied directly to the worked surface, agitated periodically with a sterile orangewood stick, and allowed to sit for one half hour. The resulting solution is drawn off, placed in a numbered, sterile plastic vial and stored at -20°C prior to testing. In the case of soil samples, one gram is placed in a vial and 0.5 ml of 1 M Tris buffer solution ($H_2NC[CH_2OH]_3$) is used instead of ammonium hydroxide. The vial is placed in a rotating mixer overnight. The resulting solution is drawn off, placed in a numbered, vial and stored at -20°C prior to testing.

A series of paired wells is punched into an agarose gel. Approximately 2 µl. of antiserum is placed into one well and the same amount of the unknown sample extract is placed in the other. An electric current is then passed through the gel. The antiserum and unknown sample migrate through the gel and come into contact. If there is protein in the unknown which corresponds with the antiserum, an antigen-antibody reaction occurs and the protein precipitates out in a specific pattern. The precipitant is detected when the gel is pressed, dried and stained. Control positives are run simultaneously with all the unknown samples. Sterile equipment and techniques are used throughout the analysis.

The Samples

Thirty-two artifacts and two soil samples recovered from Kelly Forks Work Center site (10CW34) on the upper North Fork of the Clearwater River on the Clearwater National Forest were submitted for immunological analysis by Laura Longstaff and Lee Sappington from the University of Idaho. Residue was removed from the artifacts as discussed above. The residues were tested against the suite of plant and animal antisera (Table 1). Animal antisera provided by Cappel Research and Lampire Biomedical, and plant antisera produced at the University of Calgary, provide family level identification only. The relationship of antisera to some of the possible species identified is shown in Table 2.

Results

Six artifacts and two soil samples registered positive reactions with available antisera. Rabbit proteins were found on five artifacts and two soil samples. Two samples reacted with bovine antiserum. Twenty-six samples registered no positive reaction (Table 3). The absence of identifiable proteins on an artifact may be due to poor preservation of protein, insufficient protein, or that they were not in contact with any of the organisms included in the available antisera.

TABLE 1: ANTISERA USED IN ANALYSIS

Animal Antiserum	Source	Plant Antiserum	Source
Bear	"	Agave	University of Calgary
Bovine	"	Amaranth	"
Camel	Lampire Biomedical	Aster	"
Cat	Cappel Research	Capparid	"
Chicken	"	Cedar	"
Deer	"	Chenopod	
Dog	"	Pine	"
Elephant	Lampire Biomedical	Walnut	"
Horse	"		
Human	Cappel Research		
Rabbit	"		
Rat	"		
Sheep	"		
Swine	"		
Trout/Salmon	Lampire		

TABLE 2: POSSIBLE SPECIES IDENTIFIED

Antiserum to:	**Reacts with:**
Bear	Black, grizzly, etc
Bovine	Bison, cow, musk ox
Camel	All camelids (New & Old world)
Cat	Bobcat, cougar, lynx, etc.
Chicken	Quail, grouse, & other gallinaceous fowl
Deer	Deer, elk, moose
Dog	Coyote, dog, wolf
Elephantidae	Elephant, mammoth
Horse	Horse, donkey, kiang, etc.
Human	Human
Rabbit	Rabbit, hare, pika
Rat	All rat & mouse species
Sheep	Bighorn & other sheep
Swine	Pig, possibly javelina
Trout	Trout and salmon species
Agave	Agave, yucca
Amaranthaceae	Amaranth, pigweed, *quelite*, etc.
Asteraceae	Rabbitbrush, sagebrush, sunflower, thistle
Capparidaeceae	Beeplant, bladderpod, stinkweed, etc.
Cedar	Cedar, cypress, juniper
Chenopodiaceae	Goosefoot, greasewood, pickleweed, saltbrush, etc.
Pinon	Fir, hemlock, pine, spruce
Walnut	Walnut, hickory

TABLE 3: RESULTS

LAS- #	Artifact Description	Prov/ Inventory Code	Results
1	Windust Point Base	49.9.a	Negative
2	Flake tool	52.8.a	Negative
3	Flake tool	59.5.a	Negative
4	Grooved abrader	71.7.a	Negative
5	Flake tool	71.11.a	Negative
6	Cascade point	60.9.b	Negative
7	Point/preform fragment	60.11.b	Negative
8	Point/preform fragment	65.6.b	Negative
9	Large Biface	65.12.b	Negative
10	Windust Point Base	74.9.b	Negative
11	Windust Point Base	47.9.c	Negative
12	Flake tool	50.5.c	Negative
13	Flake tool	50.6.c	RABBIT
14	Point/preform fragment	50.11.c	Negative
15	Flake tool	67.8.c	Negative
16	Cascade point	57.4.d	Negative
17	Cascade uniface midsection	57.7.d	Negative
18	Cascade point	57.11.d	Negative
19	Reworked stemmed point	62.7.d	Negative
20	Windust base	62.8.d	Negative
21	Flake tool	62.9.d	Negative
22	Flake tool	66.8.d	BOVINE
23	Flake tool	53.9.e	Negative
24	Windust point	58.14.e	Negative
25	Quartz crystal biface fragment	58.15.e1	BOVINE, RABBIT
26	Large biface	58.15.e2	RABBIT
27	Flake tool	58.19.e	RABBIT
28	Point/preform fragment	64.10.e	Negative
29	Flake tool	63.9.f	RABBIT
30	Flake tool	46.4.f	Negative
31	Side-notched projectile point	48.2.f	Negative
32	Point/preform fragment	51.10.f	Negative
33	Soil sample F2011A	53.10.17	RABBIT
34	Soil sample F2011B	71.7.10	RABBIT

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Appendix 6c

Results of Protein Residue Analysis, May, 2013

By

Laboratory of Archaeological Science

California State University

Bakersfield, CA

Protein Residue Analysis of Fifty-Seven Artifacts From Kelly Forks Work Center Site (10CW34) In the Clearwater National Forest

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(LAS-331)

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The use of chemical and molecular biological techniques in the analysis of archaeological materials can provide significant new information for the interpretation of their use. The identification of organic residue from lithic and ceramics artifacts, coprolites and soils have provided archaeologists with specific data regarding prehistoric exploitation of animals and plants. Although ancient protein residues may not be preserved in their original form, linear epitopes are generally conserved which can be identified by immunological methods (Abbas et al. 1994).

Immunological methods have been used to identify plant and animal residues on flaked and groundstone lithic artifacts (Allen et al. 1995; Gerlach et al. 1996; Henrikson et al. 1998; Hyland et al. 1990; Kooyman et al. 1992; Newman 1990, 1995; Petraglia et al. 1996; Shanks et al.1999; Yohe et al. 1991) and in Chumash paint pigment (Scott et al. 1996). Plant remains on artifacts also been identified through chemical (opal phytoliths), and morphological (use-wear), studies (Hardy and Garufi 1998; Jahren et al. 1997, Sobolik 1996). Plant and animal residues on ceramic artifacts have been identified through the use of gas-liquid chromatography, high performance liquid chromatography and mass spectrometry (Bonfield and Heron 1995; Evershed et al. 1992; Evershed and Tuross, 1996; Heron et al. 1991, Patrick et al. 1985). Serological methods have been used to determine blood groups in skeletal and soft tissue remains (Heglar 1972; Lee et al. 1989) and in the detection of hemoglobin from 4500-year-old bones (Ascenzi et al. 1985). Human leukocyte antigen (HLA) and deoxyribonucleic acid (DNA) determinations made on human and animal skeletal and soft tissue remains have demonstrated genetic relationships and molecular evolutionary distances (Hänni et al. 1995; Hansen and Gurtler 1983; Lowenstein 1985, 1986; Pääbo 1985, 1986, 1989; Pääbo et al. 1989). Successful identification of residues on stone tools, dated between 35-60,000 B.P., has been made by DNA analysis (Hardy et al. 1997), while recently, residues on surgical implements from the American Civil War were identified by immunological and DNA analysis (Newman et al. 1998). A recent study demonstrated the viability of identifiable immunoglobulin G in 1.6 million-year-old fossil bones from Venta Micena, Spain, (Torres et al. 2002). Horse exploitation was identified by immunological analysis of residues retained on Clovis points dated to ca. 11,200 B.P. (Kooyman et al. 2001).

The use of forensic techniques in the investigation of archaeological materials is appropriate as both disciplines deal with residues that have undergone changes, either deliberate or natural. Criminals habitually endeavor to remove bloodstains by such means as laundering, scrubbing with bleach, etc. yet; such degraded samples are still identified by immunological methods (Lee and De Forest 1976; Milgrom and Campbell 1970; Shinomiya et al. 1978, among others). Similarly it has been shown that immunological methods can be successfully applied to ancient human cremations (Cattaneo et al. 1992). Forensic wildlife laboratories use immunological techniques in their investigation of hunting violations and illegal trade, often from contaminated evidence (Bartlett and Davidson 1992; Guglich et al. 1993; Mardini 1984; McClymont et al. 1982). Immunological methods are also used to test the purity of food products such as canned luncheon meat and sausage, products which have undergone considerable degradation (Ashoor et al. 1988; Berger et al. 1988; King 1984). Thus the age and degradation of protein does not preclude detection (Gaensslen 1983:225).

Materials and Methods

The method of analysis used in this study of archaeological residues is cross-over immunoelectrophoresis (CIEP). Prior to the introduction of DNA fingerprinting this test was used by forensic laboratories to identify trace residues from crime scenes. Minor adaptations to the original method were made following procedures used by the Royal Canadian Mounted Police Serology Laboratory, Ottawa (1983). The solution used to remove possible residues is five percent ammonium hydroxide which is the most effective extractant for old and denatured proteins without interfering with subsequent testing (Dorrill and Whitehead 1979; Kind and Cleevely 1969). Artifacts are placed in shallow plastic dishes and 0.5 ml of five percent ammonia solution applied directly to each. Initial disaggregation is carried out by floating the dish and contents in an ultrasonic cleaning bath for five minutes. Extraction is continued by placing the dish and contents on a rotating mixer for thirty minutes. For large ground stone items, such as metates, stone bowls, etc., the ammonium hydroxide is applied directly to the worked surface, agitated periodically with a sterile orangewood stick, and allowed to sit for one half hour. The resulting solution is drawn off, placed in a numbered, sterile plastic vial and stored at -20°C prior to testing. In the case of soil samples, one gram is placed in a vial and 0.5 ml of 1 M Tris buffer solution ($H_2NC[CH_2OH]_3$) is used instead of ammonium hydroxide. The vial is placed in a rotating mixer overnight. The resulting solution is drawn off, placed in a numbered, vial and stored at -20°C prior to testing.

A series of paired wells is punched into an agarose gel. Approximately 2 µl. of antiserum is placed into one well and the same amount of the unknown sample extract is placed in the other. An electric current is then passed through the gel. The antiserum and unknown sample migrate through the gel and come into contact. If there is protein in the unknown which corresponds with the antiserum, an antigen-antibody reaction occurs and the protein precipitates out in a specific pattern. The precipitant is detected when the gel is pressed, dried and stained. Control positives are run simultaneously with all the unknown samples. Sterile equipment and techniques are used throughout the analysis.

The Samples

Fifty-seven artifacts recovered from Kelly Forks Work Center site (10CW34) on the upper North Fork of the Clearwater River on the Clearwater National Forest were submitted for immunological analysis by Laura Longstaff and Lee Sappington from the University of Idaho. Residue was removed from the artifacts as discussed above. The residues were tested against a suite of plant and animal antisera (Table 1). Animal antisera provided by Cappel Research and Lampire Biomedical, and plant antisera produced at the University of Calgary, provide family level identification only. The relationship of antisera to some of the possible species identified is shown in Table 2.

Results

Eleven artifacts registered positive reactions with available antisera. Several samples reacted with multiple antisera. Sheep proteins were found on nine artifacts. Two samples reacted with dog antiserum. Three samples tested positive for rat, two for horse, one for swine and one for bovine. Forty-six samples registered no positive reaction (Table 3). The absence of identifiable proteins on an artifact may be due to poor preservation of protein, insufficient protein, or that they were not in contact with any of the organisms included in the available antisera.

TABLE 1: ANTISERA USED IN ANALYSIS

Animal Antiserum	Source	Plant Antiserum	Source
Bear	"	Agave	University of Calgary
Bovine	"	Amaranth	"
Camel	Lampire Biomedical	Aster	"
Cat	Cappel Research	Capparid	"
Chicken	"	Cedar	"
Deer	"	Chenopod	
Dog	"	Pine	"
Elephant	Lampire Biomedical	Walnut	"
Horse	"		
Human	Cappel Research		
Rabbit	"		
Rat	"		
Sheep	"		
Swine	"		
Trout/Salmon	Lampire		

TABLE 2: POSSIBLE SPECIES IDENTIFIED

Antiserum to:	Reacts with:
Bear	Black, grizzly, etc
Bovine	Bison, cow, musk ox
Camel	All camelids (New & Old world)
Cat	Bobcat, cougar, lynx, etc.
Chicken	Quail, grouse, & other gallinaceous fowl
Deer	Deer, elk, moose
Dog	Coyote, dog, wolf
Elephantidae	Elephant, mammoth
Horse	Horse, donkey, kiang, etc.
Human	Human
Rabbit	Rabbit, hare, pika
Rat	All rat & mouse species
Sheep	Bighorn & other sheep
Swine	Pig, possibly javelina
Trout	Trout and salmon species
Agave	Agave, yucca
Amaranthaceae	Amaranth, pigweed, *quelite*, etc.
Asteraceae	Rabbitbrush, sagebrush, sunflower, thistle
Capparidaeceae	Beeplant, bladderpod, stinkweed, etc.
Cedar	Cedar, cypress, juniper
Chenopodiaceae	Goosefoot, greasewood, pickleweed, saltbrush, etc.
Pinon	Fir, hemlock, pine, spruce
Walnut	Walnut, hickory

TABLE 3: RESULTS

LAS- #	Artifact Description	Prov/ Inventory Code	Results
1	Flaked cobble	76.2.3	Negative
2	Side-notched projectile point	76.3.3	Negative
3	Windust point base	76.8.4	Negative
4	Biface fragment	76.12.3	SHEEP
5	Biface fragment	77.9.7	RAT, SHEEP
6	Point/preform fragment	77.11.4	RAT, SHEEP
7	Flake tool	77.15.2	Negative
8	Flake tool	77.17.2	Negative
9	Windust point base	78.5.2	Negative
10	Biface tool	78.11.7	SHEEP
11	Biface fragment	80.11.10	Negative
12	Battered cobble	82.2.3	Negative
13	Flake tool	83.9.5	Negative
14	Windust point base	83.9.7	Negative
15	Preform	84.3.2	SHEEP
16	Preform	86.6.3	SHEEP
17	Flake tool	88.7.5	HORSE, SHEEP
18	Flake tool	88.8.5	Negative
19	Grooved abrader	90.10.6	Negative
20	Flake tool	92.8.4	RAT, SHEEP
21	Cascade point	92.12.2	Negative
22	Flake/potential utilization	93.6.1	Negative
23	Flake tool	94.7.4	DOG, HORSE, SHEEP, SWINE
24	Goshen/Plainview point	94.9.6	Negative
25	Side-notched point fragment	95.2.7	Negative
26	Windust point base	97.3.2	Negative
27	Windust point base	97.11.8	Negative
28	Flake tool	98.10.5	Negative
29	Flake tool	98.11.4	Negative
30	Flake tool	99.11.3	Negative
31	Windust point base	100.13.4	Negative
32	Point/preform fragment	101.5.5	Negative
33	Windust point base	101.6.4	Negative

34	Flake/potential utilization	101.7.4	Negative
35	Preform	101.7.6	Negative
36	Flake tool	102.13.2	Negative
37	Edge-ground cobble	103.7.7	Negative
38	Flake tool	103.8.4	DOG
39	Flake tool	104.13.3	Negative
40	Side-notched point fragment/biface	105.1.5	Negative
41	Grooved abrader	105.9.7	Negative
42	Flaked cobble	105.9.8	Negative
43	Flake tool	107.2.4	Negative
44	Flake/potential utilization	109.9.3	Negative
45	Biface fragment	109.11.3	Negative
46	Point/preform fragment	110.10.4	Negative
47	Flake tool	111.5.3	Negative
48	Grooved abrader	111.7.6	Negative
49	Point/preform fragment	111.8.4	Negative
50	Point/preform fragment	111.8.5	Negative
51	Perforator	111.8.6	Negative
52	Flaked cobble	111.9.2	Negative
53	Flake tool	112.7.4	Negative
54	Flaked cobble	112.7.5	Negative
55	Flake tool	113.5.4	Negative
56	Flake tool	113.8.6	BOVINE
57	Flake/potential utilization	113.11.5	Negative

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Appendix 7

Results of Glass Composition Analysis for 10CW34 soil sample

By

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TABLE 1. GLASS COMPOSITION/PROBABLE SOURCE OF A 10CW34 TEPHRA

Oxide	10CW34 **38-42-S111**
SiO_2	72.88(0.19)
Al_2O_3	14.82(0.11)
Fe_2O_3	2.09(0.03)
TiO_2	0.44(0.04)
Na_2O	4.90(0.18)
K_2O	2.68(0.07)
MgO	0.44(0.04)
CaO	1.55(0.08)
Cl	0.19(0.01)
Total[2]	100
Number of shards analyzed	10
Probable Source/Age	Mazama Climactic Eruption 6730 +/- 40 ^{14}C BP
Similarity Coefficient[3]	0.99

excellent compositional match to known Mazama tephra

(S.C. = 1.00 is a perfect match)

[1] Standard deviations of the analyses given in parentheses
[2] Analyses normalized to 100 weight percent
[3] Borchardt et al. (1972) J. Sed. Petrol., 42, 301-306

Sample: Laura 10CW34 sample 38-42-S111

number of records searched: 1716

Glass composition of sample:

SiO2	TiO2	Al2O3	MgO	CaO	BaO	MnO	Fe2O3	Na2O	K2O	Cl	Total
72.89	0.44	14.62	0.44	1.55	0.00	0.00	2.09	4.90	2.68	0.19	100.00

weighting factor (only for oxides in bold type)

1	0.25	1	0.25	1			1	1	1		

Similiarity Coefficients for 15 closet matches

SiO2	TiO2	Al2O3	MgO	CaO	Fe2O3	Na2O	K2O	sim coef weighted avg	rec#	Std	Date	State	Source/Age	Notes
0.996	0.977	0.977	0.978	0.981	0.986	1.000	0.996	0.989	217			WA	Mazama/6850	Sample #2 Toppenish Creek, T 9N R13E, SE 1/4, NW 1/4 of S2, G. Cleveland, Yakima Indian Nation
0.998	0.955	0.987	0.936	0.994	0.977	1.000	0.996	0.988	1365			WA	Mazama Climactic	Sample KRF 02-003 from the Pasco Basin, WA; Karl Fecht, Environmental Technologies, Bechtel Hanford Inc., 3550 George Washington Way, Richland,
0.994	0.932	0.974	1.000	0.981	0.990	0.998	1.000	0.988	24			OR	Mazama ?	Twin Lakes 4.65m, Wallows-Whitman NF, OR, Marden-Mehringer
0.996	1.000	0.971	0.978	0.994	0.991	0.990	0.982	0.987	1016			OR	Mazama Climactic 6850 BP ???	MCA-1, Meyers Canyon near Mitchell, OR; 120 degrees and 8' and 44 degrees and 38'; Dan Levish, Bur of Reclamation, Denver Federal Center, Denver,
0.998	0.977	0.978	0.977	0.975	0.986	0.994	0.993	0.986	218			WA	Mazama/6850	45SP207, Spokane Co., S. Stump, BOAS Inc.
0.997	1.000	0.976	0.957	0.969	0.991	0.986	1.000	0.986	1303			WA	Mazama Climactic	Sample SR-1 from 16 inches b.s. on Lopez Island WA; Scott Rozenbaum, Rozewood Environmental Services Inc., P.O. Box 298, Lopez Island, WA 9826
0.996	0.977	0.978	0.957	0.981	0.995	0.990	0.985	0.986	999			OR	Mazama 6850 BP ???	Sample LIB-A, west of Mt Hood, OR, Jim Chatters, Applied PaleoScience, 648 Saint Street, Richland, WA 99352
0.993	0.982	0.978	0.936	1.000	0.990	0.971	0.996	0.986	1324			ID	Mazama Climactic	Sample 1 from Site 10BR090 along Pend Oreille River in northern Idaho; Leslie Norman, Northwest Archaeological Associates Inc., 5418 20th Avenue N\
0.995	0.977	0.972	0.978	0.969	0.986	0.998	0.996	0.985	1302			WA	Mazama Climactic	Sample TP 26, Test Pit Yakima Reservation (N 46 deg 21.442', W 120deg 36.851') Chane Salois, Yakima Nation Engineering, 211 South Toppenish Ave.,
0.995	0.978	0.979	0.978	0.969	0.995	0.992	0.985	0.985	779 a			OR	Mazama Climactic 6850 BP	USGS Mazama Climactic Standard W-97, from Wasco OR, Andre Sama
0.993	0.955	0.968	0.978	0.975	0.995	0.992	0.996	0.985	215			WA	Mazama/6850	Sample from along Skagit River near Sky Creek Siding northern Skagit Co., J. Reidel, N Cascades NP
0.998	1.000	0.976	1.000	0.969	0.995	0.970	0.993	0.985	462			OR	Mazama 6850 ?	Sample 35JE51B, 2753-2; Infotec, Willowdale Quad
0.996	0.955	0.976	0.978	0.987	0.990	0.992	0.975	0.985	1030			OR	Mazama climactic 6850 BP ??	Sample 52-02, Site 35GR1730 in the valley of the Middle Fork John Day River west of Austin, central portion of the Blue Mt physiographic province (Grant
0.995	1.000	0.982	0.936	0.994	0.981	0.967	0.996	0.985	1327			ID	Mazama Climactic	Sample 4 from Site 10BR094 along Pend Oreille River in northern Idaho; Leslie Norman, Northwest Archaeological Associates Inc., 5418 20th Avenue N\
0.994	1.000	0.976	0.917	0.994	0.986	0.969	1.000	0.984	1326			ID	Mazama Climactic	Sample 3 from Site 10BR094 along Pend Oreille River in northern Idaho; Leslie Norman, Northwest Archaeological Associates Inc., 5418 20th Avenue N\

Appendix 8

10CW34 Sample Inventory

Appendix 8
10CW34 Sample Inventory

Recovery Area	Cat. No.*	Description	Material	Lot No.	WT (g)
-	SB.1-5.2 (np)	charcoal sample	charcoal	-	0.03
D	1987ST4.8.1	bone fragments	bone	5+	0.89
B	T5.3.1	charcoal/soil sample	charcoal/soil	-	n/a[1]
A	1.2.4	charcoal/soil sample	charcoal/soil	-	5.32
A	1.4.3	charcoal/soil sample	charcoal/soil	-	15.22
A	2.1.2	bone fragments	bone	4	0.15
A	3.1.3	bone fragments	bone	2	0.4
A	4.2.4	charcoal/soil sample	charcoal/soil	-	19.04
A	5.10.1	charcoal/soil sample	charcoal/soil	-	4.44
A	8.1.14	charcoal sample	charcoal	-	4.24
A	8.5.4	charcoal sample	charcoal	-	2.59
A	8.7.4	charcoal sample	charcoal	-	0.7
A	8.12.2[2]	charcoal/soil sample	charcoal/soil	-	13.26
A	9.6.4	charcoal/soil sample	charcoal/soil	-	2.51
A	9.6.5	charcoal/soil sample	charcoal/soil	-	6.56
A	9.7.1	charcoal/soil sample	charcoal/soil	-	15.79
B	2010misc.8[3]	charcoal sample	charcoal	-	n/a[1]
B	10.8.2	charcoal sample	charcoal	-	n/a[1]
B	10.12.2	charcoal sample	charcoal	-	n/a[1]
C	11.1.1	seed shells	floral	3	0.02
A	13.5.7	bone fragments	bone	20+	0.32
A	13.5.8	charcoal/soil sample	charcoal/soil	-	200
A	13.5.9	charcoal/soil sample	charcoal/soil	-	2300
A	13.5.11[4]	soil sample	soil	-	52
A	13.6.6	charcoal/soil sample	charcoal/soil	-	1.16
A	13.6.7[2]	charcoal/soil sample	charcoal/soil	-	123.3
A	13.7.3	charcoal/soil sample	charcoal/soil	-	16.25
A	13.7.4	charcoal/soil sample	charcoal/soil	-	5.1
A	13.7.5	charcoal/soil sample	charcoal/soil	-	2.94
A	13.7.6	charcoal/soil sample	charcoal/soil	-	20.97
A	13.15.2	charcoal/soil sample	charcoal/soil	-	54.1
C	15.2.1	bone fragments	bone	1	0.06
B	16.10.1	charcoal sample	charcoal	-	n/a[1]
B	16.13.1	charcoal/soil sample	charcoal/soil	-	n/a[1]
A	18.14.2	charcoal/soil sample	charcoal/soil	-	n/a[1]
E	20.4.4	charcoal sample	charcoal	-	10.91
E	21.7.5	charcoal/soil sample	charcoal/soil	-	6.51
A	23.2.5	charcoal/soil sample	charcoal/soil	-	94.38
A	23.2.6	charcoal/soil sample	charcoal/soil	-	78.94
A	23.3.6	charcoal/soil sample	charcoal/soil	-	113.12

*Items are listed in order by unit and increasing level depth; non-provenienced items (np) are listed first.

[1]Charcoal stored in tinfoil was not weighed to avoid opening the sample.

[2]Radiocarbon dated charcoal sample (see Table 35, Appendices 4a-4d).

[3]Recovered in Unit 10 from 70 cm BD.

[4]Soil submitted for protein residue analysis (see Table 44, Appendices 6a-6c).

Appendix 8
10CW34 Sample Inventory

Recovery Area	Cat. No.*	Description	Material	Lot No.	WT (g)
A	23.9.2	charcoal/soil sample	charcoal/soil	-	8.6
E	24.2.4	charcoal sample	charcoal	-	n/a[1]
E	24.7.4	charcoal sample	charcoal	-	n/a[1]
E	24.8.5[2]	charcoal sample	charcoal	-	89
E	24.9.5	charcoal sample	charcoal	-	n/a[1]
E	26.2.5	charred wood	wood	1	2.18
E	27.2.5	charcoal sample	charcoal	-	85.52
E	30.3.5	rodent skull	bone	1	0.92
E	30.9.11[2]	charcoal sample	charcoal	-	0.93
E	30.11.7	charcoal sample	charcoal	-	n/a[1]
E	31.9.5	charcoal sample	charcoal	-	n/a[1]
E	32.1.5	bone fragments	bone	3	0.35
E	32.7.4[2]	charcoal sample	charcoal	-	3.91
E	32.7.5	charcoal sample	charcoal	-	3.07
E	33.3.4[2]	charcoal sample	charcoal	-	18.72
E	34.1.2	charcoal sample	charcoal	-	n/a[1]
E	34.4.6	charcoal sample	charcoal	-	n/a[1]
E	34.6.5	charcoal sample	charcoal	-	n/a[1]
E	35.3.5	charcoal sample	charcoal	-	6.55
E	36.3.4	clay sample	sediment	-	0.17
E	36.10.6	charcoal sample	charcoal	-	n/a[1]
E	37.7.2[2]	charcoal sample	charcoal	-	14.83
E	37.9.4	charcoal sample	charcoal	-	n/a[1]
E	38.10.4	charcoal/soil sample	charcoal/soil	-	217.2
E	39.6.3	rodent bones	bone	50+	19.52
E	39.3.5	charcoal sample	charcoal	-	n/a[1]
E	39.5.3[2]	charcoal sample	charcoal	-	1.44
E	39.8.6	charcoal sample	charcoal	-	n/a[1]
E	40.11.3	charcoal sample	charcoal	-	n/a[1]
E	41.9.1[2]	charcoal sample	charcoal	-	13.42
E	42.15.3	charcoal/soil sample	charcoal/soil	-	n/a[1]
E	42.15.4	charcoal/soil sample	charcoal/soil	-	n/a[1]
E	42.17.3	charcoal/soil sample	charcoal/soil	-	n/a[1]
E	42.18.3[2]	charcoal sample	charcoal	-	0.4
E	44.1.3	bone	bone	1	0.01
E	46.5.4	charcoal sample	charcoal	-	0.48
E	46.5.5	charcoal sample	charcoal	-	1.85
E	46.5.6	charred wood	wood	1	0.24
E	46.6.4	charcoal sample	charcoal	-	0.63
E	46.7.7	charcoal sample	charcoal	-	0.31
E	46.8.8	charcoal/soil sample	charcoal/soil	-	13.45
E	46.8.9	charcoal sample	charcoal	-	6.38
E	46.9.4	charcoal/soil sample	charcoal/soil	-	4.23

*Items are listed in order by unit and increasing level depth.
[1]Charcoal stored in tinfoil was not weighed to avoid opening the sample.
[2]Radiocarbon dated charcoal sample (see Table 35, Appendices 4a-4d).

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10CW34 Sample Inventory

Recovery Area	Cat. No.*	Description	Material	Lot No.	WT (g)
E	47.9.6	charcoal/soil sample	charcoal/soil	-	6.88
E	47.9.7	slag fragments	slag	1	0.07
E	48.8.3	charcoal sample	charcoal	-	2.54
E	49.4.4	charcoal/soil sample	charcoal/soil	-	1.76
E	49.8.8	charcoal/soil sample	charcoal/soil	-	2.85
E	49.8.9	charcoal sample	charcoal	-	0.52
E	49.9.7	charcoal/soil sample	charcoal/soil	-	3.02
E	49.9.8	charcoal/soil sample	charcoal/soil	-	22.94
E	49.9.9	charcoal/soil sample	charcoal/soil	-	8.15
E	49.9.10	charcoal/soil sample	charcoal/soil	-	81.67
E	49.9.11	charcoal/soil sample	charcoal/soil	-	18.06
E	49.10.7	charcoal sample	charcoal	-	10.91
E	49.10.8	charcoal sample	charcoal	-	5.31
E	49.10.9	charcoal sample	charcoal	-	9.3
E	49.10.10	charcoal sample	charcoal	-	20.09
E	49.11.8	charcoal/soil sample	charcoal/soil	-	5.91
E	49.11.9	charcoal/soil sample	charcoal/soil	-	8.61
E	49.11.10	charcoal sample	charcoal	-	1.8
E	49.12.5	charcoal sample	charcoal	-	1.41
E	50.5.4	wood sample	wood	1	10.68
E	50.7.5	charcoal sample	charcoal	-	8.77
E	50.8.7	charcoal/soil sample	charcoal/soil	-	2.63
E	50.9.8	charcoal/soil sample	charcoal/soil	-	4.06
E	50.9.9	charcoal/soil sample	charcoal/soil	-	18.95
E	50.9.10[2]	charcoal/soil sample	charcoal/soil	-	68.63
E	50.9.11	charcoal/soil sample	charcoal/soil	-	9.1
E	50.9.12	charcoal/soil sample	charcoal/soil	-	17.71
E	50.10.6	charcoal/soil sample	charcoal/soil	-	14.71
E	50.10.7	charcoal/soil sample	charcoal/soil	-	29.52
E	50.11.5	charcoal sample	charcoal	-	4.41
E	51.4.3	charcoal/soil sample	charcoal/soil	-	2.4
E	51.7.6	charcoal/soil sample	charcoal/soil	-	1.27
E	51.10.7[2]	charcoal/soil sample	charcoal/soil	-	12.95
E	52.5.5	charcoal/soil sample	charcoal/soil	-	1.44
E	52.5.6	charcoal sample	charcoal	-	0.26
E	52.5.7	ash sample	ash	-	0.86
E	52.6.3	charcoal/soil sample	charcoal/soil	-	10.58
E	52.6.4	charcoal/soil sample	charcoal/soil	-	2.16
E	52.6.5	charcoal/soil sample	charcoal/soil	-	2.55
E	52.8.19	charcoal/soil sample	charcoal/soil	-	3.18
E	52.8.20	charcoal/soil sample	charcoal/soil	-	16.91
E	52.8.21	charcoal/soil sample	charcoal/soil	-	122.5
E	52.8.22	charcoal/soil sample	charcoal/soil	-	2.73
E	52.8.23[2]	charcoal/soil sample	charcoal/soil	-	8.58
E	52.8.24	charcoal/soil sample	charcoal/soil	-	2.76

*Items are listed in order by unit and increasing level depth.
[2]Radiocarbon dated charcoal sample (see Table 35, Appendices 4a-4d).

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10CW34 Sample Inventory

Recovery Area	Cat. No.*	Description	Material	Lot No.	WT (g)
E	52.9.6	stained soil	soil	-	176.46
E	52.10.9	charcoal/soil sample	charcoal/soil	-	0.66
E	52.10.10	charcoal/soil sample	charcoal/soil	-	17.65
E	52.11.8	charcoal/soil sample	charcoal/soil	-	2.93
E	52.11.9	charcoal/soil sample	charcoal/soil	-	1.96
E	52.12.4[2]	charcoal sample	charcoal	-	0.79
E	53.10.15	charcoal sample	charcoal	-	24.52
E	53.10.17[4]	soil sample	soil	-	65.3
E	54.4.3	charcoal sample	charcoal	-	0.72
E	54.4.4	oxidized soil	soil	-	13.39
E	54.5.1	charcoal sample	charcoal	-	0.73
E	55.7.6	charcoal/soil sample	charcoal/soil	-	14.91
E	55.7.7	stained soil	soil	-	21.44
E	55.8.7	charcoal/soil sample	charcoal/soil	-	53.55
E	55.8.8	charcoal/soil sample	charcoal/soil	-	31.03
E	55.8.9	stained soil	soil	-	420
E	56.7.2	charcoal/soil sample	charcoal/soil	-	75.09
E	56.9.5	charcoal sample	charcoal	-	4.07
E	56.16.4	charcoal/soil sample	charcoal/soil	-	59.43
E	57.4.4	charcoal sample	charcoal	-	0.08
E	57.5.4	charcoal sample	charcoal	-	1.24
E	57.6.2	charcoal sample	charcoal	-	0.18
E	57.7.6	charcoal sample	charcoal	-	0.12
E	57.8.11	charcoal sample	charcoal	-	1.32
E	57.9.13[2]	charcoal/soil sample	charcoal/soil	-	4.04
E	57.10.6	charcoal/soil sample	charcoal/soil	-	1.62
E	58.9.5	charcoal/soil sample	charcoal/soil	-	44.61
E	58.10.6[2]	charcoal/soil sample	charcoal/soil	-	7.08
E	58.13.7	charcoal/soil sample	charcoal/soil	-	23.43
E	58.14.4	charcoal/soil sample	charcoal/soil	-	18.57
E	58.15.9[2]	charcoal/soil sample	charcoal/soil	-	27.51
E	58.17.3[2]	charcoal sample	charcoal	-	2.55
E	59.6.6	charcoal/soil sample	charcoal/soil	-	6.36
E	59.6.7	charcoal/soil sample	charcoal/soil	-	2.81
E	59.7.8	charcoal/soil sample	charcoal/soil	-	1.62
E	59.7.9	charcoal/soil sample	charcoal/soil	-	17.5
E	59.7.10	charcoal/soil sample	charcoal/soil	-	2.77
E	59.8.9	charcoal/soil sample	charcoal/soil	-	2.54
E	59.9.10	charcoal sample	charcoal	-	2.28
E	59.10.6	charcoal/soil sample	charcoal/soil	-	2.96
E	59.10.7	charcoal/soil sample	charcoal/soil	-	1.83
E	59.11.6	charcoal sample	charcoal	-	1.92
E	59.11.7	charcoal sample	charcoal	-	2.52

*Items are listed in order by unit and increasing level depth.
[2]Radiocarbon dated charcoal sample (see Table 35, Appendices 4a-4d).
[4]Soil submitted for protein residue analysis (see Table 44, Appendices 6a-6c).

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10CW34 Sample Inventory

Recovery Area	Cat. No.*	Description	Material	Lot No.	WT (g)
E	59.11.8	charcoal sample	charcoal	-	2.21
E	59.12.4	charcoal sample	charcoal	-	0.24
E	60.7.6	charcoal/soil sample	charcoal/soil	-	16.53
E	60.8.9	charcoal/soil sample	charcoal/soil	-	4.7
E	60.9.4	charcoal sample	charcoal	-	2.22
E	60.9.5	charcoal/soil sample	charcoal/soil	-	3.7
E	60.10.4	charcoal sample	charcoal	-	3.39
E	60.12.4	compacted soil	soil	-	0.22
E	62.4.4	charcoal sample	charcoal	-	0.36
E	62.5.3	charcoal sample	charcoal	-	0.32
E	62.6.4	charcoal sample	charcoal	-	0.81
E	62.8.9	charcoal sample	charcoal	-	0.16
E	62.8.10	charcoal/soil sample	charcoal/soil	-	5.32
E	62.9.9	charcoal/soil sample	charcoal/soil	-	3.06
E	62.10.10	charcoal sample	charcoal	-	1.14
E	62.11.4	charcoal/soil sample	charcoal/soil	-	4.29
E	63.6.4	charcoal/soil sample	charcoal/soil	-	9.35
E	63.6.5	charcoal/soil sample	charcoal/soil	-	4.68
E	63.7.3	charcoal/soil sample	charcoal/soil	-	2.92
E	63.8.4	charcoal sample	charcoal	-	3.09
E	63.9.4	charcoal sample	charcoal	-	11.01
E	63.10.3	charcoal sample	charcoal	-	1.18
E	64.3.4	soil sample	soil	-	10.22
E	64.3.5	burned wood	wood	-	8.37
E	64.10.17	soil sample	soil	-	2940
E	64.13.8	charcoal/soil sample	charcoal/soil	-	37.98
E	66.4.3	charcoal sample	charcoal	-	0.33
E	66.5.3	charcoal sample	charcoal	-	4.84
E	66.6.5	charcoal sample	charcoal	-	0.45
E	66.7.6	charcoal sample	charcoal	-	3.1
E	66.8.6	charcoal sample	charcoal	-	1.4
E	66.9.6	charcoal sample	charcoal	-	0.96
E	66.10.3	charcoal/soil sample	charcoal/soil	-	11.8
E	67.11.8	charcoal/soil sample	charcoal/soil	-	18.93
E	68.10.8	charcoal/soil sample	charcoal/soil	-	40.93
E	69.9.4	charcoal/soil sample	charcoal/soil	-	32.32
E	69.10.10	soil sample	soil	-	8.3
E	70.4.4	charcoal sample	charcoal	-	0.67
E	70.5.4	charcoal sample	charcoal	-	0.7
E	70.6.8	charcoal sample	charcoal	-	0.58
E	70.7.10	charcoal/soil sample	charcoal/soil	-	2.79
E	70.8.6	charcoal/soil sample	charcoal/soil	-	2.46
E	70.9.9	charcoal/soil sample	charcoal/soil	-	26.33
E	70.10.3	charcoal/soil sample	charcoal/soil	-	4.02
E	71.7.10[4]	soil sample	soil	-	78.69

*Items are listed in order by unit and increasing level depth.
[4]Soil submitted for protein residue analysis (see Table 44, Appendices 6a-6c).

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10CW34 Sample Inventory

Recovery Area	Cat. No.*	Description	Material	Lot No.	WT (g)
E	71.7.11	charcoal/soil sample	charcoal/soil	-	10.66
E	71.8.10	charcoal/soil sample	charcoal/soil	-	1.59
E	71.9.11	charcoal/soil sample	charcoal/soil	-	1.45
E	71.11.6	charcoal/soil sample	charcoal/soil	-	2.6
E	71.11.7	charcoal/soil sample	charcoal/soil	-	8.44
E	72.11.6[2]	charcoal sample	charcoal	-	1.76
E	72.12.4	charcoal/soil sample	charcoal/soil	-	2.46
E	73.7.11	charcoal sample	charcoal	-	0.61
E	73.9.10	charcoal/soil sample	charcoal/soil	-	1.74
E	73.12.5	charcoal/soil sample	charcoal/soil	-	4.03
E	74.3.3	charcoal sample	charcoal	-	0.54
E	75.5.6	charcoal/soil sample	charcoal/soil	-	0.87
E	75.6.4	charcoal/soil sample	charcoal/soil	-	0.38
E	75.8.9	charcoal sample	charcoal	-	1.34
E	75.9.6	charcoal/soil sample	charcoal/soil	-	3.07
E	75.10.3	charcoal/soil sample	charcoal/soil	-	1.14
E	75.11.4[2]	charcoal/soil sample	charcoal/soil	-	2.12
E	76.9.7	charcoal sample	charcoal	-	0.09
E	76.9.8	charcoal sample	charcoal	-	0.4
E	76.10.5	charcoal/soil sample	charcoal/soil	-	0.69
E	76.11.5	charcoal/soil sample	charcoal/soil	-	4.92
E	76.12.4	charcoal/soil sample	charcoal/soil	-	5.18
E	76.12.5	charcoal sample	charcoal	-	1.73
E	76.12.6	charcoal sample	charcoal	-	0.16
E	76.12.7	charcoal sample	charcoal	-	0.07
E	77.5.3	ash sample	ash	-	14.33
E	77.6.3	charcoal/soil sample	charcoal	-	2.2
E	77.7.3	ash sample	ash	-	20.35
E	77.11.5	charcoal/soil sample	charcoal/soil	-	6.85
E	77.12.8	charcoal/soil sample	charcoal/soil	-	6.72
E	77.13.5	charcoal/soil sample	charcoal/soil	-	6.49
E	77.13.6	charcoal/soil sample	charcoal/soil	-	8.81
E	77.14.6	charcoal/soil sample	charcoal/soil	-	14.84
E	77.15.3	charcoal sample	charcoal	-	3.08
E	77.16.3	charcoal/soil sample	charcoal/soil	-	21.05
E	78.2.2	bone fragments	bone	2	0.29
E	78.5.3	charcoal sample	charcoal	-	24.99
E	78.9.2	ash/clay sample	sediment	-	10.19
E	78.10.3	charcoal/soil sample	charcoal/soil	-	45.62
E	78.10.4	charcoal/soil sample	charcoal/soil	-	92.48
E	78.11.10	charcoal/soil sample	charcoal/soil	-	1.72
E	78.11.11	charcoal/soil sample	charcoal/soil	-	1.86
E	78.11.12	charcoal/soil sample	charcoal/soil	-	0.8
E	78.11.13	charcoal/soil sample	charcoal/soil	-	27.3
E	78.11.14	charcoal/soil sample	charcoal/soil	-	4.19

*Items are listed in order by unit and increasing level depth.
[2]Radiocarbon dated charcoal sample (see Table 35, Appendices 4a-4d).

Appendix 8
10CW34 Sample Inventory

Recovery Area	Cat. No.*	Description	Material	Lot No.	WT (g)
E	78.11.15	charcoal sample	charcoal	-	0.22
E	78.12.4	charcoal/soil sample	charcoal/soil	-	5.12
E	80.3.2	charcoal/soil sample	charcoal/soil	-	13.92
E	80.8.2	charcoal/soil sample	charcoal/soil	-	5.47
E	80.11.11	charcoal/soil sample	charcoal/soil	-	49.51
E	82.5.2	ash sample	ash	-	58.61
E	83.2.4	wood fragments	wood	2	2.75
E	83.10.7	charcoal/soil sample	charcoal/soil	-	14.13
E	83.13.3	charcoal/soil sample	charcoal/soil	-	4.41
E	83.13.4	charcoal/soil sample	charcoal/soil	-	8.48
E	83.13.5	charcoal/soil sample	charcoal/soil	-	35.56
E	84.7.1	charcoal/soil sample	charcoal/soil	-	6.49
E	84.8.2	charcoal/soil sample	charcoal/soil	-	1.24
E	84.8.3	charcoal/soil sample	charcoal/soil	-	1.93
E	84.9.4	charcoal/soil sample	charcoal/soil	-	19.24
E	84.9.5	charcoal/soil sample	charcoal/soil	-	30.67
E	84.9.6	burned soil	soil	-	1.01
E	84.10.8	soil sample	soil	-	8.2
E	84.10.9	charcoal/soil sample	charcoal/soil	-	4.26
E	84.10.10	charcoal/soil sample	charcoal/soil	-	5.75
E	84.10.11	charcoal/soil sample	charcoal/soil	-	1
E	84.10.12	charcoal/soil sample	charcoal/soil	-	21.6
E	84.11.6	charcoal/soil sample	charcoal/soil	-	20.05
E	84.11.7	charcoal/soil sample	charcoal/soil	-	18.09
E	84.11.8	charcoal/soil sample	charcoal/soil	-	5.16
E	84.11.9	charcoal/soil sample	charcoal/soil	-	6.76
E	85.6.3	charcoal/soil sample	charcoal/soil	-	6.02
E	85.6.4	charcoal/soil sample	charcoal/soil	-	11.46
E	85.6.5	charcoal/soil sample	charcoal/soil	-	12.18
E	85.7.5	charcoal/soil sample	charcoal/soil	-	13.72
E	85.7.6	charcoal/soil sample	charcoal/soil	-	261.81
E	85.8.4	charcoal/soil sample	charcoal/soil	-	28.69
E	85.9.6	charcoal/soil sample	charcoal/soil	-	5.69
E	85.9.7	charcoal/soil sample	charcoal/soil	-	1.25
E	85.10.5	charcoal/soil sample	charcoal/soil	-	20.79
E	85.10.6	charcoal/soil sample	charcoal/soil	-	5.52
E	85.11.5	charcoal/soil sample	charcoal/soil	-	36.23
E	86.7.3	charcoal/soil sample	charcoal/soil	-	17.88
E	86.8.17	charcoal/soil sample	charcoal/soil	-	23.81
E	86.8.18	charcoal/soil sample	charcoal/soil	-	15.01
E	86.9.5	charcoal sample	charcoal	-	0.22
E	86.10.4	charcoal/soil sample	charcoal/soil	-	57.57
E	86.10.5	charcoal/soil sample	charcoal/soil	-	52.49
E	87.5.5	charcoal sample	charcoal	-	9.15
E	87.7.4	charcoal sample	charcoal	-	4.6
E	87.8.6	charcoal/soil sample	charcoal/soil	-	17.43

*Items are listed in order by unit and increasing level depth.

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10CW34 Sample Inventory

Recovery Area	Cat. No.*	Description	Material	Lot No.	WT (g)
E	87.9.5	charcoal/soil sample	charcoal/soil	-	13.63
E	87.9.6	charcoal/soil sample	charcoal/soil	-	14.11
E	87.9.7	charcoal/soil sample	charcoal/soil	-	14.47
E	87.10.2	charcoal/soil sample	charcoal/soil	-	7.89
E	88.10.5	charcoal/soil sample	charcoal/soil	-	0.77
E	88.11.3[2]	charcoal/soil sample	charcoal/soil	-	1.76
E	89.6.7	charcoal/soil sample	charcoal/soil	-	0.72
E	89.6.8	charcoal/soil sample	charcoal/soil	-	0.96
E	89.6.9	charcoal/soil sample	charcoal/soil	-	2.44
E	89.7.6	charcoal/soil sample	charcoal/soil	-	8.41
E	89.7.7	charcoal/soil sample	charcoal/soil	-	5.25
E	89.7.8	charcoal/soil sample	charcoal/soil	-	6.7
E	89.7.9	charcoal/soil sample	charcoal/soil	-	6.33
E	89.8.4	charcoal/soil sample	charcoal/soil	-	5.41
E	89.8.5	charcoal/soil sample	charcoal/soil	-	6.13
E	89.8.6	charcoal/soil sample	charcoal/soil	-	3.79
E	89.8.7	charcoal/soil sample	charcoal/soil	-	10
E	89.8.8	charcoal/soil sample	charcoal/soil	-	2.23
E	89.9.8	charcoal/soil sample	charcoal/soil	-	2.73
E	90.9.2	charcoal sample	charcoal	-	0.37
E	90.9.3	charcoal/soil sample	charcoal/soil	-	7.35
E	90.9.4	charcoal sample	charcoal	-	1.52
E	90.10.8	charcoal/soil sample	charcoal/soil	-	6.1
E	90.10.9	charcoal/soil sample	charcoal/soil	-	1.96
E	90.10.10	charcoal/soil sample	charcoal/soil	-	3.61
E	90.10.11	charcoal/soil sample	charcoal/soil	-	13.06
E	91.6.2	charcoal/soil sample	charcoal/soil	-	13.97
E	91.8.3	charcoal/soil sample	charcoal/soil	-	14.42
E	91.9.7	charcoal/soil sample	charcoal/soil	-	3.67
E	91.11.6	charcoal/soil sample	charcoal/soil	-	8.91
E	91.12.3	charcoal/soil sample	charcoal/soil	-	10.74
E	91.12.4	charcoal/soil sample	charcoal/soil	-	8.01
E	92.2.2	bone fragment	bone	1	2.39
E	92.8.5	charcoal/soil sample	charcoal/soil	-	1.68
E	92.10.9	charcoal/soil sample	charcoal/soil	-	2.08
E	93.2.3	burned wood	wood	2	2.21
E	93.8.2	charcoal sample	charcoal	-	1.85
E	93.9.2	charcoal/soil sample	charcoal/soil	-	20.08
E	93.9.3	charcoal/soil sample	charcoal/soil	-	12.13
E	93.10.8	charcoal sample	charcoal	-	2.24
E	93.10.9	charcoal sample	charcoal	-	2.59
E	93.10.10	charcoal sample	charcoal	-	2.49
E	93.10.11	charcoal sample	charcoal	-	5.93
E	93.11.5	charcoal sample	charcoal	-	1.16
E	93.11.6	charcoal/soil sample	charcoal/soil	-	22.71

*Items are listed in order by unit and increasing level depth.
[2]Radiocarbon dated charcoal sample (see Table 35, Appendices 4a-4d).

Appendix 8
10CW34 Sample Inventory

Recovery Area	Cat. No.*	Description	Material	Lot No.	WT (g)
E	93.11.7	charcoal/soil sample	charcoal/soil	-	29.24
E	94.4.3	rodent bones	bone	4	0.48
E	94.5.4	rodent bones	bone	30 +	2.16
E	94.8.5	bone fragment	bone	1	0.07
E	94.6.6	charcoal/soil sample	charcoal/soil	-	6.37
E	94.6.7	charcoal/soil sample	charcoal/soil	-	4.48
E	94.6.8	charcoal/soil sample	charcoal/soil	-	3.33
E	94.6.9	charcoal/soil sample	charcoal/soil	-	7.67
E	94.7.5	charcoal/soil sample	charcoal/soil	-	2.9
E	94.8.6	charcoal/soil sample	charcoal/soil	-	1.95
E	94.8.7	charcoal/soil sample	charcoal/soil	-	0.61
E	94.8.8	charcoal/soil sample	charcoal/soil	-	3.21
E	94.8.9	charcoal/soil sample	charcoal/soil	-	0.89
E	94.9.7	charcoal/soil sample	charcoal/soil	-	2.66
E	94.9.8	charcoal/soil sample	charcoal/soil	-	4.75
E	94.9.9[2]	charcoal/soil sample	charcoal/soil	-	1.89
E	94.9.10	charcoal/soil sample	charcoal/soil	-	7.38
E	94.10.4	charcoal/soil sample	charcoal/soil	-	3.35
E	94.10.5	charcoal/soil sample	charcoal/soil	-	0.79
E	94.10.6	charcoal/soil sample	charcoal/soil	-	2.53
E	94.10.7	charcoal/soil sample	charcoal/soil	-	3.45
E	94.11.3	charcoal/soil sample	charcoal/soil	-	1.41
E	95.10.5	charcoal/soil sample	charcoal/soil	-	1.32
E	95.10.6	charcoal sample	charcoal	-	1.53
E	95.10.7	charcoal/soil sample	charcoal/soil	-	1.47
E	96.7.4	charcoal/soil sample	charcoal/soil	-	2.21
E	96.7.5	charcoal/soil sample	charcoal/soil	-	11.95
E	96.8.5	charcoal/soil sample	charcoal/soil	-	12.66
E	97.11.4	charcoal/soil sample	charcoal/soil	-	42.66
E	97.11.5	charcoal/soil sample	charcoal/soil	-	2.5
E	97.11.6	charcoal/soil sample	charcoal/soil	-	19.68
E	97.11.7	charcoal/soil sample	charcoal/soil	-	59.17
E	97.12.2[2]	charcoal/soil sample	charcoal/soil	-	19.3
E	98.6.2	charcoal/soil sample	charcoal/soil	-	44.76
E	98.7.2	charcoal/soil sample	charcoal/soil	-	24.24
E	98.9.3	charcoal/soil sample	charcoal/soil	-	51.2
E	99.9.3	charcoal/soil sample	charcoal/soil	-	8.07
E	100.9.10	charcoal/soil sample	charcoal/soil	-	17.34
E	100.12.4	charcoal/soil sample	charcoal/soil	-	10.08
E	100.13.6	charcoal/soil sample	charcoal/soil	-	34.39
E	100.15.6	charcoal/soil sample	charcoal/soil	-	21.03
E	100.17.5	charcoal/soil sample	charcoal/soil	-	56.1
E	100.19.1[2]	charcoal/soil sample	charcoal/soil	-	10.77
E	100.19.2	charcoal/soil sample	charcoal/soil	-	237.9

*Items are listed in order by unit and increasing level depth.
[2]Radiocarbon dated charcoal sample (see Table 35, Appendices 4a-4d).

Appendix 8
10CW34 Sample Inventory

Recovery Area	Cat. No.*	Description	Material	Lot No.	WT (g)
E	101.4.6	rodent bones	bone	6	1.36
E	101.5.6	rodent bones	bone	4	0.26
E	101.6.5	charcoal/soil sample	charcoal/soil	-	15.08
E	101.6.6	charcoal/soil sample	charcoal/soil	-	2.21
E	101.6.7	charcoal/soil sample	charcoal/soil	-	4.29
E	101.7.7	charcoal/soil sample	charcoal/soil	-	17.56
E	101.7.8	charcoal/soil sample	charcoal/soil	-	2.7
E	101.7.9	charcoal/soil sample	charcoal/soil	-	24.02
E	101.8.6	charcoal/soil sample	charcoal/soil	-	1.77
E	101.8.7	charcoal/soil sample	charcoal/soil	-	2.61
E	101.9.3	charcoal/soil sample	charcoal/soil	-	8.18
E	101.9.4	charcoal/soil sample	charcoal/soil	-	2.57
E	101.10.5	charcoal/soil sample	charcoal/soil	-	14.15
E	101.10.6	charcoal/soil sample	charcoal/soil	-	11.58
E	101.10.7	charcoal/soil sample	charcoal/soil	-	15.8
E	101.10.8	charcoal/soil sample	charcoal/soil	-	6.14
E	102.13.3	red ochre	sediment	1	0.2
E	102.8.7	charcoal/soil sample	charcoal/soil	-	6.02
E	102.8.8	charcoal/soil sample	charcoal/soil	-	3.12
E	102.10.5	charcoal/soil sample	charcoal/soil	-	31.52
E	102.11.5	charcoal/soil sample	charcoal/soil	-	42.94
E	102.13.4	charcoal/soil sample	charcoal/soil	-	12.77
E	102.13.5	charcoal/soil sample	charcoal/soil	-	15.53
E	102.14.3	charcoal/soil sample	charcoal/soil	-	24.16
E	102.14.4	charcoal/soil sample	charcoal/soil	-	33.43
E	102.16.2	charcoal/soil sample	charcoal/soil	-	30.8
E	102.18.1	charcoal/soil sample	charcoal/soil	-	6.77
E	103.6.6	charcoal/soil sample	charcoal/soil	-	3.56
E	103.6.7	charcoal/soil sample	charcoal/soil	-	1.11
E	103.7.6	charcoal/soil sample	charcoal/soil	-	12.27
E	103.8.5	charcoal/soil sample	charcoal/soil	-	9.05
E	103.9.5	charcoal/soil sample	charcoal/soil	-	29.68
E	104.6.5	charcoal/soil sample	charcoal/soil	-	57.07
E	104.7.4	charcoal/soil sample	charcoal/soil	-	19.81
E	104.13.4[2]	charcoal/soil sample	charcoal/soil	-	15.55
E	104.16.1	charcoal/soil sample	charcoal/soil	-	6.46
E	105.6.4	charcoal/soil sample	charcoal/soil	-	19.06
E	105.7.3	charcoal/soil sample	charcoal/soil	-	40.46
E	105.8.6	charcoal/soil sample	charcoal/soil	-	3.36
E	105.8.7	charcoal/soil sample	charcoal/soil	-	48.26
E	105.9.12[2]	charcoal/soil sample	charcoal/soil	-	14.23
E	105.9.13	charcoal/soil sample	charcoal/soil	-	8.45
E	105.10.5	charcoal/soil sample	charcoal/soil	-	57.01
E	105.10.6	charcoal/soil sample	charcoal/soil	-	30.79
E	105.10.7	charcoal/soil sample	charcoal/soil	-	88.3

*Items are listed in order by unit and increasing level depth.
[2]Radiocarbon dated charcoal sample (see Table 35, Appendices 4a-4d).

Appendix 8
10CW34 Sample Inventory

Recovery Area	Cat. No.*	Description	Material	Lot No.	WT (g)
E	106.6.5	charcoal/soil sample	charcoal/soil	-	3.16
E	106.7.7	charcoal/soil sample	charcoal/soil	-	7.52
E	106.7.8	charcoal/soil sample	charcoal/soil	-	4.8
E	106.7.9	charcoal/soil sample	charcoal/soil	-	5.65
E	106.7.10	charcoal sample	charcoal	-	0.28
E	106.8.3	charcoal/soil sample	charcoal/soil	-	15.08
E	106.8.4	charcoal/soil sample	charcoal/soil	-	12.67
E	106.8.5	charcoal/soil sample	charcoal/soil	-	4.52
E	106.9.5	charcoal/soil sample	charcoal/soil	-	10.98
E	106.9.6	charcoal/soil sample	charcoal/soil	-	6.24
E	106.9.7	charcoal/soil sample	charcoal/soil	-	21.44
E	108.8.7	charcoal/soil sample	charcoal/soil	-	35.58
E	108.10.3	charcoal/soil sample	charcoal/soil	-	16.63
E	108.11.4	charcoal/soil sample	charcoal/soil	-	23.61
E	109.11.4	charcoal/soil sample	charcoal/soil	-	1.68
E	109.11.5	charcoal/soil sample	charcoal/soil	-	3.24
E	109.11.6	charcoal/soil sample	charcoal/soil	-	16.85
E	109.11.7	charcoal/soil sample	charcoal/soil	-	1.05
E	110.10.6	charcoal/soil sample	charcoal/soil	-	3.01
E	111.6.3	charcoal/soil sample	charcoal/soil	-	42.85
E	111.8.13	charcoal/soil sample	charcoal/soil	-	25.93
E	112.7.7	charcoal/soil sample	charcoal/soil	-	6.07
E	112.11.2	charcoal/soil sample	charcoal/soil	-	26.71
E	113.7.5	charcoal/soil sample	charcoal/soil	-	4.46
E	113.7.6	charcoal/soil sample	charcoal/soil	-	4.39
E	113.8.11	charcoal/soil sample	charcoal/soil	-	9.2
E	113.11.8	charcoal/soil sample	charcoal/soil	-	4.92
E	113.12.5	charcoal/soil sample	charcoal/soil	-	25.93

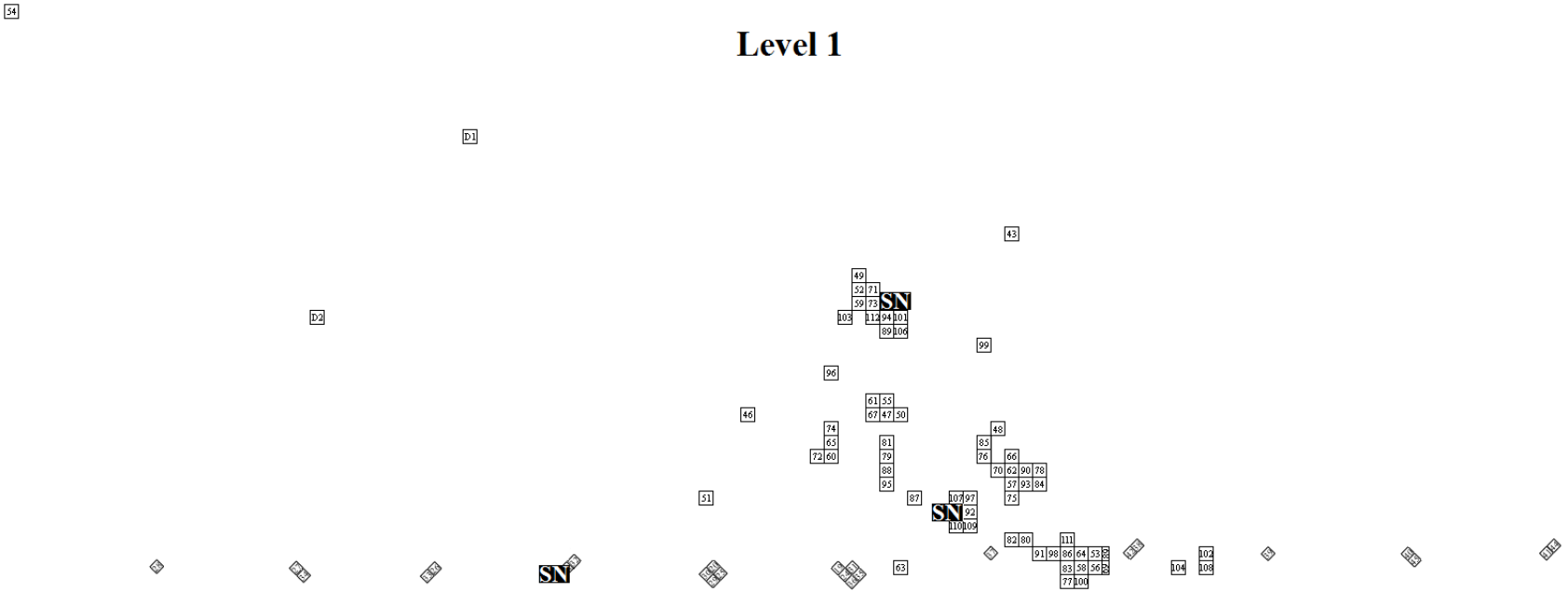
*Items are listed in order by unit and increasing level depth.

Appendix 9

Spatial Distributions of Area E Time Diagnostic Tools and Radiocarbon Dates by Level

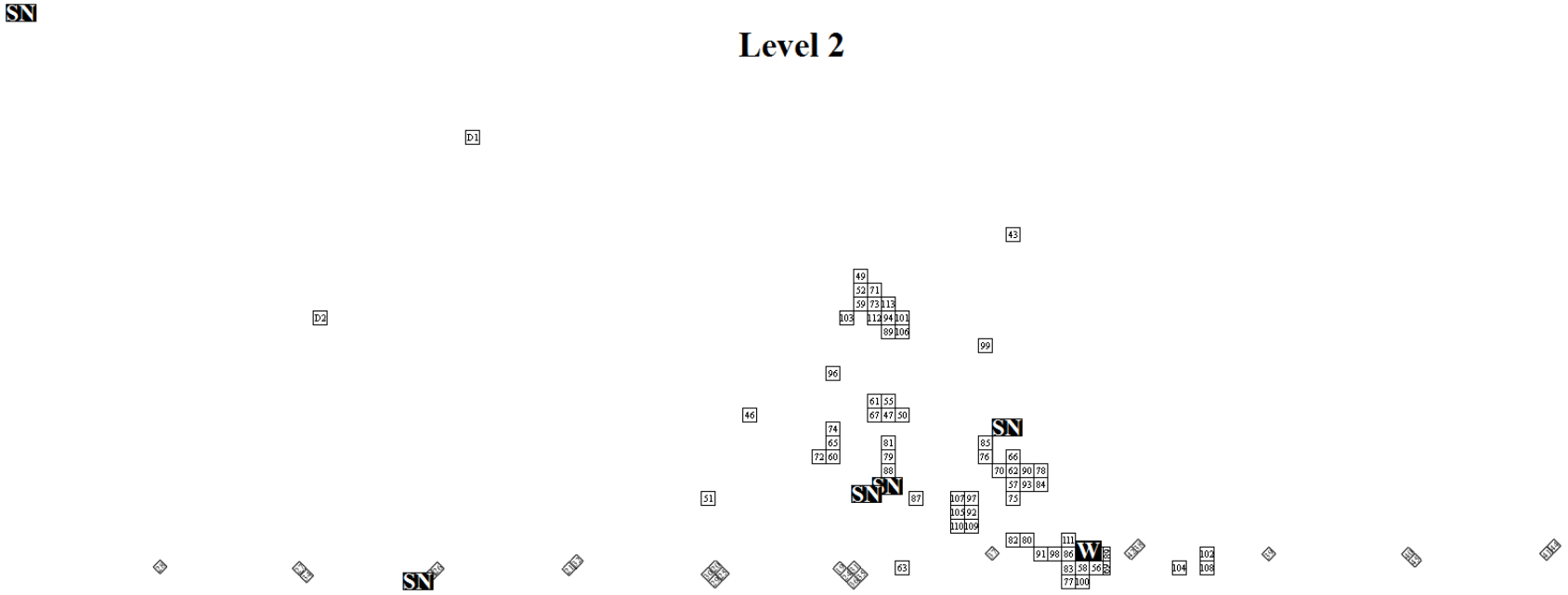
Appendix 9
Level 1 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



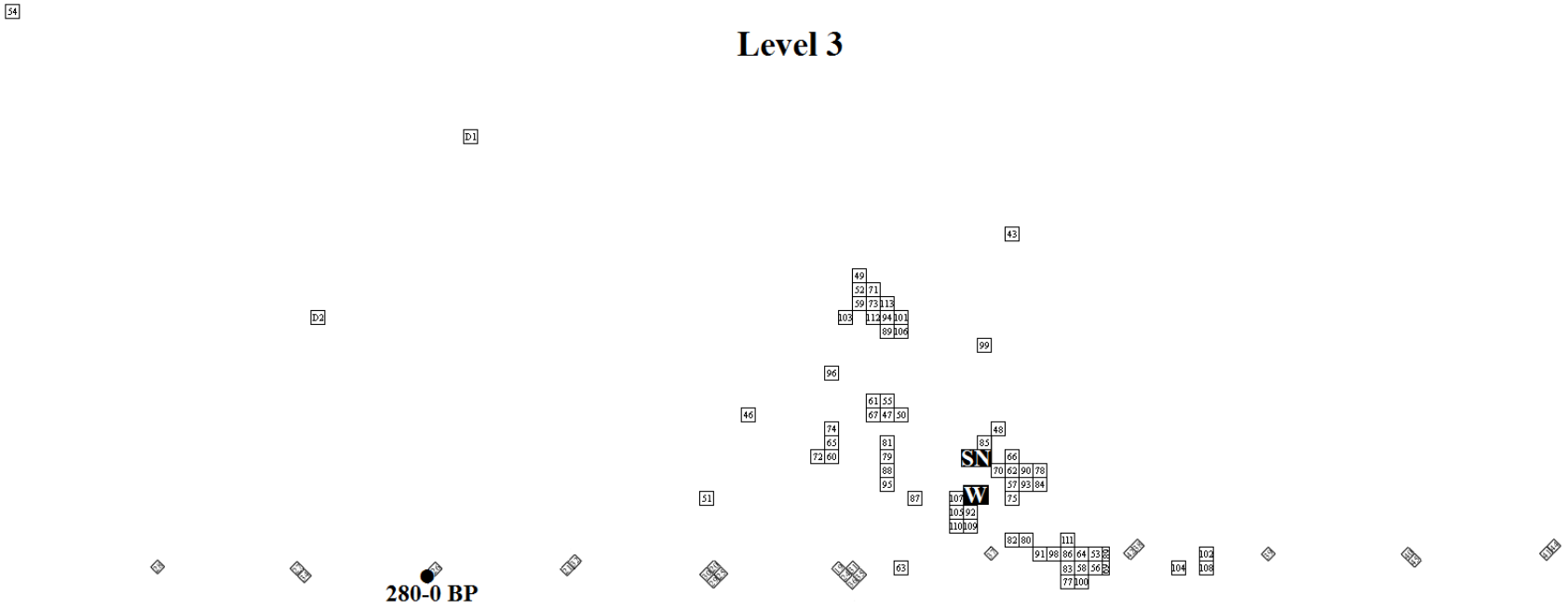
Appendix 9
Level 2 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



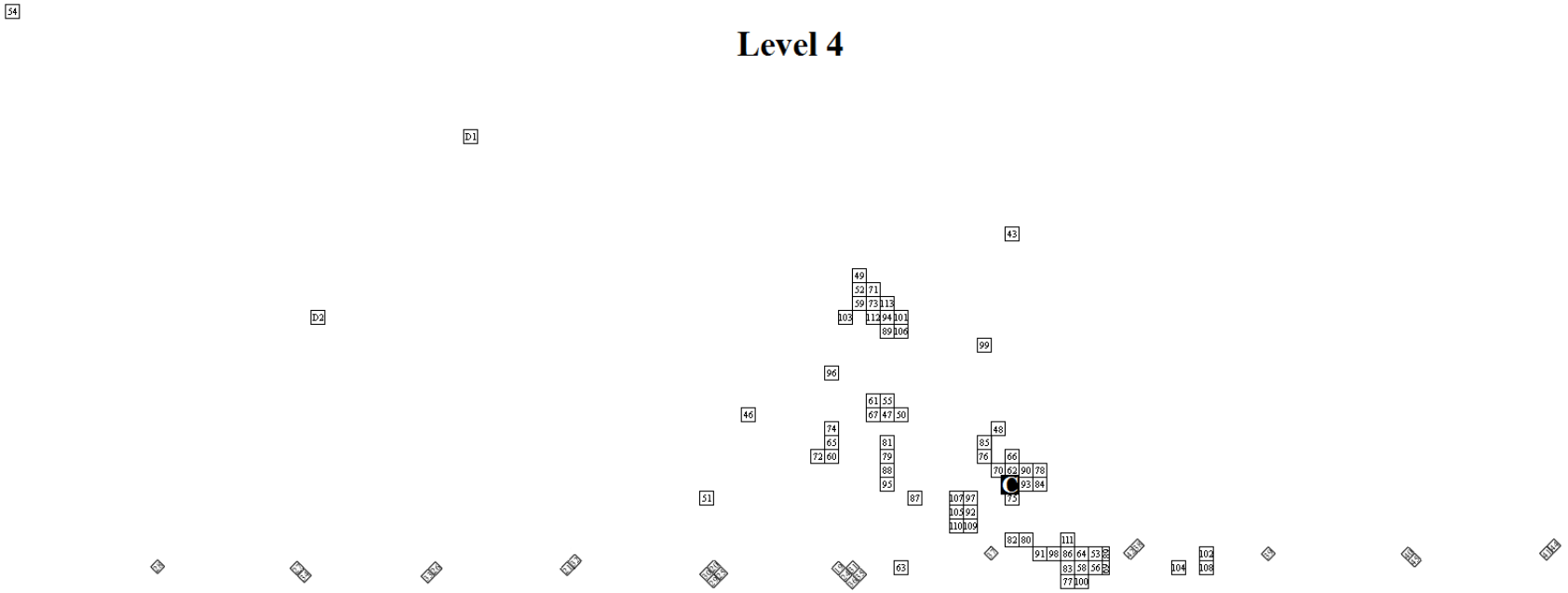
Appendix 9
Level 3 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



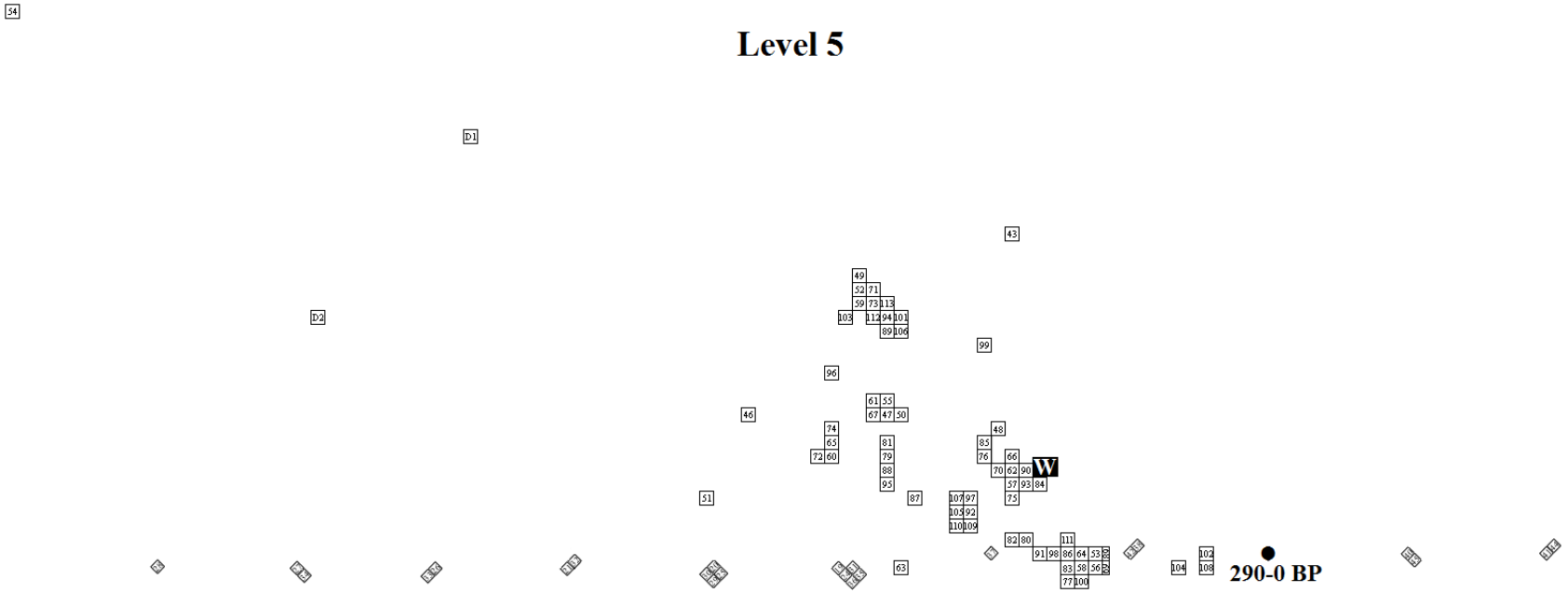
Appendix 9
Level 4 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



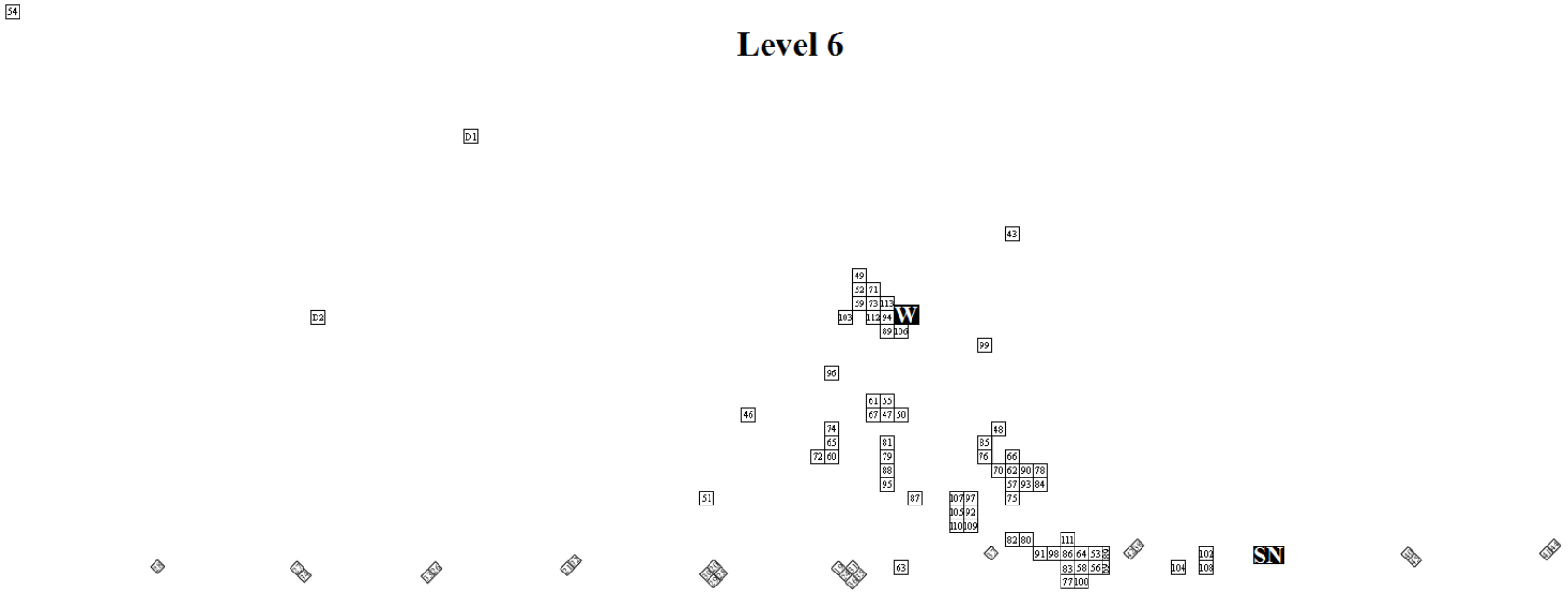
Appendix 9
Level 5 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



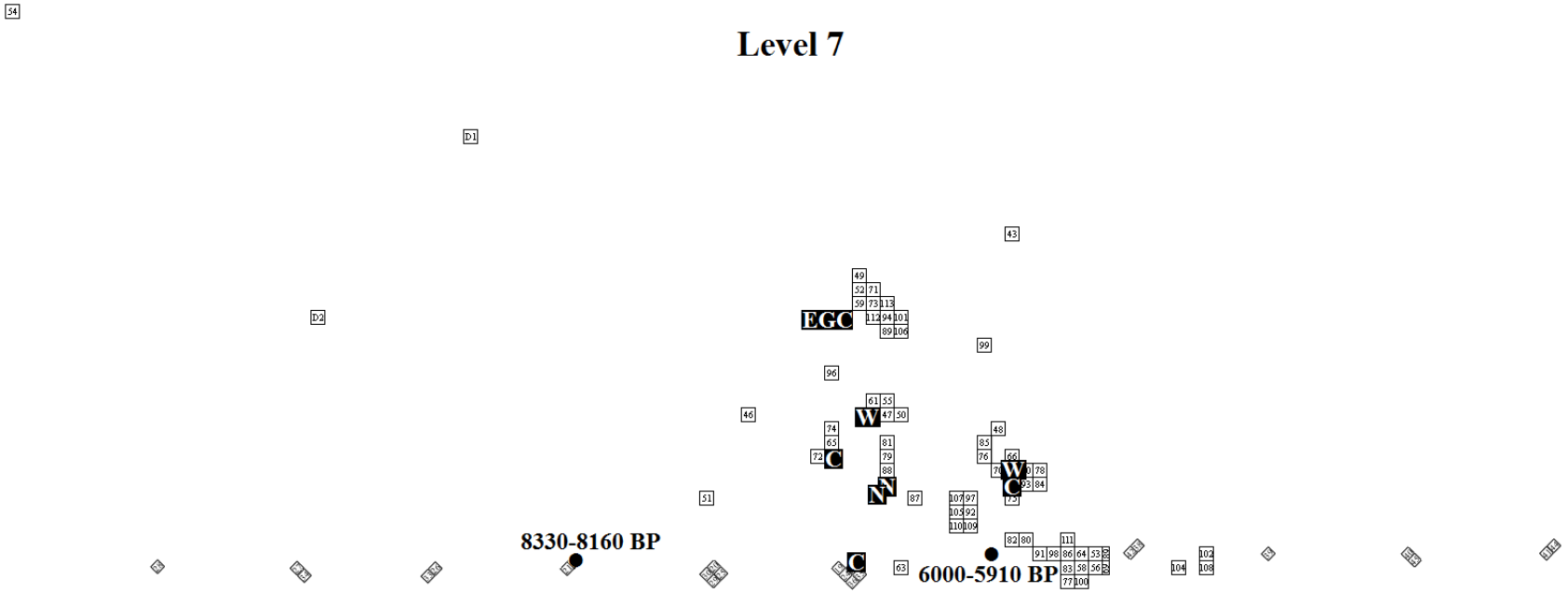
Appendix 9
Level 6 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



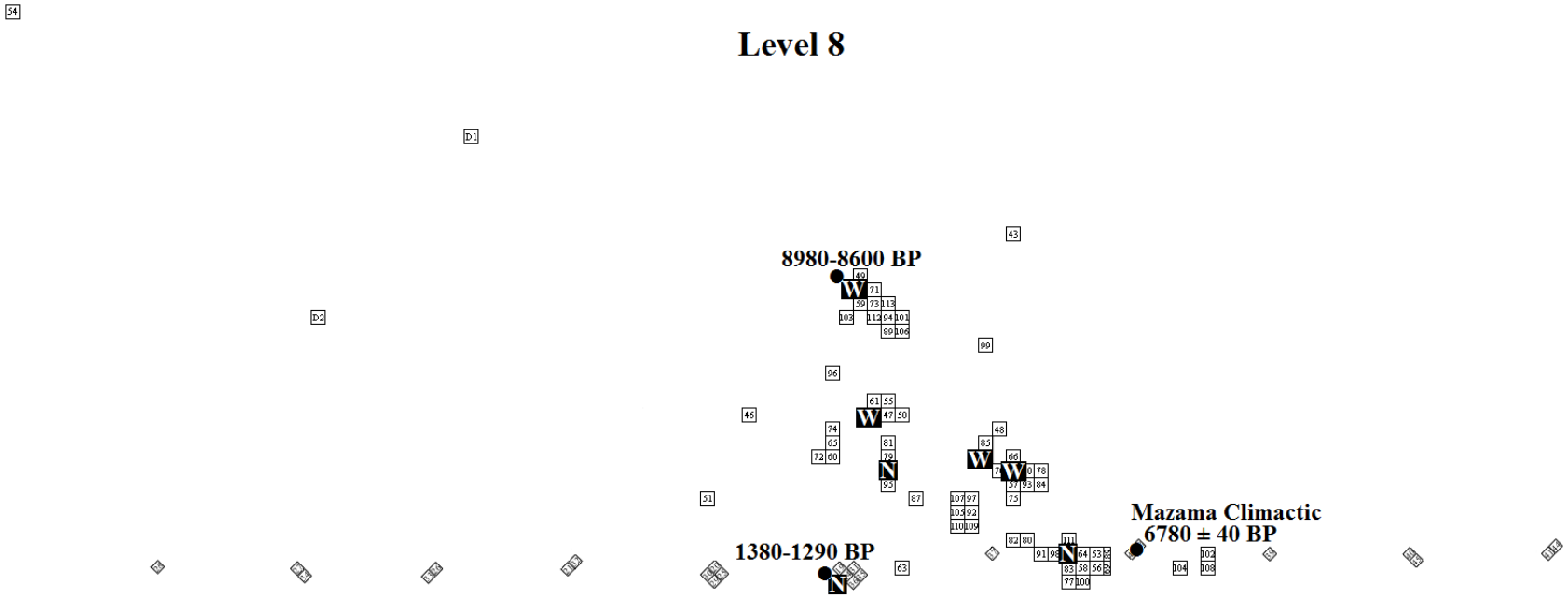
Appendix 9
Level 7 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



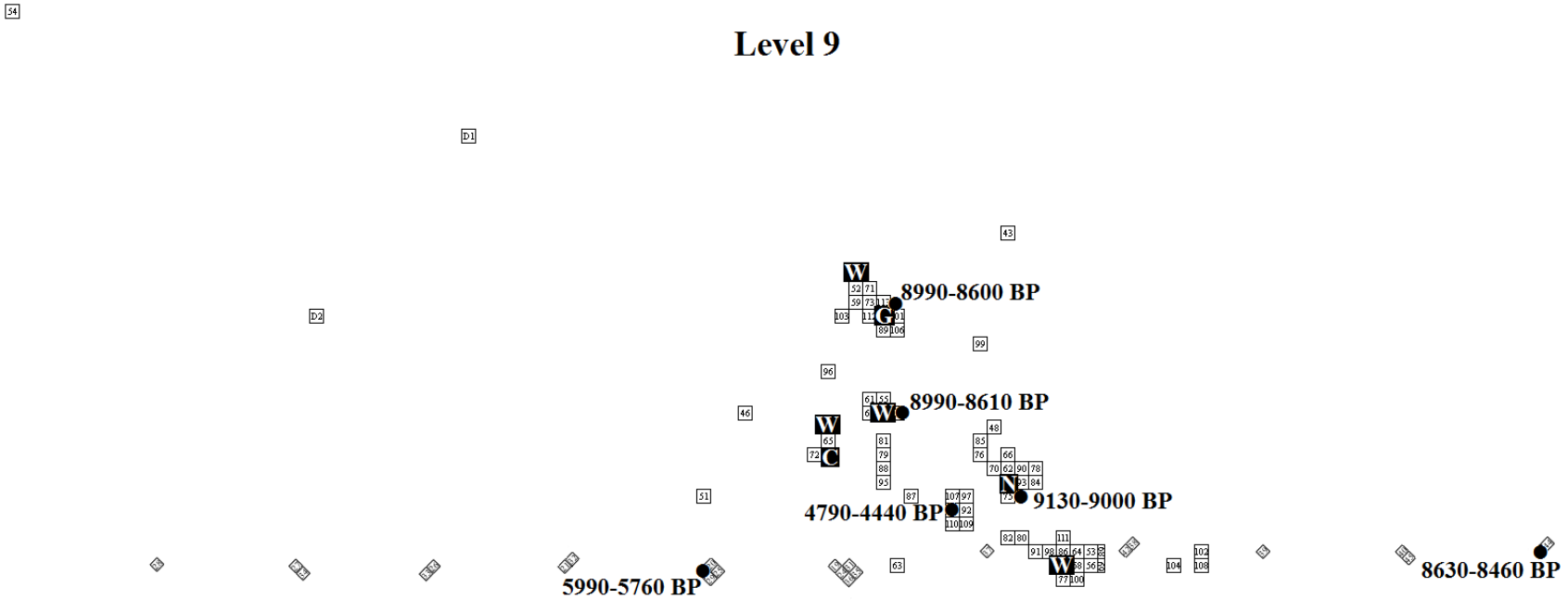
Appendix 9
Level 8 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



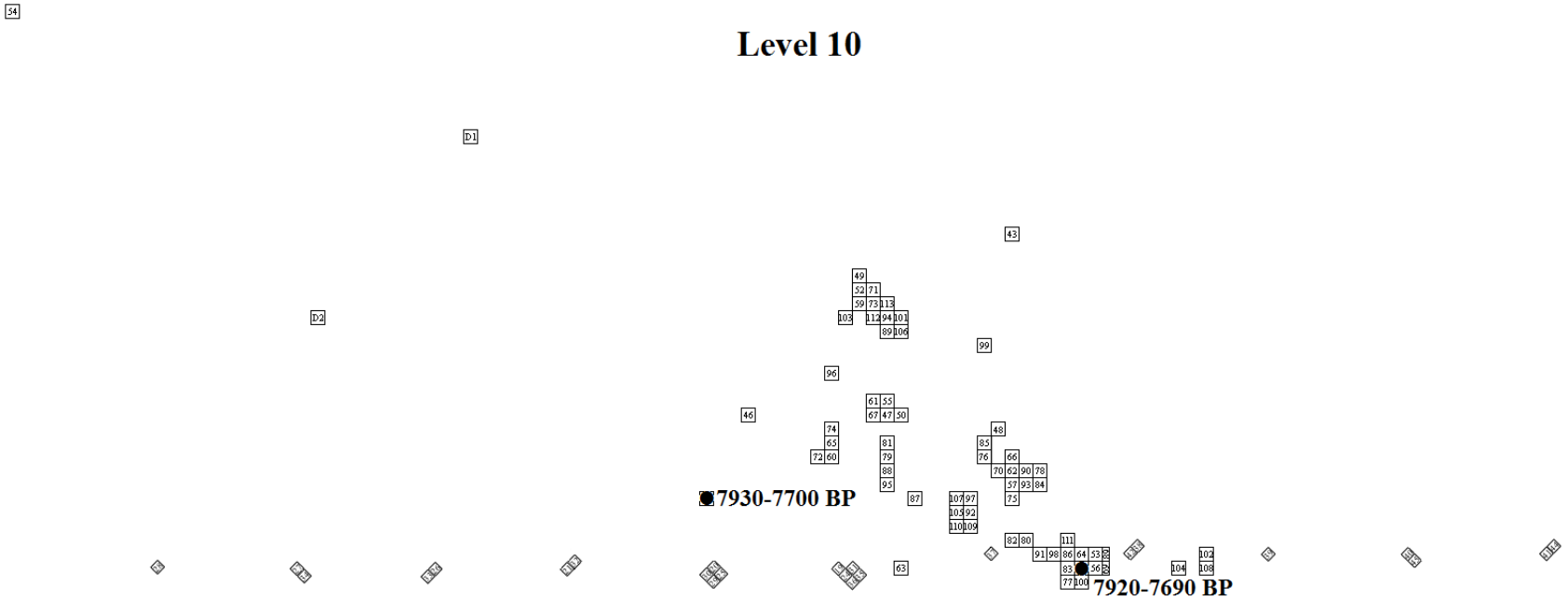
Appendix 9
Level 9 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



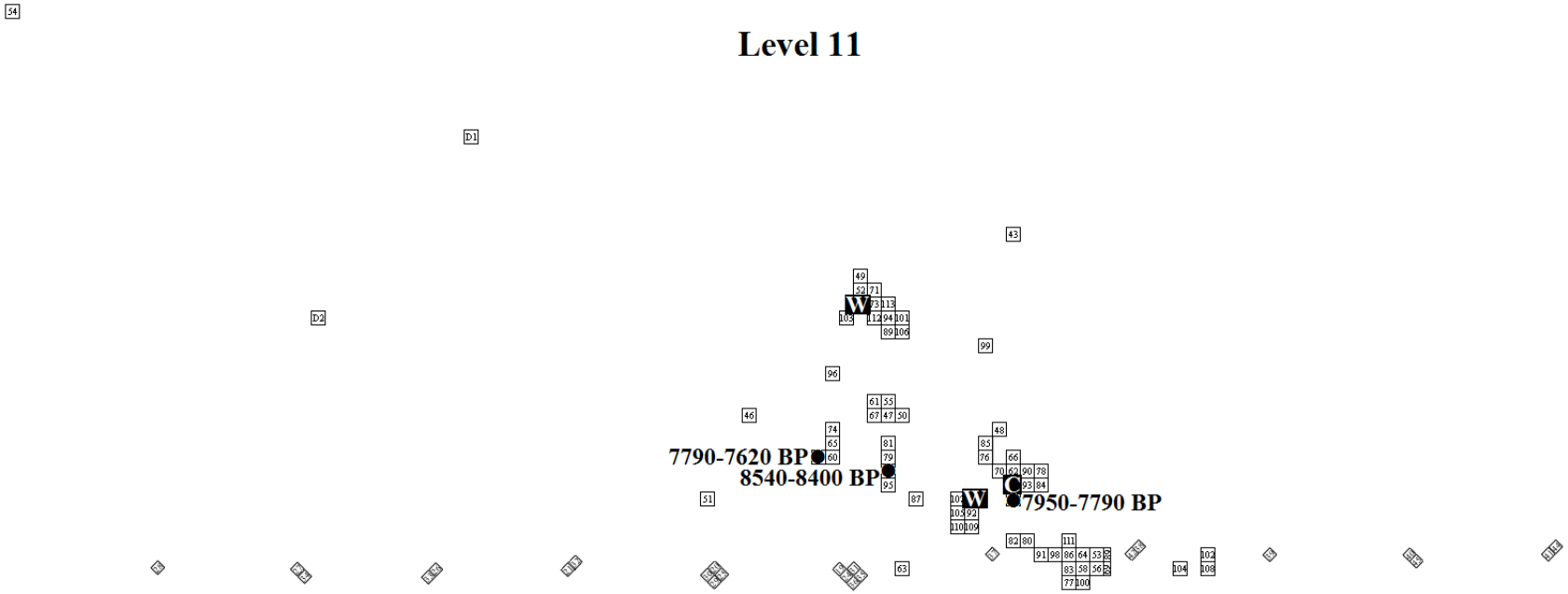
Appendix 9
Level 10 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



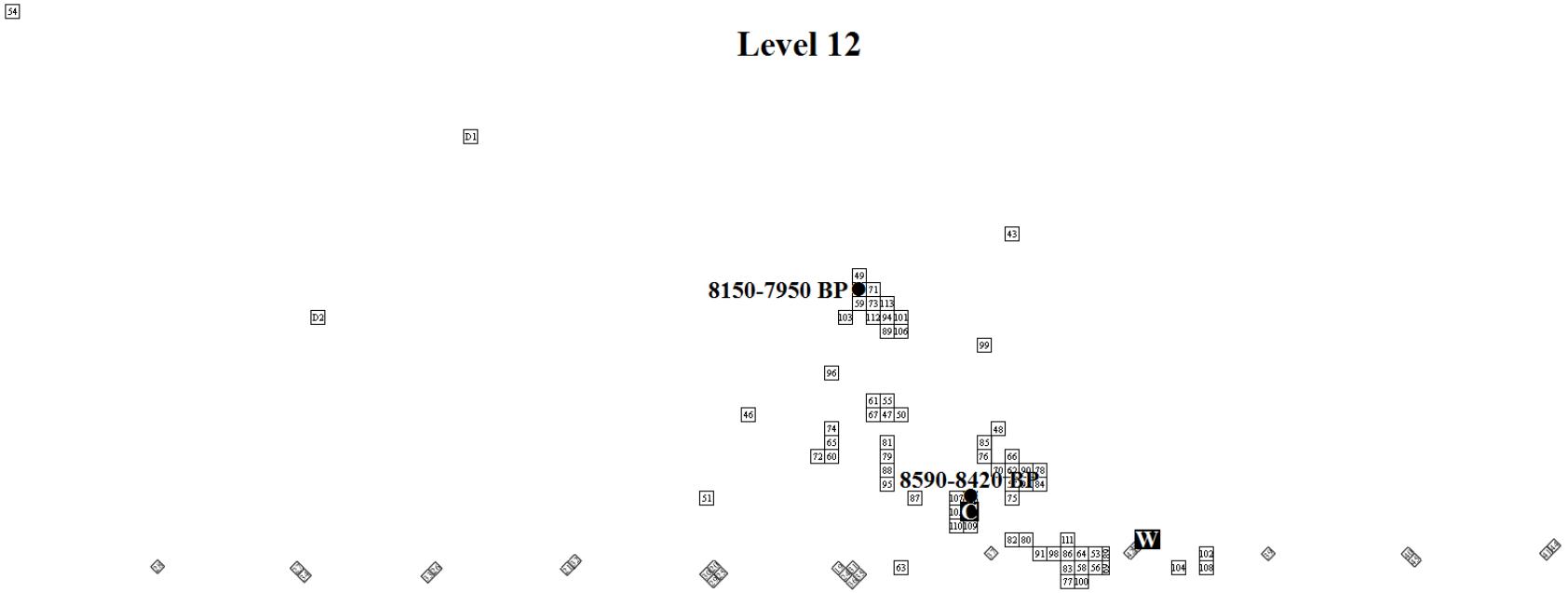
Appendix 9
Level 11 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



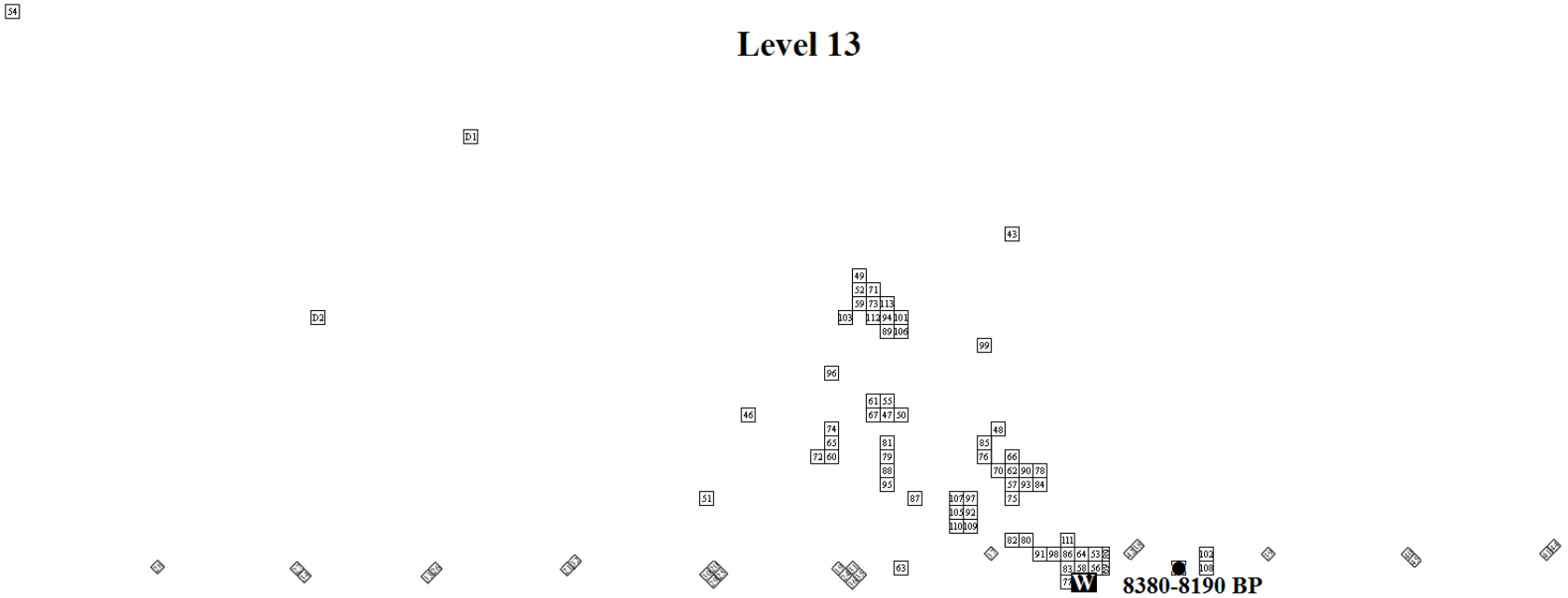
Appendix 9
Level 12 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



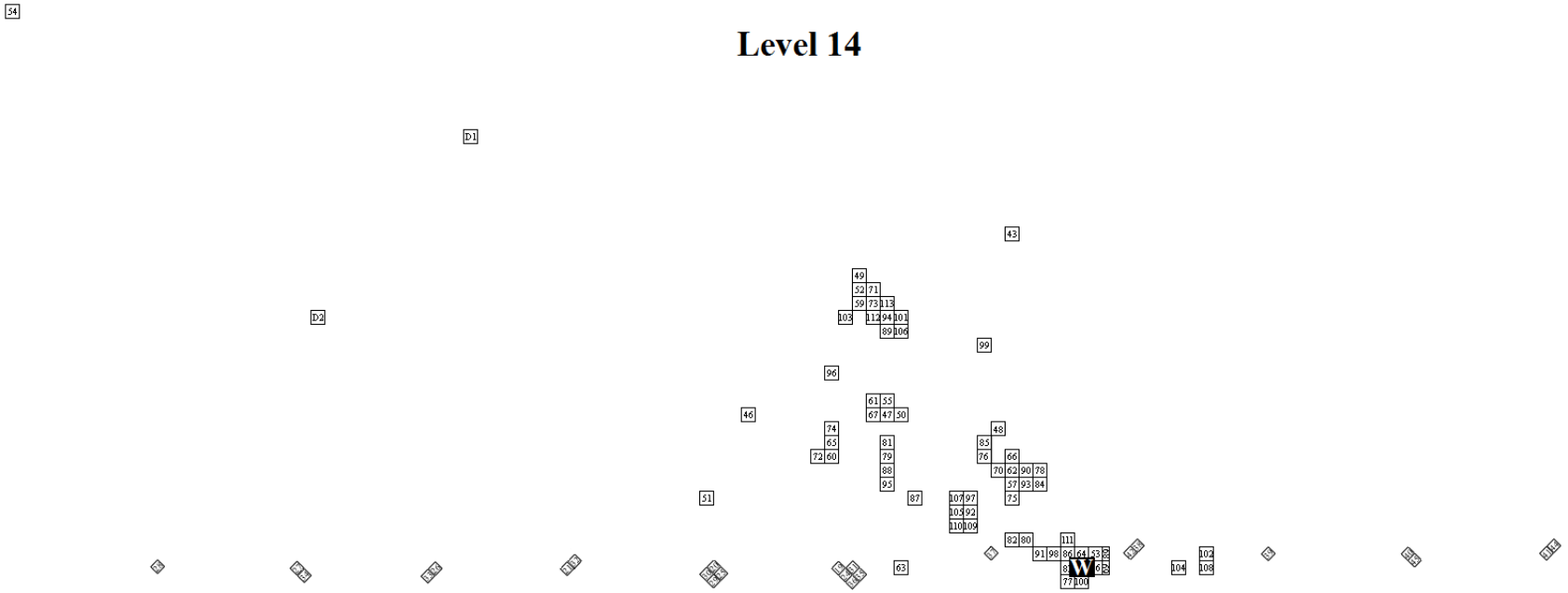
Appendix 9
Level 13 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



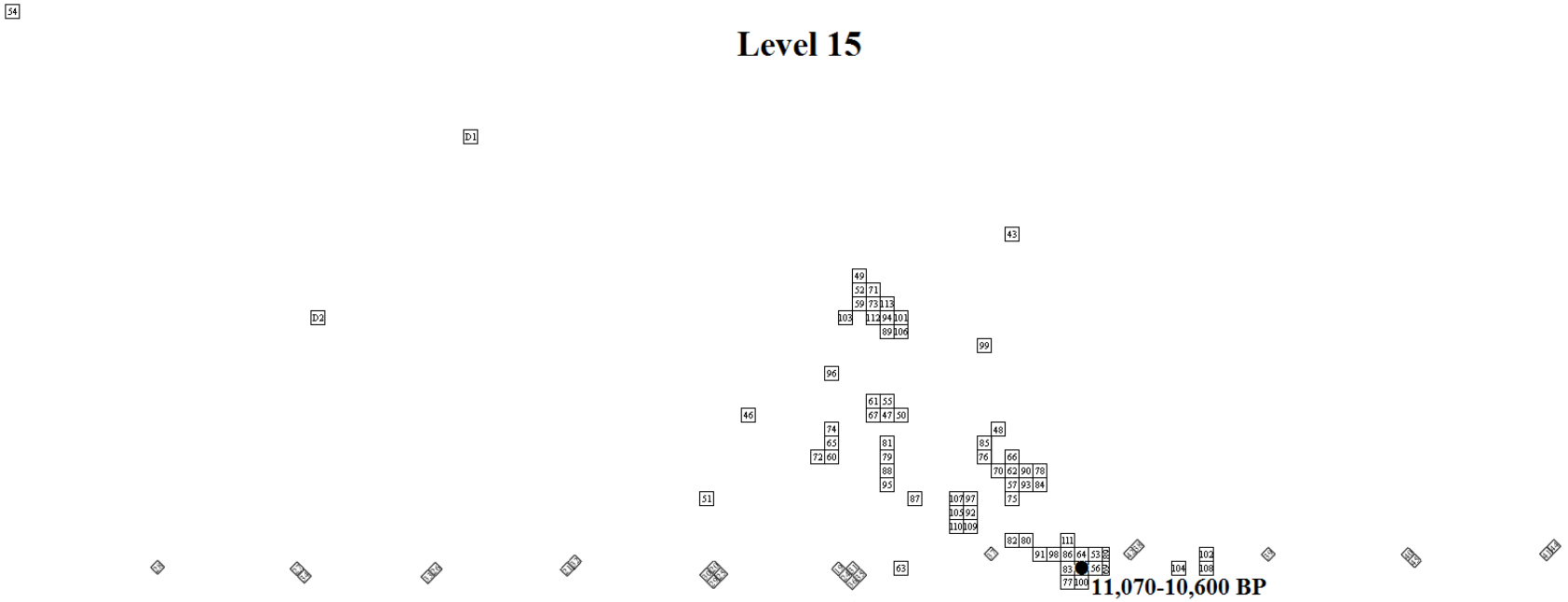
Appendix 9
Level 14 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



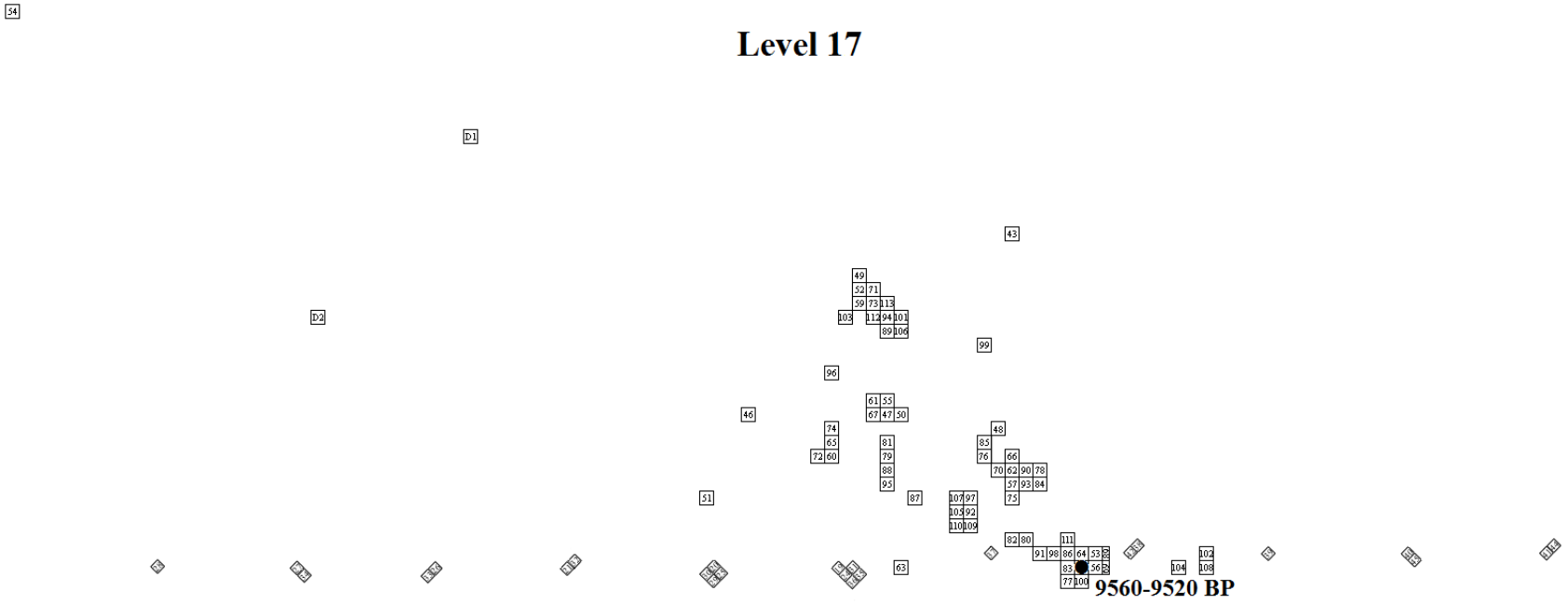
Appendix 9
Level 15 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



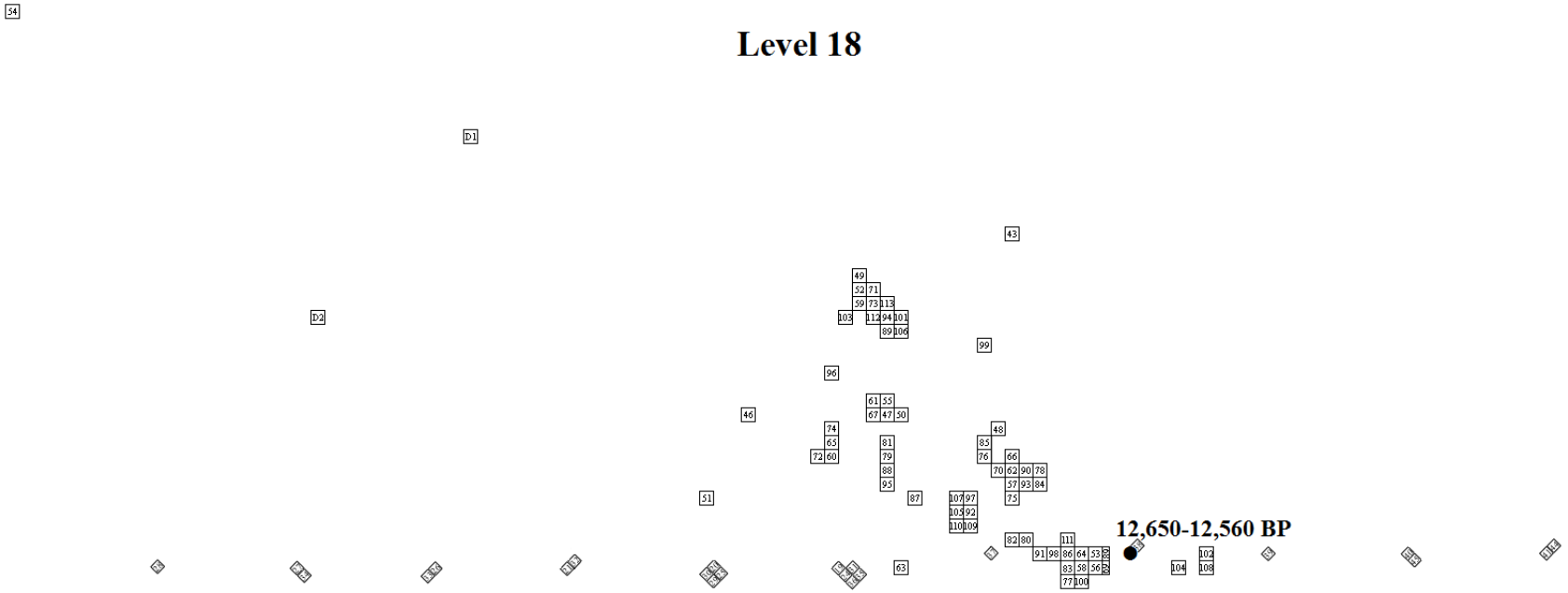
Appendix 9
Level 17 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E
(Level 16 contained no time diagnostic tools or radiocarbon dates.)

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



Appendix 9
Level 18 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.



Appendix 9
Level 19 Distribution of Time Diagnostic Tools and Radiocarbon Dates in Area E

W = Windust/Stemmed point; C = Cascade point; G = Goshen/Plainview point;
SN = side-notched point; NW = net weight; EGC = edge-ground cobble.

