THESIS

A CAMP OF POINTS AND TROUBLESOME: SPATIAL AND LITHIC PERSPECTIVES ON SITE STRUCTURE AND MOBILITY AT PORCUPINE PEAK (5ST98), COLORADO

Submitted by

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ABSTRACT

A CAMP OF POINTS AND TROUBLESOME: SPATIAL AND LITHIC PERSPECTIVES ON SITE STRUCTURE AND MOBILITY AT PORCUPINE PEAK (5ST98), COLORADO

This thesis presents the results of an archaeological investigation at Porcupine Peak (5ST98), a prehistoric camp excavated in the late 1970s, situated in Summit County of the Colorado Rockies. Although excavated nearly 50 years ago, the site had never received an official report until now. This thesis presents the first detailed analysis of the site's artifact assemblage and spatial organization, drawing on newly compiled provenience data and lithic descriptions. Spatial analysis was used to examine artifact distribution and identify activity areas, while lithic attributes provide insights into reduction strategies and raw material use. These patterns are integrated into a study of site structure and land use, with particular attention to mobility strategies in the high-altitude environment of the Colorado Rockies. Typological analysis of projectile points indicates traces of occupations spanning ~12,000 BP to ~410 BP, with Late Archaic use (3,000–1,800 BP) dominating the record. This conclusion is supported by the high frequency of Late Archaic corner-notched dart points, radiocarbon dates, and the intensive use of Troublesome chert. ArcGIS Pro was used to conduct horizontal and vertical spatial analysis, revealing a dominance in Late Archaic activity within a high elevation environment and evidence for activity areas related to camp use. Analysis of Kremmling (Troublesome) chert shows that distance from the quarry shaped lithic use, with Porcupine Peak reflecting curated technological strategies and the careful management of non-local stone alongside expedient local materials. The results suggest that Porcupine Peak functioned as a temporary camp site, primarily used during the Late Archaic, where tool maintenance, cooking, and food processing took place. This study contributes to understanding hunter-gatherer mobility, site use, and high-altitude adaptations in the Colorado Rockies.

ACKNOWLEDGMENTS

This research would not have been possible without the generosity, patience, and wisdom of the people who guided me along the way. Their encouragement and insight were invaluable throughout this process. The project was supported by the resources of the Center for Mountain and Plains Archaeology (CMPA) and funded in part by the Jim and Audrey Benedict Endowment for Mountain Archaeology, which made both my research and graduate education possible. I am also grateful for the support I received from the National Park Service and Rocky Mountain National Park, which funded my graduate research assistantship and stipend for one year. I am grateful for the support of the organizations that recognized my work. In 2024, the Plains Archaeological Society awarded me for my Graduate Student Poster at the 81st Annual Plains Conference, and in 2025 I received the Eugene Eisenbarth Memorial Graduate Scholarship from the Loveland Archaeological Society of Colorado. These awards not only helped with my educational expenses but also provided encouragement and confidence in the work I was pursuing, reinforcing my commitment to the field of archaeology.

My graduate advisor and mentor, Dr. Jason LaBelle, has been a constant source of encouragement and guidance throughout this thesis. I first met him near the end of my bachelor's degree, in the basement of the Clark Building, cataloging the Woodward Collection full of children's moccasins, unsure of my next steps. He invited me to attend his field school, a decision that, little did I know at the time, would change the course of my life. From there, he consistently provided direction that helped me navigate the research process, introducing me to key resources at the Center for Mountain and Plains Archaeology (CMPA) library and sharing his extensive knowledge. The opportunities he offered for hands-on learning, including knapping activities in class, hiking in Rocky Mountain National Park, and exploring mountain archaeology, not only fueled my excitement but also deepened my understanding and helped me discover my passion for the field. His encouragement and thoughtful feedback, both in class and throughout the thesis, guided me through the process and shaped the direction of this work. I am deeply grateful for his mentorship, support, patience, and dedication to my growth as a scholar.

I am deeply grateful for the friends I have made along the way, whose support, humor, and encouragement made this journey both enjoyable and meaningful. I especially want to acknowledge the friends I met during the 2022 Field School, Mikayla Gonzales, Autumn Haase, Kelsy Kreikemeier, Caelie McCuster, and Kayla Rhode, who not only became close friends but also helped me laugh at my mistakes and reminded me of my capabilities. I am also thankful to the 2022 Field School crew chief, Kelton Meyer, and crew members Spencer Little and Robert Madden, for their guidance and support over the years. I would like to recognize Erika Brooks and Kim Biela for their encouragement and thoughtful advice throughout my graduate experience. Finally, I am grateful to Dalton Pierce, Riley Limbaugh, and Elaine Henson for their friendship, for being there when I needed a break, and for making sure I got out of the house once in a while during long periods of research and study.

I would also like to thank the Geospatial Centroid at Colorado State University for their assistance and support while I was working with ArcGIS Pro. In particular, I am deeply grateful to Joshua Reyling, whose guidance and troubleshooting expertise helped me resolve numerous technical challenges. His patience and willingness to teach me how to approach and prevent similar issues in the future were invaluable to the completion of this project.

I am especially grateful to Dave Swinehart, who was part of the Cabin Creek East Dillon Powerline Project and was present the day Porcupine Peak was discovered. Over a cup of coffee, he generously shared stories and photographs from the project, offered his thoughts on the site, and told me about Dr. Morris. This interaction was one of the most exciting parts of my thesis; it was inspiring and energizing to talk to someone so passionate about archaeology, and it deepened my enthusiasm for the work I was doing. I hope my future is filled with meeting more kind and generous people like him.

I wish to acknowledge Dr. Elizabeth Morris, whose work and discovery of Porcupine Peak made this thesis possible. Although I never had the privilege of meeting her, her discovery of Porcupine Peak created the opportunity for this project, and her example as a distinguished archaeologist and woman in the field has been a lasting source of inspiration. Her contributions not only advanced archaeological knowledge but also provided me with the opportunity to engage with a site that has become central to my own research and professional growth.

I would also like to thank my committee members for their support and inspiration. Dr. Sarah Payne, from the History department, brought energy and enthusiasm to my thesis. Her encouragement reminded me of the joy in pursuing research I care about. Dr. Mary Van Buren, who has been my professor at CSU for six years, was another major inspiration for me as a woman in the field of archaeology and anthropology. She challenged me, built my confidence, and was there when I needed support. I am deeply thankful for everything she has done for me and for the lasting memories she gave me during my time at Colorado State University.

DEDICATION

This thesis is dedicated to my sister, Mariah, for our shared love of mountains, rocks, and science, and to my family and loved ones for their endless love and encouragement. I also dedicate it to all who look upon the mountains and wonder about the ancient stories they hold.

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CHAPTER I: INTRODUCTION

Porcupine Peak (5ST98) is a pre-contact Native American site situated on the Snake River in Summit County, Colorado (Figure 1). Although within the boundaries of the Arapaho National Forest, management of this parcel falls under the jurisdiction of the White River National Forest. In 1975, Dr. Elizabeth Ann Morris was contacted by William Davies of the Public Services of Colorado to conduct a reconnaissance for the Cabin Creek East Dillon Powerline Project. That fall, Dr. Morris and James R. Marcotte directed a survey crew composed of Lewis Arthur Hutchinson, Stephan A. Riley, and L. David Swinehart, during which the site was first identified (Morris and Marcotte 1975) (Figure 2 and Figure 3). Colorado State University (CSU) recommended testing of the site due to a rich surface collection of nine projectile points, 91 flakes, and hearths in the exposed cutbank of the Snake River. During the 1977 and 1978 field seasons, CSU excavated approximately 94 square meters at the site. In 1980, Porcupine Peak was formally recognized on the National Register of Historic Places.

Figure 1. Left: The 1977 excavation crew uncovering a hearth feature at Porcupine Peak. Right: The 2024 CMPA team revisits the same location, observing that erosion from the river has removed the bank.

Figure 2. Cabin Creek – East Dillon Line Rebuild project for Colorado Public Service, Clear Creek and Summit Counties, Colorado, 1975. Breakfast at the first campsite. Left to right: Steve Riley, Art Hutchinson, and Jim Marcotte. Photograph by Dave Swinehart.

Figure 3. Cabin Creek – East Dillon Line Rebuild project for Colorado Public Service, Clear Creek and Summit Counties, Colorado, 1975. Crossing the Snake River on a suspended two-cable bridge near 5ST98. Left to right: Liz Morris and Sparky. Photograph by Dave Swinehart.

Although Porcupine Peak was identified, excavated, and formally listed on the National Register of Historic Places, no final report was produced until the present study. As a result, the site's significance has never been fully discussed, leaving key questions about the site's occupational history unresolved. This thesis addresses that gap by focusing on a fundamental question: Does Porcupine Peak represent a single-component occupation?

The potential for identifying a single-component occupation at Porcupine Peak is crucial for addressing long-standing questions of site integrity in mountainous regions. Bioturbation, solifluction, and other post-depositional processes frequently complicate stratigraphic analysis in these landscapes, making it difficult to associate artifacts and features with discrete occupational events. Determining whether Porcupine Peak represents a single occupation, even if partially disturbed, would provide an important opportunity to investigate the spatial and behavioral patterns of a discrete cultural episode.

Single-component sites are particularly valuable because they allow archaeologists to link artifacts and features confidently to a single group or time period. In contrast, multi-component sites, where deposits from multiple occupations overlap, often obscure behavioral patterns and make it challenging to reconstruct settlement strategies, resource use, or chronology. By isolating a single occupation, researchers can refine regional chronologies, test models of seasonal use, and assess hypotheses regarding site structure and resource exploitation (Guthrie et al. 1984). The research questions posed by Eighmy (1984) and Guthrie et al. (1984) regarding Archaic land use and mobility in the Platte River Basin remain highly relevant today (Gilmore et al. 1999). Progress has been limited by the scarcity of well-preserved, single-component assemblages, which provide the clearest insight into the behaviors and activities of specific groups.

Archaeologists have long emphasized the need for more such sites, as they allow clearer interpretation of artifact distributions, activity areas, and subsistence strategies (Brunswig 2005).

In North Park and South Park, Lischka et al. (1983) documented 41 Late Archaic components, of which 20 were single-component sites (commonly isolates). Artifacts from these sites, including several corner-notched points, allow researchers to directly associate tool types with specific occupations, enhancing understanding of technological organization in the region. For example, the Scratching Deer site (5BL69) in western Boulder County exemplifies how single-component sites reveal detailed aspects of camp life. Situated in an upper subalpine forest, the site shows that although few tools were discarded, waste flakes indicate extensive resharpening of scraping and cutting tools and production of new tools from imported, heat-treated raw materials (Benedict 1975). With a radiocarbon date of 1260 ± 95 radio-carbon years before present (RCYBP), Scratching Deer provides an unambiguous window into the technological strategies and resource use of its occupants (Benedict 1975).

Another example is the Blue Lake Valley site in the Indian Peaks Wilderness, which provides insight into specialized hunting strategies above timberline. The site contains a circle of stones likely used for concealment during ambush hunting, along with at least five butchering tools (Benedict 1979). A radiocarbon date of 3215 ± 90 RCYBP confirms the Late Archaic context, offering a clear view of high-altitude hunting practices (Benedict 1979).

Determining whether Porcupine Peak (5ST98) represents a single occupation is the central focus of this study, in addition to developing the first official report of the site. On the surface, the site appears to represent a single-component occupation due to the high proportion of Kremmling Chert (a small part of the Troublesome formation), which suggests a focused selection of non-local lithic material and a potentially more restricted occupational history. This is further supported by the dominance of Late Archaic corner-notched dart points present within the assemblage. If this analysis demonstrates that the site does represent a single occupation, then Porcupine Peak would have the potential to significantly advance understanding of Late Archaic mobility, camp organization, and resource exploitation within the Colorado subalpine.

Research Questions:

This thesis seeks to answer five central questions. The first is concerned with the first official report on what makes up the Porcupine Peak assemblage. It asks: (i) *What is the nature of the assemblage recovered from Porcupine Peak (5ST98)?* The second research question is concerned with the spatial organization of the site. It asks: (i) *What is the spatial distribution of artifacts across Porcupine Peak (5ST98)?* and (ii) *Where are the high-resolution (dense artifact concentrations) areas that will be prioritized for further analysis?* The third research question is concerned with the vertical distribution of artifacts across the site within the high-resolution areas identified. It asks: (i) *What is the vertical distribution of artifacts in high-resolution excavation areas?* and (ii) *What does vertical analysis reveal about site integrity?* The fourth research question seeks to understand the occupational function of the site. It asks: (ii) *What do the assemblage and spatial distributions within high-resolution areas reveal about the time of occupation, site function, and site structure?* (ii) *How were activities organized across the site? (iii) What do projectile point distributions indicate about site function and structure?* and *(iv) How does the overall site structure reflect hunter-gatherer organization?* The final chapter questions examine the site and its projectile points in a broader lens. It asks: (i) *Is Porcupine Peak an isolated occupation or part of a wider strategy for exploiting mountainous environments? (ii) Is there a relationship between the blade-edge angles of Late Archaic* *projectile points made from Kremmling chert and their distance from the source quarry? and (iii) What do these patterns indicate about Late Archaic technological strategies?*

Structure of Thesis

This thesis is structured to build from site-specific background and methods, through artifact description and spatial analysis, to broader regional interpretation. Chapter two introduces Porcupine Peak by detailing its physical setting, including geology and geography, along with a summary of past archaeological work at the site. Chapter three outlines the analytical approach, describing the cataloguing system, measurement strategies, and GIS techniques used to record and evaluate the assemblage. Chapter four presents the first comprehensive report of artifacts from Porcupine Peak, including lithic debitage, tools, ground stone, faunal material, features, and a charcoal sample. Chapters five and six focus on spatial analysis: Chapter five addresses horizontal artifact distributions across the site, while Chapter six investigates vertical distributions within high-density areas to evaluate site integrity. Chapter seven expands on these findings by analyzing artifact attributes, such as flake size, cortex presence, burning, tool frequencies, and the relationship between bone and tools, providing insights into how the site was used and organized. Chapter eight situates Porcupine Peak in its regional context, comparing technological characteristics and mobility patterns to other sites in the area to exemplify similarities and differences. Finally, Chapter Nine synthesizes the results of the study and proposes directions for future research at Porcupine Peak.

CHAPTER II – PORCUPINE PEAK LOCATION, SETTING, AND RESEARCH HISTORY

Introduction

This chapter outlines the environmental and research context of the Porcupine Peak site (5ST98) in Summit County, Colorado. Situated in the upper Snake River Valley, the site's high-elevation setting reflects the combined influence of glacial processes, variable hydrology, and seasonal mountain climates. These factors shaped both the resources available to past inhabitants and the formation and preservation of the archaeological record. The sections that follow describe the site's geography, climate, flora, fauna, and geology, establishing the physical foundation necessary to interpret human activity at Porcupine Peak. The chapter also summarizes archaeological investigations beginning with Dr. Elizabeth Anne Morris and James Marcotte in the late 1970s, whose careful fieldwork established the site's significance, and incorporates insights from the 2024 CMPA survey, which documented broader artifact distributions and evidence for multiple occupations across the terrace.

Geography and Climate

The Porcupine Peak site (5ST98) is situated at an elevation of 2,959 meters (9,708 feet) in the central Rocky Mountains, between the Gore Range and the Front Range of Colorado (Figure 4). The site takes its name from Porcupine Peak, which rises directly to the north at 3,596 meters (11,801 feet). Located approximately 80 kilometers (50 miles) west of Denver, five kilometers (3 miles) northeast of Keystone, and 13 kilometers (8 miles) from the town of Dillon, the site occupies a strategic position within the upper Snake River Valley. The Snake River, one of whose headwaters originates near Arapahoe Basin, flows along the southern edge of the site before eventually reaching Dillon Reservoir. Seasonal fluctuations in water levels, ranging from approximately 91 centimeters (3 feet) in spring to 30 centimeters (one foot) in fall (USGS 2023), have contributed to the gradual erosion of hearths and other cultural materials along the riverbank (Mohr 2021).

The immediate terrain is relatively flat, a characteristic often associated with large camps in the archaeological record (Figure 4). This setting not only facilitated excavation but would also have provided an advantageous and comfortable space for past inhabitants. The combination of level ground, nearby water, and access to surrounding uplands made the site well-suited for a range of communal activities, including tool manufacture, food processing, and daily domestic tasks.

The Dillon–Keystone area of Colorado falls within a subarctic climate zone under the Köppen classification system (Weather Atlas n.d.). This climate is characterized by long, cold winters and short, cool to warm summers. Snowfall typically begins in late September and continues into mid-May, averaging more than 2.5 meters (100 inches) annually (United States Climate Data 2025). Summers are brief but mild, with July as the warmest month and January the coldest (United States Climate Data 2025). Overall, annual precipitation is relatively low but occurs year-round in various forms. These conditions would have strongly influenced seasonal mobility, resource use, and the preservation of archaeological materials at Porcupine Peak.

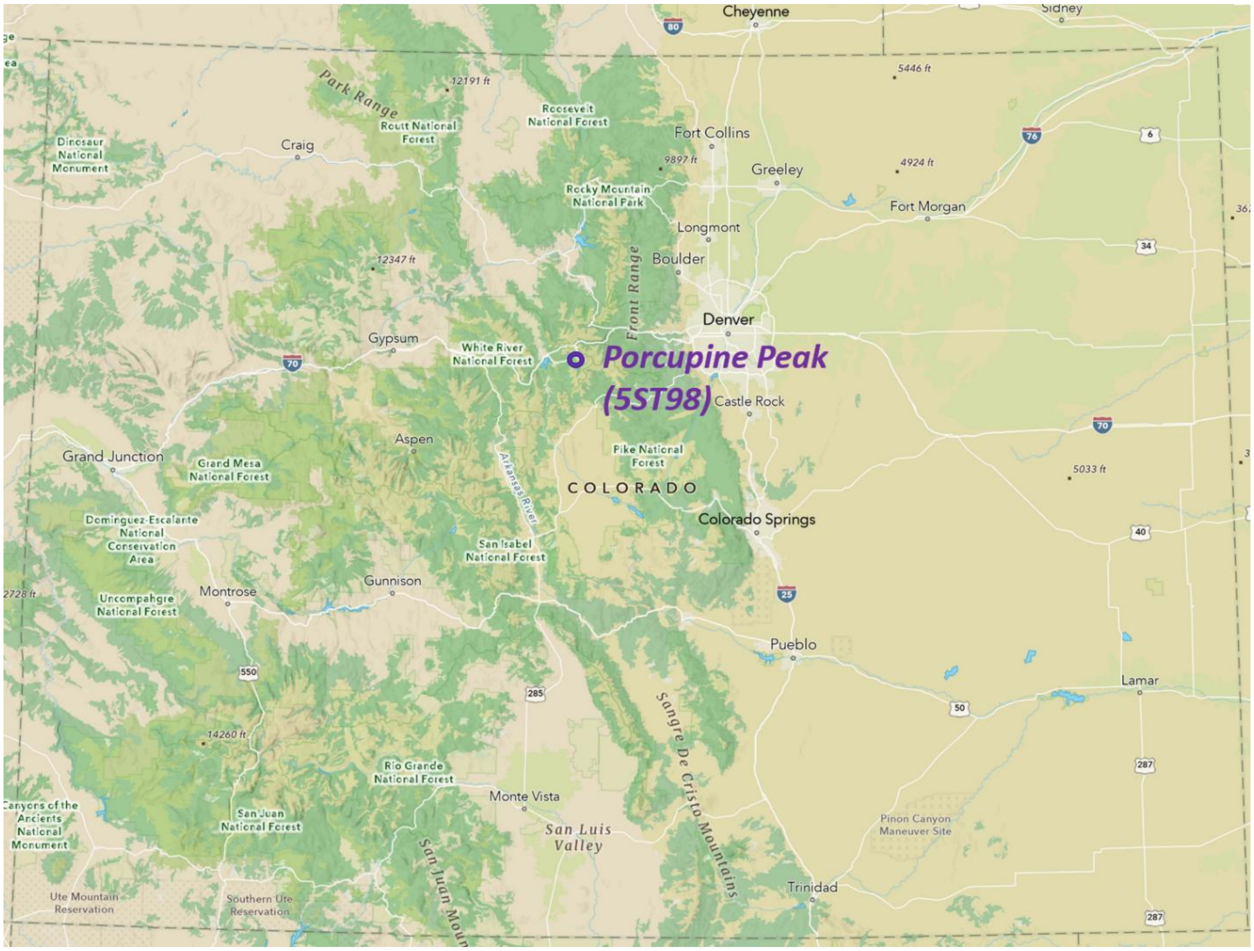

Figure 4. Location and setting of the Porcupine Peak site (5ST98) in the upper Snake River Valley, central Colorado.

Flora and Fauna

Porcupine Peak (5ST98), at 2,959 meters (9,708 feet), lies within the subalpine forests (Benedict 1991). The area is dominated by lodgepole pines and quaking aspens, with an understory of shrubs and herbaceous plants. The fauna reflect this diverse forested environment. Small mammals such as pine squirrels and numerous woodpecker species inhabit the forests, while large game animals, including moose, elk, and mule deer, frequent the area, particularly near the Snake River. Historically, black bears, bobcats, coyotes, and wolves were also present. The Snake River supports several trout species, adding freshwater resources to the landscape.

Geology

Porcupine Peak (5ST98) is situated on a valley-floor terrace composed of alluvial and colluvial deposits dating from the Late Pleistocene to Holocene (Macrostrat 2025; Kellogg et al. 2008). The terrace lies about two meters above the modern Snake River and slopes steeply toward the valley axis, which has influenced how sediments and artifacts have moved over time (Benedict 1975–1979) (Appendix A). The terrace sediments include coarse sand and gravels ranging from small pebbles to large boulders, reflecting both water transport and material washed down from nearby slopes (Benedict 1975–1979). Charcoal layers within these deposits provide opportunities for radiocarbon dating, offering a way to understand when the terrace and site formed (Benedict 1975–1979).

The site is located just south of a lateral moraine, likely formed during the Pinedale glaciation. Large boulders and a variety of rock types from the moraine have contributed to the terrace through slopewash and colluvial processes (Benedict 1975–1979). The sediments are layered, with pebbles and cobbles mostly lying flat and showing little rounding, suggesting they did not travel far from their source. These features indicate that the terrace formed mainly through colluvial deposition, possibly combined with a collapsed glacial feature known as a kame terrace, rather than as a classic outwash terrace (Benedict 1975–1979). The abundance of angular boulders and variety of lithologies further support this interpretation (Benedict 1975–1979).

Porcupine Peak is also strategically positioned near several lithic sources, including Kremmling Chert, Windy Ridge quartzite, and Table Mountain jasper (Madden 2022). The Snake River and its tributaries provided natural routes connecting Porcupine Peak to nearby lithic sources, including Kremmling Chert, Windy Ridge quartzite, and Table Mountain jasper, enabling tool production and resource procurement. Overall, the terrace's slope, sediment composition, and proximity to glacial features have shaped artifact preservation and site formation, providing critical context for understanding human activity at Porcupine Peak (Benedict 1975–1979).

History of Archaeological Investigation at Porcupine Peak

The first systematic archaeological investigations at Porcupine Peak (5ST98) were conducted in 1977 under the direction of Dr. Elizabeth Anne Morris (Morris 1975). In 1977, Dr. Morris, serving as the field school director, and James Marcotte returned to the site with a crew that included Jay Beyer, Ian Von Essen, Daniel Mayo, Mona Bucher Hutchinson, and Kathy Knull. Initial work began with a surface survey, during which the team collected lithic flakes, tools, and ground stone materials. Notably, no pottery was recovered from site 5ST98. This absence is significant, as sites containing pottery were documented during the original powerline survey, indicating that the investigators were familiar with identifying ceramic material in the mountain environment. These efforts laid the groundwork for a more systematic approach to excavation.

The excavation strategy involved establishing a cardinal grid system and a fixed datum point. General surface collections were conducted with reference to horizontal provenience, aiding in the identification of site boundaries, distinct features, and areas of potential subsurface deposits. A total of 94 one-by-one-meter excavation units were selected based on these criteria. Excavation levels were generally removed in ten-centimeter increments, with select units excavated in finer 2.5-centimeter increments to better capture stratigraphic and geological variation. Sediments were screened through a ¼-inch mesh to ensure recovery of small artifacts.

Between July 11–15, 1977, the initial crew excavated forty test units, revealing a substantial subsurface component and clarifying the extent of the site. Excavations resumed in 1978, with a second crew comprising Marilyn Andrews, James Angell, Brian Browning, Timothy Montross, Deborah Nordeen, Al-Saloom, Duncan McCollum, Suzanne Wilcock, Susan Wilson, Alan Brace, David Grimes, and Lisa Hutchinson. This team completed an additional 54 excavation units, bringing the total to 94. Dr. James Benedict provided expertise on site dating, stratigraphic descriptions, and interpretation of the geological context (Benedict 1975–1979) (Appendix A). Based on the estimated total site area of approximately 3,600 square meters, only about 3% of the site was excavated (Marcotte 1978; Labelle and Kuhr 2025).

Following the 1978 excavations, Dr. Morris prepared a nomination form for the National Register of Historic Places (NRHP). In her 13-page submission, she emphasized the site's significance, noting its numerous occupational components, extensive time range, and diversity of artifact types, which together suggest a variety of past cultural activities. Porcupine Peak was formally recognized on the NRHP in 1980, marking an important milestone in the documentation and preservation of high-altitude prehistoric sites in Colorado.

James Marcotte contributed extensively to the excavation and subsequent analysis of Porcupine Peak. Although he had intended to produce a thesis based on the site, the project was never completed. His meticulous excavation work, detailed notes, and analytical efforts provided a solid foundation for understanding the site and its artifact assemblage. Marcotte's contributions remain central to the reconstruction and interpretation of site structure and stratigraphy. Following the original fieldwork, Jason LaBelle retrieved the collections from Dr. Morris to enable continued study. Spencer Pelton and Hallie Meeker played key roles in organizing the artifacts and identifying preliminary patterns in the assemblage. Meeker's work, published as a

Colorado Council of Professional Archaeologists (CCPA) paper, provided valuable insights into artifact distributions and typologies, establishing a framework that the following research could build upon (Meeker 2013).

Dr. LaBelle later made the assemblage available to Robert Madden and to the author for coursework and research projects, continuing the process of analysis and interpretation initiated by Meeker. LaBelle also revisited the site multiple times, collaborating with the U.S. Forest Service to emphasize its significance and ensure proper documentation. This ongoing stewardship ultimately supported a systematic survey and mapping of Porcupine Peak in 2024, reinforcing the importance of long-term site management.

In summer 2024, the Center for Mountain and Plains Archaeology (CMPA) undertook a field project at Porcupine Peak (5ST98) to better understand the spatial extent, artifact distribution, and condition of the site. The terrace site spans approximately 350 m east–west and 150 m north–south, with a lithic assemblage dominated by Late Archaic corner-notched dart points, as well as tools and debitage representing a range of periods up to the late pre-contact era (LaBelle and Kuhr 2025). To locate and contextualize these materials, the CMPA crew conducted a high-resolution pedestrian survey using a 25 x 25-meter grid, with transects spaced one to two meters apart (LaBelle and Kuhr 2025). All artifacts encountered within the grid were flagged, mapped with differential GPS, and recorded, while select formal tools at risk of illegal collection were curated for CMPA collections (LaBelle and Kuhr 2025). The fieldwork also included efforts to locate the original 1970s site datum to georeference past excavation units, as well as photographic documentation of “then-and-now” site features to assess landscape changes and disturbances over the past five decades (LaBelle and Kuhr 2025).

The 2024 survey revealed extensive lithic debris across the site, including flakes, angular debris, bifaces, and projectile point fragments, suggesting a broader and more complex occupational history than previously documented (LaBelle and Kuhr 2025). Artifacts were present well beyond the limited 1970s excavation area, representing the potential for multiple discrete occupations across the terrace (LaBelle and Kuhr 2025). Surface clusters likely reflect a combination of past human activity, erosion, and modern disturbances such as recreational camping and decompaction work. While some buried deposits were observed along the eastern cutbank, the majority of the site surface showed shallow, disturbed soils, emphasizing both the need for careful monitoring and the importance of CMPA's detailed spatial mapping in identifying areas of high artifact density (LaBelle and Kuhr 2025). The 2024 fieldwork documents the distribution of cultural materials, informs U.S. Forest Service management decisions, and indicates that Porcupine Peak's terrace may have supported multiple occupations over time.

Conclusion

The environmental and geological setting of Porcupine Peak provides essential context for interpreting its archaeological record. The site's location within the upper Snake River Valley, its proximity to diverse lithic sources, and its position on a Late Pleistocene to Holocene terrace created favorable conditions for short-term, high-altitude occupations. Seasonal climate patterns, available resources, and geomorphic processes shaped both how people used the landscape and how their material traces were preserved. Archaeological investigations beginning with Dr. Elizabeth Anne Morris in the late 1970s established Porcupine Peak as one of the most systematically documented high-elevation camps in central Colorado, with careful excavation and recording forming a strong foundation for ongoing study. Building on this work, the 2024

CMPA fieldwork mapped artifact distributions across the terrace, revealing evidence for multiple occupations beyond the limited 1970s excavation area. These findings not only expand our understanding of the site's use over time but also guide future research and management strategies by the U.S. Forest Service. The following chapter outlines the analytical methods used to examine artifact patterning, site structure, and the processes influencing preservation, setting the stage for interpreting the human activities represented at Porcupine Peak.

CHAPTER III – METHODS

Introduction

This chapter details the procedures used to organize and analyze the archaeological materials from Porcupine Peak (5ST98). It provides a detailed description of the steps taken to convert original excavation data into a numerical framework, catalog artifacts, and record measurements. These processes established a reliable dataset suitable for spatial, vertical, and functional analyses. The chapter also describes methods for examining site structure, lithic reduction, and artifact use-life, including approaches to assess flake size, cortex presence, burning, and co-variation among artifact classes. Procedures for studying projectile points from the region, with a focus on Kremmling chert (part of the Troublesome formation), are discussed, including selection criteria, blade-tip-angle measurements, and distance-based reduction analyses. By detailing these methods, this chapter establishes the analytical foundation for the results presented in subsequent chapters.

Conversions

The author's organization and cataloguing of the excavation data began with converting the original unit labels (e.g., 6N 5W) into a numerical coordinate system designed for ease of interpretation. This was undertaken to facilitate spatial analysis, align the dataset with more common excavation grid conventions, and eliminate potential confusion caused by negative coordinates. Dr. Morris and the CSU students excavated 94 one-by-one-meter units, each tied to defining coordinates measured from the Northwest Corner relative to the site datum. To accomplish the numerical conversion, excavation units were remapped by hand, with the site datum assigned the value of 1000 along both the x- and y-axes. Coordinates were then renumbered outward from the datum, extending from 945 (equivalent to 55W) to 1055 (55E) along the east–west axis, and from 939 (50S) to 1020 (20N) along the north–south axis

(Appendix B). The placement of the datum and excavation grid was reconstructed using original site maps and excavation sketches. Once the grid system was in place, cataloguing and recording of excavation data could proceed.

Data Collection and Cataloguing

As part of this thesis, I catalogued all artifacts to ensure consistent recording of provenience and attributes. I applied a uniform bagging system throughout the process: after recording each artifact's attributes, I placed it in an individual bag labeled with its catalog number. I then grouped these individual bags by level within larger bags, which I consolidated into a master bag labeled with the site number (5ST98) and the original unit ID.

Cataloguing began with provenience flakes, flakes that retained locational data. Originally stored in bags, these had been repackaged by the CMPA and organized by unit (e.g., 6N 5W). Each bag was opened and gently poured onto a tray. The author recorded attributes for each flake in an Excel spreadsheet, including: newly assigned numerical system number (e.g., 973_995), original unit number (25S5W), catalog number (5ST98.1), level, class (CS; chipped stone), element (FK; flake), maximum length (mm), mass (g), raw material, cortex presence, and evidence of burning (Table 1). Each flake was then placed in its own small bag labeled with its catalog number, then grouped by level into larger bags, and finally into a master bag labeled with the site number and original unit ID.

Measurements were taken with Mituoyo electronic calipers (mm) and a Tree Electronic Precision Balance HRB-S 213 (g). For larger artifacts, such as ground stone, mass was recorded using an Adam Equipment CPW-75 bench scale. Maximum length, width, and thickness were measured with a sliding length gauge consisting of a flat measuring board marked in both inches and centimeters, a fixed upright wall at one end, and a parallel sliding wall. Artifacts were placed against the fixed wall, the sliding wall was moved into contact with the opposite end, and dimensions were read directly from the scale. Raw material identifications were based on the author's familiarity with regional types and CMPA reference samples. Evidence of burning was determined visually, based on potlids, crazing, and color changes. Other artifact categories were recorded with attribute sets appropriate to their type:

Table 1. Attributes recorded for each artifact type from the Porcupine Peak (5ST98) assemblage.

	Thousands Conversions	Unit (x,Y)	Porcupine Peak Artifact Number (Madden)	Catalogue Number	Level	Class	Element	Count	Late or Early Stage	Portion	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)	Projectile Point Type	Period
Flakes	X	X		X	X	X	X				X			X	X	X	X		
Angular Debris	X	X		X	X	X	X				X	X	X	X	X	X	X		
Bifaces	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X		
Bone	X	X		X	X						X	X	X	X			X		
Charcoal	X	X		X	X									X					
Core	X	X		X	X	X	X				X	X	X	X	X	X	X		
Edge Modified Flakes	X	X		X	X	X	X				X	X	X	X	X	X	X		
Fire Cracked Rock	X	X		X	X	X	X				X	X	X	X	X		X		
Flake Tool	X	X		X	X	X	X				X	X	X	X	X	X	X		
Ground Stone	X	X		X	X	X	X				X	X	X	X	X		X		
Historic		X		X	X	X	X	X											
Projectile Point	X	X	X	X	X		X			X	X	X	X	X	X		X	X	X
Rocks	X	X		X	X	X	X								X				
Scraper	X	X		X	X	X	X			X	X	X	X	X	X	X	X		

The author determined projectile point types and cultural periods through comparison with published typologies and regional studies. Primary references included *Points of View: A Guide on Saskatchewan Projectile Points with Indigenous Perspectives* (Boser 2022) and *Light from Ancient Campfires: Archaeological Evidence for Native Lifeways on the Northern Plains* (Peck 2011), as well as several publications and site reports by James Benedict. Identifications were further verified through comparison with Bob Madden's 2022 analysis of the Porcupine Peak projectile points and with reference collections maintained by the Center for Mountain and Plains Archaeology (CMPA).

After cataloguing and documenting all artifacts, each was photographed for visual records. Images were captured using a high-resolution camera and subsequently edited in Microsoft PowerPoint using the "Remove Background" feature to isolate artifacts from the background. This process ensured clear and consistent images for analysis, illustration, and presentation purposes.

ArcGIS Pro

Spatial data from the Porcupine Peak (5ST98) excavation was processed using ArcGIS Pro. Since no datum coordinates were linked to UTMs or latitude/longitude were available from the original excavation, a fishnet grid was created in collaboration with the Geospatial Centroid members at Colorado State University. The fishnet consisted of one by one meter squares, totaling 71 × 110 individual cells, designed to encompass all excavation units. The fishnet was roughly aligned with the original site map sketches to approximate the original excavation locations (Figure 5). Each square of the fishnet was treated as a polygon with X and Y labels corresponding to the newly assigned numerical system. Excavation units were plotted by concatenating the X and Y numeric coordinates, providing unique identifiers for each unit within the fishnet and the site.

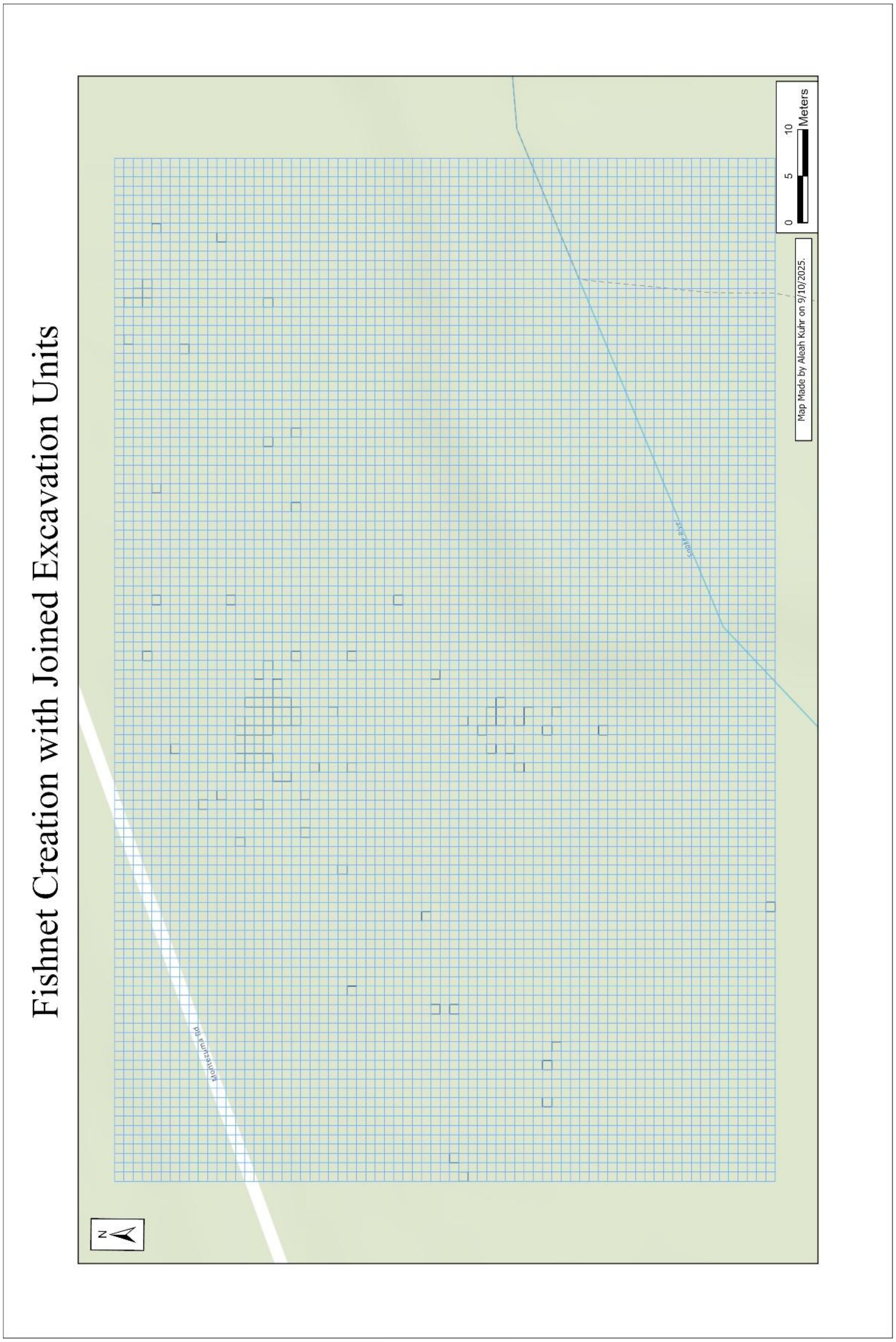

Figure 5. Fishnet grid (blue) created in ArcGIS Pro with one-by-one-meter cells, overlaid with joined excavation units (black) representing the original Porcupine Peak (5ST98) excavation locations. The grid approximates the placement of excavation units based on original site maps and sketches.

All recorded artifact and provenience data were compiled into a CSV file, which was then joined to the fishnet layer using ArcGIS Pro's "Joins and Relates" function. The fishnet layer served as the input table, and the concatenated numerical identifiers in the CSV ("Thousands Conversion") were used as the join field. The option to "keep all input records" was turned off to ensure only matched records were included. After validating the join, a new layer was exported to preserve the combined data. The original fishnet layer was then cleared of all joins, and the new layer was symbolized to represent the recorded excavation data accurately with graduated colors as the primary symbology.

Vertical Analysis

For the vertical analysis, artifacts were first organized by provenience in Excel, with each excavation unit separated by level (surface through level 6). Artifact counts for each level were then compiled and displayed in stacked bar charts, designed so that the y-axis represented depth (surface at the top and deeper levels at the bottom) to reflect stratigraphic order, while the x-axis indicated artifact frequency. This structure allowed visual comparison of artifact density both within individual units and across the site as a whole.

In addition to raw counts, artifact types were tallied by level and displayed in a complementary graphic. For this, unique icons sourced from Flaticon were used to represent different artifact classes (e.g., flakes, tools, ground stone). These icons were plotted according to excavation level in a manner consistent with the stacked bar charts, effectively linking artifact type to depth. These visualizations showed vertical patterns, such as dense clusters of flakes or concentrations of specific tool forms. This approach also showed which levels yielded the greatest artifact diversity and provided a means of evaluating the movement of artifacts within the site's vertical profile.

Site Structure Analysis Methods

To examine site structure and use, multiple artifact attributes were analyzed to identify activity areas and behavioral patterns. Flake size was the first variable considered, serving as a proxy for stages of lithic reduction. Following approaches outlined in comparable studies (Andrefsky 2008; Henry 1989; Newcomer 1971; Stahle and Dunn 1982), the average length (mm) of flakes from each excavation unit was calculated in Excel. These values were then imported into GIS, where spatial patterns in flake size were mapped to identify concentrations associated with different stages of tool production.

Cortex presence was also assessed to determine the frequency and spatial distribution of primary reduction activities. Items retaining cortex were tallied per unit and plotted in GIS. Raw material types were recorded in conjunction with cortex presence to evaluate resource selection and potential mobility strategies. Burning was a major focus of this thesis. Burned flakes and other burned artifacts were counted per unit, with distributions analyzed both vertically (by excavation level) and horizontally (across the site). These data were mapped in GIS to identify clusters of burned materials that may represent hearths or other activity loci.

Finally, co-variation among artifact classes was examined to explore functional associations. Stacked bar charts were created to display artifact counts per level, while pie charts summarized the proportional representation of artifact classes per unit. Flakes were excluded from these pie charts so that other artifact types were not overshadowed, allowing for clearer interpretation of activity diversity within excavation units.

Projectile Point Study Methods

To examine patterns of lithic use and curation in the broader region, this study focused on Late Archaic corner-notched dart points made from Kremmling Chert. By analyzing projectile points from sites within 100 km of the Kremmling Chert quarry, I assessed how distance from the raw material source influenced tool reduction and maintenance. The following sections outline the criteria for selecting points, methods for recording blade-tip angles, and the analytical approach for exploring relationships between tip angles and quarry distance. This analysis provides a means to evaluate how Late Archaic groups organized mobility and raw material use across the landscape, offering insight into the decisions that shaped site occupation and resource management in high-altitude environments such as Porcupine Peak.

Projectile Point Selection Criteria:

To select projectile points for analysis, I first established the location of the Kremmling Chert quarry, following the coordinates reported by Metcalf et al. (1991). This location was plotted using Google Earth Pro, and concentric circles with a radius of ten km, 25 km, 50 km, and 100 km were drawn around the quarry using the program's ruler tool. These circles define a study area spanning from Mount Massive Lakes (south) to the Routt Access North Platte River (north), Camel Peak (west), and Heatherwood Lake (east) (Figure 147). Given the complexities surrounding the categorization of Late Archaic Corner-Notched Dart Projectile Points, the selection process for this study followed three criteria: (i) each artifact had to be a dart point with corner notches, (ii) the point had to have been made from Kremmling Chert, with confirmed material identification by the authors of the original site reports, and (iii) the artifact had to derive from sites with radiocarbon dates between 1500 and 4000 BC (Eighmy and LaBelle 1996).

To meet these criteria, excavated sites within northern Colorado and within 100 km of the Kremmling chert quarry were identified. Site data was gathered from the Online Resources for Colorado Archaeology and Historic Preservation (ORCA) and the Center for Mountain and

Plains Archaeology library at Colorado State University. Once the appropriate sites were identified, they were plotted in Google Earth Pro. Digital photographs of the selected corner-notched dart points were prepared for angle analysis using ImageJ software (Figure 148).

Angle Recording:

Projectile point blade-tip angles were recorded as a measure of reduction and retouch using ImageJ Software (Appendix H and Appendix I). This metric is used in consideration of the observation that, as projectile points are used, maintained, and resharpened, their blade tip angles become less acute. Material removal during retouch increases the angle between the blade tip angles, resulting in stubbier points over time (Figure 6). Points farther from the quarry are hypothesized to have undergone greater use and maintenance due to decreased access to raw material, leading to larger blade angles compared to points closer to the source (Andrefsky 2010 and Gardner 1983). Distance from the quarry serves as a proxy for the duration and intensity of use, as reflected in the blade-tip angles. Angle measurements were conducted using the measurement tool in ImageJ. For intact points, the angle at the tip was measured. For fragmented points, the angle was inferred based on the estimated convergence of the blade tip angles (Figure 7).

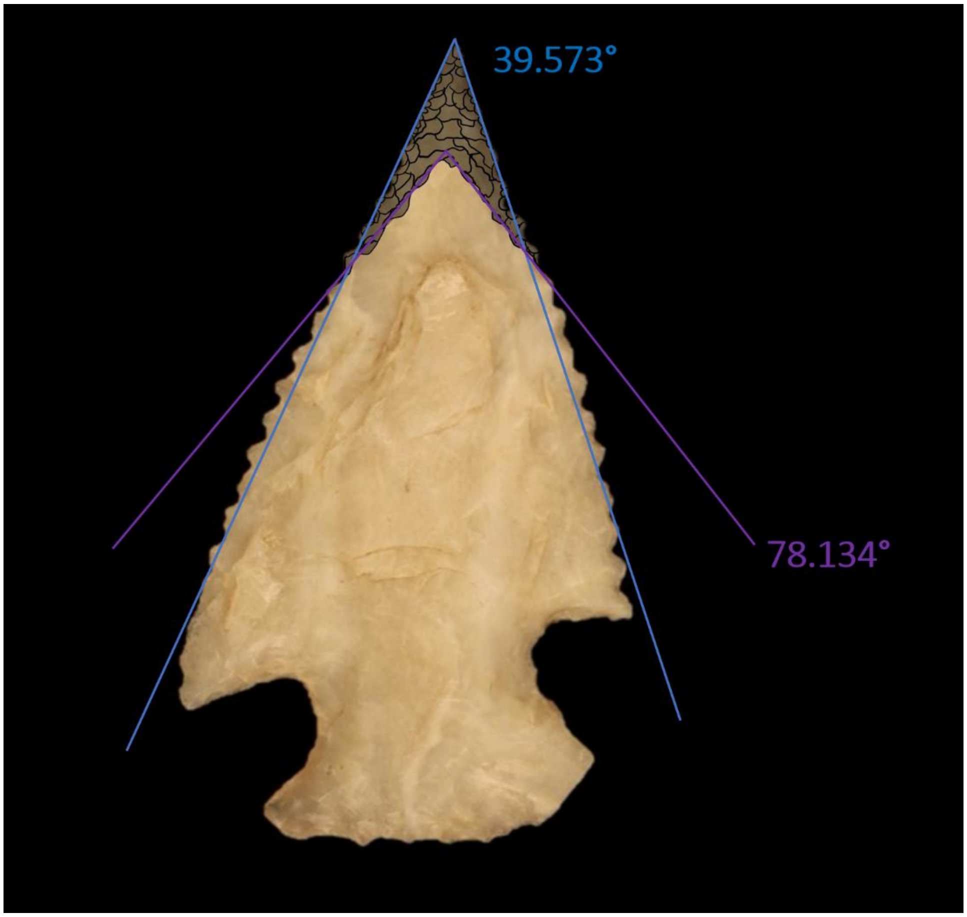

Figure 6. This image depicts specimen #33 from the Porcupine Peak assemblage that illustrates a retouch that results in morphological changes in blade angles; from an acute 39 degrees to an obtuse 78 degrees.

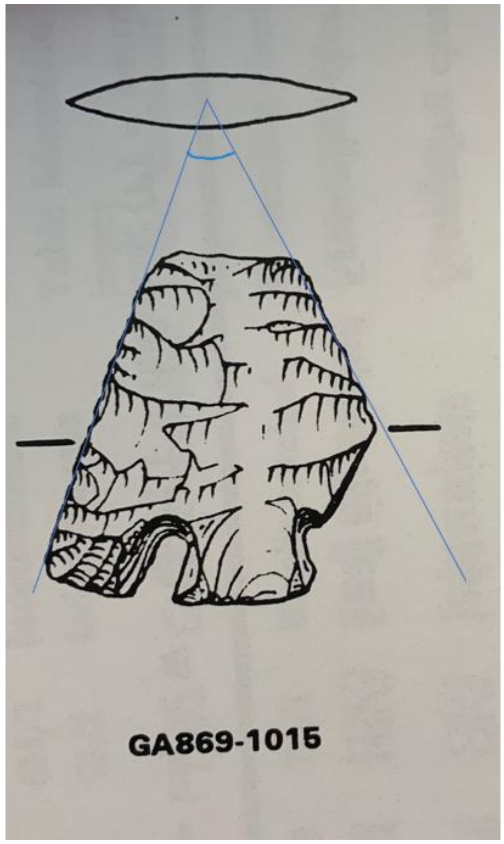

Figure 7. Image depicting estimation of angle measurements based on the original angles of the remaining blade tip-angles on broken or fragmented projectile points.

Building on Gardner's (1983) findings, which demonstrate that reduction indices increase with distance from the source, this study applies blade-tip angles as a complementary metric to examine retouch intensity. Hoffman (1985) and Buchanan and Collard (2010) show that resharpening produces shorter, stubbier forms and increases tip angles due to faster width reduction relative to thickness. Experimental and morphometric research further supports this pattern: Bement (1999) and Hunzicker (2008) document how repeated resharpening of Folsom points produces predictable geometric changes, while Iovita (2010) demonstrates that elliptical Fourier analysis can quantify shape shifts across resharpening sequences, providing a robust framework for linking tip-angle changes to use-life and curation.

Angle and Distance Analysis:

To explore the relationship between blade-tip-angle and distance from the Kremmling chert quarry, measurements from each site were averaged to represent site-level characteristics. These average angles, along with site distances, were plotted on a scatter plot to visually assess trends. Scatter plots are particularly effective for summarizing and reasoning about quantitative data, as Tufte (2001) notes, because they simplify complex relationships and allow for easy identification of trends, clusters, and outliers.

Histograms were also employed to illustrate the range of angle variation within sample sites, capturing the distribution of angles at each location. For sites with fewer than three points, data were presented in table format to ensure clarity and accuracy. By combining scatter plots and histograms, the analysis captures both overarching trends in blade-tip-angle changes and site-specific variations, offering a comprehensive view of how distance from the quarry correlates with projectile point reduction intensity.

Conclusion

The procedures described in this chapter organized and structured the Porcupine Peak (5ST98) dataset for detailed analysis. Converting the excavation coordinates enabled clear spatial interpretation, while systematic cataloging and measurement ensured accurate and consistent records of artifact attributes. GIS analyses, vertical profiling, and site-structure assessments revealed patterns in artifact distribution, lithic reduction, and use-related modifications. Methods for selecting, measuring, and analyzing projectile points based on distance provide insights into raw material use and tool maintenance. These procedures enable a clear and accurate presentation of the artifact assemblage from Porcupine Peak in the following chapter.

CHAPTER IV – ARTIFACT ASSEMBLAGE

Introduction

The purpose of this chapter is to (i) present the results of the artifact assemblage recovered from Porcupine Peak (5ST98) during the 1970s excavations conducted by Dr. Elizabeth Ann Morris and Colorado State University (CSU) students, (ii) to provide a descriptive overview of the lithic materials, including both modified stone tools and unmodified debitage, and (iii) to lay the foundation for later chapters that examine spatial patterning. This chapter focuses specifically on the types, frequencies, and characteristics of lithic artifacts recovered from both surface and subsurface contexts, as well as the extent to which provenience data is available for each class of material. The assemblage from 5ST98 includes 3,914 unmodified flakes and 168 chipped and ground stone tools. Among the tools, projectile points and bifaces are the most prevalent, while other tool types, such as scrapers, netherstones, handstones, and edge-modified flakes, occur in smaller quantities. The high frequency of projectile points, particularly fragmented specimens, and the presence of bifaces suggest a diverse range of activities associated with hunting, butchering, tool maintenance, and plant processing. The condition and distribution of these artifacts help to understand site use, post-depositional processes, and behavioral patterns of the Late Archaic occupants.

The 5ST98 Artifact Assemblage

The 5ST98 assemblage includes cultural materials collected by CSU students under Dr. Morris's direction during the summers of 1975, 1977, and 1978 (Morris 1975). A total of 94 one-by-one-meter units were excavated, each tied to coordinates measured from the site datum at the northwest corner. Although the units were not recorded using modern coordinate systems (e.g., UTM or latitude/longitude), detailed maps, notes, and photographs allow the excavation grid to be reconstructed with reasonable accuracy—typically within a few meters. Thus, while the grid is “floating” relative to modern coordinates, its spatial layout remains well documented and reliable for analysis. Materials recovered from 5ST98 excavation units include angular debris (n=6), bifaces (n=23), bone (n=47), one charcoal sample, one core, unmodified debitage (n=2,420), two edge-modified flakes (n=2), one fire-cracked rock, netherstones (n=6), hand stones (n=1), projectile points (n=71), and two scraping implements.

Materials recovered from the surface of 5ST98 with no specific provenience include angular debris (n=3), bifaces (n=7), bone (n=5), unmodified debitage (n=1,494), fire-cracked rock (n=2), one edge-modified flake (n=1), netherstones (n=3), hand stones (n=4), one unidentifiable ground stone fragment, and projectile points (n=34).

Chipped Stone

Angular Debris

Nine angular debris fragments will be discussed here (Figure 8). Angular debris is defined as the miscellaneous fragments or shatter produced during the reduction process, which lack diagnostic attributes of flakes, such as a bulb of percussion or striking platform (Andrefsky 1998; Buckner 2020). Artifacts 5ST98.2561 – 5ST98.2564, 5ST98.138, and 5ST98.351 are angular debris fragments found within the Porcupine Peak assemblage with provenience (Table 2). Specimens 5ST98.2561, 5ST98.2563, 5ST98.2564, 5ST98.138, and 5ST98.351 are all composed of what has been identified as Troublesome chert. In contrast, 5ST98.2562 is manufactured from an unidentified raw material. Specimens 5ST98.2565 through 5ST98.2568 are angular debris fragments that lack specific provenience. Both 5ST98.2565 and 5ST98.2566 are composed of Troublesome chert. Specimen 5ST98.2568, made of an unidentified material, exhibits extensive burning. While it may have originally been a flake or other artifact, the severity of the burning has obscured any diagnostic attributes. As a result, it has been classified as angular debris for this thesis.

Table 2. Descriptive attributes of the six angular debris fragments from the 5ST98 lithic assemblage.

Unit (X,Y)	Catalogue Number	Level	Class	Element	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Average Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
10n46e	5ST98.2562	1	CS	ANG	89.7	63.8	32.7	136.9	Unknown	Yes	No
4n5w	5ST98.351	1	CS	ANG	9.5	6.5	4.3	0.3	Troublesome	No	Yes
5n3w	5ST98.2563	unknown	CS	ANG	34.9	25.7	13.3	11.6	Troublesome	Yes	No
6n8w	5ST98.2561	4	CS	ANG	77.3	54.2	15.9	51.4	Troublesome	Yes	No
8n6w	5ST98.2564	unknown	CS	ANG	37	28	9	7.6	Troublesome	No	Yes
8n7w	5ST98.138	1	CS	ANG	20.7	20.6	9.4	3.5	Troublesome	Yes	No
No Prov. Surface	5ST98.2565	surface	CS	ANG	43.7	21.9	9.9	5.3	Troublesome	No	Yes
No Prov. Surface	5ST98.2566	surface	CS	ANG	54.8	21.7	11.8	15.3	Troublesome	Yes	Yes
No Prov. Surface	5ST98.2568	surface	CS	ANG	32.5	26.3	9.9	6.2	Unknown	No	Yes

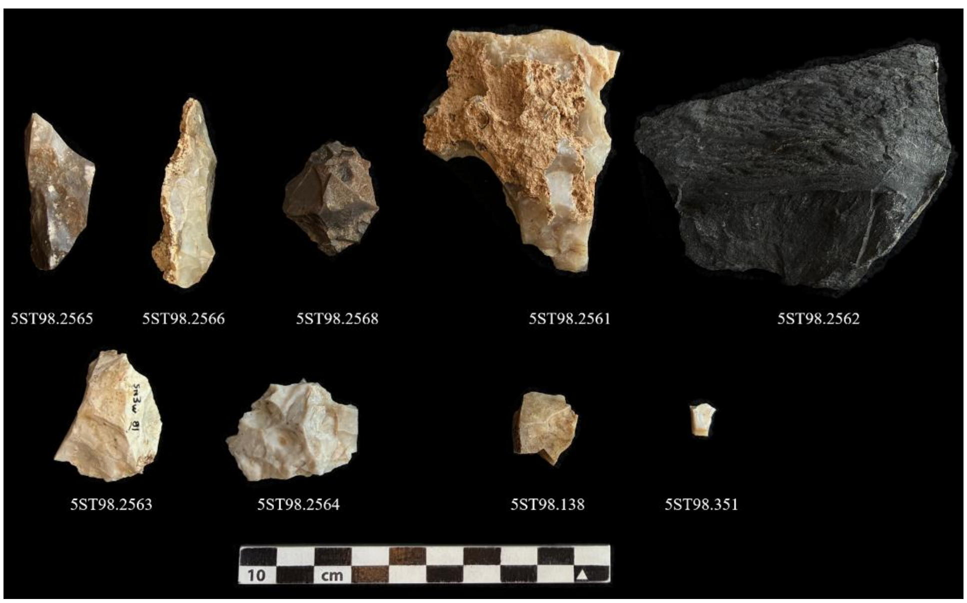

Figure 8. Angular debris recovered from site 5ST98. Specimens without provenience include 5ST98.2565 through 5ST98.2568, while specimens with recorded provenience include 5ST98.2561 through 5ST98.2564, 5ST98.138, and 5ST98.351.

Unhafted Bifacial Tools (Provenience)

A total of thirty unhafted bifaces are examined in this section, of which twenty-seven are identified as late-stage bifaces and three as early-stage. A biface is broadly defined as a bifacially-worked artifact that demonstrates intentional shaping but does not exhibit definitive evidence of preparation for use as a hafted tool, or is too fragmentary to determine whether such modifications were present. The tool category discussed here includes bifacially flaked artifacts with minimal distinguishing features, which may have been used for various tasks, such as cutting, sawing, or scraping (Andrefsky 2005:180, 181; Kelly 1988; Meyer 2019; Odell 1981). 5ST98.2535 – 5ST98.2540 were found in the grid 7n 9w, ten – 20 cm below surface level.

5ST98.2535 is a complete mid-stage biface manufactured from Troublesome Chert (Table 3 and Figure 9). It was identified as mid-stage, or stage three, based on the limited remaining cortex, the presence of thinning flakes along the midline, and its overall form. In terms of reduction sequence, this biface aligns approximately with Stage two and Stage three bifaces as defined by Andrefsky (2005:189) and Callahan (1979). Additionally, the biface's lenticular cross-section exhibits irregular surfaces consistent with characteristics of Stage three reduction.

5ST98.2536 is a complete mid-stage biface made from Troublesome Chert (Table 3 and Figure 9). It was classified as Stage three based on its broad flake scars extending across the midline and its overall ovate form. Although the absence of cortex suggests it may fall between Stage three and Stage four as defined by Andrefsky (2005:189) and Callahan (1979), the irregularity of its lenticular cross-section, lacking a flat profile, supports a Stage three designation.

5ST98.2537 is a complete mid-stage biface manufactured from Troublesome Chert (Table 3 and Figure 9). Its classification as mid-stage is based on the presence of cortex on the dorsal surface, the squared edges, and the limited number of flake scars crossing the midline. In terms of reduction stage terminology, the artifact aligns approximately with Stage two and Stage three bifaces as defined by Andrefsky (2005:189) and Callahan (1979). The cross-sectional morphology with irregular faces further supports this classification.

5ST98.2539 is a complete mid-stage biface manufactured from Troublesome Chert (Table 3 and Figure 9). Its classification is based on the presence of large, minimally overlapping flake scars extending across the midline and its overall morphology. Both the ventral and dorsal surfaces display pot-lid fractures, concave scars typically resulting from differential thermal expansion and contraction caused by exposure to fire (Andrefsky 2005). The dorsal surface is heavily burned, obscuring any remaining cortex and complicating precise stage identification. However, the prominent flake scars on both surfaces and the irregular cross-section are consistent with Stage two and Stage three bifaces, as defined by Andrefsky (2005:189) and Callahan (1979).

5ST98.2540 appears to be a fractured biface manufactured from Troublesome Chert (Table 3 and Figure 9). The ventral surface exhibits two steep breaks along one edge, which may indicate a plunging failure. The dorsal surface displays substantial flake removals along multiple edges and across the midline. Based on these attributes and the absence of cortex, the biface is most consistent with Stage three and Stage four reduction, as defined by Andrefsky (2005:189) and Callahan (1979).

5ST98.2541 is a complete mid-stage biface produced from Troublesome Chert (Table 3 and Figure 9). Its classification is based on the absence of cortex on both the dorsal and ventral surfaces, its ovate morphology, and an irregular lenticular cross-section lacking flat faces. In terms of the reduction stage, the artifact corresponds most closely to Stage three bifaces, as defined by Andrefsky (2005:189) and Callahan (1979).

5ST98.2542 is a complete biface manufactured from Troublesome Chert (Table 3 and Figure 9). It is classified as mid to late-stage based on the minimal presence of cortex, its ovate form, and the presence of flake scars that extend across the midline. In terms of reduction stage terminology, the artifact corresponds approximately to Stage three and Stage four bifaces, as defined by Andrefsky (2005:189) and Callahan (1979). The cross-section exhibits irregular lenticular surfaces, consistent with observations noted by Boser (2022), which match the determined stages.

5ST98.2543 is a complete mid-stage biface made up of Troublesome Chert (Table 3 and Figure 9). The biface is determined to be a mid-stage biface based on the minimal remaining cortex, thinning flake scars that extend across the midline, and the overall ovate shape. This biface roughly aligns with a Stage three biface as defined by Andrefsky (2005:189) and Callahan (1979). The lenticular cross-section

5ST98.2551 appears to be a fractured biface manufactured from Troublesome Chert (Table 3 and Figure 9). The ventral surface exhibits few large flake scars that extend past the midline, and the dorsal surface has more fine flaking along the edges with large scars reaching the midline. It appears that the biface was broken on the traverse axis of the artifact. The presence of cortex on the dorsal side and the irregular lenticular cross-section makes the biface align with a Stage three biface as outlined by Andrefsky (2005:189) and Callahan (1979).

5ST98.2547 is a broken biface manufactured from Troublesome Chert (Table 3 and Figure 9). The biface appears to have a clean step fracture, a scar left on the artifact after a previous flake has been detached with step termination or where the flake was removed and terminated abruptly in a right-angle break (Andrefsky 2005). Furthermore, the ventral side exhibits a clear plunging termination error. Given the few large flake scars across the faces, the minimal cortex, and the lenticular cross-section, the biface roughly compares to Stage two and Stage three bifaces in terms of reduction terminology, as described by Andrefsky (2005:189) and Callahan (1979).

Table 3. Descriptive attributes of 5ST98.2539 – 5ST98.2543, 5ST98.2535 – 5ST98.2537, 5ST98.2551, AND 5ST98.2547 from the 5ST98 lithic assemblage.

Unit (X,Y)	Catalogue Number	Level	Class	Element	Stage	Portion	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
7n9w	5ST98.2535	1	CS	BF	Mid-Stage	CO	59.1	42.5	10.2	26.5	Troublesome Chert	Y	N
7n9w	5ST98.2536	1	CS	BF	Mid-Stage	CO	60.2	43.6	11.5	29.4	Troublesome Chert	N	N
7n9w	5ST98.2537	1	CS	BF	Mid-Stage	CO	63.5	39	9.9	27.8	Troublesome Chert	Y	N
7n9w	5ST98.2539	1	CS	BF	Mid-Stage	CO	57.3	36.6	11.1	22	Troublesome Chert	N	N
7n9w	5ST98.2540	1	CS	BF	Mid-Stage	MS/DS	38.6	35.8	8.7	13.3	Troublesome Chert	N	Y
7n9w	5ST98.2541	1	CS	BF	Mid-Stage	ABC	64.4	36.7	8.8	27.5	Troublesome Chert	N	N
7n8w	5ST98.2542	1	CS	BF	Mid-Stage	CO	55.7	45.1	9.7	28.7	Troublesome Chert	N	N
7n8w	5ST98.2543	1	CS	BF	Mid-Stage	CO	50.8	41.1	10.7	22.4	Troublesome Chert	N	N
8n9w	5ST98.2547	unknown	CS	BF	Mid-Stage	CO	50.2	36.3	10.7	20.3	Troublesome Chert	Y	N
4n5w	5ST98.2551	unknown	CS	BF	Mid-Stage	DS	33.7	24	7.7	7.5	Troublesome Chert	N	N

Figure 9. Unhafted provenience bifaces recovered from 5ST98, including the six from the 7n 9w excavation grid.

5ST98.1041 is a fragmented mid-stage biface manufactured from Troublesome Chert (Figure 10) (Table 4). It is most consistent with Stage three bifaces, as defined by Andrefsky

(2005:189) and Callahan (1979), based on the absence of cortex, the presence of large flake scars extending beyond the midline, and a relatively irregular yet lenticular cross-section. The artifact is incomplete, as evidenced by a proximal step fracture.

5ST98.1146 is a fragmented early-stage biface manufactured from Troublesome chert (Figure 10). The artifact is consistent with a Stage two biface, as defined by Andrefsky (2005:189) and Callahan (1979), based on the presence of cortex and the distribution of small flake scars along the edges, with few scars extending across the face. The plano-convex cross-section further supports this classification. However, due to its fragmentary condition, marked by a proximal step fracture, additional morphological characteristics are not distinct.

5ST98.1149 is an early-stage complete biface manufactured from Troublesome Chert (Figure 10). The artifact is consistent with Stage 2, as defined by Andrefsky (2005:189) and Callahan (1979), based on the presence of cortex on both the dorsal and ventral sides. There is all the presence of small flake scars around the edges with a few extending across the midline, and the lenticular cross-section, which further supports this classification.

5ST98.2548 is a distal mid-section of a large bifacial tool manufactured from Troublesome Chert (Figure 10). Due to the presence of cortex on both dorsal and ventral faces, as well as a few flakes extending past the midline, the artifact roughly aligns with a Stage three biface, as described by Andrefsky (2005:189) and Callahan (1979). The proximal end exhibits a step fracture and no other morphological attributes that can be identified.

5ST98.1785 is a heavily burned edge fragment of a biface manufactured from a dendritic variety of Troublesome chert (Figure 10). The artifact is consistent with Stage four bifaces, as defined by Andrefsky (2005:189) and Callahan (1979), based on the presence of fine edge retouch. Both the dorsal and ventral surfaces exhibit pot-lid fractures, concave scars typically resulting from differential thermal expansion and contraction due to exposure to fire (Andrefsky 2005). Additionally, two step-fractures are present along separate edges. Due to its fragmentary and thermally altered condition, no further morphological attributes are discernible.

5ST98.2368 is a fractured late-stage biface manufactured from Table Mountain jasper (Figure 10). The artifact is consistent with Stage four bifaces, as defined by Andrefsky (2005:189) and Callahan (1979), based on the presence of large, flat flake scars and a relatively thin, flat cross-section. Two step fractures are visible along one edge. Due to its fragmentary condition, no additional morphological attributes can be identified.

5ST98.2550 is a fractured early-stage biface made from Troublesome Chert (Figure 10). The biface aligns with Stage two bifaces as described by Andrefsky (2005:189) and Callahan (1979) with the presence of small flake scars along the edges, with a few flake scars across the faces, minimal cortex, and a lenticular cross-section. There appears to be a large step fracture across the biface, which obscures any other morphological traits.

5ST98.2553 is a mid-stage fractured and thermally altered biface manufactured from Troublesome Chert (Figure 10). A prominent step fracture extends along the transverse axis of the artifact. Multiple flake scars are visible along the edges, with some reaching across the midline. The ventral surface exhibits a large pot-lid scar, a concave feature typically resulting from differential thermal expansion and contraction due to exposure to fire (Andrefsky 2005). Given these characteristics, the biface aligns with a Stage three biface as described by Andrefsky (2005:189) and Callahan (1979). Due to its fractured and burned condition, further morphological characteristics are not discernible.

5ST98.2365 is a fractured mid-stage biface made from Troublesome Chert. A large step fracture is present across the biface (Figure 10). This biface aligns with a Stage three biface, as outlined by Andrefsky (2005:189) and Callahan (1979), as several flake scars are along the present edges, as well as a few large flake scars extend across the midline of the artifact. Furthermore, the cross-section of the biface has an irregular lenticular face that further supports this classification. Due to this fractured condition, no more morphological traits can be identified.

5ST98.2552 is a complete late-stage, fire-altered biface manufactured from Troublesome Chert (Figure 10). This biface aligns with a Stage four biface as described by Andrefsky (2005:189) and Callahan (1979) as it has large flat flake scars that extend past, the midline, no cortex, and a lenticular cross-section. The dorsal face is heavily burned and obscures any other morphological traits.

Table 4. Descriptive attributes of 5ST98.1041, 5ST98.1146, 5ST98.2549, 5ST98.2548, 5ST98.1785, 5ST98.2368, 5ST98.2550, 5ST98.2553, 5ST98.2365, and 5ST98.2552 from the 5ST98 lithic assemblage.

Unit (X,Y)	Catalogue Number	Level	Class	Element	Late or Early Stage	Portion	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
6n7w	5ST98.2365	unknown	CS	BF	Mid-Stage	PR	36	19.9	9.4	5.1	Troublesome Chert	N	N
8n8w	5ST98.1146	1	CS	BF	Early	MS	36	22.4	9.6	6.9	Troublesome Chert	Y	N
2n6w	5ST98.2548	unknown	CS	BF	Late	MS/DS	39.6	29.2	13	13.8	Troublesome Chert	N	N
8n8w	5ST98.2549	unknown	CS	BF	Early	CO	47	42.8	13.2	17.8	Troublesome Chert	N	N
19n39e	5ST98.1785	2	CS	BF	Late	LT	21	13.7	6.1	1.6	Troublesome Chert	N	Y
16s6w	5ST98.2368	unknown	CS	BF	Late	DS	28.1	20.9	5.8	3.4	Table Mountain jasper	Y	N
4n4w	5ST98.2550	unknown	CS	BF	Early	MS/DS	42.5	28.6	12.7	12.2	Troublesome Chert	N	N
8n6w	5ST98.2552	unknown	CS	BF	Late	ABC	44.2	32.3	7.9	10.4	Troublesome Chert	N	Y
10n14w	5ST98.1041	1	CS	BF	Mid-Stage	MS/DS	25.7	28.7	8.2	6.7	Troublesome Chert	N	N
5n5w	5ST98.2553	unknown	CS	BF	Mid-Stage	MS/DS	30	25.9	10.3	5.8	Troublesome Chert	N	Y

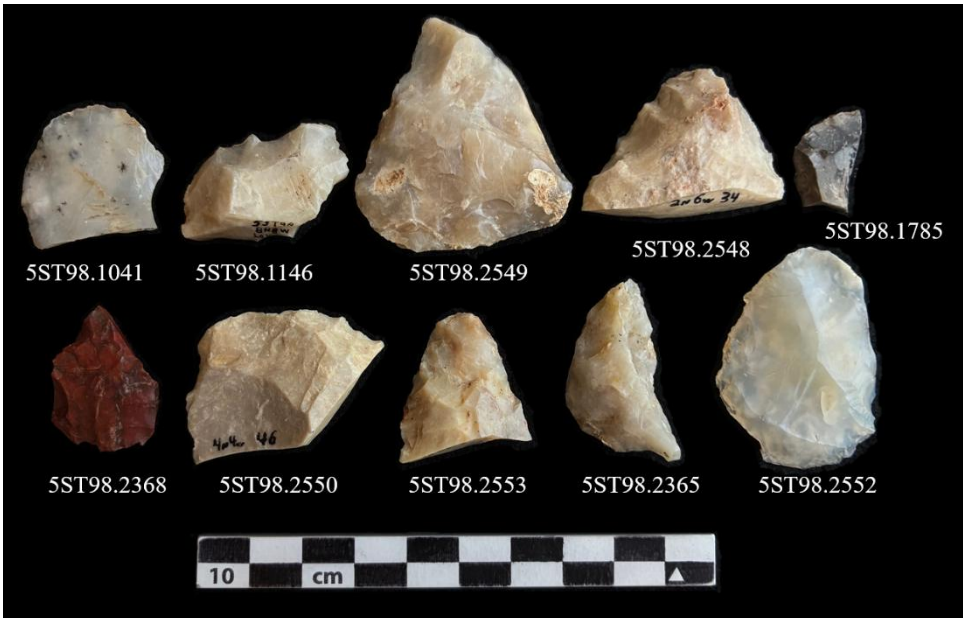

Figure 10. Unhafted provenience bifaces recovered from 5ST98. Several of which belong to an excavation unit, but most have unknown levels.

5ST98.2545 is a complete late-stage biface manufactured from a dendritic variety of Troublesome chert (Figure 11) (Table 5). Its classification as Stage 4/Stage five is based on the absence of cortex, its ovate shape, and the presence of refined edge trimming, consistent with late-stage bifacial reduction as defined by Andrefsky (2005:189) and Callahan (1979). The lenticular cross-section further supports its placement within the later stages of the biface reduction sequence.

5ST98.2546 is a fragmented biface manufactured from Troublesome chert (Figure 11). It is classified as a mid-stage biface based on the presence of cortex, flake scars that extend across the midline, and its overall morphology. In terms of reduction stage terminology, the artifact roughly matches Stage two and Stage three bifaces, as outlined by Andrefsky (2005:189) and Callahan (1979). The lenticular cross-section of the artifact further supports its placement within the mid-stages of bifacial reduction.

5ST98.2544 is a fragmented late-stage biface manufactured from an unknown raw material (Figure 11). It is classified as a late-stage biface due to the lack of cortex, the presence of flake scars along the edges of the ventral and dorsal surfaces, and large flake scars that extend past the midline. The artifact roughly aligns with Stage three and four bifaces in terms of reduction terminology outlined by Andrefsky (2005:189) and Callahan (1979). The relatively flat lenticular cross-section further supports this assessment.

Table 5. Descriptive attributes of 5ST98.2545, 5ST98.2546, and 5ST98.2544 from the 5ST98 lithic assemblage.

Unit (X,Y)	Catalogue Number	Level	Class	Element	Late or Early Stage	Portion	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
3n4w	5ST98.2544	1	CS	BF	Early	MS/DS	43.2	23	6.7	6.1	Unknown	N	N
7n7w	5ST98.2545	unknown	CS	BF	Late	CO	34.1	30.9	7.3	7.3	Troublesome Chert	N	N
20n39e	5ST98.2546	unknown	CS	BF	Mid-Stage	MS/DS	54.3	27	8.4	12.9	Troublesome Chert	N	N

Figure 11. Unhafted provenience bifaces recovered from 5ST98 with two varieties of Troublesome Chert and an unknown raw material.

Unhafted Bifacial Tools (Non-Provenience)

5ST98.2554 is a heavily burned biface fragment manufactured from Troublesome chert (Figure 12) (Table 6). Extensive thermal alteration, evidenced by surface crazing, combined with the small size of the fragment, obscures diagnostic characteristics necessary for confident reduction stage assignment. Nonetheless, small edge flakes are present on both the dorsal and ventral surfaces.

5ST98.2555 is a mid-stage biface manufactured from Troublesome chert (Figure 12). The biface has a large step fracture along the edge, as well as a plunging failure that can be seen with the thin translucent edge on the ventral side. The thick end of the biface on the ventral side exhibits several flake scars around the edges and a few that extend past the midline. The dorsal side has large flake scars across the face, and no cortex is present. Given these characteristics, the biface roughly aligns with a mid-stage biface or Stage three as outlined by Andrefsky (2005:189) and Callahan (1979).

5ST98.2556 is a fragmented, thermally altered early-stage biface manufactured from Troublesome chert (Figure 12). The artifact exhibits two prominent step fractures along the edges and extensive burning across one face. Multiple flake scars are present along the edges and extending across the midline. Based on the minimal remaining cortex and flake scar distribution, the biface is consistent with a Stage two classification, as defined by Andrefsky (2005:189) and Callahan (1979). The highly irregular cross-section further supports this interpretation.

5ST98.2557 is a fragmented early-stage biface manufactured from an unidentified raw material (Figure 12). The artifact displays multiple step fractures along the edges and a plunge fracture on one face. Several small flake scars are visible around the remaining edges, along with areas of residual cortex. These attributes are consistent with Stage two bifaces, as defined by

Andrefsky (2005:189) and Callahan (1979). Additionally, the irregular lenticular cross-section further supports this classification. Due to the artifact's fragmentary condition, no additional morphological characteristics can be reliably identified.

ST98.2558 is a late-stage biface manufactured from Troublesome chert (Figure 12). The ventral surface exhibits a prominent plunge fracture extending across nearly half of the face, accompanied by several translucent edges and a gradual thinning that may have contributed to its discard. Both the dorsal and ventral surfaces contain large flake scars that extend beyond the midline. These attributes are consistent with Stage four bifaces, as defined by Andrefsky (2005:189) and Callahan (1979). The cross-section on the more intact side of the artifact is lenticular in form, further supporting this classification. However, the extent of the plunge fracture limits the ability to observe additional morphological features.

5ST98.2559 is a fractured mid-stage biface manufactured from Troublesome chert (Figure 12). The artifact corresponds approximately to Stage three bifaces, as defined by Andrefsky (2005:189) and Callahan (1979), based on the limited presence of cortex and the removal of flakes from the central portion of the biface. The specimen is incomplete, exhibiting a snap fracture along the base and a plunge failure on one edge. The cross-section approximates half of a lenticular form; however, due to its fragmentary condition, additional morphological characteristics are not discernible.

5ST98.2567 is a small fragment of a late-stage biface made from an unknown raw material (Figure 12). The biface is roughly comparable to Stage four as defined by Andrefsky (2005:189) and Callahan (1979), based on the absence of cortex, small size, thinness, and fine flaking across both dorsal and ventral faces. The fragment is too small to discern a clear cross-sectional form. The biface is incomplete with two snap fractures on both proximal and distal ends, making more morphological traits difficult to discern.

Table 6. Descriptive attributes of bifaces found on the surface 5ST98.2554 – 5ST98.2559, and 5ST98.2567.

Unit (X,Y)	Catalogue Number	Level	Class	Element	Late or Early Stage	Portion	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
No Prov.	5ST98.2554	unknown	CS	BF	Late	LT	25.5	15	3.9	1.9	Troublesome Chert	N	Y
No Prov.	5ST98.2555	unknown	CS	BF	Late	CO	35.2	27.3	7.8	6.6	Troublesome Chert	N	N
No Prov.	5ST98.2556	unknown	CS	BF	Late	LT	42.9	19.6	7.3	4.4	Troublesome Chert	N	Y
No Prov.	5ST98.2557	unknown	CS	BF	Late	DS	30.3	22.5	9.8	5	Unknown	y	N
No Prov.	5ST98.2558	unknown	CS	BF	Late	MS	40.9	29.3	7.9	8.3	Troublesome Chert	N	N
No Prov.	5ST98.2559	unknown	CS	BF	Late	LT	26.5	16.7	6.9	3.4	Troublesome Chert	N	N
No Prov.	5ST98.2567	surface	CS	BF	Late	LT	15.6	11.5	3.7	0.6	Unknown	N	N

Figure 12. Several unhafted bifaces have been recovered from the surface context of 5ST98. Some of these artifacts exhibit evidence of thermal alteration. Others are made from unidentified raw materials.

Core (Provenience)

One lithic core, catalogued as 5ST98.2572, was recoevered from the site and its discussed here (Figure 13) (Table 7). A core is defined as a nucleus or mass of stone from which flakes or other detached pieces have been intentionally removed. It is typically regarded as an objective piece, primarily serving as a source of raw material for detached pieces (Andrefsky 2005; Odell 2004). Specimen 5ST98.2572 was identified as a core based on the presence of cortex on both faces, its substantial size and mass, and its overall morphology. The artifact is made from Troublesome Chert and exhibits evidence of thermal alteration, which complicates its classification to some degree. Nonetheless, it appears to represent a bifacial core with a multidirectional reduction pattern. Multidirectional cores are characterized by flake removals oriented in several directions across both faces of the specimen (Andrefsky 2005).

Table 7. Descriptive attributes of a single core found at 5ST98.

Thousands Conversions	Unit (X,Y)	Catalogue Number	Level	Class	Element	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Average Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
978, 991	21s9w	5ST98.2572	1	CS	Core	54.2	31.9	17.8	30	Troublesome	Yes	Yes

Figure 13. Lithic core recovered from Cell 978, 991 (21S9W). The image on the right shows evidence of thermal alteration and flake removals, while the image on the left shows remaining cortex with comparatively less fire damage. Scale in centimeters.

Unmodified Debitage (Provenience)

The 5ST98 collection includes a total of 3,914 flakes. Of these, 2,420 are provenience flakes, defined as pieces removed from a larger objective piece through percussion or pressure flaking (Andrefsky 2005; Odell 2004) (Appendix D and Appendix K (flakes)). These flakes represent byproducts of stone tool production and show no evidence of modification or use. Flakes make up the majority of the recovered assemblage and were identified based on diagnostic features such as a platform, a bulb of percussion, an errailure scar, or rippling on the ventral surface (Andrefsky 2005; Sullivan and Rozen 1985). In addition to the provenience flakes, 1,494 non-provenience flakes were analyzed using a mass analysis approach; further details are provided in Appendix D.

The assemblage includes flakes made from seven raw material types: Troublesome Chert (n = 2,246), Table Mountain jasper (n = 28), Windy Ridge quartzite (n = 25), Trout Creek (n = 11), petrified wood (n = 4), rhyolite (n = 3), and quartzite (n = 1). An additional 102 flakes were made from unidentified materials and were classified as "unknown." Raw material identifications were based on the author's familiarity with regional sources, comparison with reference collections at the CMPA, and published photographs of known materials (Dinkel 2021; Metcalf et al. 1991; Mitchell 2022).

Most flakes fall into two size categories: 5.6–12.5 mm (Grade Three, n = 1,186) and 12.5–25 mm (Grade 2, n = 1,038). The dominance of Grade three flakes indicates frequent tool resharpening and later-stage reduction. The abundance of Grade two flakes also suggests mid-stage core reduction. Cortex is found on only 141 flakes; the remaining 2,279 lack cortical surfaces. This further supports the interpretation that flake production at 5ST98 reflects mid- to late-stage tool manufacturing, rather than early-stage core preparation.

Edge Modified Flakes

Within this assemblage, only three flakes displayed edge modification. Debitage showing edge wear, often referred to as edge-utilized flakes, is not deliberately shaped into tools but exhibits signs of use such as minor chipping, rounding, or step fractures along the edge. In contrast, flakes with edge retouch reflect more intentional shaping, often associated with resharpening efforts to prepare the edge for specific tasks. These modified pieces typically fall under the unimarginal category, meaning only one face, either the dorsal or ventral surface, shows signs of alteration, regardless of which part of the edge was affected (Andrefsky 2005).

Artifact **5ST98.2571** is a large flake produced from an unidentified coarse-grained raw material from 1016_1047 (17N47E) at an unknown level (Table 8)(Figure 14). The ventral surface displays minor flake scars and edge damage near the distal end, suggesting possible use or modification. Although the dorsal surface also appears to have been modified at the distal end, the coarse texture of the material obscures clear evidence of individual flake removals. Nonetheless, indications of alteration are present.

5ST98.2569 is an edge-modified flake manufactured from a gray, medium-grained raw material of unknown type, recovered from the surface context of site 5ST98 (Table 8)(Figure 15). The artifact exhibits a moderately triangular form with a step fracture located at its widest end. Both lateral edges show evidence of flaking; however, no flake scars extend across the midline. The opposite face is unmodified, lacking flake scars, and remains flat.

5ST98.2570 is an edge-modified flake manufactured from Troublesome Chert, recovered from unit 1005_997 (6N3W) (Table 8)(Figure 15). The artifact exhibits flaking along one lateral edge, while the opposite edge displays irregular and likely unintentional chipping. The dorsal face shows few flake scars and appears largely unmodified. A step fracture is present at the proximal end.

Table 8. Descriptive attributes of a single edge-modified flake found at 5ST98.

Thousands Conversions	Unit (X,Y)	Catalogue Number	Level	Class	Element	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Average Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
1016, 1047	17n47e	5ST98.2571	Unknown	CS	EMF	95.9	45.7	12.3	59.5	Unknown	yes	No
No Prov.	No Prov. Surface	5ST98.2569	surface	CS	FT	34.5	31.9	5.1	5.6	Unknown	No	No
1005, 997	6n3w	5ST98.2570	unknown	CS	FT	24.9	22	3.8	1.5	Troublesome	No	No

Figure 14. Edge-modified flake (5ST98.2571) from unit 17N47E. Made of coarse-grained material, the artifact shows distal edge damage and minor flake scars, suggesting minimal modification.

Figure 15. Edge-modified flakes recovered from 5ST98.

Preforms

Within the assemblage, four specimens were identified as preforms, all manufactured from Troublesome chert (Figure 16)(Table 9). These artifacts represent various stages of the bifacial reduction sequence, ranging from early shaping to forms nearing completion. Each piece exhibits a convex base and lacks notches, suggesting that they had not yet reached the stage of haft preparation. Several examples display evidence of serration or edge modification, indicating that fine retouch was already underway on some specimens prior to final finishing. The presence of both incomplete and nearly finished examples points to on-site tool production and maintenance activities, reflecting the technological investment in shaping durable tools from locally available raw material.

5ST98.2497 is a preform manufactured from Troublesome chert. The tip is missing, and both blade edges exhibit possible serration. The base is convex, and no notches are present. Despite the damage, the artifact retains enough of its form to suggest it was in an advanced stage of production prior to breakage.

5ST98.2534 is a preform manufactured from Troublesome chert. The artifact lacks serration and notches, and the base is convex. Its overall form suggests an unfinished stage in the reduction sequence prior to final shaping or haft preparation.

5ST98.2469 is a complete preform manufactured from Troublesome chert. The piece exhibits serration along one blade edge, while the opposite edge remains unmodified. The base is convex, and no notches are present. Overall, the artifact appears to represent a late-stage preform that was nearing completion prior to hafting or final edge modification.

Finally, **5ST98.2512** is a finely flaked, teardrop-shaped point also made from Troublesome chert. A portion of the lateral blade edge is missing, but the point retains a convex base and shows signs of basal thinning. It lacks notches and is formally similar in some respects to Plains Triangular types (Boser 2022; Peck 2011).

Figure 16. Four preforms were recovered from 5ST98, each containing provenience data except for 5ST98.2512.

Table 9. Table presenting physical attributes of each preform.

Thousands Conversions	Catalogue Number	Unit (X,Y)	Level	Element	Portion	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
1004, 995	5ST98.2496	5n5w	surface	Preform	CO	33.2	23.6	4.6	3.3	Kremmling Chert	N	N
1002, 988	5ST98.2497	3n12w	surface	Preform	PR/MS	30.8	27.5	3.6	2.9	Kremmling Chert	N	N
1005, 985	5ST98.2534	6n15w	n/a	Preform	CO	31.8	22.4	5.5	3.9	Kremmling Chert	N	N
No Prov.	5ST98.2512	n/a	surface	Preform	ABC	25.4	16.8	2.3	0.9	Kremmling Chert	N	N

Projectile Points

A total of 105 chipped stone projectile points are included in this analysis. Of these, ten specimens are "complete" (CO), exhibiting no observable damage or missing parts. Fourteen points are categorized as "all but complete" (ABC), with only minor portions, such as a tip or an ear, absent. "Distal tips" (DS) account for 18 specimens, while two fragments are limited to "lateral edges" (LT). Eight pieces represent "midsections" (MS), some of which may include the hafting area but lack the base. Additionally, nine specimens preserve both the tip and midsection (MS/DS), though they are missing the base. Twenty-six pieces consist of "proximal bases" (PR), with the base and sometimes the hafting area intact. Finally, 22 points preserve the base, hafting area, and a substantial portion of the midsection but lack the distal tip. Forty-four projectile points and projectile point fragments in the collection are considered temporally diagnostic, as their morphological characteristics align with established projectile point styles associated with specific periods in prehistory or history. Fifty-eight projectile points and point fragments in the collection are classified as temporally non-diagnostic, as they exhibit few or no morphological features that can be confidently linked to a recognized projectile point style from a specific period in prehistory or history. The Paleoindian period (12,000 to 7,500 BP), the Early Archaic period (7,500 to 5,000 BP), Middle Archaic period (5,000 to 3,000 BP), Late Archaic period (3,000 to 1800 BP), and Late Prehistoric period (1800 to 410 BP) are represented in the forty-seven projectile point specimens, with a dominance in Late Archaic with 33 projectile points (Chenault 1993). Additional metric and descriptive attributes of all projectile point tools are presented in Appendix K.

Diagnostic Projectile Points

Paleoindian (12,000 to 7,500 BP)

5ST98.2492, 5ST98.2493, and **5ST98.2494** are refitted fragments of a single Paleoindian projectile point, all manufactured from Table Mountain jasper (Figure 17). Despite refitting, the point remains incomplete, with a portion of its midsection along one lateral edge missing. The breakage appears to have resulted from multiple-step fractures. The artifact is bifacially flaked and shows no evidence of a flake blank or cortical surface. Morphologically, the point exhibits a lanceolate overall shape, a concave base, and a blade that ranges from parallel-sided to ovate. Flaking is irregular across the surface. These attributes are consistent with Paleoindian point forms and correspond closely with Goshen-type points, one of which has also been documented at site 5ST695 (Madden 2022; Benedict 1981; Kornfeld 2010; Boser 2022; Trevor 2011). Early interpretations suggested that Clovis and Folsom groups rarely ventured into mountainous areas, particularly the Colorado high country, due to factors like persistent snow cover and limited resources. Yet, Pitblado (2017) refutes this perspective by presenting evidence of Clovis activity across the Rocky Mountains, indicating that Paleoindian engagement with subalpine landscapes may have been more widespread than previously recognized.

5ST98.2500 is the proximal base of a Paleoindian projectile point manufactured from quartzite (Figure 17). The point is incomplete due to a traverse step fracture that removed the distal end. The point is bifacially flaked and exhibits no presence of cortex or flake blanks. The projectile point appears to fit the category of a basally thinned triangular point. It exhibits a concave base with clear evidence of basal thinning but lacks fluting, defined as the removal of flakes from the basal edge of a lithic tool to facilitate hafting (Boser 2022). Although the point displays an overall triangular morphology, interpretation is limited by a traverse step fracture, which obscures part of its original shape. The flaking pattern is irregular, but the observable characteristics are consistent with Paleoindian point forms and may correspond to another Goshen-type point, as identified at comparable sites (Kornfeld 2010; Madden 2022; Trevor 2011).

Figure 17. Paleoindian projectile points from site 5ST98 include specimens 5ST98.2492 through 5ST98.2494, which have associated provenience data. In contrast, specimen 5ST98.2500 was recovered from the surface and lacks provenience information.

Early Archaic (7,500 to 5,000 BP)

5ST98.2516 is the proximal base of an Early Archaic projectile point manufactured from an unknown chert raw material (Figure 18). The point is incomplete due to a traverse step fracture that removed the distal end. The point is bifacially flaked and exhibits no presence of cortex or flake blanks. This projectile point appears to be associated with the Early Archaic period. It features a convex base, an expanding stem, and an irregular flaking pattern. These attributes are consistent with the Mount Albion Complex, which dates to approximately 5800–5600 RCYBP and is commonly found in mountainous regions (Benedict 1978; Dinkel 2021; Madden 2022). The Cache la Poudre River geographically defines the Mount Albion Complex to the north, the South Platte River to the south, the Continental Divide to the west, and the Dakota Hogback to the east (Benedict and Olson 1978).

Figure 18. One Mount Albion Complex projectile point was identified at site 5ST98; it was recovered as a surface find and lacks associated provenience information.

Middle Archaic (5,000 to 3,000 BP)

5ST98.2495 is the proximal base of a Middle Archaic projectile point manufactured from Table Mountain jasper (Figure 19). The point is incomplete due to a traverse step fracture that removed the distal end. The point is bifacially flaked and exhibits no presence of cortex or flake blanks. This projectile point was identified as a Duncan point in the National Register of Historic Places report authored by Dr. Elizabeth Ann Morris (Morris 1978; Madden 2022). This identification is supported by the point's morphological characteristics, which include a concave base, a constricted straight stem, and subtle, rounded shoulders. The slightly concave base also exhibits evidence of notching created through pressure flaking (Wheeler 1954; Boser 2022). Duncan points are typically dated to approximately 4,000 BP (Kornfeld et al. 2010).

Figure 19. A single Duncan projectile point was identified at site 5ST98. It appears to have been recovered from the surface of 5ST98; however, the precise provenience coordinates are uncertain.

Late Archaic (3,000 to 1,800 BP)

A total of 33 projectile points (5ST98.2444 through 5ST98.2447, 5ST98.2452, 5ST98.2455, 5ST98.2458, 5ST98.2460, 5ST98.2462 through 5ST98.2465, 5ST98.2468, 5ST98.2470 through 5ST98.2474, 5ST98.2477 through 5ST98.2479, 5ST98.2481 through 5ST98.2485, 5ST98.2488 through 5ST98.2491, 5ST98.2497 through 5ST98.2498, 5ST98.2518, 5ST98.2532, 5ST98.2534) are assigned to the Late Archaic and are discussed herein. All points exhibit corner-notching. Serration is present on 36% (12 of 33) of the specimens. Among the 33 points assigned to the Late Archaic, 93% (31 specimens) retain complete bases. Of these, 60% (20 of 33) have straight bases, while 33% (11 of 33) exhibit concave bases. Additionally, 96% (32 of 33) of the points are manufactured from Troublesome Chert.

5ST98.2440 is the proximal base and midsection of a Late Archaic projectile point manufactured from Troublesome Chert (Figure 20). The point is heavily burnt with the presence of a few large potlids across the midline. It also has a traverse step fracture that resulted in the removal of the distal tip. The projectile point most likely fits within the Pelican Lake type; a Late Archaic corner-notched form found throughout the Northwestern Plains and into northern Colorado (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). This assessment is based on several key morphological characteristics. The point exhibits prominent corner notches and is widest just above the notches at the shoulders, which is a defining feature of Pelican Lake points. Its blades are triangular and show clear serration along the edges, another common trait associated with this type. Although the base of the point is straight and somewhat irregular, likely due to burning, this does not rule out a Pelican Lake identification, as post-depositional processes often affect base morphology.

5ST98.2441 is an all but complete Late Archaic projectile point made from Troublesome Chert that is missing a small bit of the ear (Figure 20). This projectile point most closely aligns with Late Archaic Pelican Lake point types (Dinkel 2021; Kornfeld et al, 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). It features corner notches and is widest at the shoulders, both traits typical of Pelican Lake points. The triangular blade shape is also consistent with this type. Although the base is irregular, this may be due to post-depositional damage, and does not rule out affiliation. The lack of serration distinguishes it from some other regional Late Archaic types, but not all Pelican Lake points are serrated, so this absence is not disqualifying. The expanding base and shoulder-heavy outline support the identification as a variant within the Pelican Lake tradition, possibly reflecting localized production or use within the Colorado Front Range.

5ST98.2444 is a complete Late Archaic projectile point made from Troublesome Chert recovered from 5ST98 (Figure 20). This projectile point most closely aligns with Late Archaic

Pelican Lake point types. The triangular blade shape, presence of corner notches, serrated blade edges, and expanding stems are all features of Pelican Lake points (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). Additionally, the equal width between the shoulders and the base, along with the concave base, is consistent with some documented Pelican Lake examples, although most are described as having a base narrower than the blade. The only characteristic that diverges slightly is the equal width between the base and shoulders. Pelican Lake points typically have a blade that is noticeably wider than the base, whereas this specimen shows similar widths.

5ST98.2445 is an all but complete Late Archaic projectile point made from Troublesome Chert that is missing a fragment of the lateral blade edge along the midsection to the shoulder (Figure 20). The projectile point most closely resembles an Elko Corner-Notched type. The Elko type is defined by corner notches, triangular blades, and an expanding stem, traits all present in this specimen (Heizer 1968; Homer 1978; Hurst 2013; Madden 2022; O'Connell 1967; Shackley 1996). The concave base also fits well, as Elko Corner-Notched points are typically described as having concave to slightly convex bases. The absence of serration is consistent with Elko points, which are not typically noted for having serrated edges. The asymmetry in the notches, one being wider than the other, may be a manufacturing variation or the result of damage, but it does not necessarily disqualify it from being an Elko type. However, due to breakage, it is not possible to compare the width of the base and shoulders, an important trait for distinguishing Elko from similar types like Pelican Lake. That limitation makes a definitive identification more difficult.

5ST98.2446 is a complete Late Archaic projectile point made from Troublesome Chert recovered from 5ST98. This projectile point most closely aligns with the Late Archaic Elko Corner-Notched point type (Figure 20). The presence of corner notches, heavily serrated triangular blades, an expanding stem, and a concave base corresponds well with many Elko characteristics (Heizer 1968; Homer 1978; Hurst 2013; Madden 2022; O'Connell 1967; Shackley 1996). Elko points are known to have concave to slightly convex bases, matching the concave base described here. Additionally, the expanding stem and corner notches are consistent with Elko morphology. While serrated blades are more commonly associated with Pelican Lake points, occasional serration in Elko points does not exclude this classification. One minor deviation is that the similar widths of the shoulders and base in this specimen contrast with the typically narrower bases seen in Elko points.

5ST98.2447 is a proximal base of a Late Archaic projectile point made from Troublesome Chert (Figure 20). This projectile point, represented only by its proximal base, appears to have corner notches and a concave base. Since the blades and shoulders are absent, it is difficult to assign it confidently to a specific point type. However, the presence of corner notches and a convex base aligns most closely with characteristics found in several Late Archaic projectile points (Taylor 2022, Taylor 2006; Peck 2011, Boser 2022; Dinkel 2021; Madden 2022). The lack of additional morphological details like blade shape or serration, limits a more precise identification.

5ST98.2452 is the proximal base and midsection of a Late Archaic projectile point made from Troublesome Chert found at 5ST98 (Figure 20). This projectile point exhibits a traverse step fracture that removed the distal tip. This projectile point most closely aligns with Pelican Lake points based on several morphological characteristics (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). It features serrated, triangular blades and corner notches, which are hallmark traits of Pelican Lake types. Additionally, the base is smaller than the shoulders, consistent with Pelican Lake points that typically have bases narrower than the blade. The base shape is straight rather than convex, which still falls within the range of variation noted for Pelican Lake points, although they are often described as straight to convex.

5ST98.2455 is a complete Late Archaic Projectile point made from Troublesome Chert excavated from 5ST98. This projectile point most closely resembles a Pelican Lake point, based on several defining morphological features (Figure 20). It has corner notches, serrated blade edges, and an expanding stem, all characteristics commonly associated with Pelican Lake points (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). The blade is triangular on one edge and more ovate on the other, which may be the result of retouch. The base is straight and irregular, but within the range of known variation for Pelican Lake points, which can exhibit straight to convex bases. Most notably, there is a pronounced difference between the width of the shoulders and the base, an important trait of Pelican Lake points, which typically have bases that are significantly narrower than the blade.

5ST98.2458 is the proximal base and midsection of a Late Archaic projectile point made from Troublesome Chert found at 5ST98 (Figure 20). This point has a straight base and corner notches, along with triangular blades and a base that is wider than the shoulders. While the corner-notched and triangular blade characteristics are shared with Pelican Lake and Elko Corner-notched types, those types typically have bases narrower than the blade or shoulders, not wider (Heizer 1968; Homer 1978; Hurst 2013; Madden 2022; O'Connell 1967; Shackley 1996). The presence of a straight base does occur among some Porcupine Peak points and aligns with the majority of En Medio and Elko Corner-notched examples, but the wider base is inconsistent with those types' defining traits. Therefore, this point does not conform well to any of the known types and may reflect a variation or localized form not formally classified, or potentially an individual manufacturing. The corner-notched design, blade shape, and base form collectively point to a Late Archaic classification, even if the specific proportions deviate from more narrowly defined types.

5ST98.2460 is the proximal base and midsection of a Late Archaic projectile point made from Troublesome Chert excavated at 5ST98 (Figure 20). This projectile point most closely resembles an Elko Corner-Notched type, though not perfectly. The point has corner notches, triangular blade edges, and a shoulder that is wider than the base, all of which are consistent with Elko Corner-Notched points (Heizer 1968; Homer 1978; Hurst 2013; Madden 2022; O'Connell 1967; Shackley 1996). The straight to convex base is also typical of Elko points, as they are generally described as having concave to slightly convex bases. Additionally, lack of serration aligns with Elko's points, since serration is not commonly associated with that type.

Figure 20. Late Archaic projectile points from 5ST98 showing typical Pelican Lake and Elko Corner-Notched features, including corner notches and triangular blades. Variation in base shape and serration reflects regional or individual differences within these types.

5ST98.2462 is the proximal base and midsection of a Late Archaic projectile point made from Troublesome Chert excavated at 5ST98 (Figure 21). This projectile point most closely aligns with Late Archaic Elko Corner-Notched point types. It features corner notches and a triangular blade shape, both traits typical of Elko points (Heizer 1968; Homer 1978; Hurst 2013; Madden 2022; O'Connell 1967; Shackley 1996). The straight base is also consistent with this type, which often exhibits straight to slightly concave or convex basal forms. Although the base is slightly wider than the shoulders, whereas Elko points typically have stems narrower than the blade, this variation may reflect localized manufacturing choices or reworking. The presence of slight serration on one blade edge is a minor deviation, as Elko points are generally non-serrated, but the limited extent suggests it may be incidental rather than diagnostic.

5ST98.2463 is a proximal base of a Late Archaic projectile point made from Troublesome Chert (Figure 21). Although incomplete, it exhibits corner notches and a concave basal edge. Due to the absence of the blade and shoulder regions, definitive typological attribution remains uncertain. However, the presence of corner notching and a concave base is consistent with several recognized Late Archaic point types (Taylor 2022, Taylor 2006; Peck 2011, Boser 2022; Dinkel 2021; Madden 2022). The absence of additional diagnostic attributes, such as full blade morphology or evidence of edge serration, impedes a more specific classification.

5ST98.2465 is a complete Late Archaic projectile point made from Troublesome Chert excavated from 5ST98 (Figure 21). This projectile point most closely aligns with Late Archaic Pelican Lake point types. It features corner notches, serrated triangular blades, and shoulders that are wider than the base, all characteristic traits of Pelican Lake points (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). The expanding stem with shoulders widest just above the notches further supports this identification. However, the point's concave base is atypical for Pelican Lake points, which generally exhibit straight to convex basal shapes and lack concavity. While the concave base resembles features found in Elko Corner-Notched points, those points typically do not have serrated blade edges, making this trait inconsistent with that type.

5ST98.2468 is a proximal base of a Late Archaic projectile point made from Troublesome Chert (Figure 21). Although incomplete, the specimen shows corner notches and a concave basal edge. Because the blade and shoulder areas are missing, a definitive typological identification is uncertain. However, the combination of corner notches and a concave base aligns with several known Late Archaic point types (Taylor 2022, Taylor 2006; Peck 2011, Boser 2022; Dinkel 2021; Madden 2022). The lack of further diagnostic features, such as complete blade shape or serrated edges, prevents a more precise classification.

5ST98.2474 is an all but complete Late Archaic projectile point made from Troublesome Chert from 5ST98 (Figure 21). The lateral blade edge exhibits several small breaks that make this point incomplete. This projectile point exhibits several characteristics that align closely with Late Archaic Pelican Lake points. The presence of corner notches, rough serration on the blade edges, and shoulders wider than the base correspond well with typical Pelican Lake morphology, which often includes serrated, triangular blades with expanding stems (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). However, the concave base is not consistent with Pelican Lake points, which usually have straight to convex bases. The more ovate blade shape, potentially resulting from retouch, slightly diverges from the classic triangular form of Pelican Lake points, though some variation can occur due to use or resharpening. While Elko Corner-Notched points sometimes feature concave bases, they generally lack serration, making this point's serrated edges an inconsistent trait for that type.

5ST98.2471 is an all but complete Late Archaic projectile point made from Troublesome Chert excavated from 5ST98 (Figure 21). This point has a traverse step fracture that has removed the distal tip. This projectile point most closely resembles Late Archaic Pelican Lake points due to its corner notches, serrated blade edges, and shoulders that are wider than the base. The triangular to ovate blade shape also aligns with the general morphology seen in Pelican Lake points (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). However, the concave base is a notable exception, as Pelican Lake points typically have straight to convex bases rather than concave ones. While Elko Corner-Notched points share the trait of a concave base, they usually lack serration, which makes this feature inconsistent with Elko types.

5ST98.2472 is an all but complete projectile point made from Troublesome Chert excavated from 5ST98 (Figure 21). This point has a traverse step fracture that has removed the distal tip. This projectile point most closely aligns with the Pelican Lake type. It exhibits corner notches and a triangular blade shape, both characteristic of Pelican Lake points. The shoulders being wider than the base (an expanding stem) also fits well within Pelican Lake morphology (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). Additionally, the convex base matches the typical straight to convex basal shapes seen in Pelican Lake points. The absence of serration further supports this identification, as serration in Pelican Lake points is sometimes present but not required.

5ST98.2473 is a complete projectile point made from Troublesome Chert excavated from 5ST98 (Figure 21). This projectile point most closely aligns with Pelican Lake point types. It features corner notches, heavy serration on the blade edges, and a triangular blade shape, all consistent with Pelican Lake characteristics. The shoulders being wider than the base (expanding stem) also fits well within this type's typical morphology (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). The base shape described as straight to convex matches the known basal shapes of Pelican Lake points. Although serration is sometimes present in Pelican Lake points, heavy serration further supports this identification.

5ST98.2470 is the proximal base and midsection of a Late Archaic projectile point made from Troublesome Chert excavated at 5ST98 (Figure 21). This projectile point most closely aligns with Pelican Lake point types. It features corner notches, a triangular blade shape, and shoulders that are wider than the base, traits consistent with the expanding stem typical of Pelican Lake morphology (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). The convex base also fits well within the expected basal range for Pelican Lake points, which are typically straight to convex. The absence of serration is not inconsistent, as Pelican Lake points are often unserrated, with serration being only occasionally present. The slightly irregular blade shape may result from use or resharpening but does not obscure the overall form.

5ST98.2477 is an all but complete projectile point made from Troublesome Chert excavated from 5ST98 (Figure 21). This point has a traverse step fracture that has removed the distal tip. This projectile point most closely aligns with Pelican Lake point types. It features corner notches, serrated blade edges, and an irregular but overall triangular blade shape, all of which are consistent with Pelican Lake morphology. The shoulders are wider than the base, forming an expanding stem typical of this type. The base, while described as irregular, is straight, which falls within the expected range for Pelican Lake points, which typically have straight to convex bases (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). Although the blade shape and base are somewhat irregular, these variations likely result from use, resharpening, or post-depositional damage and do not significantly conflict with Pelican Lake characteristics.

Figure 21. Late Archaic projectile points from 5ST98 showing variability in base shape, blade morphology, and serration. Most align with Pelican Lake and Elko Corner-Notched types, though several exhibit minor deviations that may reflect localized manufacturing or use-related modification.

5ST98.2478 is a proximal base of a Late Archaic projectile point made from Troublesome Chert (Figure 22). The projectile point displays a transverse step fracture that runs from the shoulders toward the base, accompanied by signs of thermal alteration. Although incomplete, the specimen shows a corner notch and an irregular base. Because the blade and shoulder areas are missing and the artifact is thermally altered, a definitive typological identification is uncertain. However, the combination of a corner notch and an irregular-concave base aligns with several known Late Archaic point types (Taylor 2022, Taylor 2006; Peck 2011, Boser 2022; Dinkel 2021; Madden 2022). The lack of further diagnostic features, such as complete blade shape or serrated edges, prevents a more precise classification.

5ST98.2479 is a complete Late Archaic projectile point made from Troublesome Chert excavated at 5ST98 (Figure 22). This projectile point most closely aligns with Pelican Lake point types. It features corner notches, a triangular blade shape, and shoulders that are slightly wider than the base, indicative of an expanding stem, a key trait of Pelican Lake points (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). The presence of serrated blade edges further supports this identification, as serration is sometimes present in Pelican Lake examples. The base is straight but irregular, which still fits within the documented range of Pelican Lake basal shapes, typically straight to convex.

5ST98.2481 is an all but complete Late Archaic projectile point made from Troublesome Chert from 5ST98 with a small piece of an ear missing (Figure 22). This projectile point most closely aligns with Elko Corner-Notched point types. It features corner notches, a triangular blade shape, and a concave base, all consistent with Elko morphology. While the stem is described as expanding, the shoulder and base widths being nearly the same suggests a less pronounced expansion, which is still within the variation seen in Elko points (Heizer 1968; Homer 1978; Hurst 2013; Madden 2022; O'Connell 1967; Shackley 1996). The lack of serration further supports this identification, as Elko points are typically unserrated. Although the slight stem expansion might overlap with Pelican Lake characteristics, the concave base and absence of serration make Elko the stronger fit.

5ST98.2482 is the proximal base and midsection of a Late Archaic projectile point made from Troublesome Chert excavated at 5ST98 (Figure 22). This projectile point exhibits a transverse step fracture that has removed the distal tip. One blade edge displays several post-depositional chips, while the opposite blade edge is largely missing. The artifact also shows evidence of fire alteration. This projectile point exhibits a combination of features that makes identification somewhat challenging. The presence of corner notches and an expanding stem align it with several Late Archaic types, including Pelican Lake and Elko points. However, the concave base is more typical of Elko Corner-Notched points, whereas Pelican Lake points usually have straight to convex bases (Heizer 1968; Homer 1978; Hurst 2013; Madden 2022; O'Connell 1967; Shackley 1996). The shoulder width being smaller than the base is unusual for an expanding stem and may be the result of breakage, which complicates assessment. The possible irregular or faint serration on one blade edge is inconclusive, as serration can be variable or absent across types.

5ST98.2484 is an all but complete Late Archaic projectile point made from Troublesome Chert from 5ST98 (Figure 22). A minor transverse step fracture at the distal apex has resulted in the loss of the tip. One shoulder exhibits a potential overshot flake scar. Both ears have been detached through step fracturing. This projectile point most closely aligns with Pelican Lake point types. It features corner notches, serrated blade edges, and a triangular blade shape, all typical of Pelican Lake morphology (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). The shoulders being wider than the base indicate an expanding stem, which is a common characteristic of this type. Additionally, the straight base fits well within the common basal shapes for Pelican Lake points, which range from straight to convex.

5ST98.2485 is the proximal base and midsection of a Late Archaic projectile point made from Troublesome Chert found at 5ST98 (Figure 22). This projectile point most closely aligns with Pelican Lake point types. It features corner notches, a triangular blade shape, and an expanding stem with shoulders wider than the base, all traits of Pelican Lake morphology. The convex base also fits well within the expected basal variation for this type (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). The presence of heavy serration on one blade edge, while the other lacks it, may reflect resharpening or use-related asymmetry rather than a diagnostic trait. Serration is sometimes present in Pelican Lake points, so this uneven expression does not conflict with the type.

5ST98.2488 is a complete projectile point made from Troublesome Chert found at 5ST98. This projectile point most closely aligns with Elko Corner-Notched point types (Figure 22). It features corner notches, a triangular blade shape, and a concave base, all traits characteristic of Elko morphology (Heizer 1968; Homer 1978; Hurst 2013; Madden 2022; O'Connell 1967; Shackley 1996). The presence of an expanding stem, indicated by shoulders that are wider than the base, also fits within the variation seen in Elko points, even if the expansion is more commonly subtle. The lack of serration supports this classification, as Elko points are typically unserrated. While Pelican Lake points also have expanding stems and triangular blades, the concave base rules out that type, since Pelican Lake points generally exhibit straight to convex bases.

5ST98.2489 is the proximal base and midsection of a Late Archaic projectile point made from Troublesome Chert from 5ST98 (Figure 22). The point has a traverse step fracture, removing the distal tip. This projectile point most closely aligns with Elko Corner-Notched point types. It features corner notches, a triangular blade shape, and an expanding stem with shoulders wider than the base, all traits seen in Elko points (Heizer 1968; Homer 1978; Hurst 2013; Madden 2022; O'Connell 1967; Shackley 1996). The concave base is a strong indicator, as it is a defining characteristic of Elko Corner-Notched points and not consistent with Pelican Lake points, which typically have straight to convex bases. The absence of serration also supports an Elko identification, as serration is not typically found on Elko points.

5ST98.2490 is the proximal base and midsection of a Late Archaic projectile point made from Troublesome Chert (Figure 22). A traverse step fracture runs above the shoulders, removing the distal tip. This projectile point most closely aligns with Pelican Lake point types. It features corner notches, an expanding stem with shoulders wider than the base, and a convex base, all traits consistent with Pelican Lake morphology (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). Although a step fracture limits full analysis of the blade shape, the preserved portion appears triangular, which fits well within Pelican Lake variability. The absence of serration is not problematic, as serration is only occasionally present in this type.

5ST98.2463 represents the proximal base of a Late Archaic projectile point made from Troublesome Chert (Figure 22). Although fragmentary, it retains corner notches and a concave basal edge. The absence of the blade and shoulder regions precludes definitive typological identification (Taylor 2022, Taylor 2006; Peck 2011, Boser 2022; Dinkel 2021; Madden 2022). Nonetheless, the presence of corner notching and a concave base aligns with characteristics common to several recognized Late Archaic point types. The lack of additional diagnostic features, such as complete blade morphology or indications of edge serration, limits more precise classification.

Figure 22. Specimens exhibit characteristic features of Pelican Lake and Elko Corner-Notched types, including expanding stems, concave to convex bases, and occasional serration. Damage such as step fractures, tip loss, and thermal alteration is common across examples.

5ST98.2498 is the proximal base of a Late Archaic projectile point made from an unknown raw material found at 5ST98 (Figure 23). An oblique step fracture extends from the distal end of the left blade edge toward the area just below the shoulder, removing the distal tip and one lateral blade edge. This projectile point most closely aligns with Elko Corner-Notched types. The concave base and corner notches are key features characteristic of Elko points (Heizer 1968; Homer 1978; Hurst 2013; Madden 2022; O'Connell 1967; Shackley 1996). Although the missing blade edge and shoulder make it difficult to confirm the blade shape and shoulder-to-base width ratio, the presence of an expanding stem suggests the shoulders could be wider than the base, which fits within Elko variation. The absence of serration further supports this identification, as Elko points typically lack serrated edges.

5ST98.2518 is the proximal base of a Late Archaic projectile point made from Troublesome Chert (Figure 23). Despite its incomplete condition, the specimen preserves corner notches and a concave basal edge. The missing blade and shoulder portions hinder confident typological assignment. However, the observed basal concavity and corner notching are consistent with attributes found in several Late Archaic point types (Taylor 2022, Taylor 2006; Peck 2011, Boser 2022; Dinkel 2021; Madden 2022). The absence of further diagnostic traits, such as intact blade form or evidence of serration, prevents more specific classification.

5ST98.2532 is the proximal base and midsection of a Late Archaic projectile point made from Troublesome Chert (Figure 23). The specimen exhibits a longitudinal step fracture extending along the midline from the distal tip to the base. This projectile point most closely aligns with Pelican Lake point types. Although the point is broken longitudinally, the presence of a corner notch, a non-serrated blade edge, and a convex base is consistent with Pelican Lake morphology (Dinkel 2021; Kornfeld et al 2010; Madden 2022; Peck 2011; Taylor 2006; Taylor 2022; Whittenburg 2017). While the blade shape is only partially preserved and the shoulder-to-base width ratio is undetermined due to the fracture, the existing traits, especially the convex base and corner notch, fit well within the known variation of Pelican Lake points. The lack of serration is not a disqualifying feature, as serration is variable and often absent in this type.

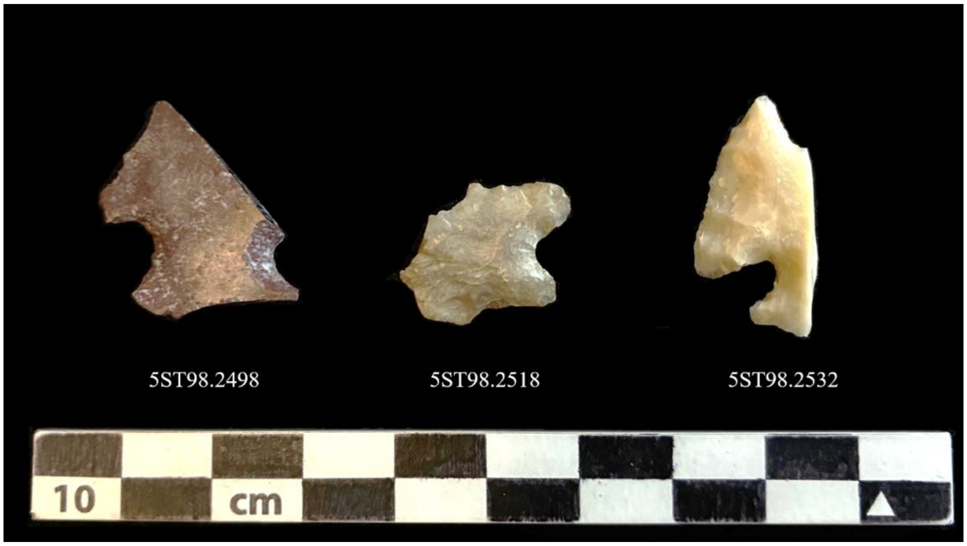

Figure 23. Late Archaic projectile point fragments from 5ST98 showing variation in base shape, notch placement, and fracture patterns. Despite their fragmentary condition, diagnostic traits such as concave or convex bases, corner notches, and expanding stems support affiliation with Elko and Pelican Lake point types.

Late Prehistoric Period (1,800 to 410 BP)

5ST98.2453 is an all but complete Late Prehistoric projectile point made from an unknown, relatively coarse raw material (Figure 24). The point is nearly complete but lacks a small fragment of an ear. The point is bifacially flaked and exhibits no presence of cortex or flake blanks. This projectile point features a straight basal edge and corner notches. The blade exhibits an incurvate shape, with the blade edges curving slightly inward along their lateral edge. These morphological traits suggest affiliation with recognized Late Prehistoric corner-notched forms. The site's NRHP nomination form classifies this projectile point as a Late Prehistoric side-notched type (Morris 1978). Comparative analysis, conducted by Bob Madden, with similar Late Prehistoric side-notched points recovered from the Coffin Bison Kill site in Jackson County, Colorado, dated to between 410 and 150 BP, further supports this identification (Byerly et al. 2015).

5ST98.2475 is a complete Late Prehistoric projectile point made from an unknown raw material (Figure 24). The point is bifacially flaked and exhibits no presence of cortex or flake blanks. This projectile point is side-notched with a convex base and a triangular blade shape. The blade edges are finely serrated, and both faces exhibit extremely fine flaking. This point was identified by Bob Madden as a Late Prehistoric Besant type, based on its morphological resemblance to specimens from the Roth site in Yuma County, Colorado (Taylor 2006). This classification is further supported by the author's research, which notes diagnostic features consistent with Besant typology, including side-notching, a lanceolate shape, wide notches, and a slightly convex base (Boser 2022). The Besant type is generally dated to approximately 2,100 to 1,500 BP (Peck 2011).

5ST98.2439 is a complete Late Prehistoric projectile point made from Troublesome chert (Figure 24). The point is bifacially flaked and exhibits no presence of cortex or flake blanks. This projectile point features a concave basal edge and side notches, with a triangular blade shape. The combination of a concave base and side-notching is consistent with forms commonly associated with Late Prehistoric typologies. This point was identified by Bob Madden as a Plains side-notch type, dated to approximately 850 to 150 BP. The classification is supported by morphological and dimensional similarities to specimens recovered from the Gull Lake site in southern Saskatchewan, the Kobold site in Bighorn County, Montana, and the Rollins Pass site in the Southern Rocky Mountains of Colorado (Dinkel 2021; Taylor 2006).

5ST98.2433 is an all but complete Late Prehistoric projectile point made from an unknown raw material (Figure 24). This projectile point is basally notched and exhibits a triangular blade shape. The artifact shows evidence of thermal alteration, including the presence of several potlids on its surface. These attributes are consistent with points found in the Late Prehistoric, but the thermal alteration makes a finer assessment difficult.

5ST98.2437 is the proximal base and midsection of a possible Late Prehistoric projectile point made from Troublesome chert found at 5ST98 (Figure 24). This projectile point exhibits a double-notched base with a convex medial section. The blade edges are long and triangular, with possible serration present. The flaking on the surface is notably fine and consistent. The projectile point is classified as a Late Prehistoric side-notched type in the site's NRHP nomination form (Morris 1978). However, a comparative analysis by Bob Madden with Late Prehistoric side-notched points from the Coffin Bison Kill site in Jackson County, Colorado, dated between 410 and 150 BP, calls this classification into question.

Figure 24. Late Prehistoric projectile points from 5ST98 showing diverse basal forms, blade shapes, and flaking, including side-notched types consistent with regional typologies such as Besant and Plains side-notched.

Non-Diagnostic Projectile Points

Three nearly complete projectile points from site 5ST98, catalogued as 5ST98.2502, 5ST98.2503, and 5ST98.2451 are classified as non-diagnostic due to their lack of definitive morphological features that would allow for confident assignment to a known projectile point type or cultural period (Figure 25). Of the four, only 5ST98.2451 has documented provenience data; the others were recovered from surface contexts. These specimens, though largely intact, each exhibit characteristics that fall short of clear typological classification. Projectile point 5ST98.2502 is manufactured from a pale rose-colored quartzite and exhibits side notches and a convex base. Its distal tip is missing, and while the point is serrated, the combination of attributes does not align with any specific projectile point type. Similarly, 5ST98.2503 is a nearly complete quartzite point, aside from its missing tip. It features a straight base, straight stem, and triangular blade morphology. Despite these attributes, it lacks diagnostic features that would allow it to be firmly placed within an established typology. The third specimen, 5ST98.2451, is notable for its size, measuring 50.8 mm in length, making it one of the longest near-complete points in the collection aside from a fragmented Paleoindian specimen. Made from Troublesome chert, it possesses a corner notch, barbed shoulder, and irregular blade shape due to some post-depositional chipping. Its base is straight to slightly convex. Although these features are suggestive of certain point types, the overall form is ambiguous enough to preclude definitive classification.

Figure 25. Three near-complete (ABC; all but complete) projectile points that are non-diagnostic.

A total of 16 distal projectile point fragments, broken tips, were recovered from site 5ST98. These include artifacts 5ST98.2501, 5ST98.2504, 5ST98.2507, 5ST98.2525, 5ST98.2526, 5ST98.2527, 5ST98.2528, 5ST98.2529, 5ST98.2530, 5ST98.2531, 5ST98.2486, 5ST98.2464, 5ST98.2454, 5ST98.2499, 5ST98.2432, and 5ST98.2436 (Figure 26 and Figure 27). Of these, 13 are manufactured from Troublesome chert, two from quartzite, and one from Table Mountain jasper. Two of the distal fragments exhibit serrated blade edges, and one specimen shows evidence of burning. Provenience data are available for six of the fragments, while the remaining ten were recovered from the surface without contextual information. These distal tips likely represent points broken during hunting events, possibly carried back to the site embedded within animal carcasses. In some cases, however, breakage may have occurred during manufacture or reworking. Although not diagnostic, these fragments contribute to a broader understanding of lithic variability and site activities at 5ST98.

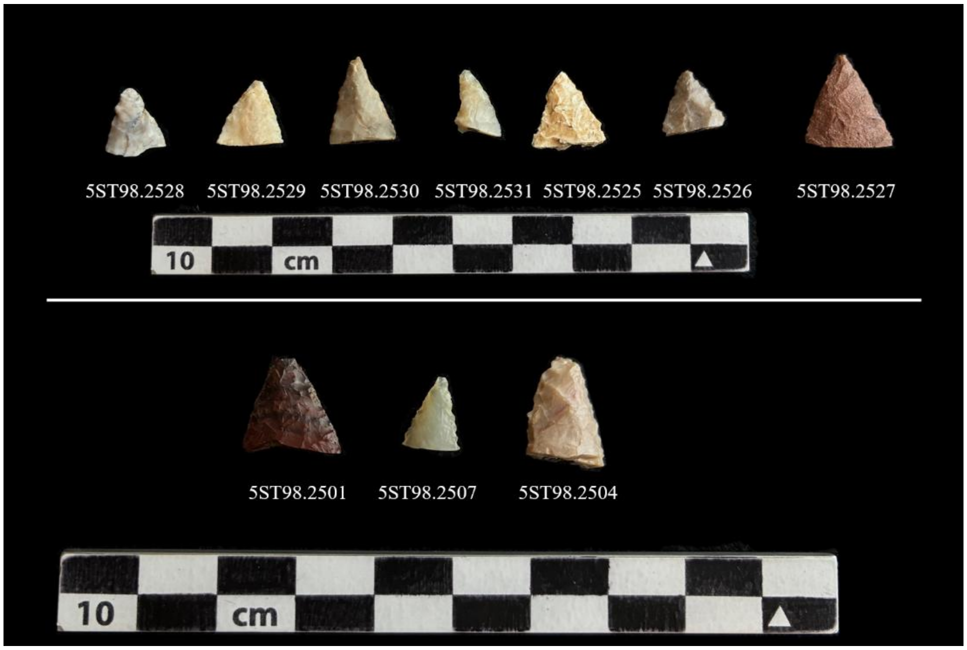

Figure 26. Distal tips (DS) 5ST98.2501–5ST98.2509 and 5ST98.2525–5ST98.2531, all recovered from the surface of site 5ST98; none have associated provenience data.

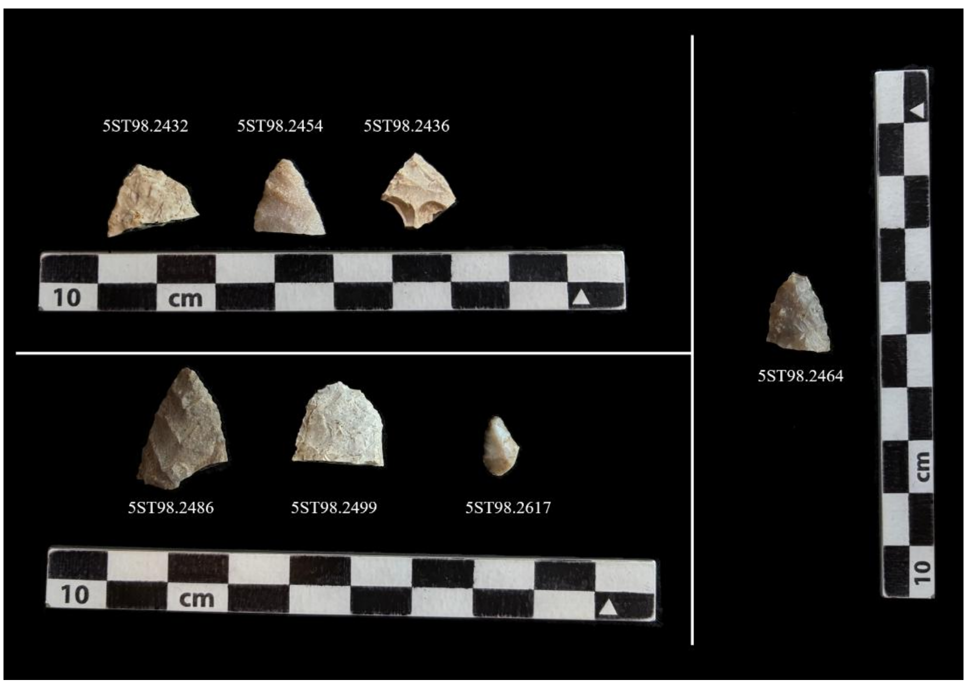

Figure 27. Distal tips (DS) 5ST98.2486, 5ST98.2464, 5ST98.2454, 5ST98.2499, 5ST98.2432, 5ST98.2436, and 5ST98.2617 were all recovered during excavations at site 5ST98, and each has associated provenience information.

A total of seven non-diagnostic projectile point midsections were analyzed from site 5ST98; this includes 5ST98.2509, 5ST98.2517, 5ST98.2467, 5ST98.2459, 5ST98.2448, 5ST98.2431, and 5ST98.2434 (Figure 28). These fragments represent the central portions of projectile points, excluding both the basal and distal ends. Of the seven midsections, five are made from Troublesome chert and two from Windy Ridge quartzite. Two specimens were recovered from the surface, while the remaining five were excavated and have associated provenience data. Midsections 5ST98.2467 and 5ST98.2459 refit with one another, and both also refit with distal tip 5ST98.2529, indicating that all three fragments once formed a single projectile point (Figure 29). One midsection, 5ST98.2434, is distinct in two ways: it exhibits serration along one or both blade edges and shows evidence of thermal alteration, including heat spalling. The remaining six midsections are unmodified and lack diagnostic features. These midsections are not diagnostic, as they lack the morphological features necessary for typological identification, yet they contribute to the broader understanding of lithic variability at the site.

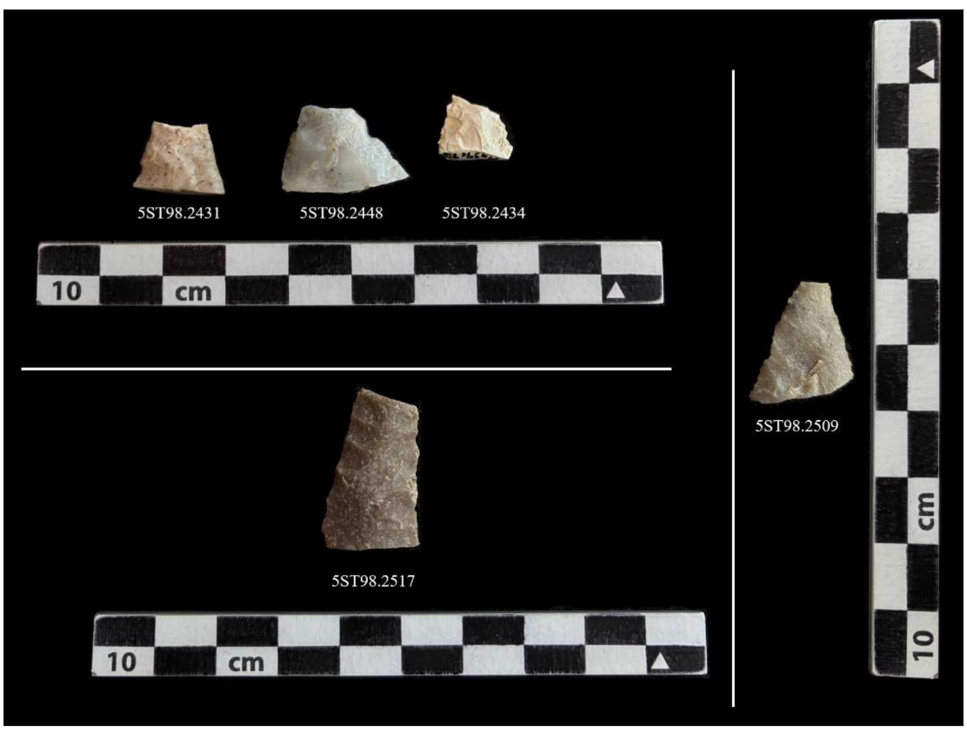

Figure 28. Midsections (MS) 5ST98.2509, 5ST98.2517, 5ST98.2448, 5ST98.2431, and 5ST98.2434. 5ST98.2509 and 5ST98.2517 were recovered from the surface of site 5ST98 and lack provenience; the remaining were all recovered during excavations at site 5ST98, and each has associated provenience information.

Figure 29. Refit of projectile point fragments from site 5ST98, comprising midsections 5ST98.2467 and 5ST98.2459, along with distal tip 5ST98.2529. The successful refit indicates that these fragments originate from a single projectile point. The basal portion is absent.

A total of six non-diagnostic projectile point fragments from site 5ST98 preserve both the midsection and distal tip (MS/DS): 5ST98.2506, 5ST98.2510, 5ST98.2480, 5ST98.2466, 5ST98.2456, and 5ST98.2438 (Figure 30). All six are manufactured from Troublesome chert. Two specimens, 5ST98.2506 and 5ST98.2510, were recovered from the surface, while the remaining four were excavated and have provenience data. Three of the six fragments (5ST98.2506, 5ST98.2466, and 5ST98.2456) exhibit blade serration, while the others are unmodified in this regard. In addition, 5ST98.2438 shows evidence of thermal alteration, with visible heat spalling present on the artifact surface. These distal/midsections are not diagnostic, as they lack the morphological features necessary for typological identification, yet they contribute to the broader understanding of lithic variability at the site.

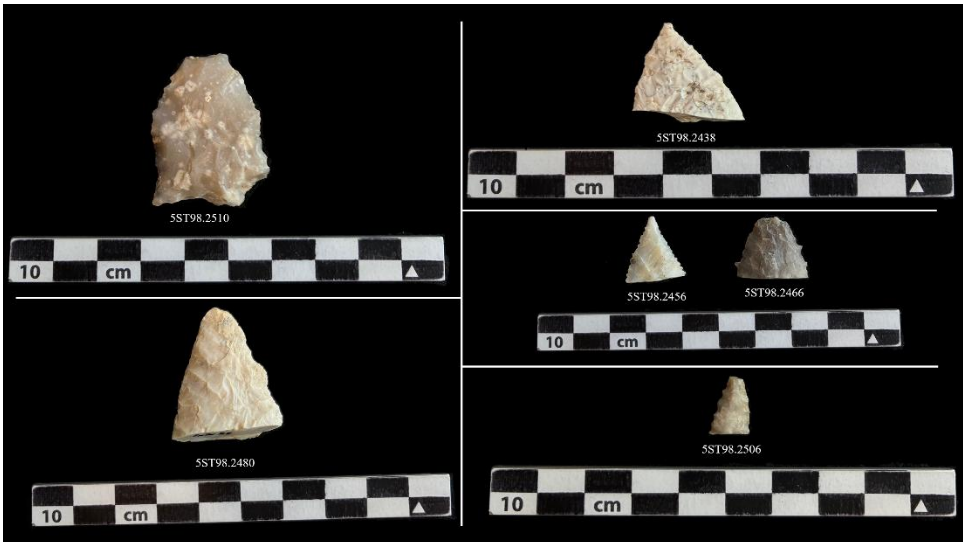

Figure 30. Midsection/distal tip fragments from 5ST98 (5ST98.2506, 2510, 2480, 2466, 2456, and 2438), all made from Troublesome chert. Three are serrated; one (5ST98.2438) shows heat spalling.

A total of fifteen non-diagnostic projectile point proximal bases (PR) were recovered from site 5ST98. These include specimens 5ST98.2508, 5ST98.2513, 5ST98.2519, 5ST98.2520, 5ST98.2521, 5ST98.2522, 5ST98.2523, 5ST98.2524, 5ST98.2533, 5ST98.2487, 5ST98.2469, 5ST98.2450, 5ST98.2443, 5ST98.2442, and 5ST98.2435 (Figure 31 and Figure 32). Thirteen of these bases are made from Troublesome chert, while the remaining two are made from Table Mountain jasper. Two of the bases, 5ST98.2508 and 5ST98.2533, exhibit both blade serration and evidence of burning. Additionally, 5ST98.2487 shows signs of fire alteration but lacks serration. Of the fifteen total bases, nine were recovered from the surface and lack provenience data. The remaining six were recovered from excavated contexts and have associated provenience information. These proximal bases are not diagnostic, as they lack the morphological features necessary for typological identification, yet they contribute to the broader understanding of lithic variability at the site.

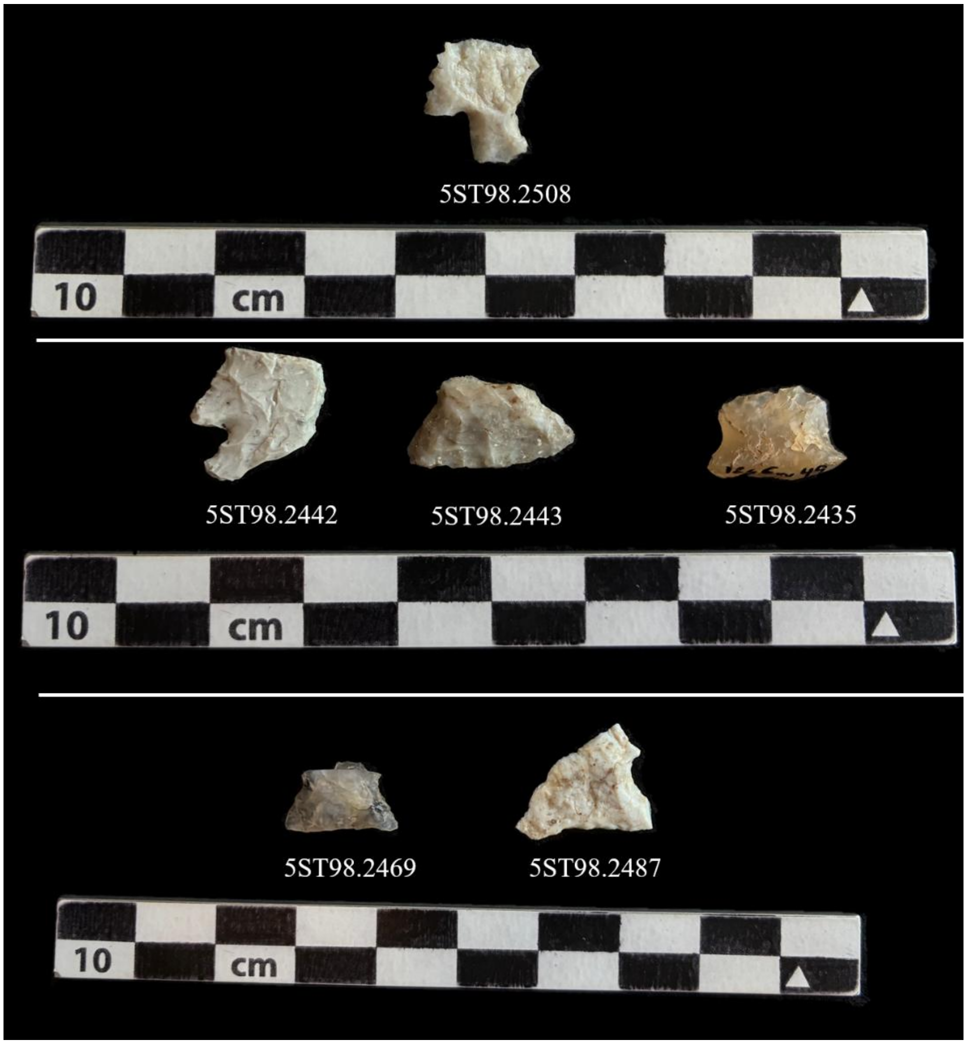

Figure 31. Proximal base fragments from 5ST98 (5ST98.2508, 5ST98.2487, 5ST98.2469, 5ST98.2443, 5ST98.2442, and 5ST98.2435.), made from Troublesome Chert, and 5ST98.2508 and 5ST98.2487 show the presence of pot-lidding.

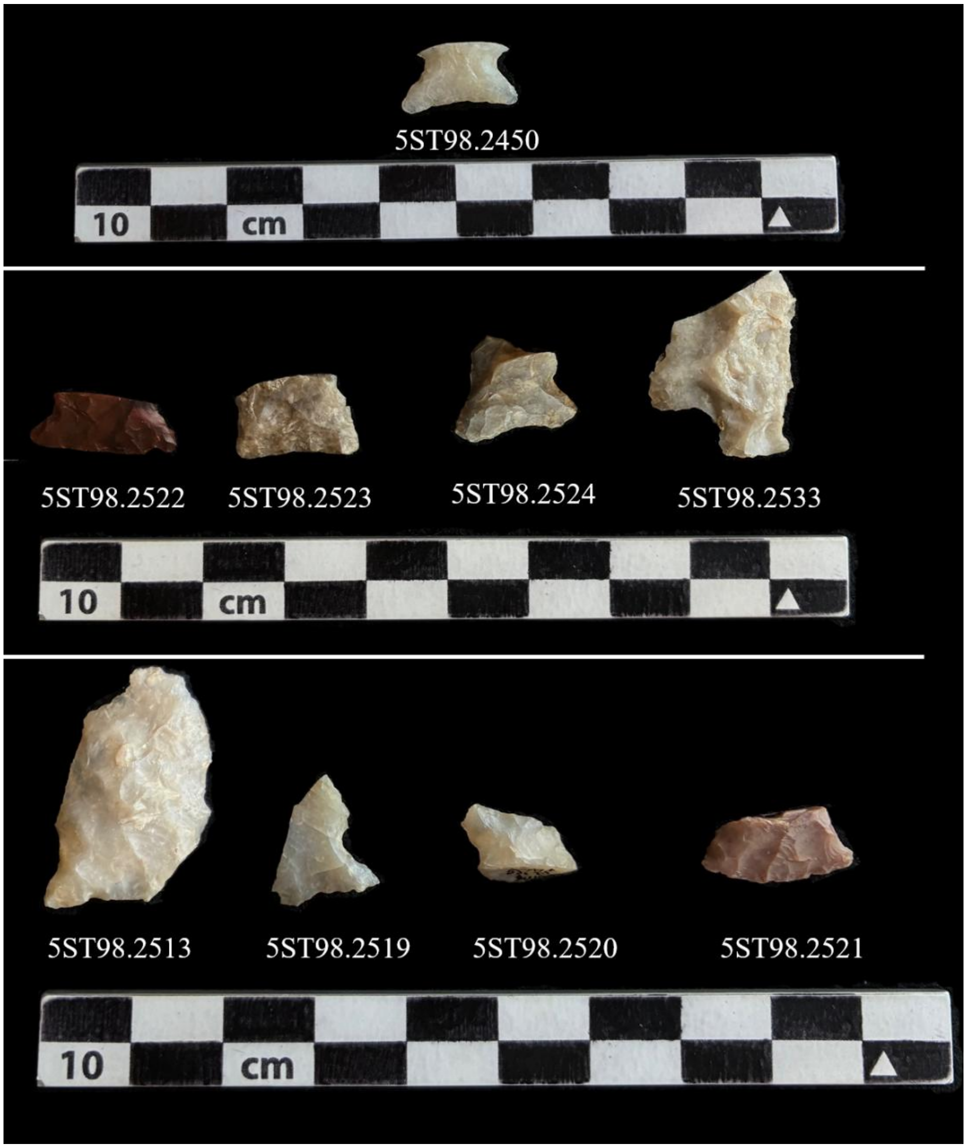

Figure 32. Proximal base fragments from 5ST98 (5ST98.2513, 5ST98.2519, 5ST98.2520, 5ST98.2521, 5ST98.2522, 5ST98.2523, 5ST98.2524, 5ST98.2533, and 5ST98.2450, made from Troublesome Chert and Table Mountain jasper.

Ten non-diagnostic projectile points from site 5ST98 preserve both the proximal base and midsection (PR/MS). These specimens include 5ST98.2525, 5ST98.2497, 5ST98.2505, 5ST98.2511, 5ST98.2514, 5ST98.2483, 5ST98.2476, 5ST98.2461, 5ST98.2457, and 5ST98.2449 (Figure 33). Of these, eight are made from Troublesome chert, one from Windy Ridge quartzite, and one from an unidentified raw material. Five of the points—5ST98.2525, 5ST98.2497, 5ST98.2505, 5ST98.2511, and 5ST98.2514 were recovered from the surface and lack provenience data. The remaining five, 5ST98.2483, 5ST98.2476, 5ST98.2461, 5ST98.2457, and 5ST98.2449, were excavated and have associated provenience information. Only one of the points, 5ST98.2505, exhibits blade serration. One specimen, 5ST98.2461, shows evidence of fire alteration, with a single potlid present on the surface.

Figure 33. Projectile point fragments from 5ST98 preserving both proximal base and midsection (PR/MS). Specimens vary in raw material, provenience, and evidence of use or alteration, including one serrated point and one showing signs of fire exposure.

Scrapers

Two scrapers were recovered from 5ST98, both crafted from an unidentified raw material (5ST98.2560 and 5ST98.2538). A pale sage green color with rust brown patches and inclusions characterizes this material. It has a chalky, coarse texture, is easily scratched, and chips poorly. A scraper is defined as a flake tool that has a retouched edge angle of approximately 60 to 90 degrees (Andrefsky 2005; Odell 2004) (Figure 34 and Table 10). 5ST98.2560 is bifacially flaked, but the ventral surface exhibits few flake scars compared to the dorsal surface. These flake scars are large and extend past the midline on the ventral surface, with some steep flake scars on one lateral edge. The dorsal surface exhibits several large overlapping flake scars. 5ST98.2538 is unifacially flaked with the dorsal surface exhibiting several step flake scars around the lateral edges. The ventral surface exhibits no flake scars and has a smooth, unmodified surface.

Table 10. Descriptive attributes of both scrapers found at 5ST98.

Thousands Conversions	Unit (X,Y)	Catalogue Number	Level	Class	Element	Portion	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
1006, 991	7n9w	5ST98.2538	1	CS	BF	CO	55.5	46.1	18.2	43.2	Unknown	N	N
1007, 989	8n11w	5ST98.2560	1	CS	ES	CO	72	56.1	19.3	104.8	Unknown	N	N

Figure 34. Scrapers recovered from Cell 1006, 991 (7n9w), and 1007, 989 (8n11w). This image shows the low flaking quality of this unknown raw material. Scale in centimeters.

Ground Stone

Netherstone

Nine netherstones (5ST98.2374, 5ST98.2375, 5ST98.2376, 5ST98.2377, 5ST98.2378, 5ST98.2379, 5ST98.2382, 5ST98.2387, and 5ST98.2388 were recovered from 5ST98 (Table 11). A netherstone is a stationary slab or block-shaped stone upon which materials are processed with a handstone (Sutton, Arkush, and Schneider 2006). Most netherstones are first roughly formed through percussion flaking and then finished by abrading and pecking with another rock (Sutton, Arkush, and Schneider 2006). Some netherstones were previously refitted with adhesive, indicating efforts to conjoin fragmented specimens. This includes 5ST98.2374, 5ST98.2379, 5ST98.2387, 5ST98.2376, and 5ST98.2377.

5ST98.2374 is a sandstone netherstone that has been fractured into six pieces found in one place and subsequently reconstructed. It is the largest netherstone recovered from site 5ST98. One face exhibits a noticeably smoother surface, interpreted as the active grinding surface, as shown on the left side of Figure 35. In contrast, the opposing face displays a rough, irregular texture, consistent with use as a passive or backing surface.

Figure 35. The largest netherstone within the 5ST98 collection which was reconstructed from six pieces.

5ST98.2379 is a sandstone netherstone that was broken into three fragments found in one place and later reassembled. It represents the second-largest netherstone recovered from site 5ST98. One surface shows significant smoothing, likely resulting from use as a grinding face, as illustrated on the left side of Figure 36. The opposite surface remains rough and uneven, suggesting it functioned as a stable backing or support during use.

Figure 36. The second largest netherstone within the 5ST98 collection and reconstructed from three pieces.

5ST98.2375 is a sandstone fragment representing a portion of a netherstone. One surface is notably more concave than the other, suggesting its use as the primary grinding surface for processing food materials, as shown on the left side of (Figure 37). The opposing face is slightly more irregular and does not exhibit clear evidence of grinding activity.

5ST98.2376 is a sandstone netherstone that was broken into three fragments found in one place and subsequently reconstructed. One face has been ground smooth and flattened, indicating its use as the active grinding surface, as illustrated in (Figure 37). The opposite face is relatively flat but exhibits minor irregularities, consistent with use as a passive or backing surface.

5ST98.2377 is a sandstone fragment made up of four fragments that have been reconstructed (Figure 37). This netherstone exhibits two smooth and flat faces that may have been used as a grinding surface, suggesting the slab may have been flipped and used on both sides (Adams 2013). Of all the nethertsones in the 5ST98 collection, this artifact is constructed from a sandstone exhibiting a notably coarse granularity compared to other specimens.

5ST98.2378 is a small sandstone fragment representing a portion of a netherstone. Due to its fragmentary condition, only one face is present, exhibiting a smooth, ground surface indicative of use as a grinding area for processing food materials (Figure 37). The remaining surfaces are rough and irregular, lacking any clearly defined face or backing, suggesting the artifact is highly fragmented.

Figure 37. Four netherstone fragments with provenience from 5ST98, several of which are fragmented and reconstructed.

5ST98.2382 is a highly fragmented sandstone netherstone found in one place that preserves two intersecting faces meeting at a near 90-degree angle. One face is smoothly ground, clearly indicative of use as a grinding surface, likely employed in food processing or other abrasive activities (Figure 38). The adjoining face is more irregular, lacking evidence of grinding, and may have functioned as a passive surface or remained unmodified. The fractured interior reveals a notably coarse-grained sandstone matrix, suggesting a relatively friable or less durable raw material.

5ST98.2388 is a sandstone fragment of a netherstone with two opposing flat surfaces. Both faces exhibit signs of wear consistent with grinding activity, suggesting bidirectional use (Figure 38). Although the piece is fragmentary, the dual working surfaces indicate it was likely flipped during use, possibly to extend its utility or accommodate different processing tasks (Adams 2013).

5ST98.2397 is a sandstone netherstone that was fragmented into six pieces found in one place and later reconstructed (Figure 38). The artifact preserves two opposing faces that are both smooth and flat, consistent with use as grinding surfaces. The bidirectional wear suggests that the slab may have been flipped during use, either to prolong its functional life or to accommodate different processing tasks (Adams 2013).

Figure 38. Fragmented sandstone netherstones from 5ST98. Specimen 5ST98.2382 preserves two intersecting faces, one of which is ground and likely served as a grinding surface, while the other remains irregular. Specimens 5ST98.2388 and 5ST98.2397 exhibit opposing smoothed faces indicative of bidirectional use.

Table 11. Descriptive attributes of netherstones in the 5ST98 collection.

Thousands Conversions	Unit (X,Y)	Catalogue Number	Level	Class	Element	Maximum Length (cm)	Maximum Width (cm)	Mass (g)	Maximum Thickness (cm)	Raw Material	Burn (Y/N)
1005, 991	6n9w	5ST98.2374	Surface	GS	Netherstone	24.7	20.1	2041	4.2	Sandstone	N
1005, 991	6n9w	5ST98.2375	Surface	GS	Netherstone	7.5	7.1	56.1	1.4	Sandstone	N
1007, 981	8n19w	5ST98.2376	Surface	GS	Netherstone	5.8	5.1	18.3	0.7	Sandstone	N
1004, 999	5n1w	5ST98.2377	Surface	GS	Netherstone	6.9	3.4	21	0.6	Sandstone	N
1007, 981	8n19w	5ST98.2378	Surface	GS	Netherstone	3	3.6	12.7	3.6	Sandstone	N
1005, 999	6n1w	5ST98.2379	Surface	GS	Netherstone	18.3	11.4	952.5	5	Sandstone	N
No prov.	No prov.	5ST98.2382	Surface	GS	Netherstone	5.2	3.9	56.5	2.8	Sandstone	N
No prov.	No prov.	5ST98.2387	Surface	GS	Netherstone	8.1	7.4	38.8	0.7	Sandstone	N
No prov.	No prov.	5ST98.2388	Surface	GS	Netherstone	9	5.3	115.5	2.6	Sandstone	N

Handstone

Five handstones (5ST98.2380, 5ST98.2381, 5ST98.2384, 5ST98.2385, and 5ST98.2386) were recovered from 5ST98 (Table 12). A handstone is a mobile, handheld milling stone used in conjunction with a netherstone, a stationary grinding surface, either one- or two-handed depending on its size. Handstones typically exhibit milling facets on one or both faces, reflecting their role in processing a variety of materials such as seeds, grains, or pigments (Sutton, Arkush, and Schneider 2006). The presence of multiple handstones suggests that processing activities at the site.

5ST98.2386 is a sandstone handstone exhibiting two adjacent, ground and smoothed flat faces. Based on its morphology, it is best classified as a Type III bifacial handstone, which features two milling surfaces oriented on adjoining faces rather than on opposite sides (Sutton, Arkush, and Schneider 2006). The proximity of these worked surfaces may reflect a design that accommodated specific hand positions or grinding angles during use (Figure 39). Notably, both ground faces exhibit a darkened area near the center, possibly indicative of thermal exposure.

5ST98.2385 is a sandstone handstone composed of a coarse-grained matrix. It exhibits two adjacent, flat, and smoothed surfaces consistent with intentional grinding (Figure 39). Based on its morphology, it is classified as a Type III bifacial handstone, characterized by two milling surfaces oriented on adjoining rather than opposing faces (Sutton, Arkush, and Schneider 2006).

5ST98.2384 is an oval-shaped sandstone handstone exhibiting two coarse, irregular faces that appear to result from fragmentation. In contrast, the lateral sides of the artifact are smooth and ground, showing clear evidence of use-wear (Figure 39). Although the primary working surfaces have broken away, the smoothed margins suggest that the tool was used along its sides, possibly as a unifacial or edge-ground handstone. The fragmentary condition makes its original morphology difficult to reconstruct, but the presence of abrasion along the sides supports its classification as a modified milling tool.

5ST98.2383 is a highly fragmented sandstone artifact exhibiting one preserved smooth and flat face. Due to its fragmentary condition, it is not possible to definitively determine whether the object functioned as a handstone or a netherstone (Figure 39). The smoothed surface indicates it was part of a groundstone tool used in milling or grinding activities, but the absence of additional diagnostic features, such as opposing surfaces, impedes secure typological assignment.

Figure 39. Two handstones exhibit adjacent ground surfaces, consistent with the characteristics of Type III bifacial handstones, which feature milling surfaces on adjoining faces rather than opposite sides. 5ST98.2384 shows well-rounded sides indicative of grinding activities, while 5ST98.2383 is unable to be categorized.

5ST98.2381 is a sandstone handstone exhibiting two opposing, flat faces, both of which show evidence of grinding. The artifact has been fractured longitudinally along the axis of use, splitting through the center of the smoothed milling surfaces (Figure 40). Based on its morphology and use-wear, this artifact is best classified as a Type II handstone, characterized by dual grinding surfaces on opposite faces (Sutton, Arkush, and Schneider 2006). The presence of wear on both faces suggests bidirectional use, potentially indicating prolonged or intensive activity (Adams 2013).

Figure 40. 5ST98.2381 at several angles to demonstrate its dual faces and un-modified sides.

5ST98.2380 is a sandstone handstone with a rounded overall shape and one clearly smoothed, worn face (Figure 41). The opposing surface is relatively flat but irregular and lacks evidence of grinding or polish. This morphology is consistent with a Type I unifacial handstone, defined by a single active milling surface (Sutton, Arkush, and Schneider 2006).

Figure 41. 5ST98.2380, a sandstone handstone with a rounded form and a single smoothed face consistent with a Type I unifacial handstone. The opposing surface remains irregular and unmodified.

Table 12. Descriptive attributes of handstones in the 5ST98 collection and one groundstone that cannot be identified due to a lack of characteristics from severe fragmentation.

Thousands Conversions	Unit (X,Y)	Catalogue Number	Level	Class	Element	Maximum Length (cm)	Maximum Width (cm)	Mass (g)	Maximum Thickness (cm)	Raw Material	Burn (Y/N)
1004, 990	5n10w	5ST98.2380	Surface	GS	Handstone	11.5	8.2	793.8	4.9	Sandstone	N
No prov.	No prov.	5ST98.2381	Surface	GS	Handstone	12	6	45.4	6	Sandstone	N
No prov.	No prov.	5ST98.2384	Surface	GS	Handstone	5.7	3.8	1.8	39.5	Sandstone	N
No prov.	No prov.	5ST98.2385	Surface	GS	Handstone	6.1	3	62.8	3	Sandstone	N
No prov.	No prov.	5ST98.2386	Surface	GS	Handstone	4.1	4.1	29.7	1.6	Sandstone	N
No prov.	No prov.	5ST98.2383	Surface	GS	Unknown	4.6	3.8	35.3	2.1	Sandstone	N

Miscellaneous

Unmodified Bone (Provenience)

A total of 46 bone fragments were recovered from 13 one by one meter excavation units. None of these specimens was identified to species during the present study.

Five bone fragments, catalog numbers 5ST98.2602, 5ST98.2603, 5ST98.2642, 5ST98.2641, and 5ST98.2688, were recovered from Cell 1005, 995 (6N5W), at depths ranging from approximately 7.5 to 12.5 cm **(**Figure 42**)** **(**Table 13**)**. Of these, three (5ST98.2642, 5ST98.2641, and 5ST98.2688) appear to be shaft fragments, while the remaining two are too small for further identification. Additional thermally altered bone fragments were recovered from several cells: one fragment (5ST98.2425) from Cell 1005, 993 (6N7W), at an unknown depth; one fragment (5ST98.1097) from Cell 1004, 994 (5N6W), at a depth of 20 cm; one fragment (5ST98.2120) from Cell 1004, 993 (5N7W), also at 20 cm; one fragment (5ST98.277) from Cell 1002, 995 (3N5W), at 0 - ten centimeters, and one fragment (5ST98.1957), from Cell 1006, 993 (7N7W), at a depth of 20 cm **(**Figure 42**)** **(**Table 13**)**.

Table 13. Descriptive attributes of bone fragments from cells 5N7W, 6N7W, 6N5W, and 7N7W.

Thousands Conversion	Catalogue Number	Unit (X/Y)	Unit Level	Maximum Length (mm)	Maximum width (mm)	Thickness (mm)	Mass (mm)	Milligrams	Burn (Y/N)
1004, 993	5ST98.2120	5n7w	2	14.30	8.60	3.40	0.08	75.50	yes
1005, 993	5ST98.2425	6n7w	level unknown	7.30	5.70	2.30	0.01	14.50	yes
1005, 995	5ST98.2602	6n5w	7.5 - ten cm	6.1	3.9	1.6	0.0105	10.5	no
1005, 995	5ST98.2603	6n5w	7.5 - ten cm	4.6	4.2	1.4	0.006	6	no
1005, 995	5ST98.2641	6n5w	10 - 12.5 cm	13.4	10	2.5	0.066	66	no
1005, 995	5ST98.2642	6n5w	10 - 12.5 cm	7.8	5.7	2.2	0.0265	26.5	no
1005, 995	5ST98.2688	6n5w	7.5 - ten cm	9.8	4.5	2.7	0.0315	31.5	no
1006, 993	5ST98.1957	7n7w	2	10.10	7.10	2.40	0.03	32.50	yes

Figure 42. Recovered bone fragments from 5ST98. Specimens include thermally altered and unmodified fragments from multiple excavation units across the site. Catalog numbers are provided for reference. Scale in centimeters.

Six bone fragments, catalog numbers 5ST98.2396, 5ST98.2394, 5ST98.2395, 5ST98.2392, 5ST98.2393, and 5ST98.1379, were recovered from Cell 1005, 994 (6N6W), at depths ranging from ten to 40 cm **(**Figure 43**)** **(**Table 14**)**. Of these, three specimens (5ST98.2393, 5ST98.2394, and 5ST98.2396) exhibit evidence of thermal alteration, while the remaining three do not. Two bone fragments, 5ST98.0923 and 5ST98.0929, were recovered from

Cell 1003, 994 (4N6W), at a depth of ten to 20 cm **(**Figure 43**)** **(**Table 14**)**. One of these fragments is thermally altered, while the other shows no visible signs of burning. Three additional fragments, 5ST98.2420, 5ST98.2421, and 5ST98.2422, were recovered from Cell 1005, 999 (6N1W), at depths ranging from ten to 30 cm **(**Figure 43) **(**Table 14**)**. Two heavily fire-altered bone fragments, 5ST98.2423 and 5ST98.2424, were recovered from Cell 1018, 1040 (19N40E), although their provenience depth is unknown **(**Figure 43**)** **(**Table 14**)**.

Table 14. Descriptive attributes of bone fragments from cells 6N6W, 4N6W, 6N1W, and 19N40E.

Thousands Conversion	Catalogue Number	Unit (X/Y)	Unit Level	Maximum Length (mm)	Maximum width (mm)	Thickness (mm)	Mass (mm)	Milligrams	Burn (Y/N)
1003, 994	5ST98.931	4n6w	2	9.60	4.00	2.50	0.23	230.00	yes
1003, 994	5ST98.929	4n6w	2	11.60	8.70	3.40	0.06	59.50	no
1005, 994	5ST98.2392	6n6w	1	14.10	12.50	3.20	0.40	400.00	no
1005, 994	5ST98.2393	6n6w	2	15.20	5.60	4.10	0.30	300.00	yes
1005, 994	5ST98.2394	6n6w	1	12.60	6.30	4.20	0.20	200.00	yes
1005, 994	5ST98.2395	6n6w	1	10.60	7.90	22.00	0.20	200.00	no
1005, 994	5ST98.1379	6n6w	1	3.20	2.80	1.30	0.02	17.50	no
1005, 994	5ST98.2396	6n6w	4	19.20	14.30	5.00	0.80	800.00	yes
1005, 999	5ST98.2420	6n1w	2	3.70	3.30	2.60	0.02	15.00	no
1005, 999	5ST98.2421	6n1w	2	3.20	2.30	2.40	0.01	14.00	no
1005, 999	5ST98.2422	6n1w	3	8.80	5.10	4.10	0.14	139.00	no
1018, 1040	5ST98.2423	19n40e	level unknown	15.00	7.90	3.50	0.08	82.50	yes
1018, 1040	5ST98.2424	19n40e	level unknown	13.20	5.80	2.10	0.03	32.00	yes

Figure 43. Bone fragments recovered from multiple excavation units at 5ST98. Specimens include both thermally altered and unaltered fragments from Cells 1005, 994 (6N6W); 1003, 994 (4N4W); 1005, 999 (6N1W); and 1018, 1040 (19N40E). Catalog numbers correspond to those discussed in the text. Scale in centimeters.

Seven bone fragments, catalog numbers 5ST98.2397, 5ST98.2398, 5ST98.2399, 5ST98.2400, 5ST98.2401, 5ST98.2402, and 5ST98.2403, were recovered from Cell 1003, 996 (4N4W), at a depth of 0 to 20 cm. Of these, fragments 5ST98.2397 through 5ST98.2402 exhibit evidence of thermal alteration, while 5ST98.2403 does not appear to be burned (Figure 44) (Table 15). Two additional bone fragments, 5ST98.2404 and 5ST98.2405, were recovered from Cell 1006, 994 (7N6W), at a depth of 20 to 30 cm. One of these fragments is burned, while the other shows no evidence of thermal alteration (Figure 44) (Table 15). A total of 14 small bone fragments, catalog numbers 5ST98.2406 through 5ST98.2419, were recovered from Cell 1005, 992 (6N8W), at a depth of 30 to 40 cm. These fragments range in mass from one to 50 milligrams and are all heavily fire-altered (Figure 45) (

Table 16).

Table 15. Descriptive attributes of bone fragments from cells 4N4W and 7N6W.

Thousands Conversion	Catalogue Number	Unit (X/Y)	Unit Level	Maximum Length (mm)	Maximum width (mm)	Thickness (mm)	Mass (mm)	Milligrams	Burn (Y/N)
1003, 996	5ST98.2397	4n4w	1	10.70	7.50	3.40	0.30	300.00	yes
1003, 996	5ST98.2398	4n4w	1	11.50	7.80	3.00	0.20	200.00	yes
1003, 996	5ST98.2399	4n4w	1	9.30	6.90	2.50	0.10	100.00	yes
1003, 996	5ST98.2400	4n4w	2	17.30	9.50	4.10	0.40	400.00	yes
1003, 996	5ST98.2401	4n4w	2	14.10	6.10	3.50	0.30	300.00	yes
1003, 996	5ST98.2402	4n4w	2	12.40	6.20	2.90	0.20	200.00	yes
1003, 996	5ST98.2403	4n4w	2	11.20	8.50	1.60	0.20	200.00	no
1006, 994	5ST98.2404	7n6w	3	19.00	6.50	1.30	0.20	200.00	yes
1006, 994	5ST98.2405	7n6w	3	12.90	6.40	3.90	0.20	200.00	no

Figure 44. Bone fragments recovered from Cells 1003, 996 (4N4W), and 1006, 994 (7N6W), at depths of 0–20 cm and 20–30 cm.. Fragments 5ST98.2397 through 5ST98.2402 are thermally altered, while 5ST98.2403, 5ST98.2404, and 5ST98.2405 show no evidence of burning. Catalog numbers correspond to those referenced in the text. Scale in centimeters.

Table 16. Descriptive attributes of bone fragments from cell 6N8W.

Thousands Conversion	Catalogue Number	Unit (X/Y)	Unit Level	Maximum Length (mm)	Maximum width (mm)	Thickness (mm)	Mass (mm)	Milligrams	Burn (Y/N)
1005, 992	5ST98.2406	6n8w	4	3.20	3.00	1.80	0.02	15.00	yes
1005, 992	5ST98.2407	6n8w	4	4.90	4.70	2.90	0.05	49.00	yes
1005, 992	5ST98.2408	6n8w	4	4.50	3.60	1.50	0.02	23.00	yes
1005, 992	5ST98.2409	6n8w	4	2.70	2.30	1.30	0.008	8.00	yes
1005, 992	5ST98.2410	6n8w	4	4.30	2.70	1.40	0.01	12.00	yes
1005, 992	5ST98.2411	6n8w	4	4.40	1.80	1.90	0.01	13.00	yes
1005, 992	5ST98.2412	6n8w	4	3.70	1.90	1.40	0.01	10.00	yes
1005, 992	5ST98.2413	6n8w	4	2.90	1.20	0.70	0.00	1.00	yes
1005, 992	5ST98.2414	6n8w	4	2.90	2.70	1.30	0.01	6.00	yes
1005, 992	5ST98.2415	6n8w	4	3.10	2.50	1.20	0.01	7.00	yes
1005, 992	5ST98.2416	6n8w	4	2.50	1.80	1.10	0.00	3.00	yes
1005, 992	5ST98.2417	6n8w	4	3.00	1.90	1.10	0.01	5.00	yes
1005, 992	5ST98.2418	6n8w	4	2.40	1.30	1.50	0.00	1.00	yes
1005, 992	5ST98.2419	6n8w	4	2.90	1.30	1.50	0.01	5.00	yes

Figure 45. Fourteen heavily fire-altered bone fragments from Cell 1005, 992 (6N8W), recovered at a depth of 30–40 cm. Cataloged as 5ST98.2406 through 5ST98.2419, the fragments range in mass from one to 50 milligrams. Scale in centimeters.

Unmodified Bone (Non-Provenience)

Five bone fragments, catalog numbers 5ST98.2426, 5ST98.2427, 5ST98.2428, 5ST98.2429, and 5ST98.2430, were recovered from the surface of site 5ST98 without associated provenience data (Figure 46) (Table 17). These specimens appear to be relatively modern, as indicated by their lighter coloration and reduced brittleness.

Table 17. Descriptive attributes of bone fragments from the surface of 5ST98.

Thousands Conversion	Catalogue Number	Unit (X/Y)	Unit Level	Maximum Length (mm)	Maximum width (mm)	Thickness (mm)	Mass (mm)	Milligrams	Burn (Y/N)
No Prov.	5ST98.2426	No Prov.	surface	20.20	7.00	1.70	0.04	40.00	no
No Prov.	5ST98.2427	No Prov.	surface	11.50	10.00	2.80	0.02	20.50	no
No Prov.	5ST98.2428	No Prov.	surface	10.80	3.60	1.40	0.02	15.00	no
No Prov.	5ST98.2429	No Prov.	surface	8.00	4.50	2.20	0.01	11.00	no
No Prov.	5ST98.2430	No Prov.	surface	8.00	5.00	1.30	0.01	12.50	no

Figure 46. Bone fragments recovered from the surface of site 5ST98 with no associated provenience. Specimens 5ST98.2426, 5ST98.2427, 5ST98.2428, 5ST98.2429, and 5ST98.2430 exhibit characteristics suggesting a more recent origin, including lighter coloration and reduced brittleness. Scale in centimeters.

Charcoal Sample

During the late 70s excavations, the crew collected a sample of charcoal that is currently housed at the Center for Mountain and Plains Archaeology at Colorado State University. The charcoal sample, which weighs approximately 8.7 grams, came from Cell 997, 995 (2S5W) at 20 – 30 centimeters deep. This charcoal was removed from a unit that was excavated to analyze the site stratigraphy (Appendix C). Although this sample has not undergone radiocarbon dating, it may provide an opportunity for future chronological refinement of the site's occupation if analyzed. Charcoal samples from stratified contexts are valuable for establishing temporal associations between artifact assemblages and site use.

Features

Feature One, located at grid coordinates 975, 996 (23S4W), is a hearth exposed along the eroding southern bank of the Snake River. It consists of a basin-shaped charcoal lens situated 15–40 cm below the surface, clearly visible in the riverbank stratigraphy (Morris 1978; Marcotte n.d.). Glacial till underlies the hearth. Radiocarbon analysis of three charcoal samples from this feature yielded dates of (UGa- 1865) 2625 ± 60, (Uga- 1464) 2845 ± 75, and (Uga- 1243) 3555 ± 215 radiocarbon years before present (Morris 1978; Marcotte n.d.) (RCYBP) (Appendix E).

Feature Two, situated just above Feature one at 976, 996 (22S4W), is another hearth exposed by the same erosional processes along the riverbank. However, charcoal samples recovered from this feature were too small to be dated (Morris 1978; Marcotte n.d.).

Feature Three is a charcoal lens located 17 cm below the surface, southeast of a concentration of stones (981_995). A charcoal sample from this feature was dated to (Uga- 1866) 2425 ± 85 RCYBP as well. Another charcoal sample that was dated to (I-10, 933) 2820 ± 85 RCYBP. The lens filled a slight depression and extended beneath the adjacent stones, which are burned and appear to have been deliberately placed (Morris 1978; Marcotte n.d.). Small amounts of additional charcoal were found between and beneath the stones, but no flakes were recovered from the feature. The charcoal deposit reached a thickness of up to six cm and consisted primarily of wood charcoal fragments with no soil or stone inclusions (Morris 1978; Marcotte n.d.). The feature overlies Unit three material without evidence of oxidation at the contact and is itself overlain by additional Unit three deposits (Morris 1978; Marcotte n.d.). A thin layer of frost-sorted sand and fine gravel (1–3 cm) was observed beneath the largest boulder (Morris 1978; Marcotte n.d.).

In addition to the Late Archaic radiocarbon dates from Feature three (2820 ± 85 RCYBP and 2425 ± 85 RCYBP), a third sample (I-10,932) collected from the same feature yielded a much more recent date of <185 RCYBP. The sample was taken from a thin A1 horizon between stratigraphic Units one and two along the eastern edge of grid square 981_994 (19S/6W), approximately 4–8 cm below the surface. Field notes by James B. Benedict (October 30, 1978) describe the charcoal as possibly originating from a forest fire, rather than cultural activity. The overlying Unit one consists of soil blown in from a nearby dirt roadway, while the underlying Unit two was interpreted as redeposited debris from the same source. This context suggests that the <185 RCYBP date reflects a recent, non-archaeological depositional event rather than a Late Archaic occupation. Consequently, while Feature 3's two primary radiocarbon dates align with the Late Archaic period, the younger sample is best interpreted as the result of later natural processes affecting the site.

Fire-Cracked Rock

Three Fire-Cracked Rock (FCR) specimens (5ST98.2389, 5ST98.2390, and 5ST98.2291) were recovered from 5ST98 (Figure 47) (Table 18). FCR refers to stones that have been intentionally heated during cooking activities, typically in earth ovens, boiling pits, or surface hearths, causing them to fracture from thermal stress (Alston 2007). Of the three pieces, only one has provenience, while the others were found on the surface. All FCR pieces in this collection are made from schist.

5ST98.2389 is a small, fragmented piece of heavily micaceous schist exhibiting slight discoloration. It was recovered from unit 18N41E at a depth of 10–20 cm. 5ST98.2390 is a large, fragmented piece of heavily micaceous schist with visible discoloration. Although it lacks recorded provenience, the material composition is consistent with other schist fragments from the site. 5ST98.2391 is a small, fragmented piece of heavily micaceous schist displaying discoloration and rounded edges, which may indicate reuse in cooking features.

Table 18. Descriptive attributes of fire-cracked rock found at 5ST98.

Thousands Conversions	Unit (X,Y)	Catalogue Number	Level	Class	Element	Maximum Length (cm)	Maximum Width (cm)	Mass (g)	Maximum Thickness (cm)	Raw Material	Burn (Y/N)
1017, 1041	18n41e	5ST98.2389	2	FCR	n/a	6.3	3	18.3	1	Schist	Y
No Prov.	No prov.	5ST98.2390	Surface	FCR	n/a	18	11.2	521.6	3.3	Schist	Y
No Prov.	No prov.	5ST98.2391	Surface	FCR	n/a	5.5	3.8	40.6	2	Schist	Y

Figure 47. Examples of fire-cracked rock (FCR) fragments recovered from 5ST98. Specimens display varying degrees of discoloration, fragmentation, and edge rounding, characteristics commonly associated with thermal alteration and potential reuse in hearth or cooking features.

Artifact Assemblage Summary and Conclusion

The lithic assemblage from site 5ST98 comprises a total of 3,914 unmodified flakes, including 2,420 pieces with documented provenience and 1,494 surface-collected specimens lacking precise contextual information. In addition to the debitage, 168 stone tools were recovered from both surface and subsurface contexts. The assemblage includes a variety of chipped and ground stone tool types, such as angular debris, complete and fragmentary bifaces, a core, edge-modified flakes, fire-cracked rock, netherstones, handstones, complete and fragmentary projectile points, and scrapers (Figure 48 and Table 19). Projectile points are the most prevalent tool class, accounting for 105 specimens (63% of the total tool assemblage). Bifaces represent the second most frequent category, with 30 examples (18%). Other tool classes are less common and include angular debris (n = 6, 5%), netherstones (n = 9, 5%), handstones (n = 5, 3%), edge-modified flakes (n = 3, 2%) fire-cracked rock (n = 3, 2%), and scrapers (n = 2, 2%). Singular examples of a core and an unidentifiable ground stone artifact (each n = 1, 1%) are also present. The limited diversity of stone tools recovered from 5ST98 suggests that only a few activities took place at the site, primarily related to projectile point maintenance. Projectile points, particularly fragmented specimens (n= 94), are the most frequently represented tool type and are commonly associated with subalpine hunting, consistent with patterns observed at other high-altitude sites (Benedict 1975, 1981, 1990, 1992, 1996; Cassels 2000; LaBelle and Pelton 2013; Whittenburg 2017). Many of these points exhibit step-fracturing, a type of damage often linked to butchering tasks, further supporting interpretations of subsistence-related activity (Benedict 1978; Olson and Benedict 1978). In addition to hunting tools, the presence of ground stone artifacts, such as handstones and netherstones, suggests the processing of plants and/or other resources through grinding, pounding, or abrading (Adams 2013; Benedict 1992; Kornfeld, Frison, and Larson 2010; Pelton 2017). Although scrapers are relatively uncommon in the assemblage, their association with hide and meat processing points to another butchering activity occurring on-site (Johnston 2016; Meeker 2017). The recovery of bifaces, which are often linked to tool production and maintenance, further supports the range of technological tasks completed by site occupants (Benedict 1992; Robinson et al. 2009) (Figure 49).

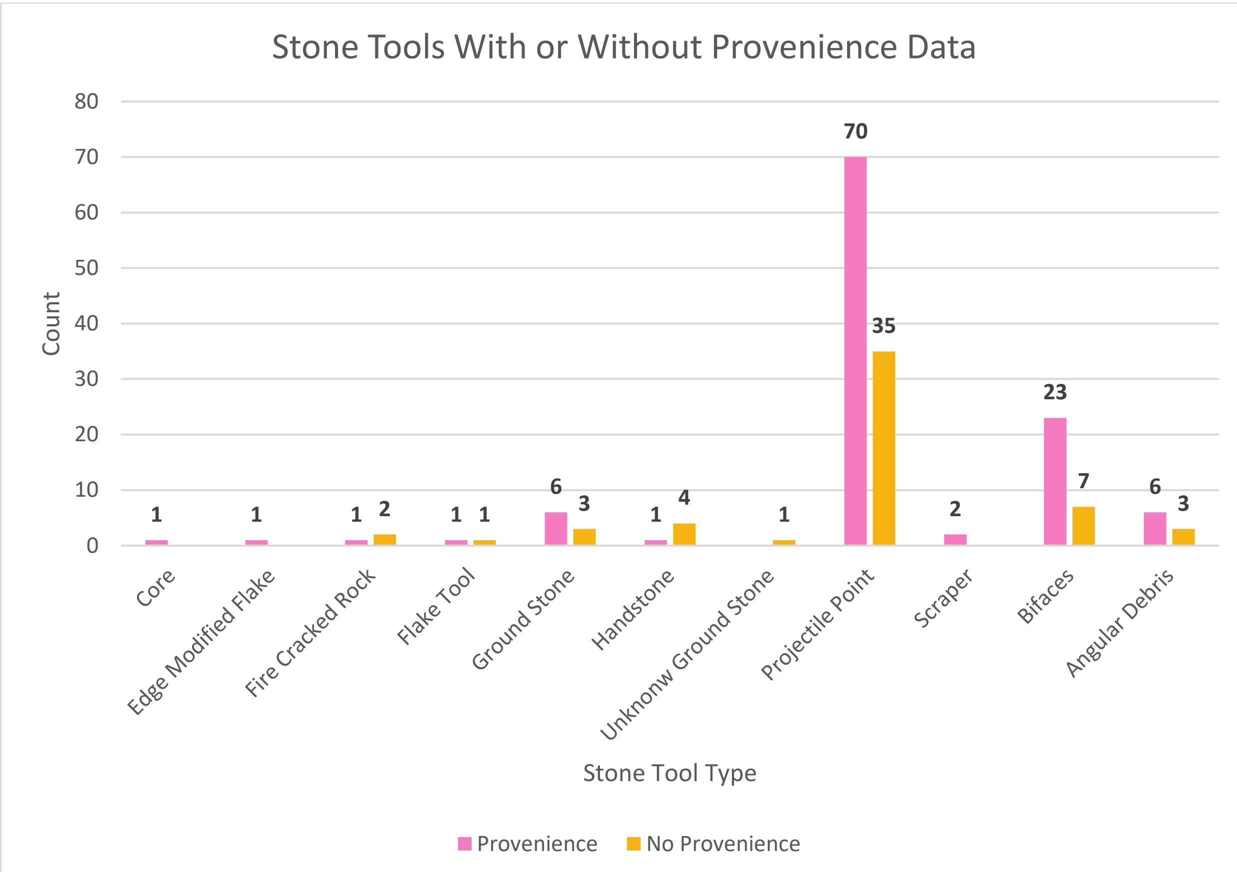

Figure 48. The stone tool assemblage from Porcupine Peak is primarily composed of projectile points and bifaces, the majority of which include provenience information.

Table 19. Table showing the number and percentage of stone tools from the Porcupine Peak assemblage with and without provenience data.

Tool Type	Prov.	No Prov	Total	% With Provenience
Core	1	0	**1**	**1%**
Edge Modified Flake	3	0	**1**	**1%**
Fire-Cracked Rock	1	2	**3**	**2%**
Ground Stone	6	3	**9**	**5%**
Handstone	1	4	**5**	**3%**
Unknown Ground Stone	0	1	**1**	**1%**
Projectile Point	70	35	**105**	**66%**
Scraper	2	0	**2**	**1%**
Bifaces	23	7	**30**	**18%**
Angular Debris	6	3	**9**	**5%**

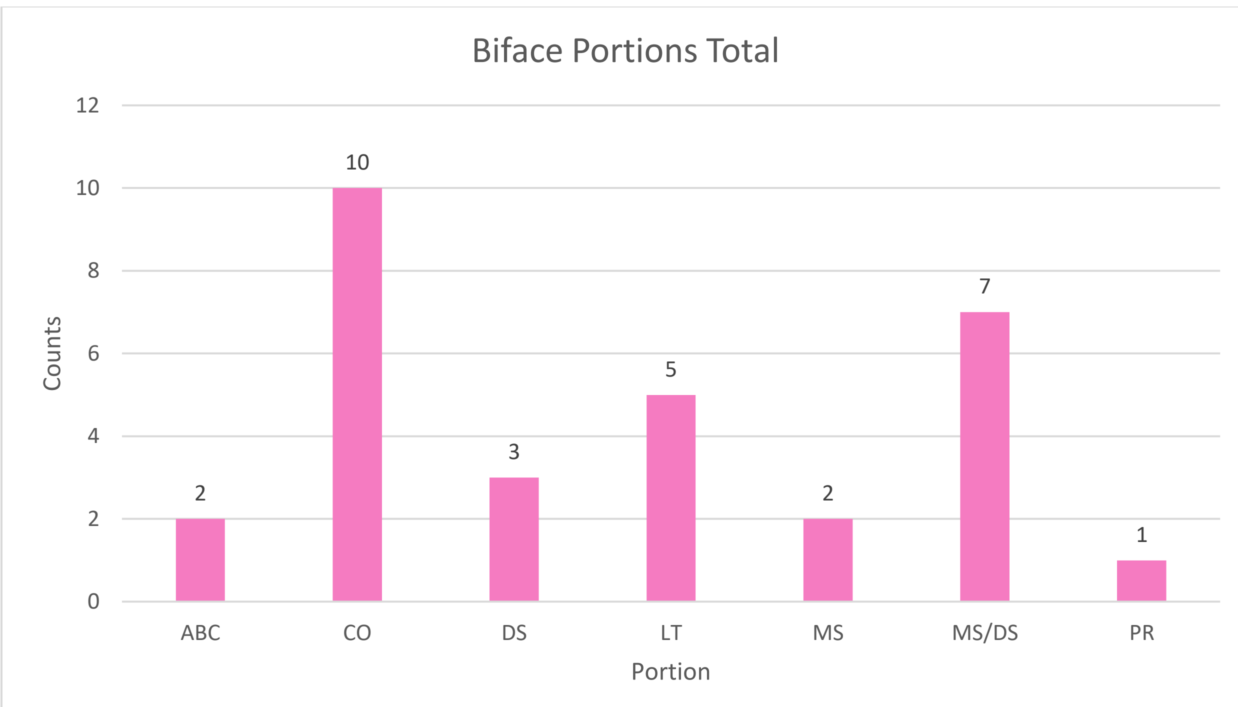

Figure 49. Distribution of biface portions. All but complete (ABC), complete (CO), distal tip (DS), edge fragment (LT, midsection (MS), midsection and distal tip (MS/DS), proximal base (PR), and proximal base and midsection (PR/MS).

A total of 105 projectile point specimens were documented at 5ST98, including both complete and fragmentary examples (Figure 50) (Appendix G). Complete points (CO) are relatively rare, with only 11 examples (10%), indicating that intact tools were infrequently lost or discarded at the site, likely because they were curated and maintained until failure. Nearly-complete but broken projectile points (ABC) account for 14 specimens (13%), representing tools that were mostly intact but suffered minor damage, such as a missing tip or ear. The most frequently represented portion is the proximal base (PR), with 25 examples (24%), followed closely by proximal base and midsection fragments (PR/MS) at 22 (21%). The high frequency of proximal fragments suggests that point breakage commonly occurred during use, particularly through impact, and that the remaining hafted sections were brought back to the site for reworking or disposal. Distal tips (DS) are also well-represented, with 17 examples (16%), likely resulting from breakage during hunting activities; the presence of these tips indicates some loss or discard of impacted points within processing areas. Midsections (MS) and midsection/distal tip fragments (MS/DS) occur less frequently, with eight (8%) and seven (7%) specimens, possibly reflecting a lower likelihood of transport back to camp or manufacturing breakage. Only one edge fragment (LT) was recorded, representing less than one percent of the assemblage. Altogether, the dominance of proximal fragments and the scarcity of complete points suggest that the site functioned as a place for tool maintenance, discard, and replacement, likely in a camp where individuals returned after hunting excursions to retool and conduct maintenance (Binford 1980). Further evidence for a camp at 5ST98 is provided by patterns in lithic raw material use, particularly the overwhelming dominance of Troublesome chert across the assemblage. This material accounts for 92% of the unmodified provenience debitage, strongly suggesting on-site tool production and the preferential use of a single raw material (Benedict and Olson) (Figure 51).

This pattern extends beyond debitage and is reflected across multiple tool categories: 88% of non-provenience debitage, the site’s only core, three edge-modified flakes, and 79% of the projectile points are also made from Troublesome chert (Figure 52, Figure 53 and Figure 54).

The consistent selection of this material across tool types indicates a deliberate strategy of raw material procurement and use.

These patterns are consistent with broader models of logistical organization among mobile hunter-gatherer groups. The prominence of Late Archaic projectile points, along with the overall size of the assemblage, supports the interpretation that 5ST98 was used as a camp utilized by groups during the Late Archaic period. Bob Madden's earlier research on Porcupine Peak supports the interpretation of the site as a camp. He notes that all projectile points recovered from the site were manufactured from Troublesome chert. This source lies approximately 72 kilometers away, a three to four-day round trip on foot, placing it beyond the foraging radius of daily-return collectors (Binford 1980; Madden 2022). Robert Madden argues that the procurement of such raw materials in bulk would therefore require planned excursions by specialized task groups, further supporting the interpretation of 5ST98 as a camp. Additional support for this interpretation comes from the presence of multiple hearth features at the site that have yielded Late Archaic radiocarbon dates (Pelton 2011; Morris 1978; Marcotte n.d.) and from the fact that Porcupine Peak contains one of the largest Late Archaic assemblages in the region (Barnes and Henss 1985; Morris and Marcotte 1975). Although the dated hearths are located approximately 15 meters from the main excavation area and therefore cannot be directly associated with the assemblage, their presence nonetheless supports the interpretation of Late Archaic use of the site. Overall, the concentration of Late Archaic artifacts, raw material transport patterns, and domestic features such as hearths point to the use of 5ST98 as a camp.

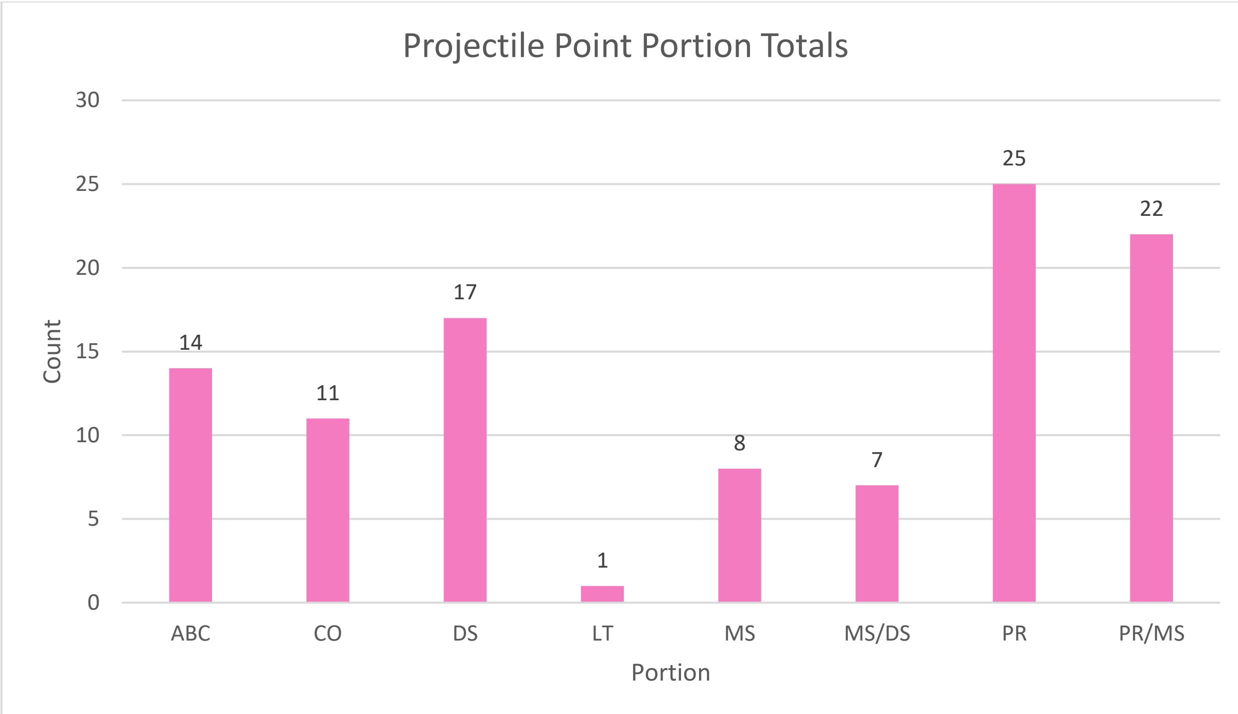

Figure 50. Distribution of projectile point portions. All but complete (ABC), complete (CO), distal tip (DS), edge fragment (LT, midsection (MS), midsection and distal tip (MS/DS), proximal base (PR), and proximal base and midsection (PR/MS).

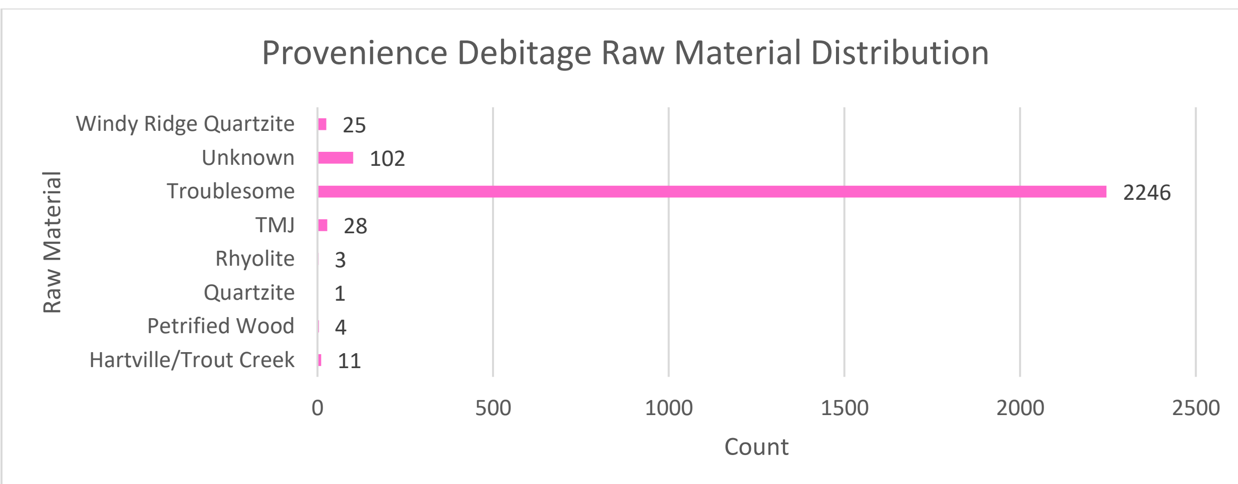

Figure 51. Raw material distribution across flakes excavated at 5ST98.

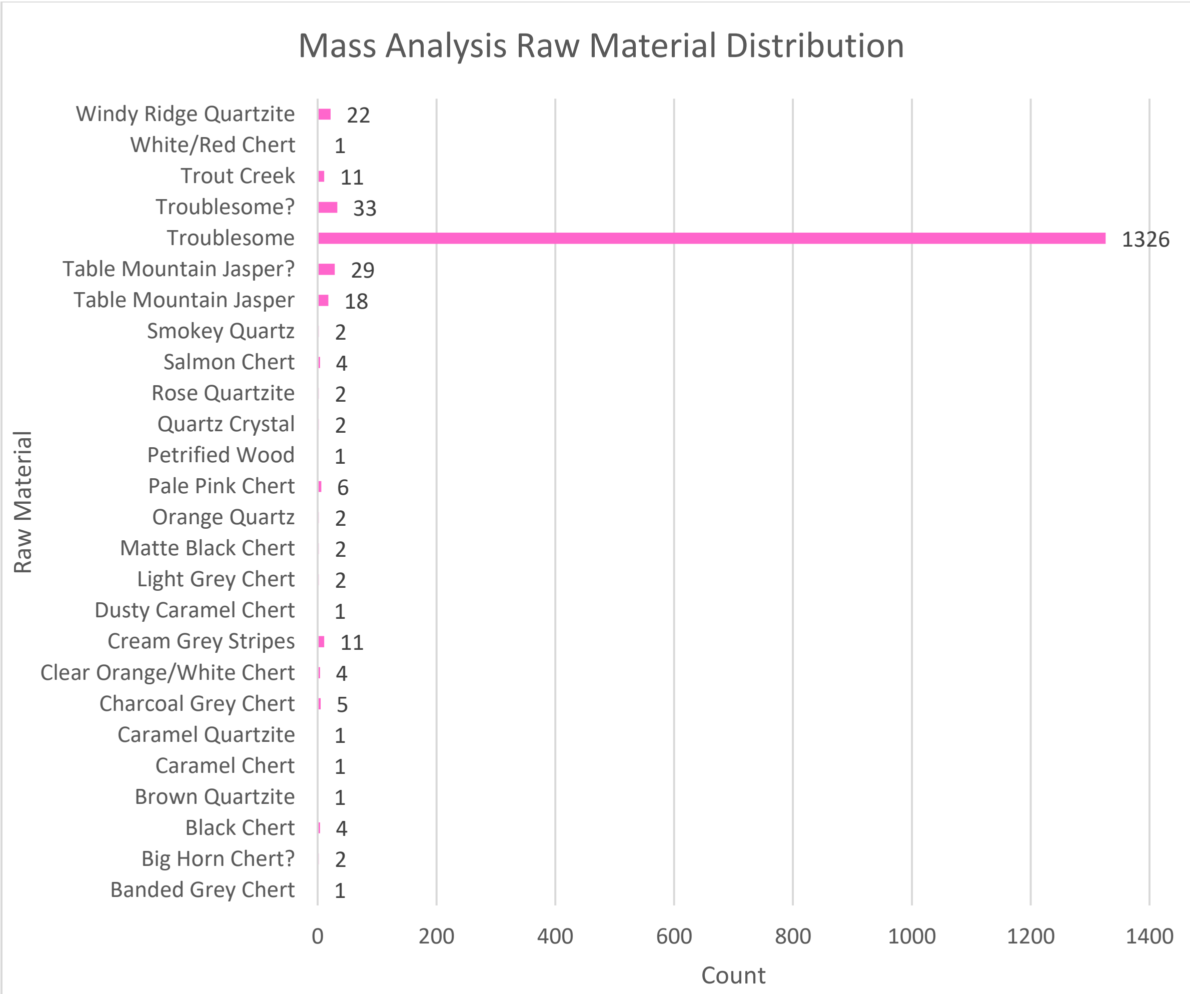

Figure 52. Raw material distribution of non-provenience surface debitage. Descriptive labels were assigned to unidentified raw materials, as detailed below.

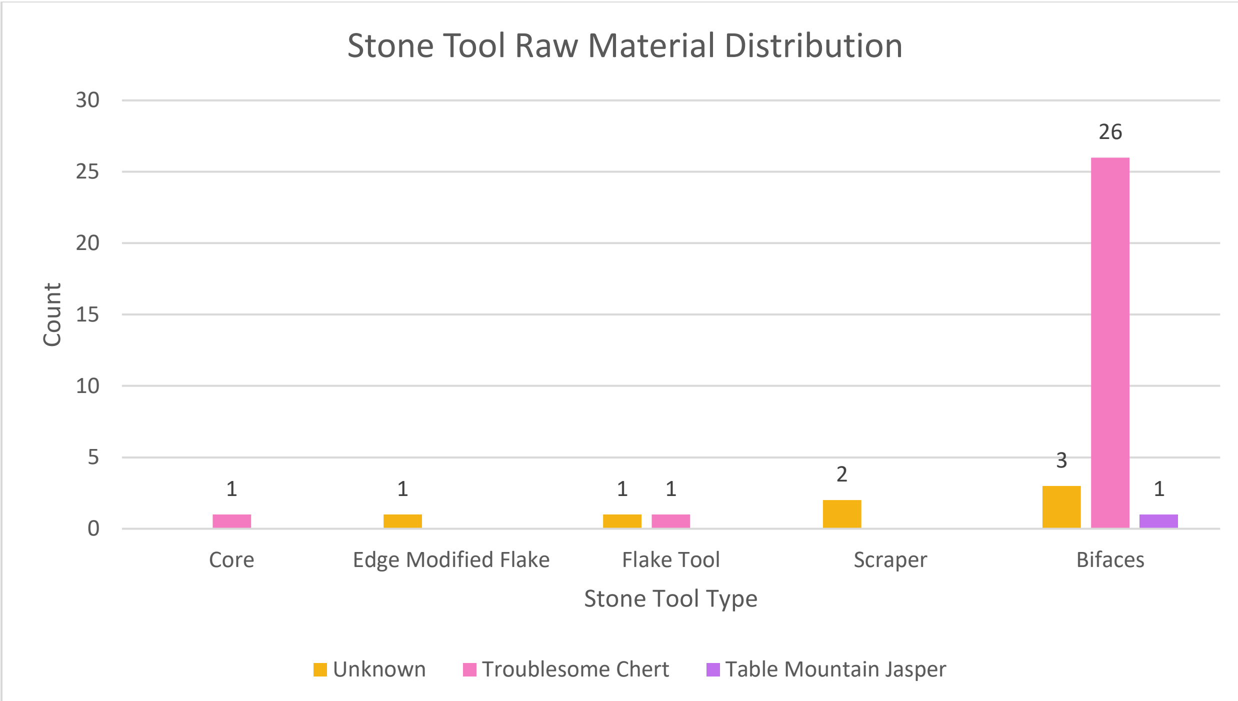

Figure 53. A chart showing the distribution of raw material across stone tools with a clear dominance in Troublesome Chert.

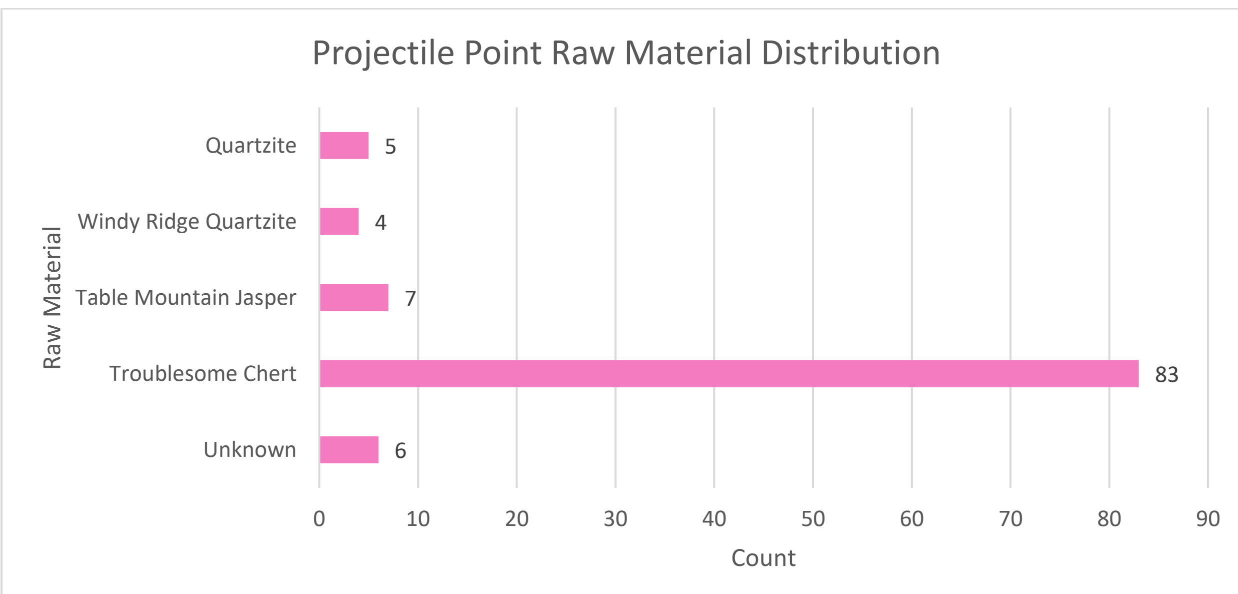

Figure 54. A chart demonstrating raw material distribution across projectile points with a clear dominance of Troublesome Chert.

CHAPTER V – SPATIAL DISTRIBUTION AND HORIZONTAL PATTERNS OF ARTIFACTS

Introduction

The purpose of this chapter is to demonstrate the spatial distribution of artifacts across the site through Geographic Information Systems (GIS) using ArcGIS Pro. Applying GIS analysis at 5ST98 may help identify spatial patterns that inform interpretations of artifact distribution and site use. It allows for (i) the identification of activity areas by visualizing clusters of different artifact types, such as projectile points, ground stone tools, or debitage. This can help distinguish between zones used for hunting-related tasks, tool maintenance, or plant processing, and clarify the spatial relationship between artifacts and features, such as hearths. GIS makes it possible to (ii) assess spatial relationships among artifacts, features, and environmental variables such as slope or proximity to water. This analysis can reveal whether behaviors were spatially patterned or more randomly distributed, offering a better understanding of site formation processes. Integrating surface and subsurface artifact data can reveal (iii) patterns of density and concentration across the site, helping to interpret the spatial extent and focus of past human activity. This is especially useful for evaluating how well surface collections reflect underlying patterns and for detecting the impact of erosion or other post-depositional processes.

Overall Artifact Distribution

A total of 2,549 artifacts were recovered from Porcupine Peak (5ST98), with the majority concentrated in two primary clusters: the main excavation block and a northeastern cluster. I mapped artifact counts by individual excavation units, including surface finds, as long as they had at least some level of provenience (Figure 55 and Figure 78). A third, smaller cluster appears to the south; however, it contains relatively few artifacts and is more spatially dispersed than the main clusters.

The highest artifact densities are found within the main block, particularly in unit 1005_993, which yielded 164 flakes, five projectile points, and one biface (Figure 55 and Figure 78). Adjacent unit 1005_994 also has a high artifact count, consisting of 107 flakes, four projectile points, and three bone fragments. Unit 1004_993, located just south of 1005_994, contains 73 flakes and two projectile points. Nearby units average around 65 flakes each and typically include between one and four projectile points. Immediately to the east, unit 1005_995 yielded 96 flakes, five bones, and one projectile point. Southeast of 1005_993, several units contain more than 70 artifacts each, with flakes comprising the majority. The unit with the highest artifact total across the site is located approximately one meter from the main cluster and contains 171 artifacts: 167 flakes, three bones, and one ground stone. This unit is relatively isolated, as most of the surrounding units were not excavated. The exception is the cell directly southeast, which yielded 16 artifacts.

The northeastern cluster is defined by three units with notably high artifact counts (Figure 55 and Figure 78). Unit 1019_1039 contains 104 flakes, one biface, and three projectile points. Adjacent unit 1017_1039 holds 113 flakes and one projectile point. Like the main cluster, these northeastern units are dominated by flake debris, with a small number of formal tools present. Adjacent to these two units and extending to the east is unit 1018_1040, which contains 33 flakes, two bone fragments, and one projectile point.

The southern portion of the site includes a loose grouping of approximately eight excavation units, each containing between one and six flakes (Figure 55 and Figure 78). This area represents the lowest-density concentration of artifacts on the site aside from isolated units. The only core recovered from Porcupine Peak was found within this area, specifically in unit 978_991, while unit 983_994 yielded two flakes, one biface, and one projectile point. Although a few stone tools are present, artifact densities across this southern area are minimal compared to the main excavation block. To the southwest, six isolated units, 984_947, 983_945, 974_953, 974_957, 973_959, and 952_974, contained no artifacts. Elsewhere across the site, nine additional units were found to be completely devoid of artifacts (Figure 55 and Figure 78). In addition, approximately 24 other dispersed units contain artifacts in low quantities, each with no more than 34 artifacts total.

Overall, the spatial distribution of artifacts at Porcupine Peak (5ST98) reveals a clear pattern of concentrated activity within the main excavation block, which accounts for approximately 79% of the total subsurface assemblage. A secondary concentration in the northeastern portion of the site comprises about 13% of the assemblage, marking it as another significant area of activity, though less dense than the main block. In contrast, the southern cluster and numerous isolated units represent the least artifact-dense areas of the site. To better interpret the function and intensity of use within each cluster, the following analysis considers how different artifact types, such as angular debris, bifaces, bones, charcoal, core, edge-modified flakes, fire-cracked rock, flakes, ground stones, projectile points, and scrapers, are distributed across the site.

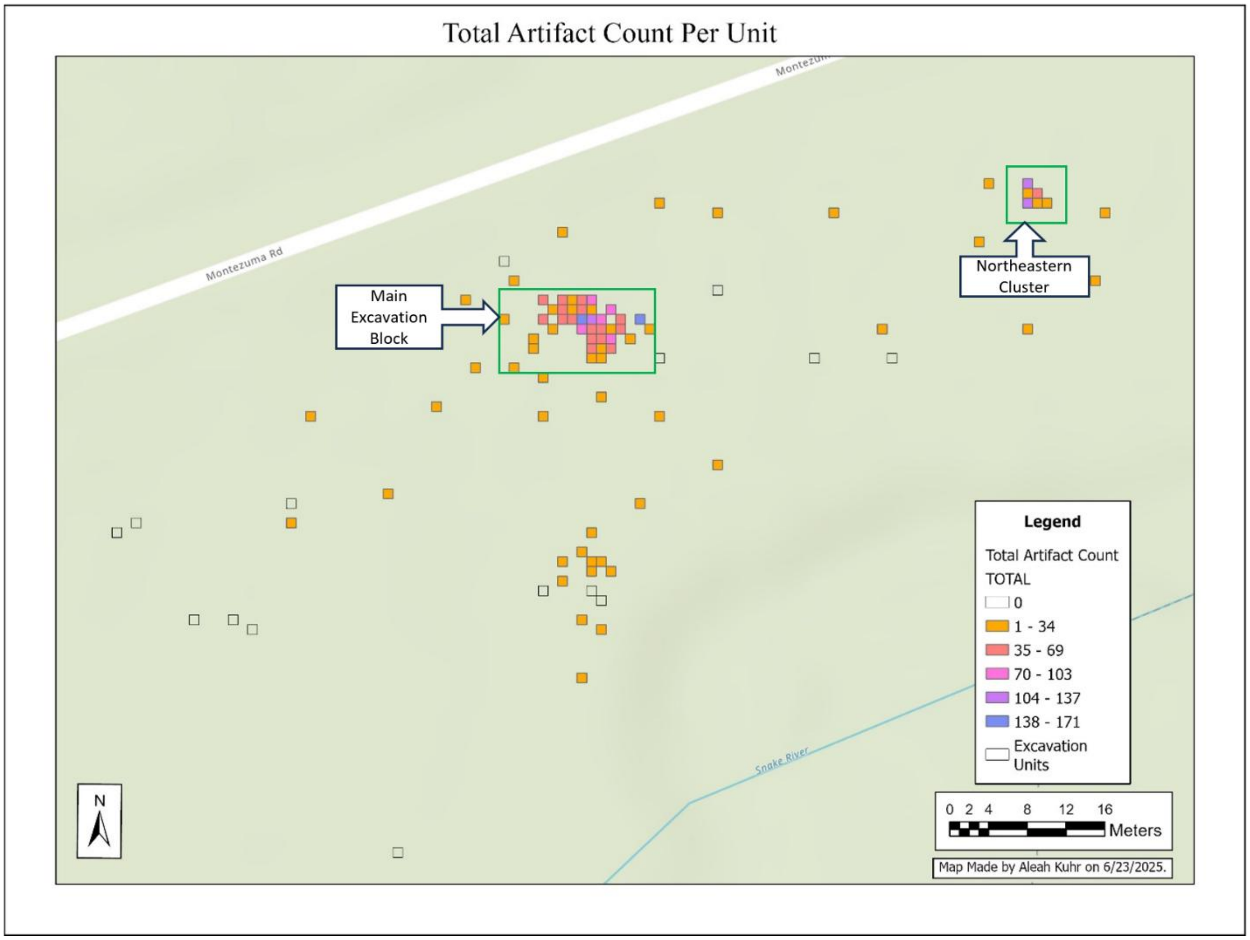

Figure 55. Spatial distribution of all 2,549 artifacts recovered from Porcupine Peak (5ST98), showing concentrations in the main excavation block and a secondary northeastern cluster.

Angular Debris

Six angular debris fragments were recovered from Porcupine Peak (5ST98). The majority of which (n = 5) are clustered within the main excavation block. Cells 1007_993, 1007_994, 1005_992, 1004_997, and 1003_995 each have a single angular debris fragment and are within the main block (Figure 56). These six angular debris fragments represent a small but notable component of the lithic assemblage. These fragments likely resulted from core reduction or tool production activities and may reflect early-stage knapping events (Andrefsky 1998). While their low frequency suggests that angular debris was not a major byproduct across the site, their presence within the densest cluster aligns with patterns of intensive lithic manufacture in the main block. Southeast of the northeastern cluster, the is a single isolated cell (1009_1046) that contains one angular debris fragment and appears to be in no cluster (Figure 56).

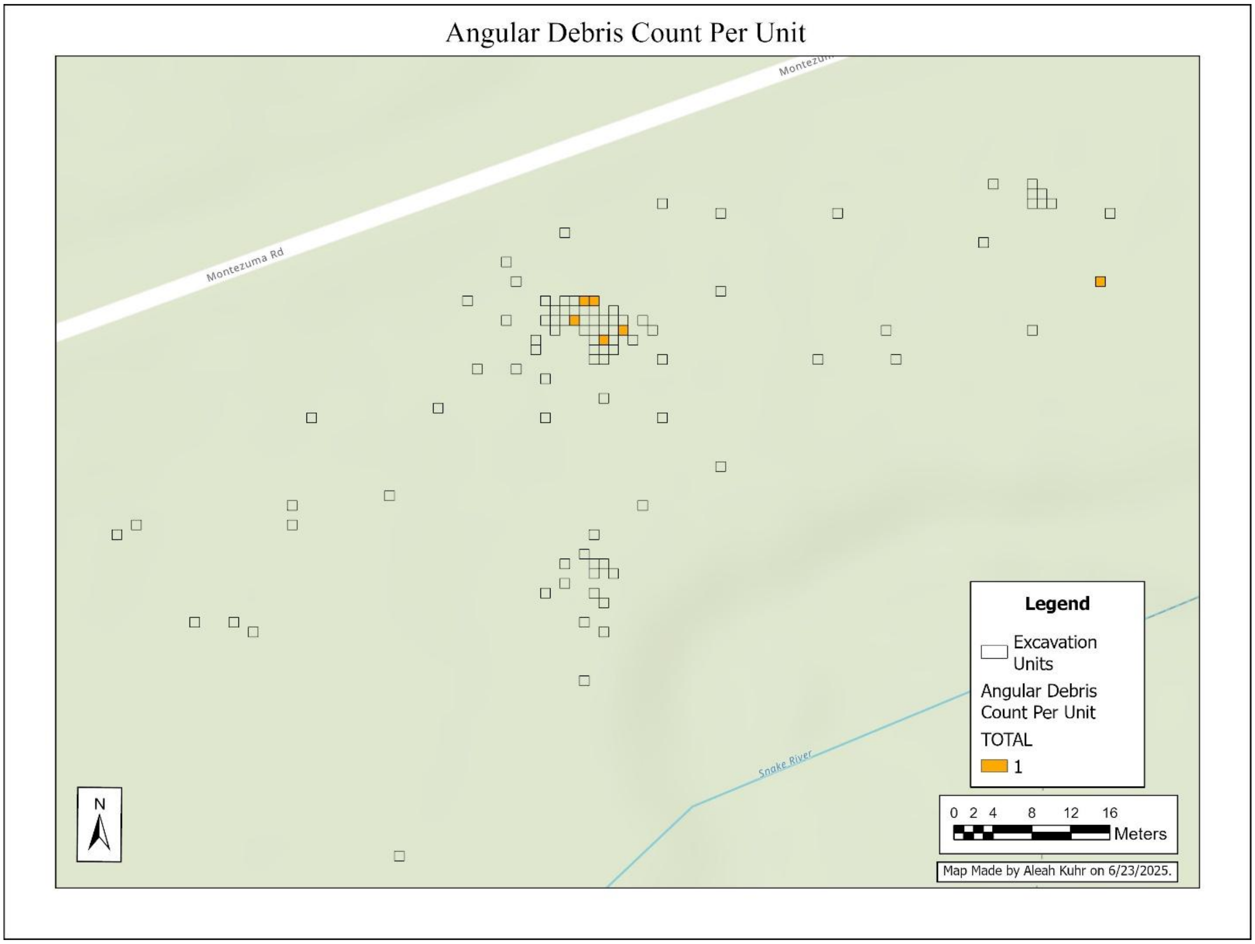

Figure 56. Distribution of angular debris fragments at Porcupine Peak (5ST98), primarily concentrated within the main excavation block.

Bifaces

A total of 23 bifaces were recovered from site 5ST98. Of these, 82% (n = 19) were found within the main excavation block. Within this block, bifaces are primarily concentrated in two areas: the northern and southeastern ends (Figure 57). The highest density occurs in the northern portion, particularly in cell 1006_991, which contains six bifaces. Adjacent cells 1006_992 and 1007_992 each contain two bifaces, and an additional biface is located in the cell directly above 1006_991. These four cells, spanning a four-meter radius, represent the greatest concentration of bifaces at the site. The second notable concentration lies in the southeastern portion of the main block, where four bifaces were recovered within a similarly small area (Figure 57). Outside the main block, the northeastern excavation area contains two bifaces, located in cells 1019_1039 and 1018_1039, forming the third most substantial cluster. The lowest concentrations are represented by two isolated bifaces: one northwest of the main block (1009_986) and another to the south (983_994) (Figure 57).

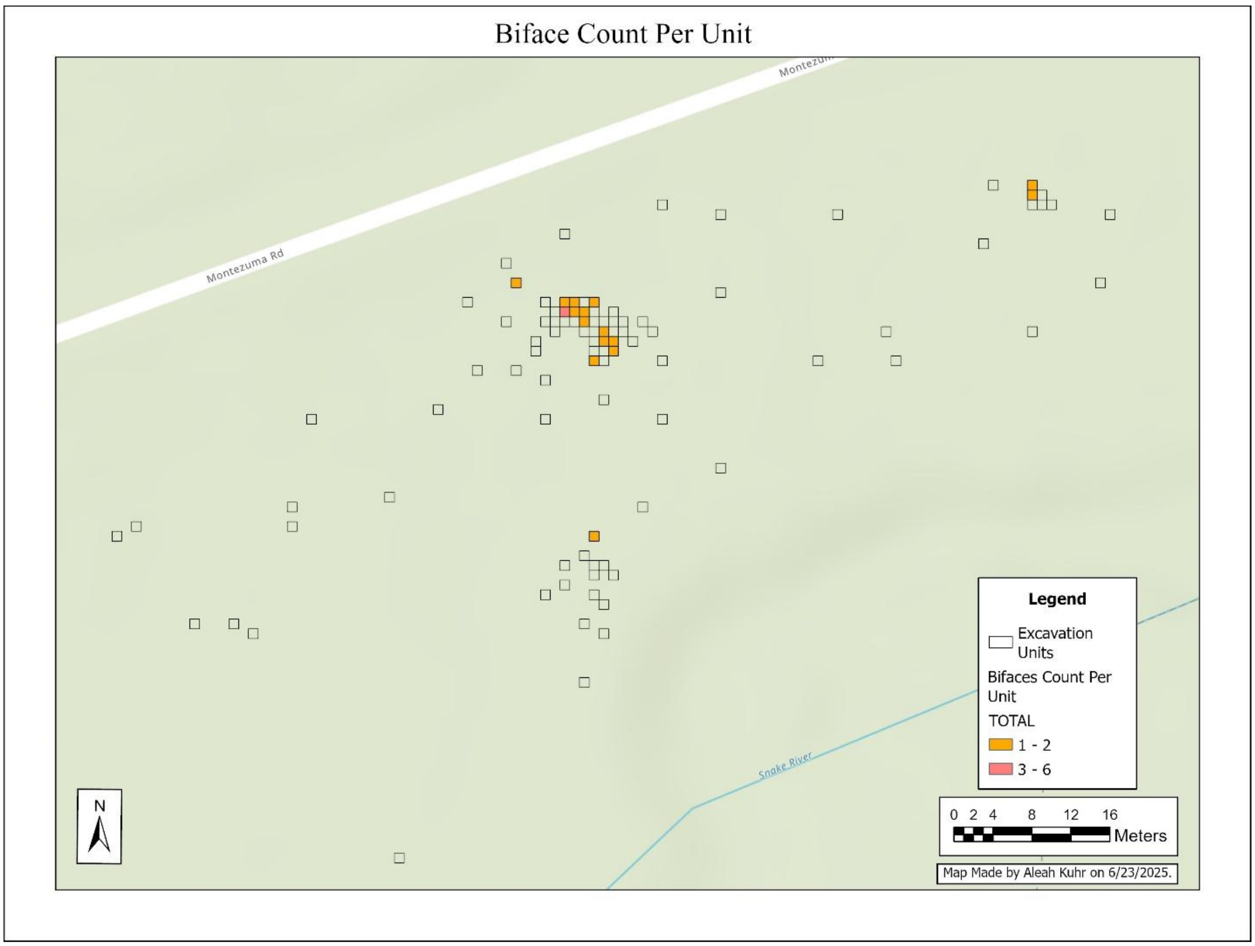

Figure 57. Distribution of bifaces at 5ST98, showing primary concentrations in the northern and southeastern areas of the main block, a smaller cluster in the northeastern block, and two isolated finds outside the main area.

Bone

A total of 46 bone fragments were recovered from site 5ST98, with 96% (n = 44) originating from the main excavation block. A single cluster of bone fragments is located near the center of this block (Figure 58). The highest density occurs in cell 1005_992, which contains 14 small fragments. To the east, cell 1005_994 contains six bone fragments, and adjacent cell 1005_995 contains five bone fragments. Additionally, the southeastern end of the main block includes cell 1003_996, which yielded eight bone fragments, representing another area of high density. Bone was also recovered from the northeastern excavation block, specifically in cell 1018_1040, which contained two fragments. This represents the lowest concentration of bone across the site.

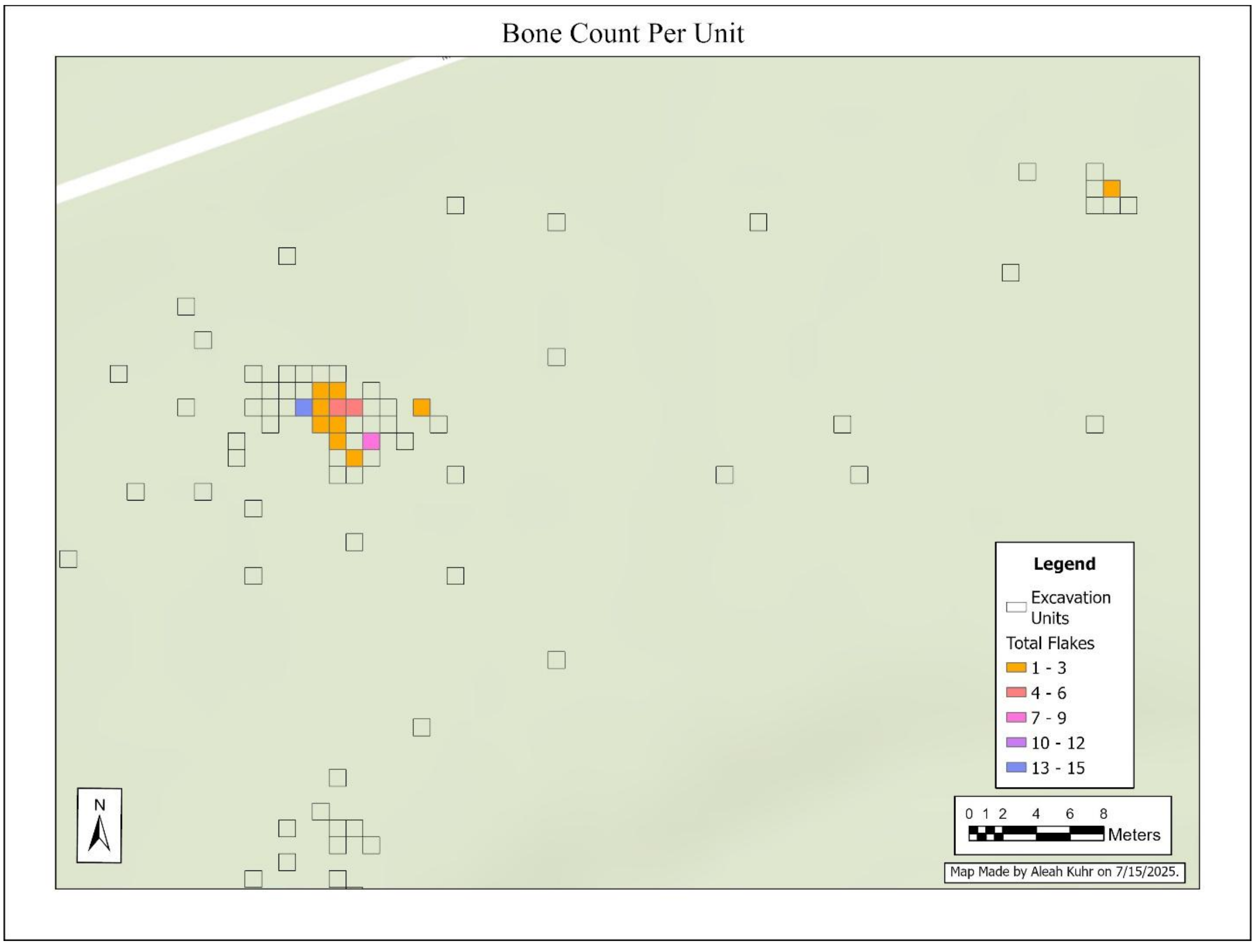

Figure 58. Distribution of bone fragments at 5ST98, with the highest concentrations in the central and southeastern areas of the main block and a low-density occurrence in the northeastern block.

Charcoal

One charcoal sample, the only one currently housed at the Center for Mountain and Plains Archaeology (CMPA), was recovered from a unit approximately three meters south of the main excavation block, north of the Snake River (Figure 59). Although not located within a high-density artifact area, its position suggests activity beyond the core excavation zone. This sample has yet to be submitted for radiocarbon dating, but it may provide information about how areas beyond the main artifact cluster were used.

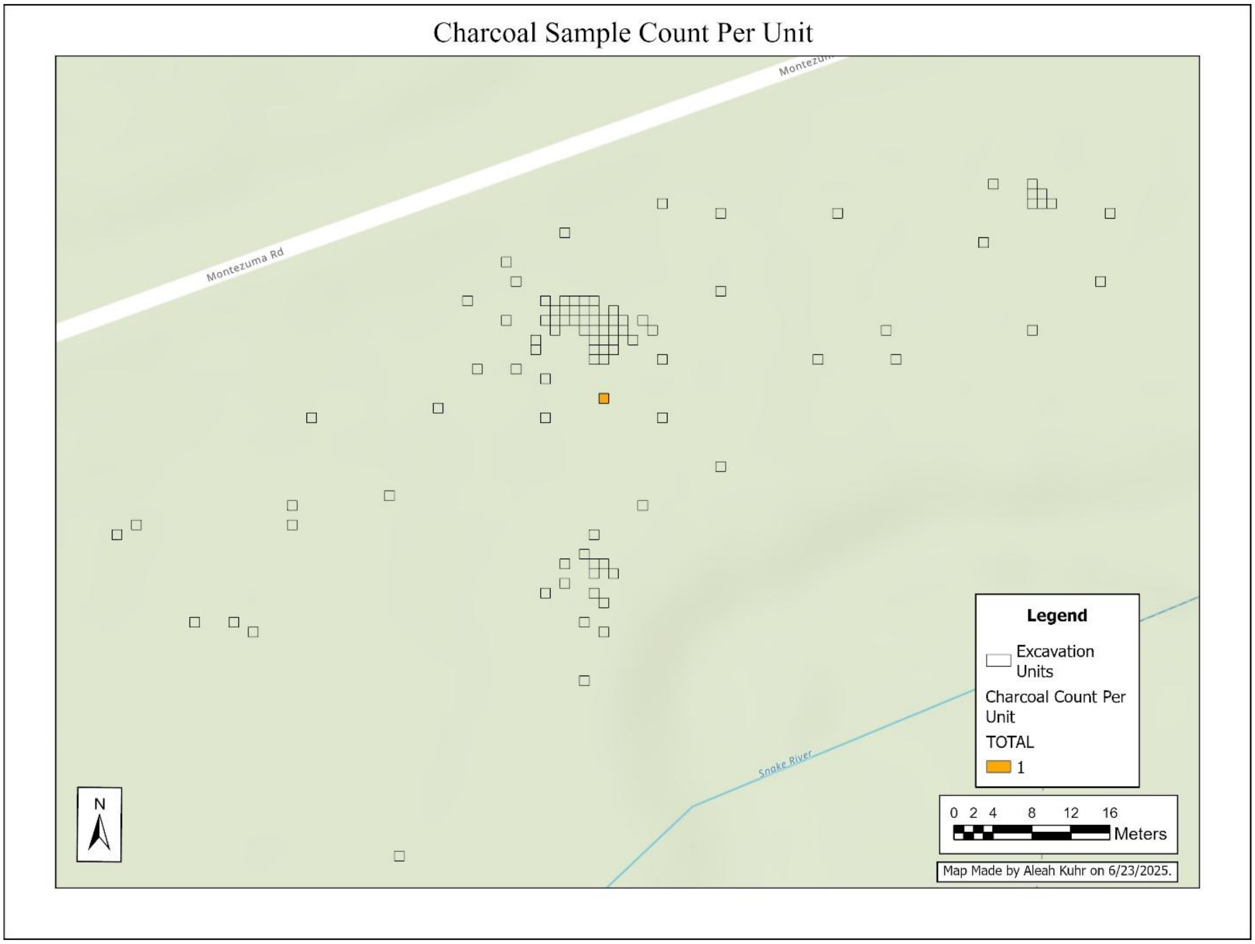

Figure 59. The location of the single charcoal sample recovered is approximately three meters south of the main excavation block north of the Snake River.

Core

A single core was recovered from cell 978_991, located south of the main excavation block and near the bank of the Snake River (Figure 60). This find originates from the southern excavation cluster. As only one core is present in the collection, no meaningful clustering can be identified in this area. Moreover, its location is spatially distant from the primary activity areas identified in the main excavation block and the northeastern excavation units.

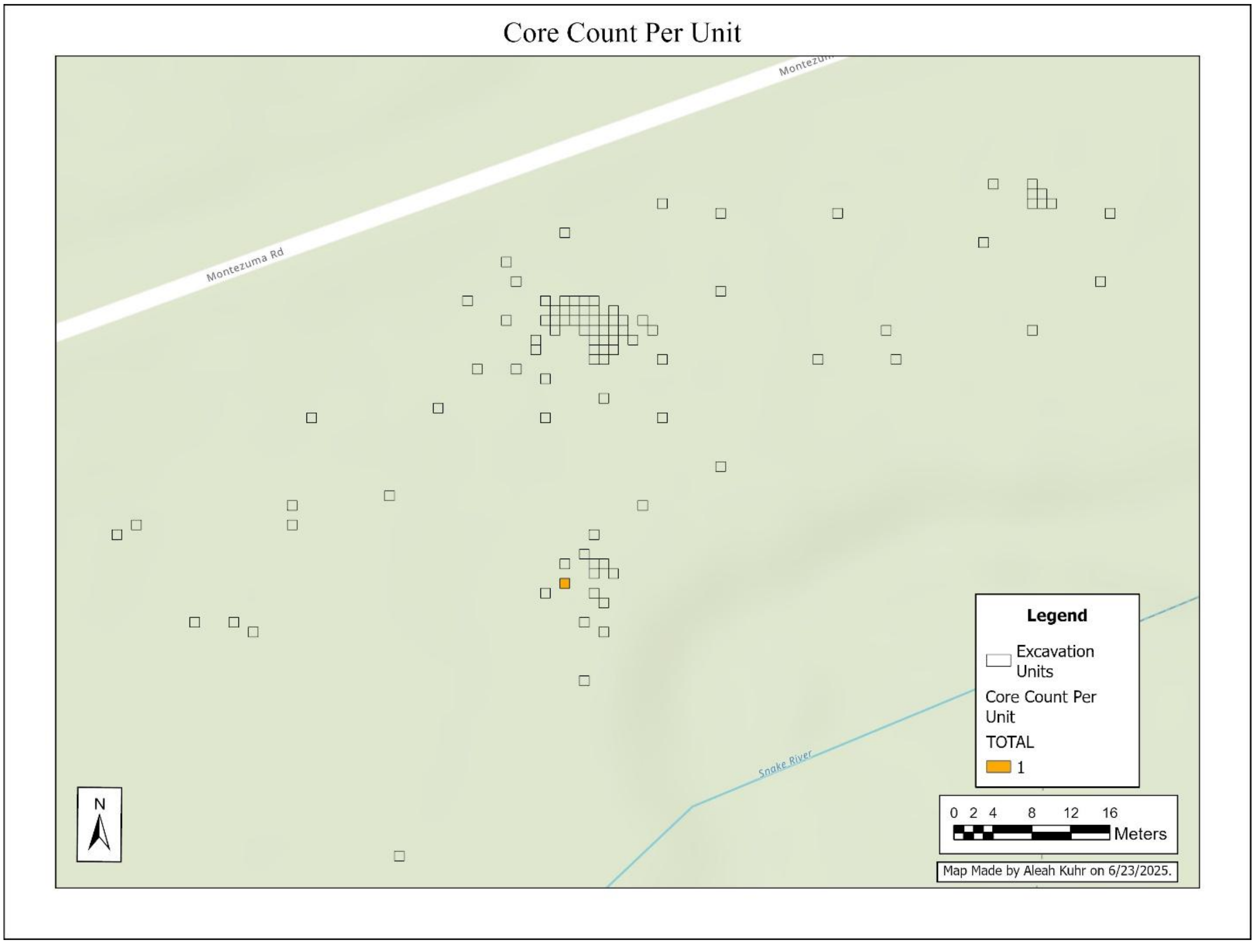

Figure 60. Location of the single core recovered from the southern excavation cluster near the Snake River, isolated from the site's primary activity areas.

Debitage

A total of 2,420 unmodified flakes were recovered from site 5ST98. Of these, 79% (n = 1,913) were found within the main excavation block. The highest concentration of flakes occurs in the central portion of this block, where cell 1005_993 contains 164 flakes (Figure 61). Adjacent cells also contain high counts: 1005_994 (107 flakes) to the east, 1004_993 (73 flakes) to the south, and 1005_995 (96 flakes) further east. These four cells, along with several surrounding units containing between ten and 71 flakes, and a few with more than 72, form the densest cluster of unmodified flakes across the site.

The cell with the single highest flake count is 1005_999 (n = 167), located at the eastern end of the main block (Figure 61). However, it is somewhat isolated, bordered only by unexcavated areas and a single adjacent cell (1004_1000) containing 15 flakes. The second most substantial flake concentration is found in the northeastern excavation cluster, which accounts for 13% of all flakes (n = 327). Within this area, two cells, 1019_1039 and 1017_1039, contain high counts of 104 and 113 flakes, while the remaining cells range from ten to 40 flakes. In contrast, the southern excavation block contains eight cells with only one to nine flakes each, making it the block with the lowest flake density. Additional flakes are scattered across the site, with 22 cells yielding one to nine flakes and fewer than five cells containing ten to 40 flakes (Figure 61). Sixteen excavated cells yielded no flakes (Figure 61).

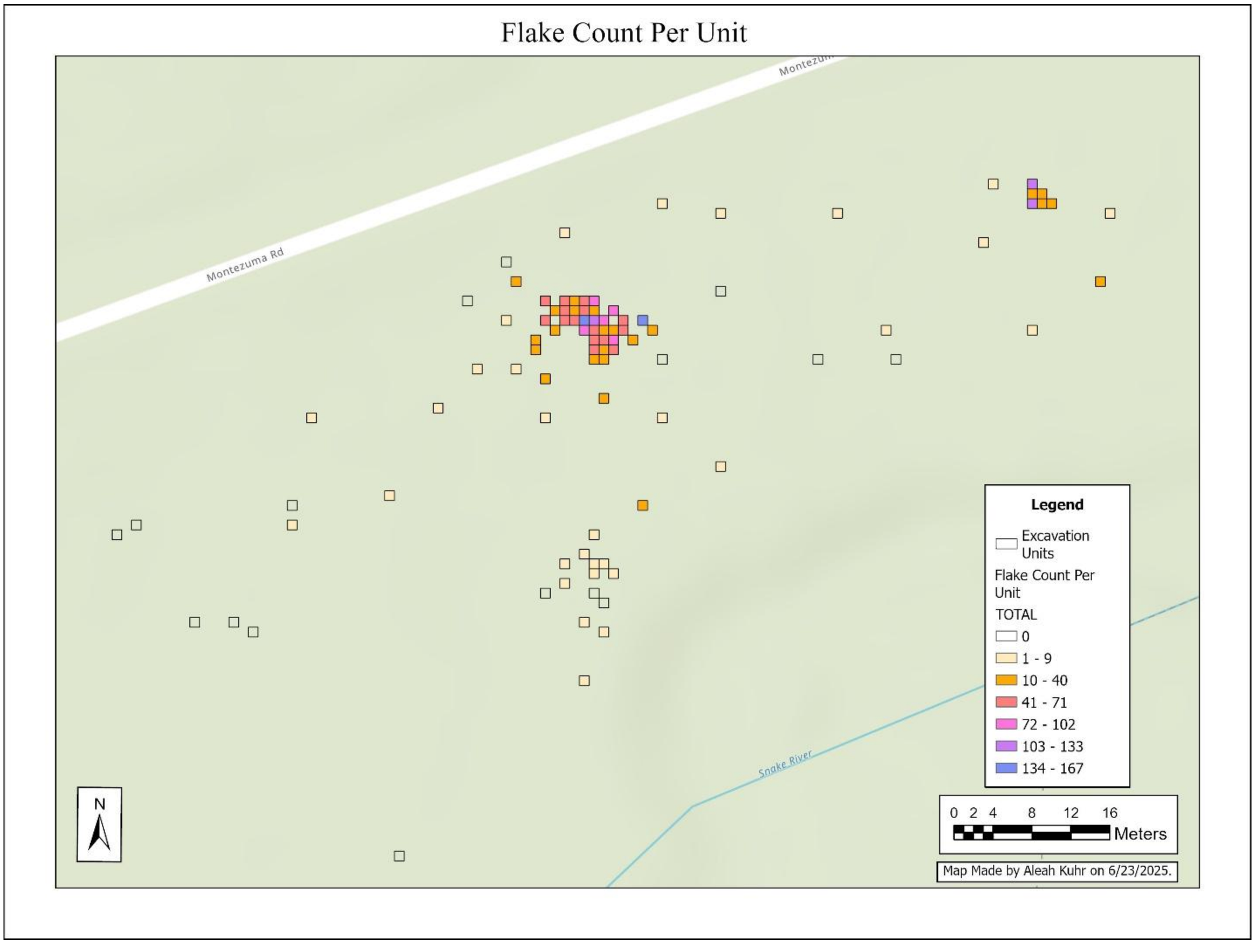

Figure 61. Distribution of unmodified flakes at 5ST98, showing the highest concentrations in the central portion of the main excavation block, a secondary cluster in the northeastern block, and minimal densities in the southern and peripheral areas.

Edge-Modified Flake

Two edge-modified flakes with recorded provenience is present in the 5ST98 collection, recovered from cell 1016_1047, located east of the northeastern excavation block (Figure 62). As the only tool of its type with documented provenience, no meaningful spatial clustering can be identified. Furthermore, its location lies outside the primary activity areas defined within the main and northeastern excavation blocks.

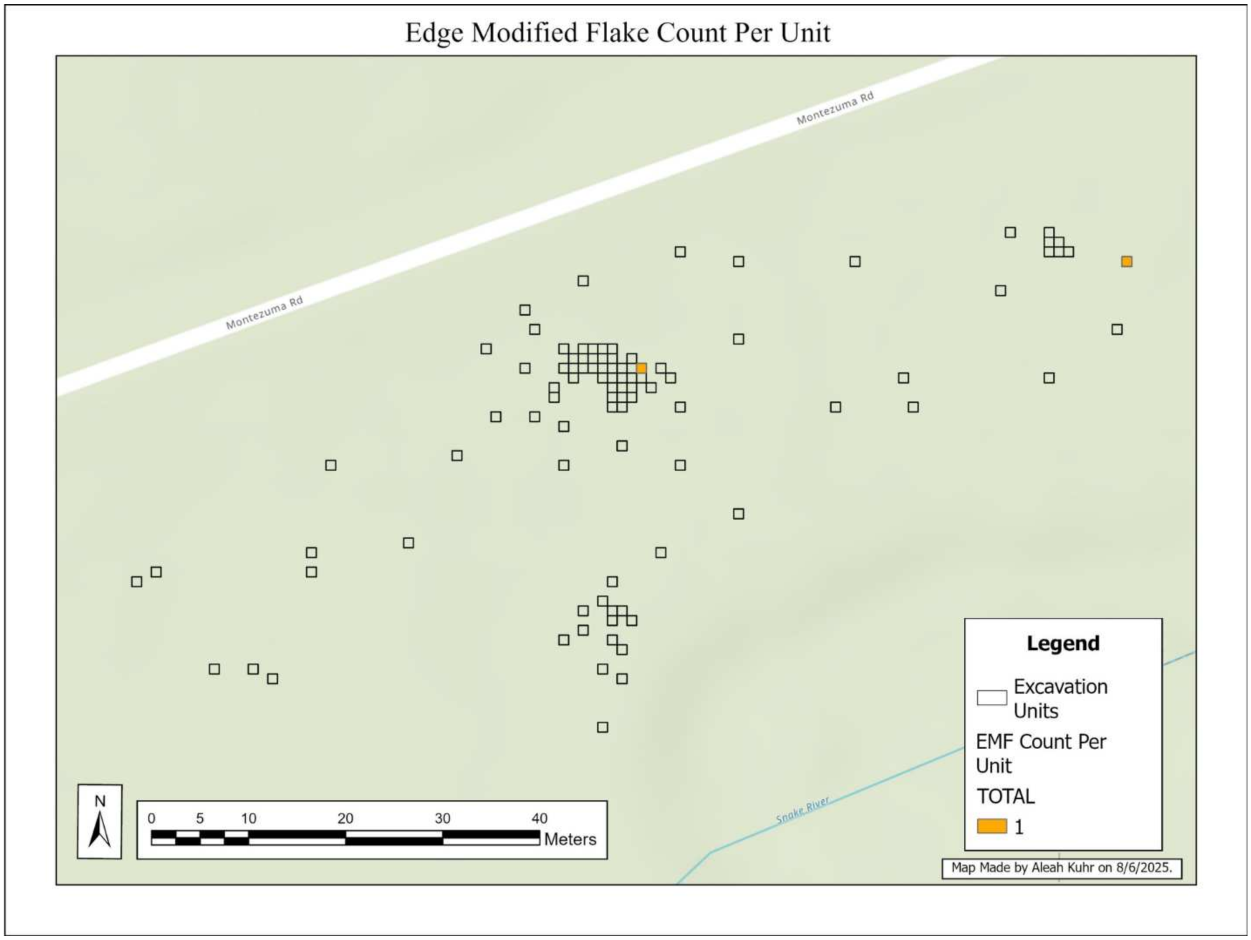

Figure 62. Location of two edge-modified flake recovered east of the northeastern excavation block at 5ST98, isolated from the site's main activity areas.

Features

Three hearth features were identified along the southern bank of the Snake River, positioned downslope and south of the main excavation block (Figure 63). These features, composed primarily of charcoal lenses and associated burned stone, represent localized activity areas that are spatially distinct from the site's primary concentrations of artifacts. Their distance from the main excavation block suggests that they may reflect discrete episodes of use, possibly related to short-term or task-specific activities near the river margin rather than within the central occupation area.

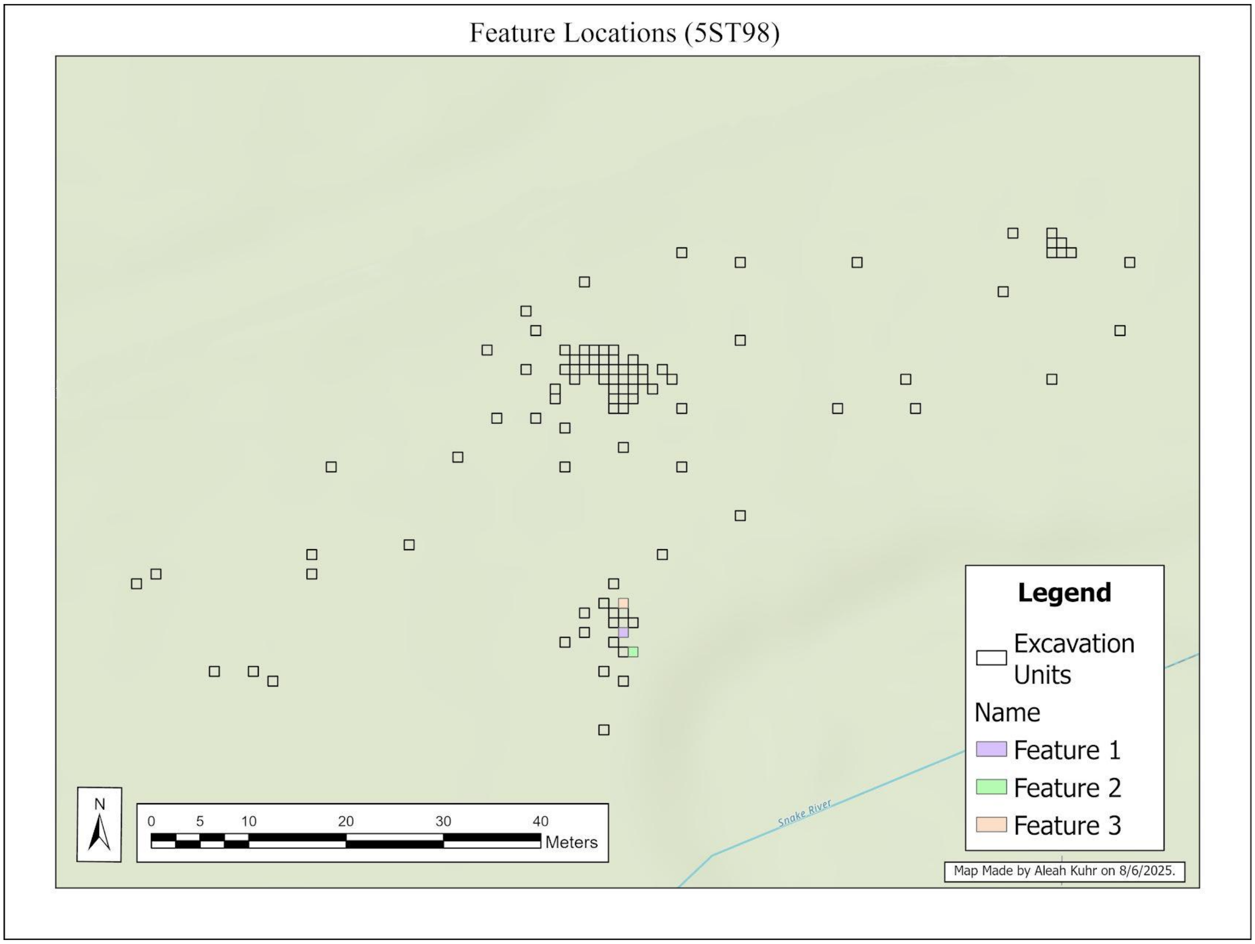

Figure 63. Feature locations from the 1970s excavations.

Fire-Cracked Rock

A single fire-cracked rock (FCR) with recorded provenience was recovered from cell 1017_1041 within the northeastern excavation block (Figure 64). As the only specimen of its type with documented provenience, no meaningful spatial clustering can be identified. Nevertheless, its presence within the primary activity area of the northeastern block suggests it may still be associated with broader tool-related or thermal processing activities, despite the absence of additional FCR in the vicinity.

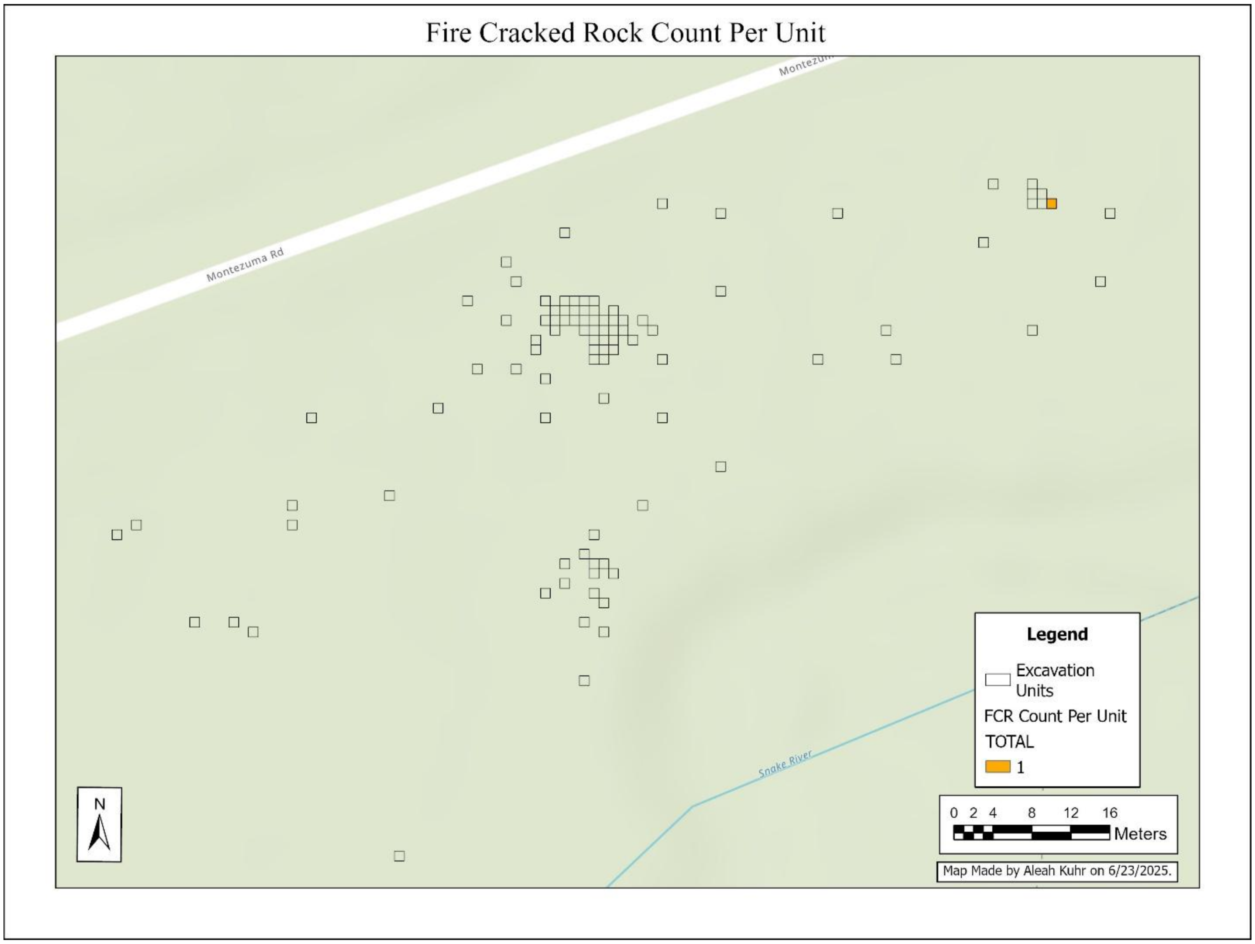

Figure 64. Location of the single fire-cracked rock with provenience data at 5ST98, situated within the primary activity area of the northeastern excavation block.

Ground Stone

Seven groundstone artifacts with recorded provenience were recovered from 5ST98, including one handstone and six netherstones. The majority (70%; n = 5) are located within the main excavation block (Figure 65). Within this area, cell 1005_991, situated in the southwestern portion of the block, contains two netherstones, while the handstone was recovered just southwest of this unit in cell 1004_990. Approximately seven meters to the east, a smaller cluster is present in cells 1005_999 and 1004_1000, each containing one netherstone. With five groundstone artifacts, the main excavation block represents the highest concentration of groundstone across the site. In contrast, the lowest concentration is found in an isolated unit west of the main excavation block (cell 1007_981), which contains two netherstone fragments.

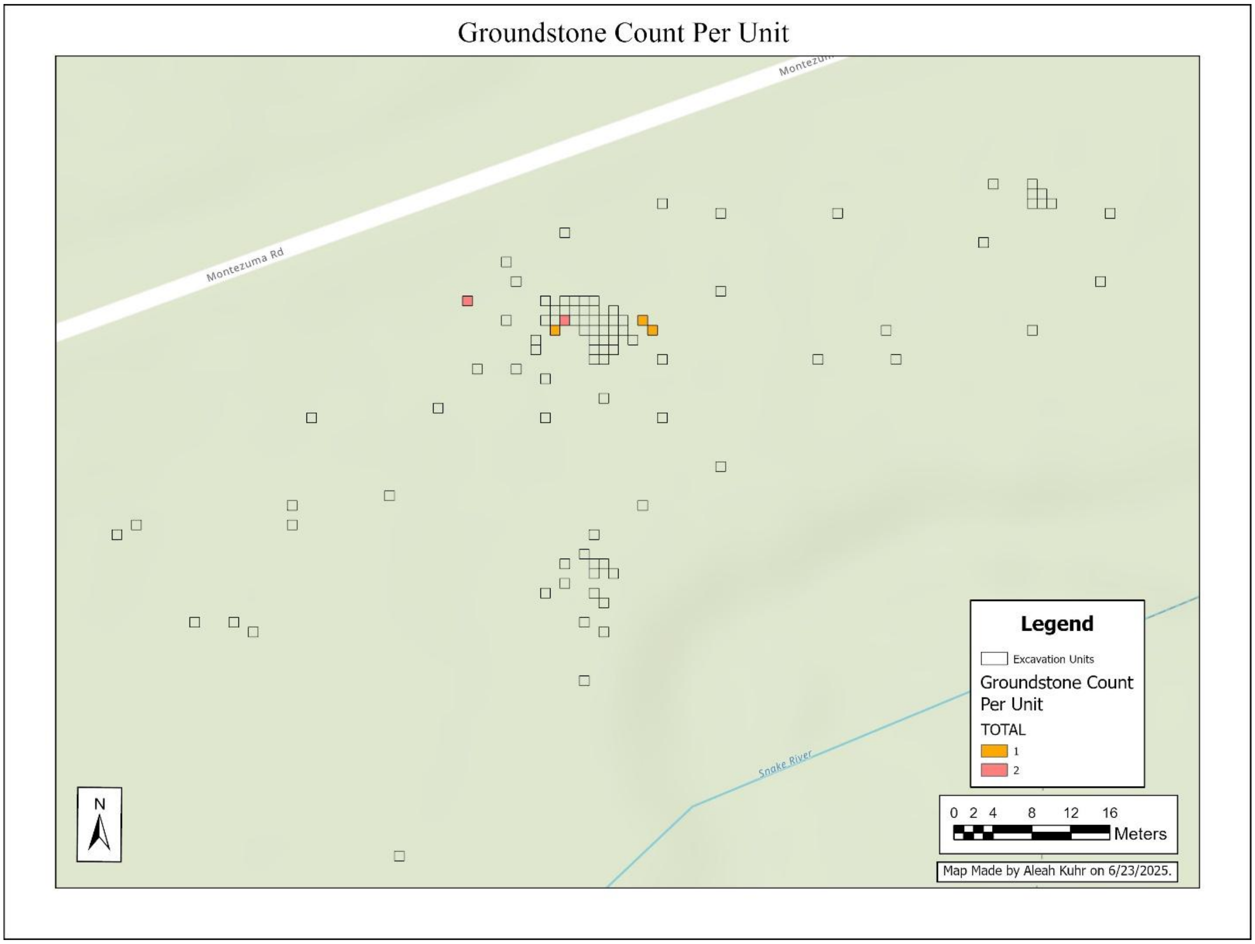

Figure 65. Distribution of groundstone artifacts at 5ST98, with the highest concentration in the main excavation block and an isolated occurrence to the west.

Projectile Points

A total of 71 projectile points with recorded provenience were recovered from site 5ST98, with 80% originating from the main excavation block. The highest concentration occurs in the central portion of this block, where cell 1005_993 contains five projectile points. Adjacent cells also have high counts, including 1005_994 to the east and 1006_993 to the north, each containing four projectile points. Surrounding these core units are five additional cells, each with three projectile points, collectively forming the densest cluster of projectile points across the site.

This high-density zone extends southeast within the main excavation block, where two cells each contain four projectile points and three additional cells contain two points each. The remainder of the main block exhibits lower densities, typically one to two projectile points per cell, though all remain within one to two meters of the central cluster (Figure 66).

The northeastern excavation block contains the second-highest concentration of projectile points (n = 10), representing 14% of the total. Within this block, cell 1018_1039 holds four projectile points, while the adjacent cell to the north, 1019_1039, contains three, indicating greater density in the northern portion of the block. The remaining projectile points are scattered as isolated finds in cells west of the main excavation block, each containing a single point. One additional projectile point was recovered from a cell near the southern excavation block.

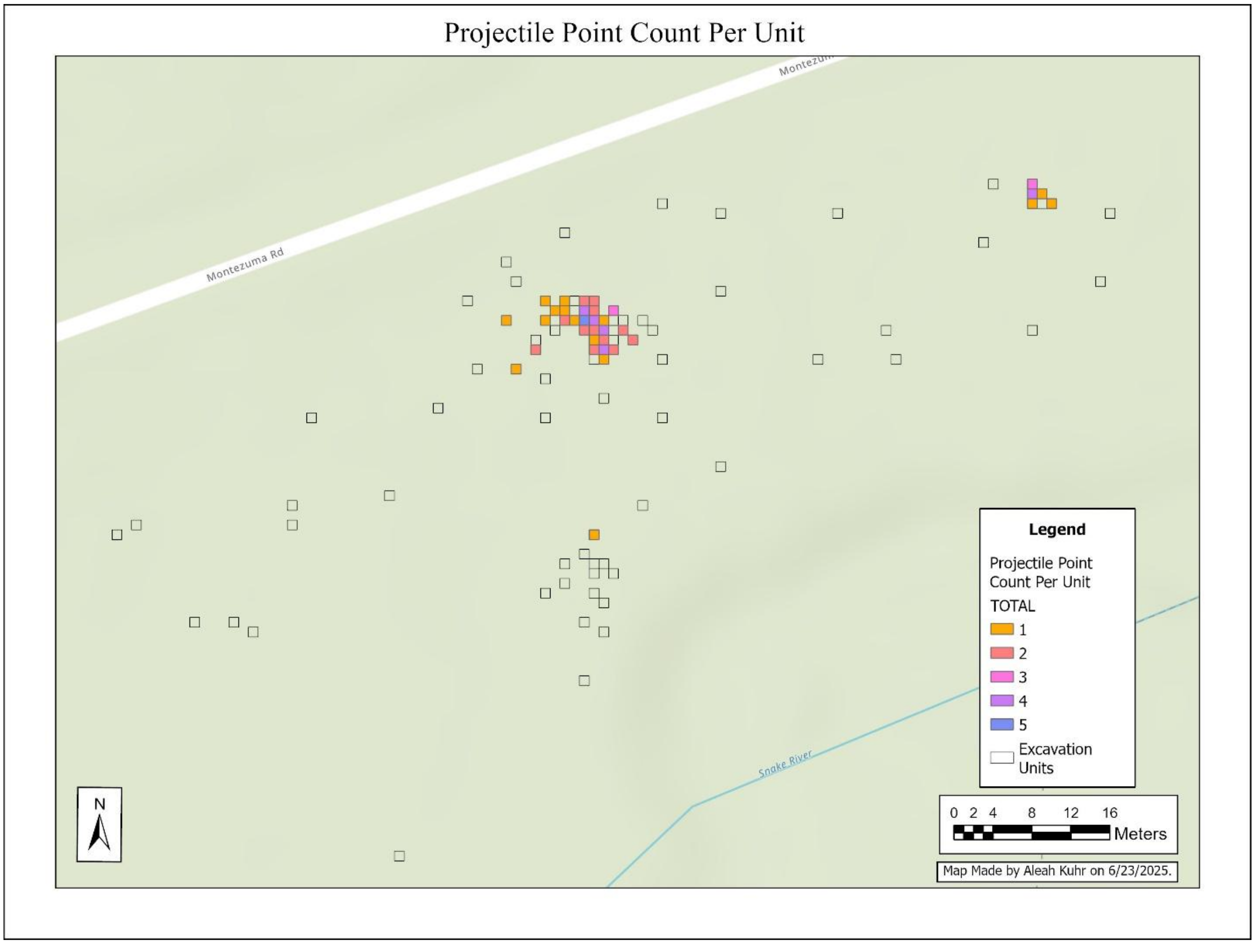

Figure 66. Distribution of projectile points at 5ST98, with the highest concentrations in the central and southeastern areas of the main excavation block and a secondary cluster in the northeastern block.

Scrapers

Two scraping implements were recovered from 5ST98, both located within the main excavation block in cells 1007_989 and 1006_991, which lie approximately one meter apart (Figure 67). While the limited number of specimens impedes strong spatial interpretations, their proximity within the site's primary activity area suggests a possible association with broader tool-related behaviors. Although the dataset is small, it offers a light but potentially informative signal of activity in this portion of the site.

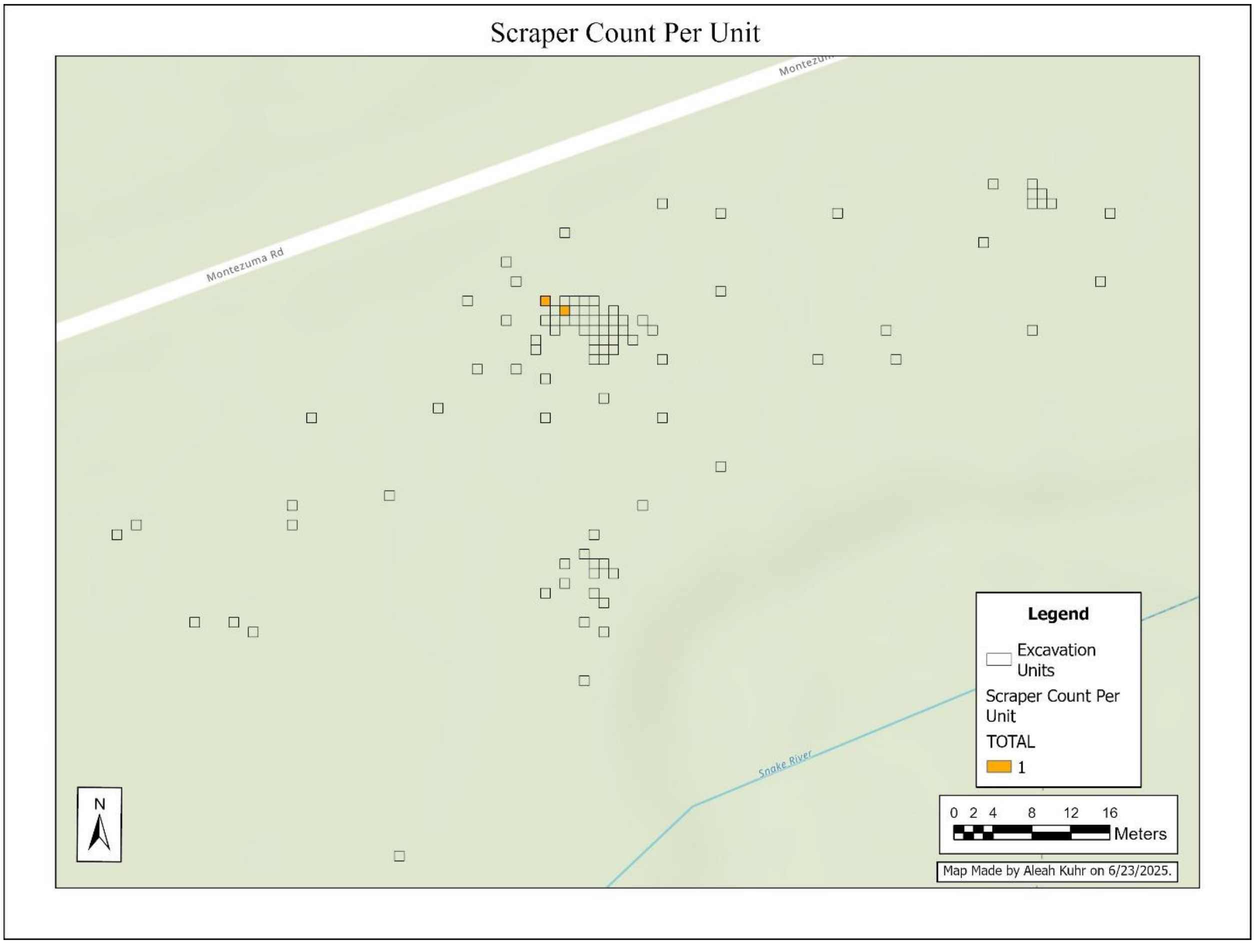

Figure 67. Location of two scraping implements recovered from adjacent units within the main excavation block at 5ST98.

Artifact Patterning Across the Site

The main excavation block at Porcupine Peak (5ST98) contains the majority of the site's recorded artifacts (Figure 68). Five of the six angular debris fragments (83%) were recovered from this area, along with 19 of the 23 bifaces (82%). Of the 46 bone fragments recovered from the site, 44 (96%) originated within the main excavation block. Similarly, five of the seven groundstone artifacts (70%), including one handstone and four of the six netherstones, were found in this area. The block also yielded 80% of the 71 projectile points, both of the site's scraping implements, and 79% (n = 1,913) of the 2,420 unmodified flakes. These concentrations indicate that the main excavation block is the densest and most diverse area for artifact recovery at 5ST98.

The northeastern excavation block at Porcupine Peak (5ST98) yielded a smaller but still significant assemblage of artifacts (Figure 69). This area contains two bifaces and ten projectile points, the latter representing 14% of the total recovered from the site and marking it as the second-highest concentration overall. Bone was also present, with two fragments recovered from cells 1018 and 1040. Additionally, a single fire-cracked rock (FCR) was found in this block. The second most substantial flake concentration is also located here, accounting for 13% of all flakes (n = 327). These findings indicate that the northeastern block contained a range of activities, though its smaller excavation area likely accounts for the reduced artifact totals relative to the main block.

The distribution and composition of artifacts in both the main and northeastern excavation blocks at Porcupine Peak (5ST98) suggest the presence of activity areas rather than high-density refuse zones (Binford 1978). High-density refuse zones are concentrations of discarded materials that result from repeated dumping, cleaning, or waste disposal rather than in-place use or production. Activity areas are typically identified by patterned clusters of artifacts associated with specific behaviors, such as lithic debitage from tool manufacture, groundstone tools for plant processing, or bone fragments resulting from butchery. The main block exhibits high concentrations and a wide variety of tools and materials, including angular debris, bifaces, bone, groundstone tools, and unmodified flakes. This combination of tool types and faunal remains points to diverse tasks, likely including tool production, maintenance, and subsistence-related activities, reflects the spatial organization of artifacts, merely their functional types, indicates patterned activity areas rather than randomly deposited refuse. Similarly, the northeastern block, while smaller in assemblage size, contains a non-trivial mix of projectile points, flakes, bifaces, and bone, indicating it too functioned as a localized activity area. The presence of both tool manufacture debris and tools in various stages of use supports the interpretation that these blocks represent spaces where specific tasks were repeatedly performed (Figure 70 and Figure 71).

Dr. Morris' excavation strategy at Porcupine Peak (5ST98) was guided by visible surface concentrations of artifacts. She initially targeted these clusters for excavation, then expanded outward as artifact densities remained high to delineate the extent of each concentration. This approach led to the identification of two primary artifact clusters, the main excavation block and the northeastern block, as well as a smaller hearth area farther downslope. While the hearth area contained few associated artifacts, the two main clusters yielded dense and varied assemblages that became the focus of subsequent excavation. As noted by Marcotte, the excavation of 94 test squares was intended to balance extensive site coverage with a more detailed investigation of key features (Marcotte n.d.). Given that less than 3% of the estimated 3,600 m² site area was excavated, it is clear that the excavators were aware of the site's broader extent but were satisfied that their sample adequately represented its main concentrations of cultural material.

Based on artifact distribution maps, it appears that the excavation team effectively sampled the densest areas of the site, but portions of the main cluster's boundaries likely remained untested. Several unexcavated areas adjacent to the main block, particularly to the southwest and east, show high artifact counts in bordering units, suggesting that additional excavation could have further refined the edges of this cluster. For example, the area southwest of the main block lies just below units with artifact totals ranging from 35–171, while unit 1005_999 to the east yielded 167 artifacts, indicating the potential for additional concentrated deposits. Similarly, several units along the northeastern edge of the main block contained between 35 and 103 artifacts, implying that the cluster may extend farther north than was explored. Nonetheless, beyond these two clusters, most isolated sample units produced fewer than 25 artifacts, supporting the interpretation that major activity areas were successfully located. The unexcavated portions of these clusters, along with the remainder of the site, represent valuable deposits that likely persist as shallow subsurface contexts, making them important targets for future monitoring and protection efforts.

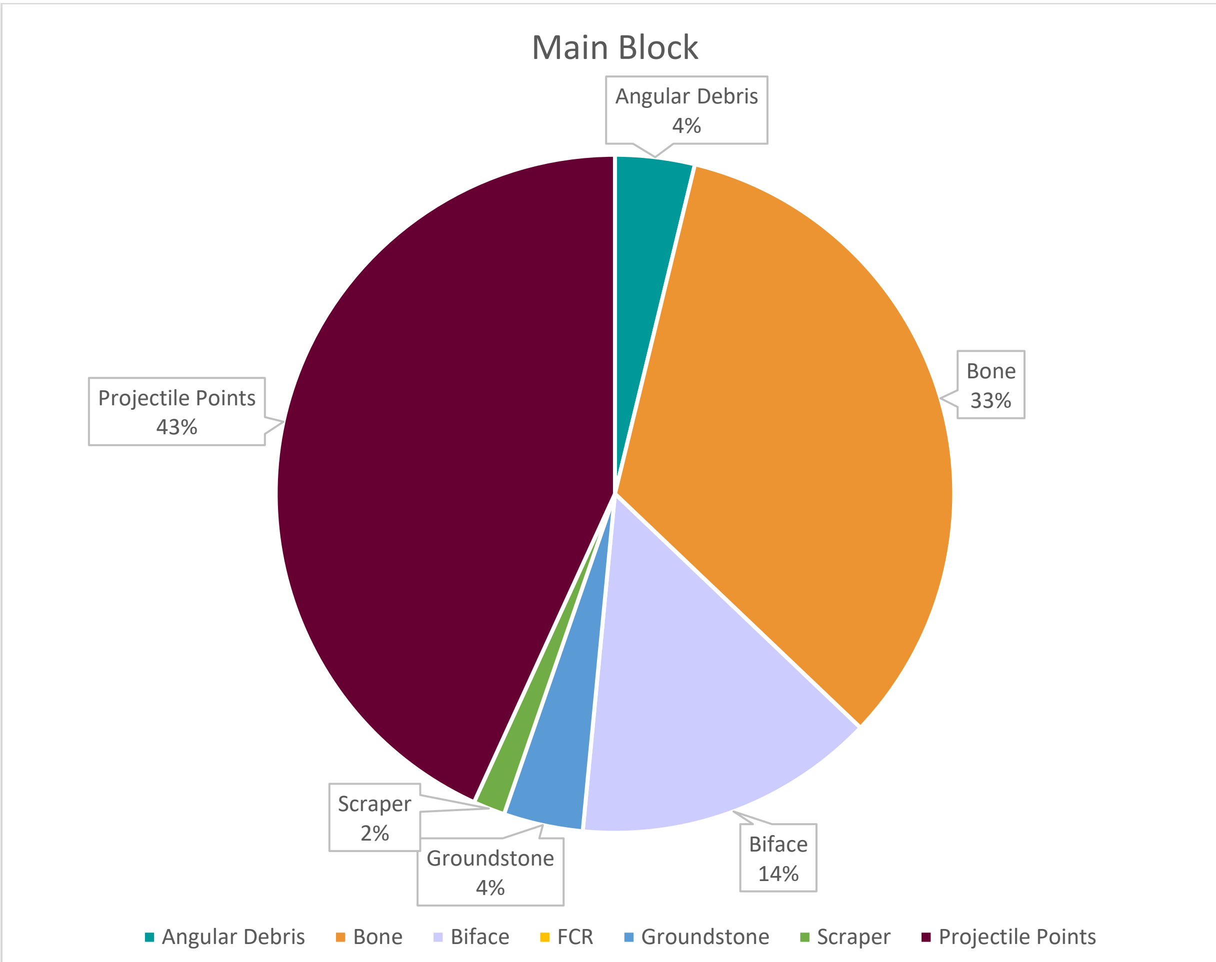

Figure 68. Artifact composition (flakes excluded) in the main excavation block at Porcupine Peak (5ST98), showing the predominance of projectile points, bone, and bifaces.

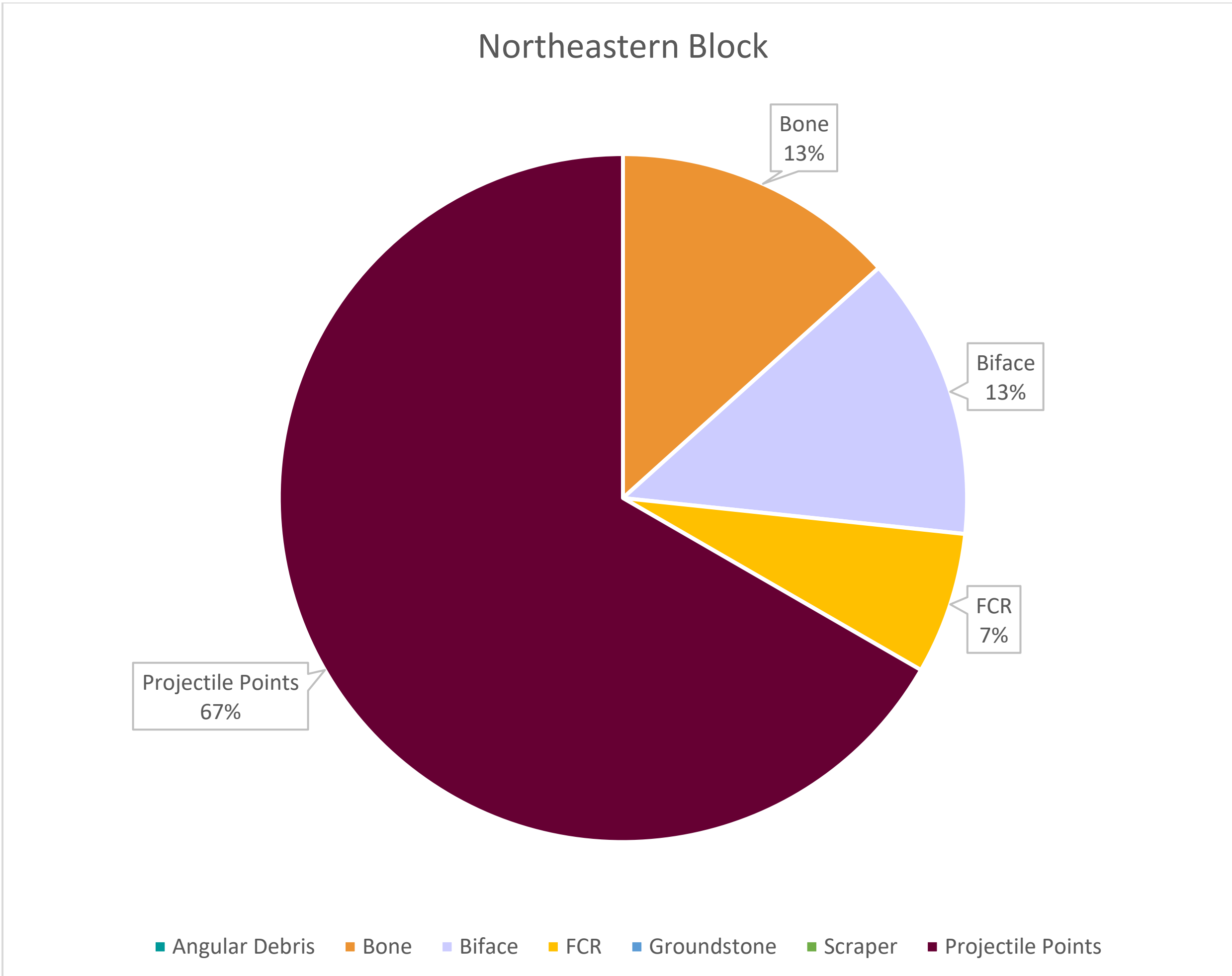

Figure 69. Artifact composition (flakes excluded) in the northeastern excavation block at Porcupine Peak (5ST98), showing a smaller but varied assemblage including projectile points, bone, and bifaces.

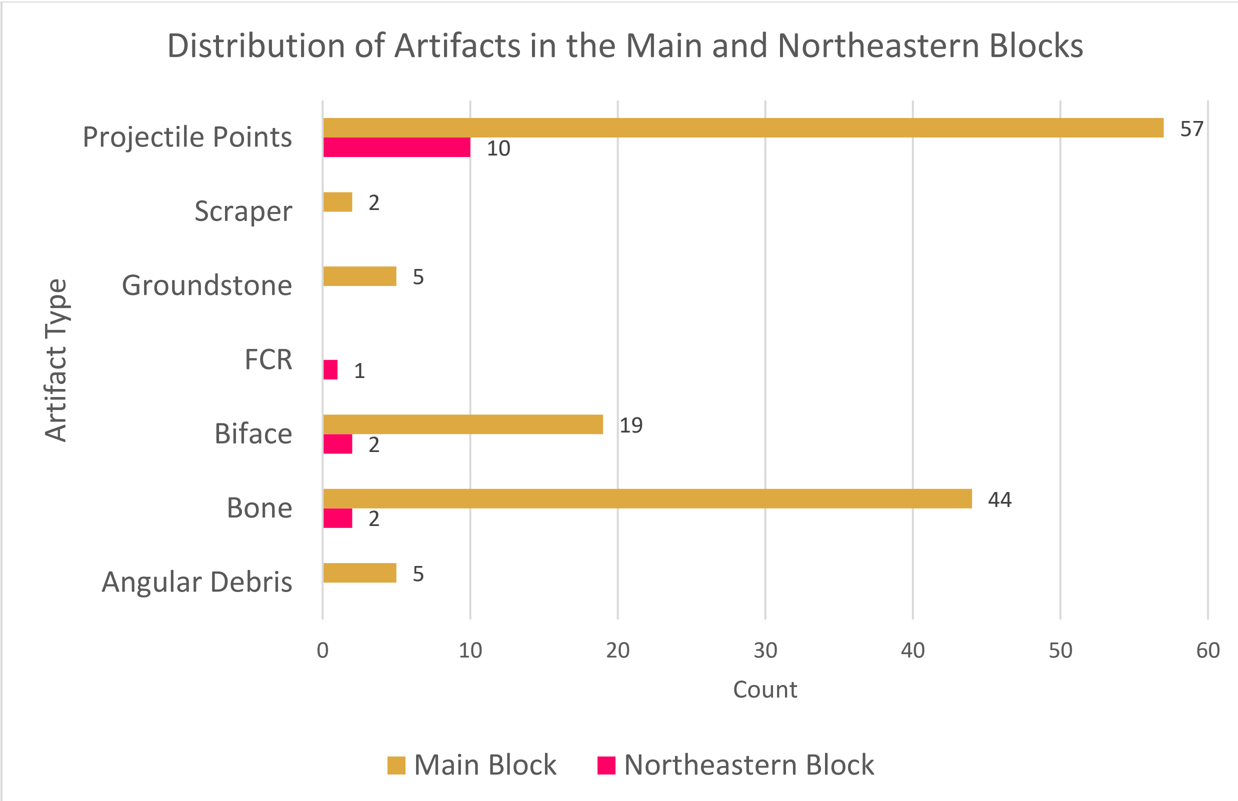

Figure 70. Counts of artifacts between the two concentrations.

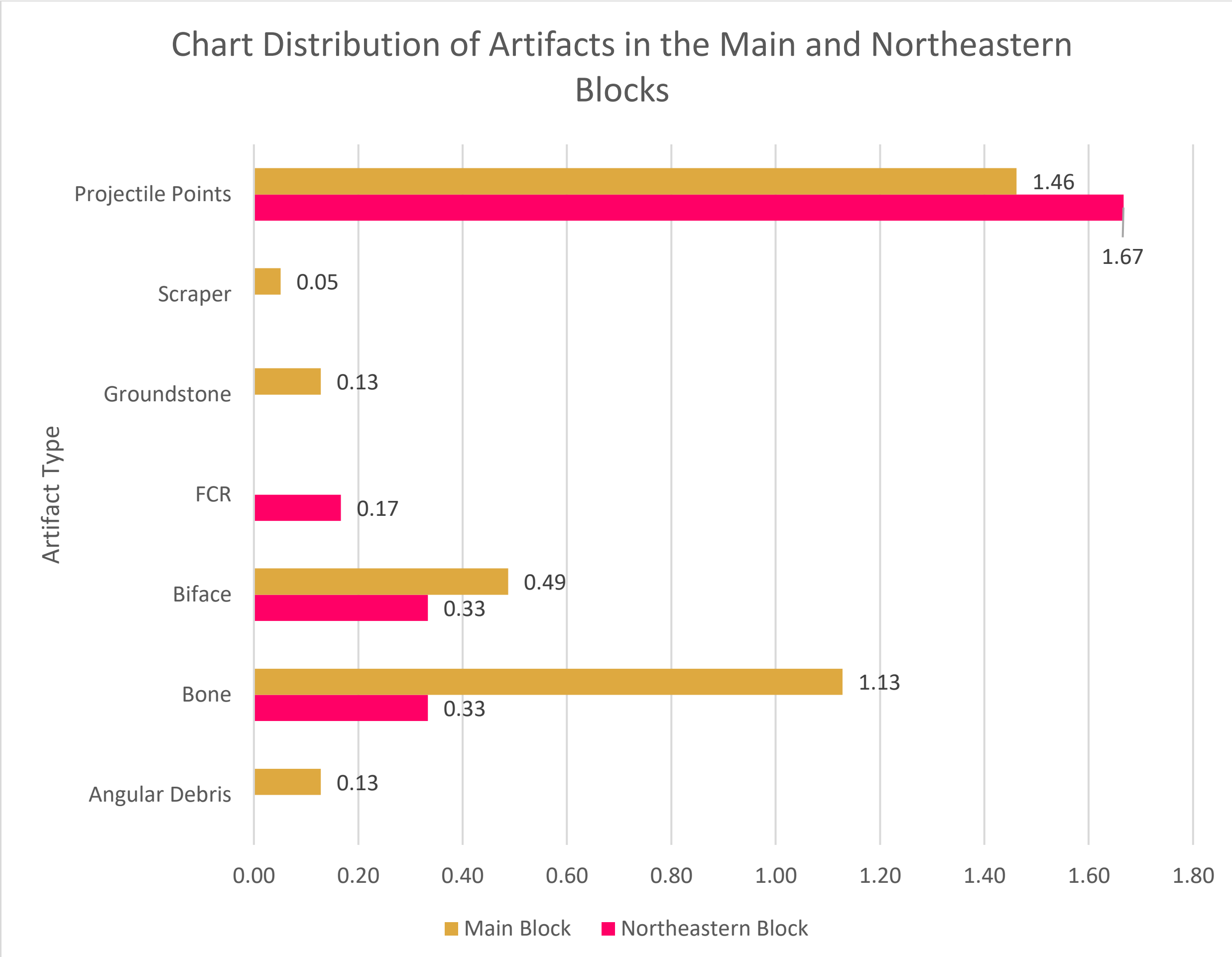

Figure 71. Artifact densities (counts per m²) by class for the main and northeastern excavation blocks at Porcupine Peak (5ST98), allowing comparison of artifact concentrations independent of excavation size.

Flake Density and Projectile Point Presence as Selection Criteria

To guide analysis and ensure meaningful interpretation of the assemblage, this study focuses on excavated units containing either ten or more lithic flakes or at least one projectile point, with particular emphasis on units where both criteria overlap. A threshold of ten flakes was chosen based on the observed distribution of artifacts across the site (Figure 72). Units with fewer than ten flakes tend to be scattered and isolated, while higher-density units frequently occur in clusters, suggesting more intensive activity. This threshold improves the reliability of comparative and quantitative analysis by reducing the influence of sampling noise and increasing the likelihood that observed variation in raw material, burning, or flake size reflects actual behavioral patterns. While key references in lithic analysis (e.g., Andrefsky 2005; Odell 2004) do not prescribe specific numerical thresholds, they emphasize that artifact concentrations, as opposed to low-density background scatter, can indicate episodes of tool manufacture, maintenance, or discard.

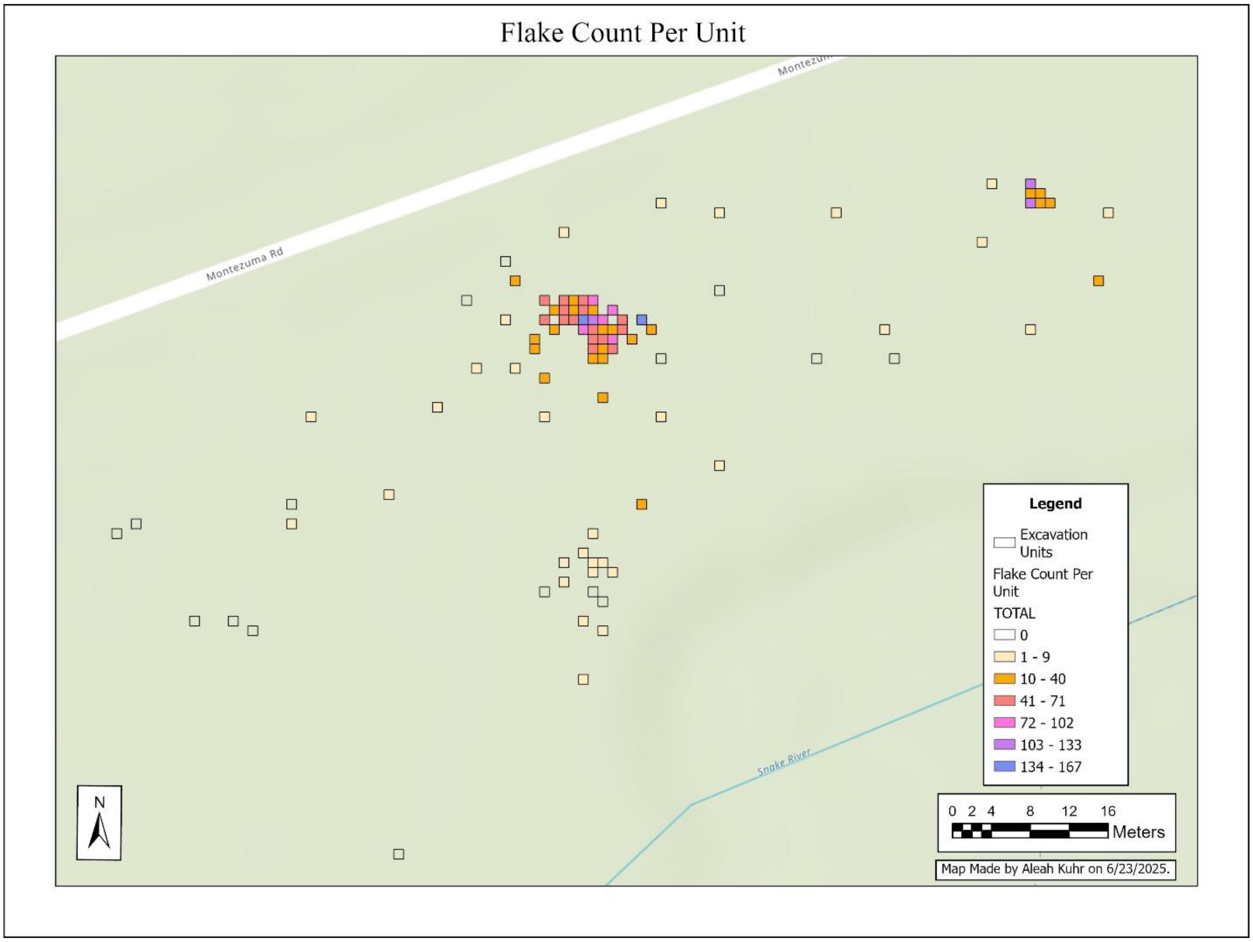

Figure 72. Distribution of flake counts across excavated units. A central cluster of units with ten or more flakes is visible, with a smaller secondary cluster to the northeast. These concentrations were used to guide unit selection for further analysis, as they likely reflect areas of focused lithic activity.

Similarly, broader archaeological studies often recognize the value of artifact density in identifying activity areas and understanding site structure (e.g., Binford 1980; Shott 1989). Projectile points, often associated with diagnostic technological behaviors and potential temporal markers, provide an additional line of evidence (Figure 73, Figure 74, Figure 75, and Figure 76).

Units containing projectile points frequently overlap with high flake-density units, further supporting the interpretive value of this selection strategy. Although low-density areas may represent activities that left fewer material traces, their investigation lies beyond the scope of this study, which focuses on dense artifact clusters as indicators of intensive use. Focusing on these units allows for a more targeted investigation of spatial patterning, technological organization, and activity areas within the site.

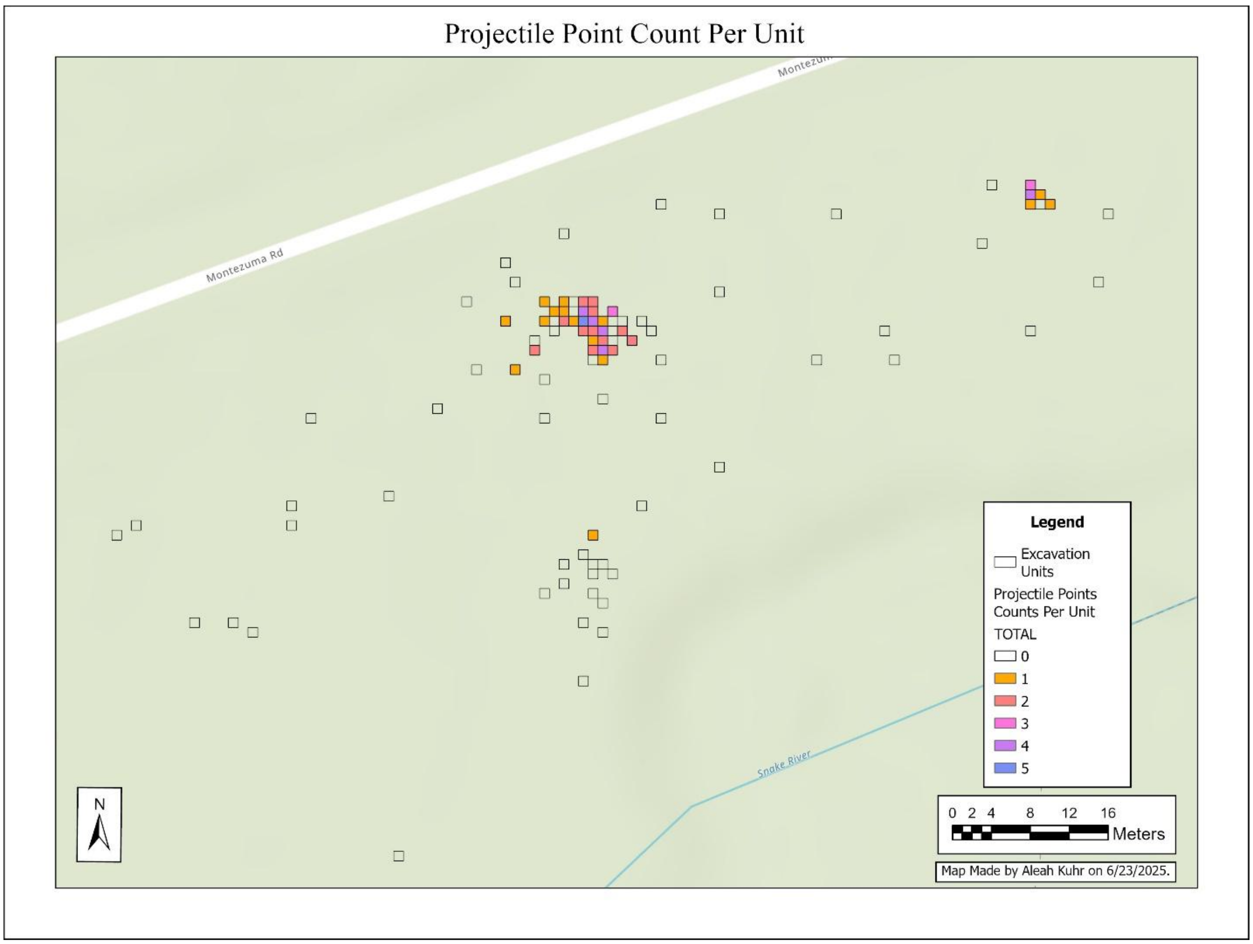

Figure 73. Distribution of projectile points across excavated units. Points are concentrated in units that frequently overlap with high flake-density areas, supporting their use as indicators of tool-related activities and reinforcing the selection of these units for further analysis.

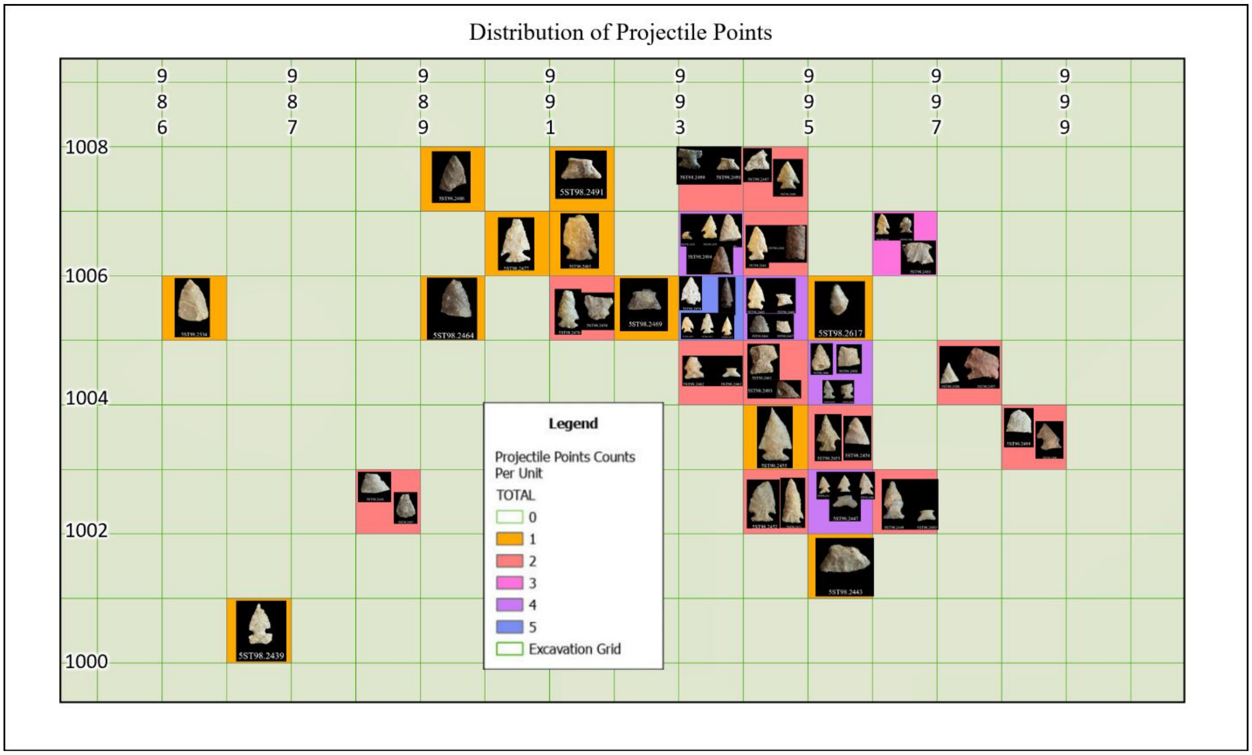

Figure 74. Distribution of projectile points across the main excavation block.

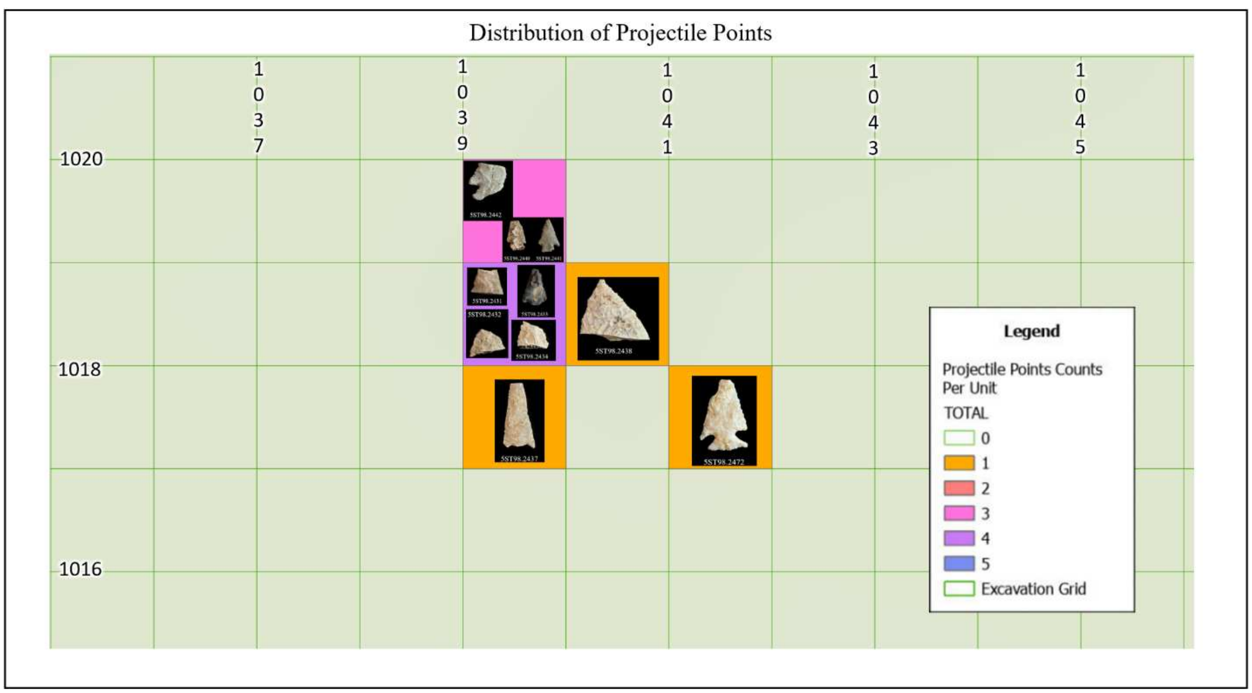

Figure 75. Distribution of projectile points across the northeastern cluster.

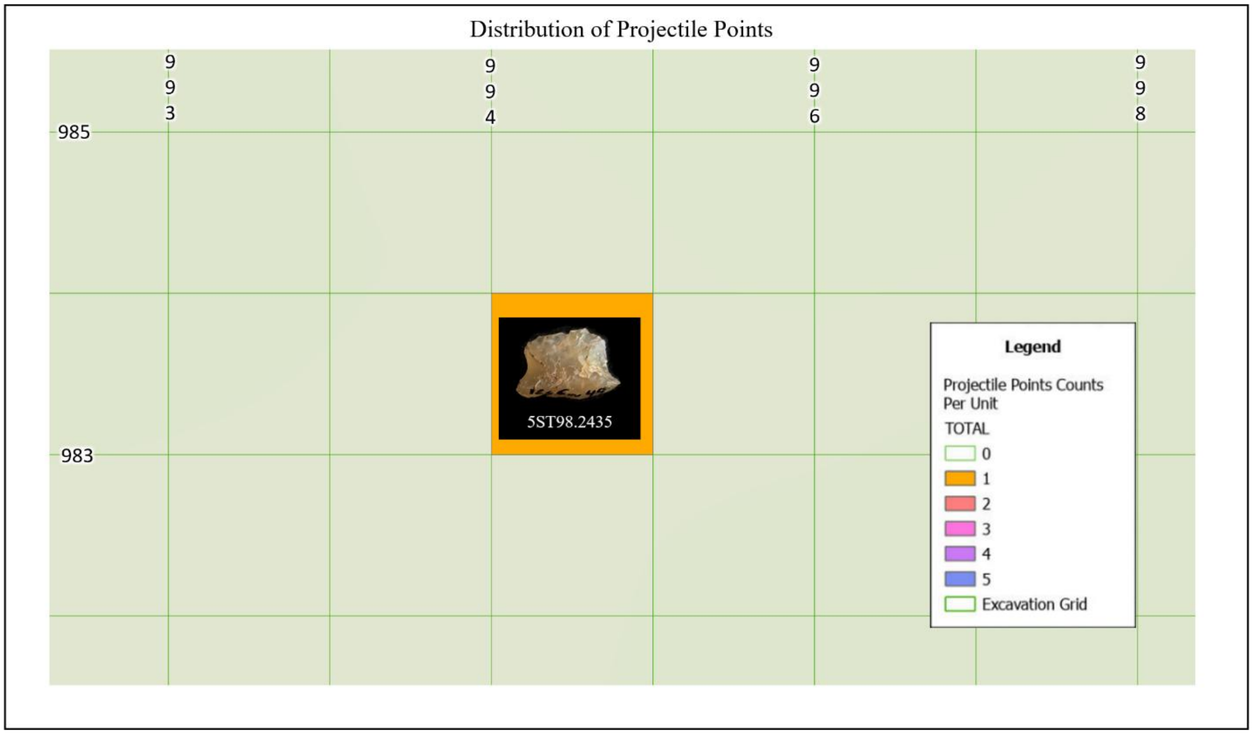

Figure 76. Single unit south of the main block that contains a single projectile point base.

Several excavated units were excluded from detailed analysis due to not meeting the selection criteria of flake density, spatial proximity to major activity clusters, or the presence of diagnostic artifacts. Although 986_999 and 997_995 each contain 23 flakes, they are spatially distant from the main excavation block, located approximately three – 14 meters away, and lack adjacent excavated units that might contextualize them within broader activity areas (Figure 77). Similarly, 999_989, 1009_986, and 1009_1046 contain between 13 and 18 flakes but are spatially isolated and lack projectile points or other features to support further behavioral interpretation. By excluding these outliers, the analysis remains focused on units most likely to reflect sustained lithic activity and site structure based on artifact density, spatial clustering, and the presence of diagnostic tools. This includes the main excavation block and the northeastern cluster (Figure 78). This focus is further supported by the presence of a wide variety of artifact types in these blocks beyond just flakes and projectile points. The main and northeastern blocks contain the highest concentrations of bone, bifaces, ground stone tools, and angular debris (Figures 14–16), reflecting diverse behaviors.

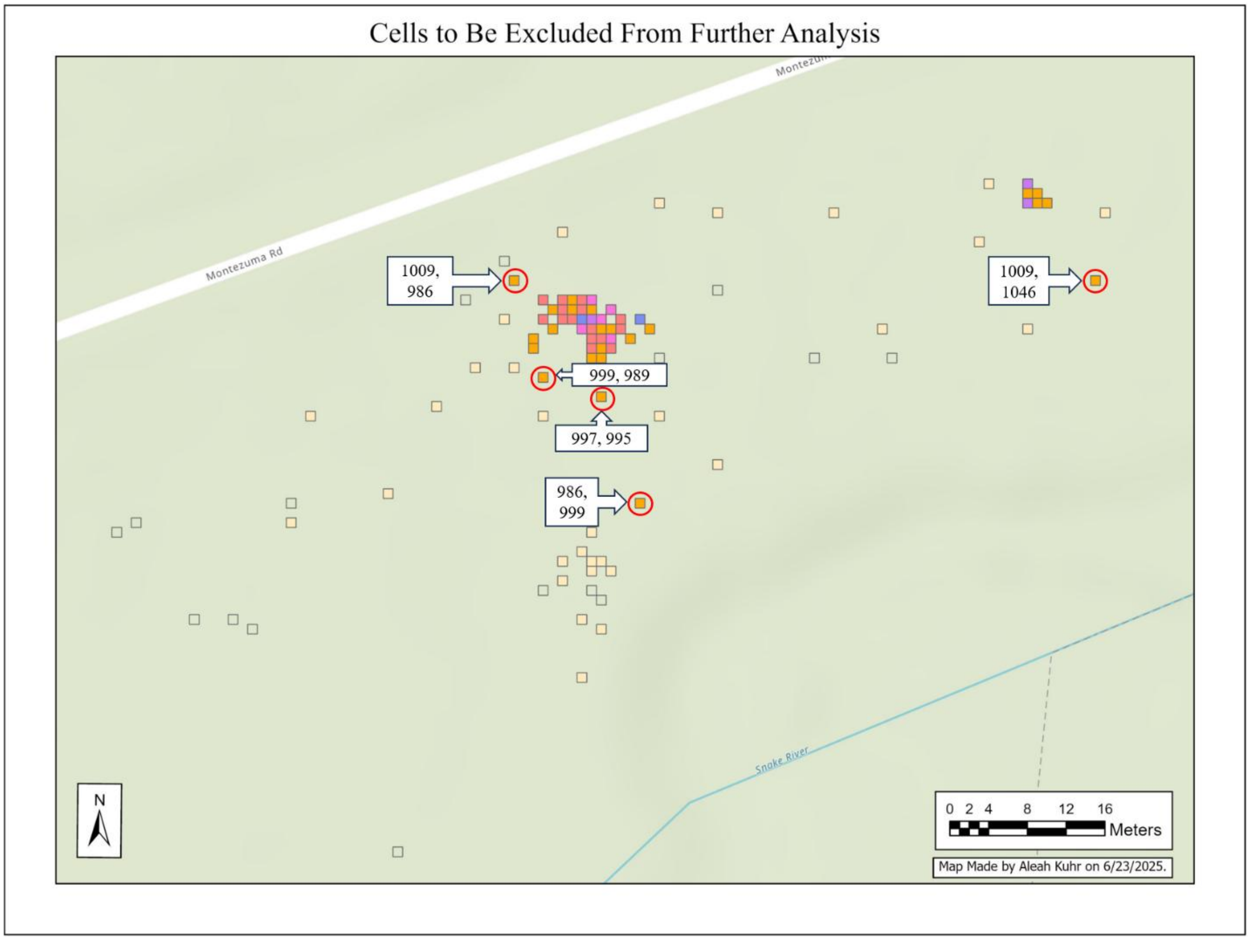

Figure 77. Excavated units excluded from detailed analysis (circled in red). These units either fall below the ten-flake threshold or are spatially distant from the main excavation block and lack surrounding units for contextual interpretation. Their exclusion helps focus the analysis on well-defined clusters more likely to reflect sustained lithic activity.

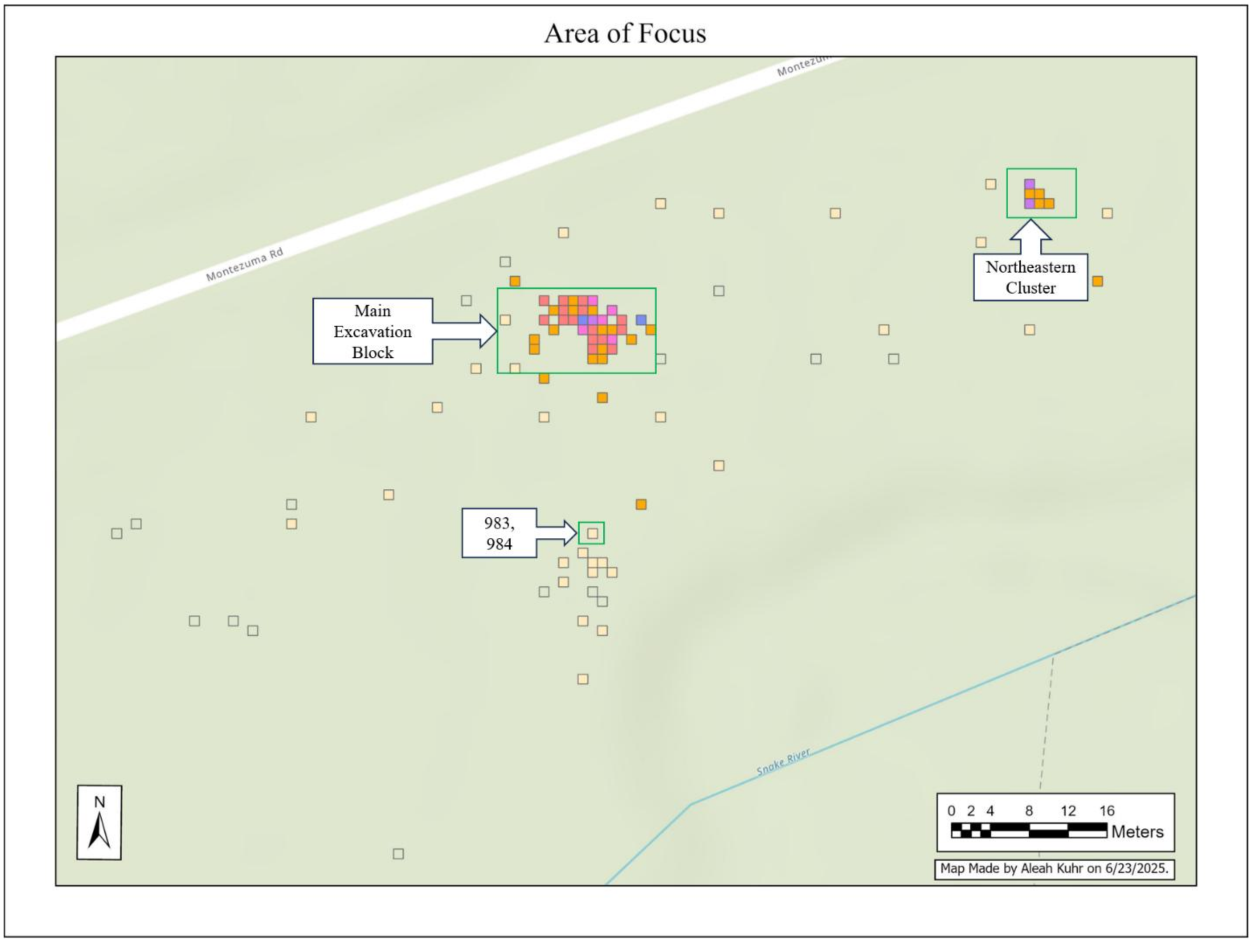

Figure 78. Areas selected for focused analysis in subsequent chapters, outlined in green. These include clusters of excavated units meeting the study's criteria of ≥10 flakes and/or the presence of projectile points, and are interpreted as zones of concentrated lithic activity.

Conclusion

This chapter has used GIS-based spatial analysis to identify patterns in artifact distribution across Porcupine Peak (5ST98), intending to identify high-resolution (concentrated artifacts) areas for more detailed analysis. By mapping artifact concentrations and assessing their composition across excavated units, it is clear that the main and northeastern excavation blocks represent the densest and most behaviorally meaningful areas of the site. These blocks are not only artifact-rich, especially in terms of lithic debitage and projectile points, but also contain a diverse range of tool types, bone, and manufacturing debris. This diversity reinforces their interpretation as activity areas reflecting task-specific behaviors.

To guide focused analysis, this chapter applied a ten-flake threshold and presence of projectile points as selection criteria, effectively isolating units most likely to preserve informative patterns while minimizing the influence of low-density background scatter. The resulting clusters, particularly the main and northeastern blocks, serve as “high-resolution” areas where artifact density, diversity, and spatial coherence offer strong potential for reconstructing behavioral patterns.

These high-resolution areas provide the foundation for the next phase of analysis in subsequent, which examines vertical artifact distributions within these clusters. By exploring whether vertical patterns are unimodal, bimodal, or otherwise structured, and by incorporating evidence of burning, the next chapter will build on the spatial patterns identified here to assess the intensity, duration, and nature of site use over time.

CHAPTER VI – SPATIAL DISTRIBUTION AND VERTICAL PATTERNS

Introduction

This chapter builds on the horizontal spatial analysis presented in the previous chapter by examining the vertical distribution of artifacts within the site's high-resolution areas. These areas, primarily the Main and Northeastern Excavation Blocks, were identified based on high artifact concentrations, particularly lithic debitage and projectile points, as well as the presence of diverse tool types and manufacturing debris. Selected using a ten-flake threshold and the presence of diagnostic artifacts, these blocks represent the densest portions of the site, making them ideal for studying vertical patterning and site formation processes. Vertical artifact distribution refers to the spread of artifacts across different excavation levels within an excavation unit or block.

Unlike horizontal patterning, which shows surface-level concentrations, vertical patterning helps identify discrete occupation surfaces and understand the degree of vertical mixing. In high-density areas, artifacts are often concentrated within a relatively narrow vertical span, forming a recognizable cluster or peak that represents the original location of activity. Above and below this dense zone, artifacts may appear more sparsely, forming a "cloud" that reflects natural or cultural post-depositional processes (Surovell 2022; Benedict 1990). In vertical artifact distributions, a unimodal pattern refers to a single, well-defined peak in artifact frequency within the excavation level (Figure 79). This suggests that the majority of artifacts were deposited during one main occupation or use event. In contrast, a bimodal pattern shows two distinct peaks at different depths, indicating at least two separate episodes of artifact deposition (Figure 79). This pattern may reflect several occupations, distinct activity surfaces, or variation in site use over time, though natural processes such as slope movement, erosion, or bioturbation could also contribute to the dispersed or bimodal artifact distributions.

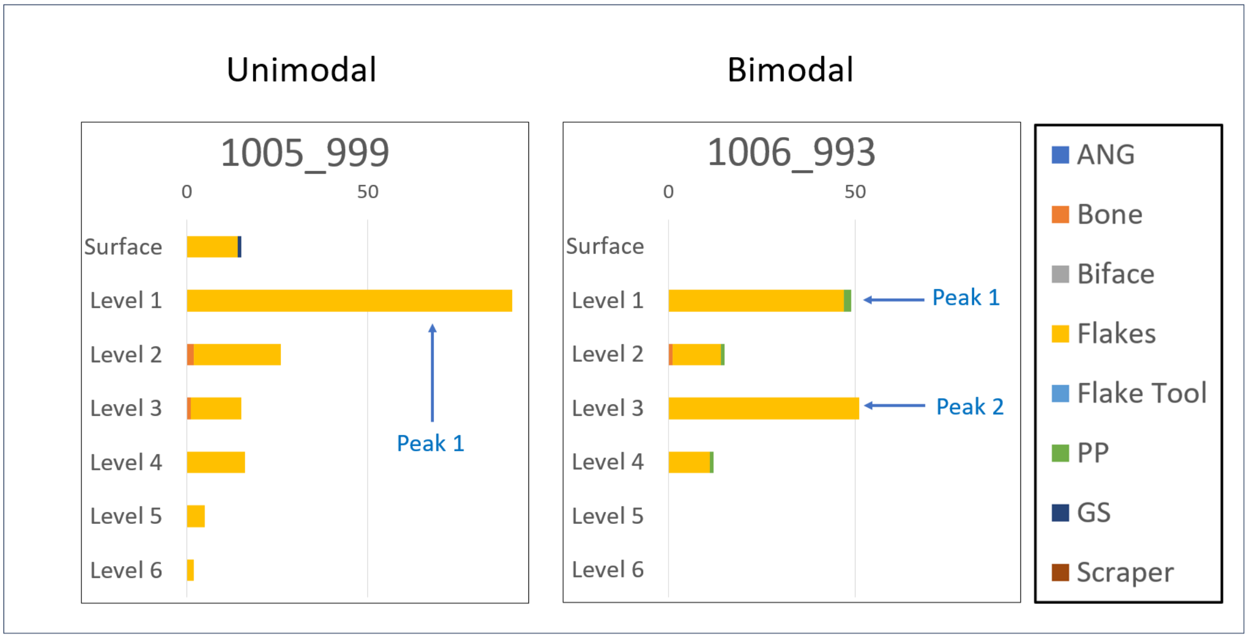

Figure 79. A unimodal pattern has one clear peak, while a bimodal pattern has two separate peaks. The right-hand chart is a simplified example used to illustrate unimodal versus bimodal distributions and does not represent actual data.

It is also important to consider the context of the original Morris and Marcotte excavations when interpreting vertical patterning. While careful with their time, their 1970s methods differ from modern excavation standards, resulting in coarser resolution data. Techniques such as shoveling deposits and defining level boundaries with less precision, combined with screening limited to ¼-inch mesh, likely allowed some vertical movement of artifacts and excluded smaller debris. Limited attention to stratigraphic relationships or discrete analytical components means that fine-scale vertical patterns should be interpreted cautiously. These factors do not diminish the value of the Morris and Marcotte data; rather, they suggest that apparent peaks, clustering, or typological mixing may be somewhat “fuzzy,” with the dominance of Late Archaic artifacts representing the clearest and most reliable signal of site use.

Main Excavation Block

Row 1007

The vertical distributions of artifacts in the first row of the main excavation block are discussed here. This includes units (from left to right or west to east), 1007_989, 1007_991, 1007_992, 1007_993, and 1007_994 (Figure 80).

Unit 1007_989 produced artifacts from the surface and 0–20 cm below the surface, with the highest concentration in level two (10–20 cm) (Figure 80). A total of 57 artifacts were recovered, 64% (n = 37) of which came from level two. Furthermore, one scraper was recovered from level one, and one projectile point was recovered from level 2, within the main subsurface concentration. The distribution is unimodal, with artifacts concentrated within a narrow vertical span.

Unit 1007_991 produced artifacts from the surface and 0 – 40 cm below the surface, with the highest concentration in level two (10 – 20 cm) (Figure 80). A total of 59 artifacts was recovered, 49% (n = 29) of which came from level two. Furthermore, one projectile point was recovered from the surface, separate from the primary concentration in level two. The distribution is unimodal, with artifacts concentrated within a narrow vertical span.

Unit 1007_992 produced artifacts from the surface and 0 – 20 cm below the surface, with the highest concentration in level one (Figure 80). A total of 21 artifacts was recovered, 90% (n = 19) of which came from level one. Furthermore, one biface was recovered as part of the level one concentration. The distribution is unimodal, with artifacts concentrated within a narrow vertical span within level one.

Unit 1007_993 produced artifacts from the surface and 0 – 30 cm below the surface, with the highest concentration in level one (0–10 cm) (Figure 80). A total of 47 artifacts was recovered, 80% (n = 38) of which came from level one. Furthermore, level one contains a single projectile point and some angular debris. The distribution is unimodal, with artifacts concentrated within a narrow vertical span.

Unit 1007_994 produced artifacts from the surface to 30 cm below the surface, with the highest concentrations in levels one (0–10 cm) and two (10–20 cm) (Figure 80). A total of 77 artifacts was recovered, with 42% (n = 33) in level two and 40% (n = 31) in level one. Additionally, two projectile points were recovered from level one, possibly representing part of a broader unimodal distribution. The distribution is unimodal, showing a broad peak across the upper 20 cm of the profile.

The vertical distributions of artifacts in row 1007 of the main excavation block, moving west to east through Units 1007_989, 1007_991, 1007_992, 1007_993, and 1007_994, consistently display unimodal patterns, suggesting an occupation surface in this portion of the site (Figure 80). Units 1007_989 and 1007_991 exhibit peaks in level two (10–20 cm), while 1007_993 and 1007_994 show peaks centered in the upper levels (0–20 cm), with 1007_994 presenting a broader distribution across two levels. Furthermore, 1007_992 stands out, as it has almost all artifacts recovered from level one, indicating either limited deposition or surface exposure due to post-depositional processes. The shift in peak depth from west to east, starting deeper (10–20 cm) in the western units and becoming shallower toward the eastern edge, may reflect a gradual slope in the original occupation surface, a slight variation in sediment accumulation across the row, or coarse excavation methods.

The vertical distribution of tools within this row generally mirrors the broader artifact patterns, with most tools occurring near or at the surface, but occasionally within concentrated levels. Projectile points and other tools were most often found in level one (0–10 cm), within the subsurface peaks (e.g., level two in Units 1007_989 and 1007_991). Similarly, Unit 1007_993 contained a projectile point at level one, while the highest artifact concentration was in level one. In contrast, Unit 1007_994 shows a slightly different pattern: two projectile points were recovered from level one, aligning more closely with the unit's broad concentration across the upper 20 cm. Only in Unit 1007_992 was a biface found directly within the dominant surface-level concentration. These patterns suggest that while the overall artifact distributions are unimodal and reflect shallow deposition, tool discard may reflect some degree of post-depositional movement, especially near the surface.

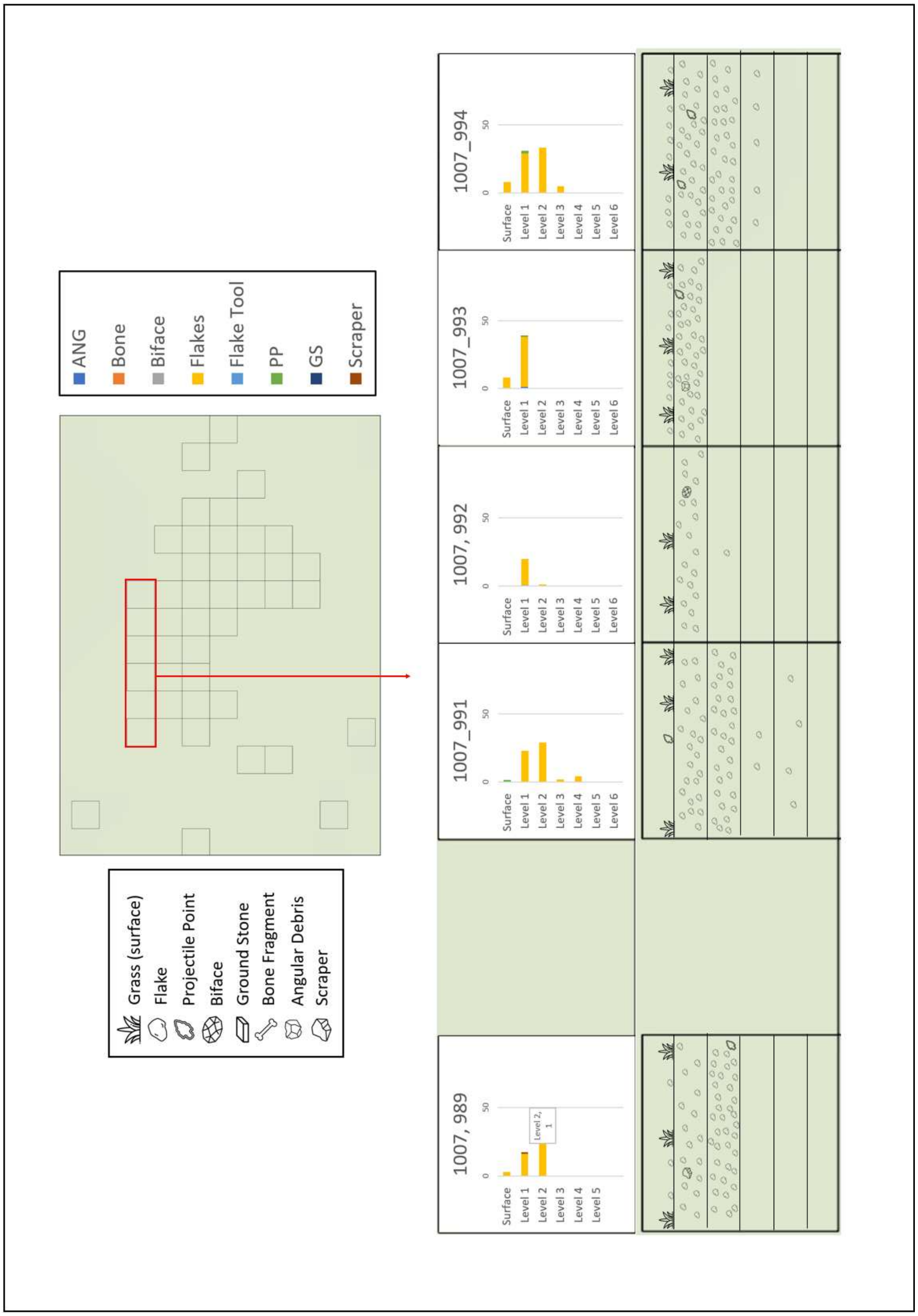

Figure 80. Vertical artifact distributions for Units 1007_989 to 1007_994 (west to east), showing consistent unimodal patterns and a slight shift in peak depth across the row. Icons used in this figure were obtained from Flaticon (www.flaticon.com).

Row 1006

The vertical distributions of artifacts in the second row of the main excavation block are discussed here. This includes units (from left to right or west to east), 1006_990, 1006_991, 1006_992, 1006_993, 1006_994, and 1006_996 (Figure 81).

1006_990 produced artifacts from 0 – 20 cm below the surface, with the highest concentrations in level one (0 – 10 cm), shortly followed by level two (10 – 20 cm) (Figure 81). A total of 17 artifacts were recovered, 53% (n = 9) deriving from level one and 47% (n = 8) recovered from level two. Additionally, one projectile point was recovered from level two, possibly representing part of a broader unimodal distribution. The distribution is unimodal, with a broad peak across the upper 20 cm.

1006_991 produced artifacts from the surface and 0 – 20 cm below the surface, with the highest concentrations in level one (0 – 10 cm) (Figure 81). A total of 57 artifacts was recovered, 77% (n = 44) of which came from level one. Additionally, level one also produced six bifaces and one scraper, while level two produced one projectile point. The distribution is unimodal, with artifacts concentrated within a narrow vertical span near the surface.

1006_992 produced artifacts from 0 – 20 cm below the surface, with the highest concentration in level one (0 – 10 cm) (Figure 81). A total of 14 artifacts was recovered, 92% (n = 13) of which came from level one. Within this concentration is the presence of two biface fragments. The distribution is unimodal, with artifacts concentrated within a narrow vertical span.

1006_993 produced artifacts from 0 - 40 cm below the surface, with the highest concentration in level one (0 –10 cm) and a secondary concentration in level three (20–30 cm) (Figure 81). A total of 68 artifacts was recovered, with 32% (n = 22) from level one and 29% (n

= 20) from level three. The distribution is bimodal, with two distinct vertical peaks (Figure 81). Notably, level one contained two projectile points, level two (10–20 cm) contained one projectile point and one bone fragment, and level three included one projectile point. The spread of artifacts across multiple levels may reflect moderate vertical mixing.

1006_994 produced artifacts from 0–30 cm below the surface, with the highest concentration occurring in level one (0–10 cm), shortly followed by level two (10–20 cm) (Figure 81). A total of 33 artifacts was recovered, with 42% (n = 14) present in level one and 36% (n = 12) in level two. Level three contains two bone fragments. With a broad peak across the upper 20 cm, this unit is unimodal.

1006_996 produced artifacts from 0 to 40 cm below the surface, with the highest concentration in level one (0–10 cm), which contained 41% of the assemblage (n = 31), including a single projectile point (Figure 81). Level two (10–20 cm) contained 25% (n = 19) and included two projectile points. Levels three and four (20–40 cm) yielded 22% (n = 17) and 10% (n = 8) of the assemblage, respectively. This distribution reflects a unimodal pattern, with a single peak in artifact density near the surface and a gradual decrease in artifact frequency with depth.

The vertical distributions of artifacts in the second row of the main excavation block (Units 1006_990 through 1006_996, west to east) are generally unimodal, with artifacts concentrated in the upper 20 cm of each unit (Figure 81). Units 1006_990, 1006_991, 1006_992, and 1006_996 all display unimodal distributions, with artifact peaks in level one (0–10 cm). Tools such as projectile points, bifaces, and a scraper appear within or just outside these upper-level concentrations, suggesting a narrow distribution of activity with minor vertical spread. Unit 1006_993 diverges from this trend, showing a bimodal pattern with peaks in levels one and three

(0–10 cm and 20–30 cm), along with projectile points scattered across multiple levels. This may indicate some post-depositional mixing. Unit 1006_994 returns to the more common unimodal pattern, with 46% of artifacts concentrated in level one and additional projectile points appearing in level two. Overall, this row reflects a general pattern of shallow deposition with moderate mixing in vertical artifact concentrations.

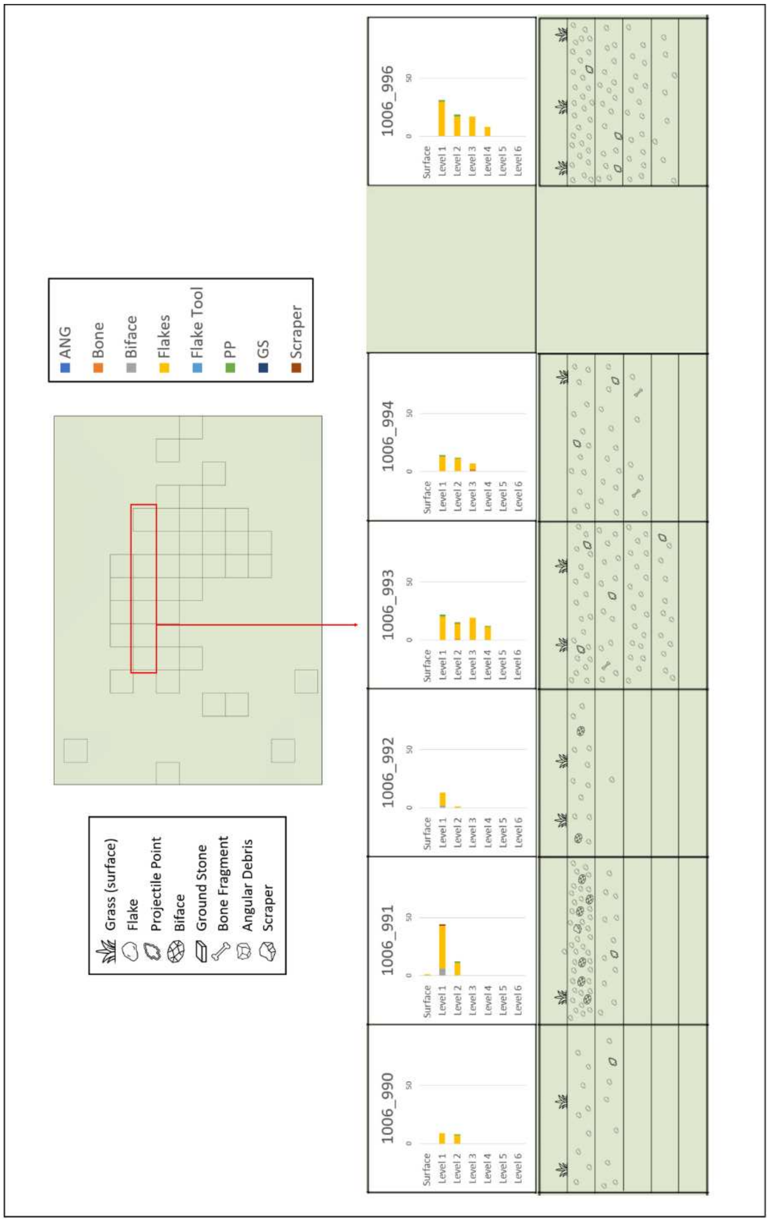

Figure 81. Vertical artifact distributions in Units 1007_989 to 1007_994 (west to east), showing unimodal patterns and shallow tool placement, often separate from main concentrations. Icons used in this figure were obtained from Flaticon (www.flaticon.com).

Row 1005

The vertical distributions of artifacts in the third row of the main excavation block are discussed here. This includes units (from left to right or west to east), 1005_985, 1005_989, 1005_991, 1005_992, 1005_993, 1005_994, 1005_995, 1005_997, and 1005_999 (Figure 82).

1005_985 produced artifacts from 0 – 30 centimeters below the surface, one in level one (0–10 cm), two in level two (10–20 cm), and two in level three (20–30 cm) (Figure 82). The distribution is diffuse and lacks a clear peak, making it difficult to assess vertical patterning.

1005_989 produced artifacts on the surface and 0 – 20 cm below the surface, with the highest concentration in level one (0 – 10) cm (Figure 82). A total of 48 artifacts were recovered, 54% (n = 26) of which came from level one. Within this concentration, there is one projectile point present. The distribution is unimodal, with artifacts concentrated within a narrow vertical span in the upper 20 cm of the profile.

1005_991 produced artifacts from the surface to 40 cm below the surface, with the highest concentrations in levels one (0–10 cm) and two (10–20 cm) (Figure 82). Of the 58 artifacts recovered, 48% (n = 28) came from level one and 43% (n = 25) from level two. Level one also contained two projectile points, while two ground stone fragments were recovered from the surface. The distribution is unimodal, with a broad peak across the upper 20 cm.

1005_992 produced artifacts from 0–40 cm below the surface, with a total of 83 artifacts recovered (Figure 82). The highest concentration occurred in level one (0–10 cm), which contained 32% (n = 27) of the unit's assemblage. Levels three and four (20–40 cm) each contained 20 artifacts, while level two (10–20 cm) had 16. The distribution is diffuse, with no clear vertical peak, suggesting moderate mixing between excavation levels. Notably, level three contained one projectile point, and level four included 14 bone fragments and one piece of angular debris.

1005_993 produced artifacts from 0 – 40 cm below the surface, with a total of 164 artifacts recovered (Figure 82). The highest concentration occurred in level three (20 – 30 cm), which contains 45% (n = 75) of the total artifacts within the unit. Three projectile points are present within level two, while in level four (30 – 40 cm), there are two projectile points. The distribution is broadly unimodal, with a strong peak in level three but significant deposition in upper levels.

1005_994 produced artifacts from 0 – 40 cm below the surface, with the highest concentrations in level Two, closely followed by level One (Figure 82). A total of 117 artifacts was recovered, with 37% (n = 44) deriving from level two, which includes one bone fragment and two projectile points. Level one contains 36% (n = 43) of the units' artifacts with four bones. Level three includes two more of the units' projectile points, while level four holds one more bone fragment. The distribution is unimodal, with a broad peak across the upper 20 cm.

1005_995 produced artifacts from 0 – 20 cm, with level one having the densest concentration (Figure 82). A total of 88 artifacts was recovered from this unit, 88% coming from level one, which includes three bone fragments and one projectile point. Level two contains a small number of flakes but has two bone fragments. The distribution is unimodal, with artifacts concentrated within a narrow vertical span in the upper 20 cm of the profile.

1005_997 produced artifacts from the surface to 30 cm below, with a total of 56 artifacts recovered (Figure 82). The highest concentration occurs in level two (10–20 cm), which accounts for 51% (n = 29) of the assemblage. Level one (0–10 cm) contains 33% (n = 19), while the surface (n = 5) and level three (20–30 cm; n = 3) together contribute less than 15%. This pattern represents a unimodal distribution, with a primary concentration of artifacts centered in level two.

1005_999 yielded artifacts from the surface to a depth of 60 centimeters, with a total of 167 artifacts recovered. This makes it both the deepest and most artifact-dense unit in the excavation. The highest concentration occurs in level one, with 54% (n = 91) of the units' artifacts. The surface contains a single ground stone fragment. Furthermore, bone is present in level two (n = 2) and level three (n = 1). The distribution is unimodal, with artifacts concentrated within a narrow vertical span within the upper 20 cm of the profile.

The vertical distributions of artifacts in the third row of the main excavation block (Units 1005_985 through 1005_999, west to east) reveal a mix of patterns, though most units exhibit unimodal distributions concentrated in the upper 10–30 cm (Figure 82). Units 1005_989, 1005_991, 1005_994, 1005_995, and 1005_999 display clear unimodal trends, with artifact peaks typically occurring in level one or two, suggesting deposition near the top of the profile. Unit 1005_991 stands out for its broad peak across levels one and two and the presence of two projectile points in level one alongside ground stone on the surface, reinforcing the interpretation of a narrow occupation surface. In contrast, Units 1005_992 and 1005_993 display deeper and more vertically extended distributions. Unit 1005_992 lacks a clear peak and contains meaningful material, including bone and a projectile point, across multiple levels, suggesting either moderate post-depositional mixing or coarse excavation methods. Unit 1005_993 shows a broadly unimodal distribution with a strong peak in level three and projectile points extending into level four, potentially indicating stacked occupations or downward movement of materials.

Unit 1005_985, with only five artifacts scattered across three levels, lacks a discernible pattern and likely reflects minimal deposition.

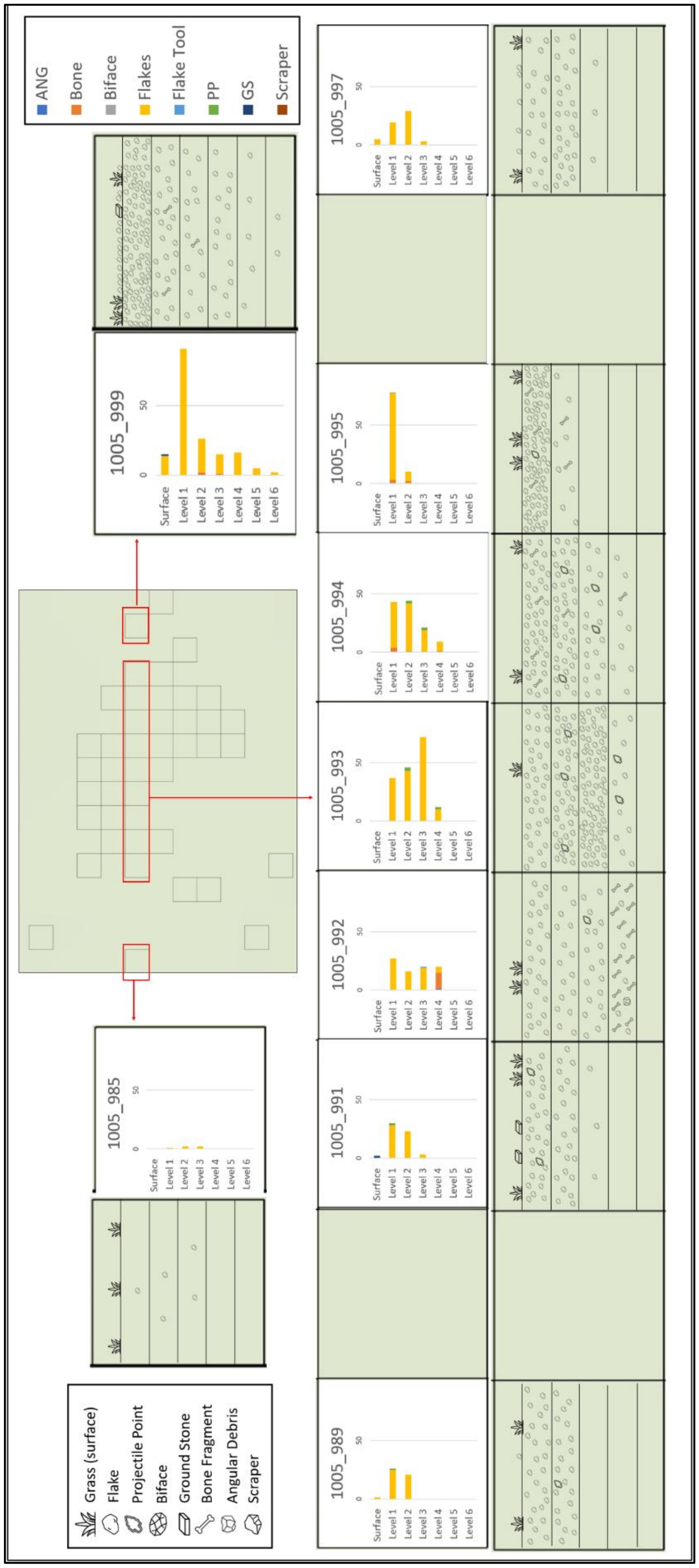

Figure 82. Vertical artifact distributions across Units 1005_985 to 1005_999 (west to east), showing mostly unimodal patterns with concentrations in the upper 20–30 cm and deeper peaks in a few units. Icons used in this figure were obtained from Flaticon (www.flaticon.com).

Row 1004

The vertical distributions of artifacts in the fourth row of the main excavation block are discussed here. This includes units (from left to right or west to east), 1004_990, 1004_993, 1004_994, 1004_995, 1004_996, 1004_997, and 1004_1000 (Figure 83).

1004_990 produced artifacts from the surface to 30 cm below the surface, with the highest concentration in level one (0–10 cm), followed closely by level two (10–20 cm) (Figure 83). Of the 19 artifacts recovered, 52% (n = 10) came from level one and 36% (n = 7) from level two. The only tool recovered was a ground stone fragment found on the surface. The distribution is unimodal, with a broad peak across the upper 20 cm.

1004_993 produced artifacts from 0–40 cm below the surface, with a total of 75 artifacts recovered (Figure 83). The highest concentration occurred in level one (0–10 cm), which contained 32% (n = 24) of the unit's assemblage, followed by level two (27%, n = 21), level three (24%, n = 18), and level four (16%, n = 13). Projectile points were recovered from both levels one and four. The distribution is diffuse, with no distinct peak.

1004_994 produced artifacts from the surface to 20 cm below the surface, with a total of 59 artifacts recovered (Figure 83). The highest concentration occurred in level two (10–20 cm), which contained 57% (n = 34) of the assemblage and one projectile point and bone fragment. Level one (0–10 cm) held 38% (n = 22) of the artifacts, including another projectile point. The distribution is unimodal, with a narrow vertical spread across the upper 20 cm.

1004_995 produced artifacts from the surface to 30 cm below the surface, with a total of 34 artifacts recovered (Figure 83). The highest concentration occurred in level two (10–20 cm), which held 52% (n = 18) of the assemblage, including two projectile points. Level one (0–10 cm) contained 38% (n = 13) of the artifacts and one additional projectile point. A single projectile point was also recovered from the surface with minimal flakes. The distribution is unimodal, with a strong peak in level two.

1004_996 produced artifacts from 0–20 cm below the surface, with a total of 30 artifacts recovered (Figure 83). The highest concentration occurred in level two (10–20 cm), which contained 83% (n = 25) of the assemblage, while level one (0–10 cm) held only 16% (n = 5). The distribution is unimodal, with artifacts tightly concentrated within a narrow vertical span within the upper 20 cm of the profile.

1004_997 produced artifacts from the surface to 50 cm below the surface, with a total of 57 artifacts recovered (Figure 83). The highest concentration occurred in level three (20–30 cm), which contained 33% (n = 19) of the assemblage. Level two (10–20 cm) held 26% (n = 15), including one projectile point, while level one (0–10 cm) contained 12% (n = 7) and also included a projectile point. Level four (30–40 cm) held 19% (n = 11), while the surface and level five (40–50 cm) contained only a few artifacts. This vertical pattern represents a diffuse distribution, with a broad zone of artifact concentration extending from ten to 40 cm below the surface.

1004_1000 produced artifacts from the surface to ten cm below the surface, with a total of 16 artifacts recovered (Figure 83). The highest concentration was in level one (0–10 cm), which contained 93% (n = 15) of the assemblage. The surface yielded a single angular debris fragment. The distribution is unimodal, with a tightly concentrated assemblage near the surface of the profile.

The fourth row of the main excavation block (moving west to east) primarily exhibits unimodal vertical distributions, with most artifact concentrations occurring in the upper 20–30 cm. Units such as 1004_990, 1004_994, 1004_995, and 1004_996 display strong or broad peaks in levels one and two, indicating a small depositional event concentrated near the surface (Figure 83). Unit 1004_1000 stands out with an extremely narrow vertical span, with nearly all artifacts found in level one, suggesting a shallow discard event. In contrast, 1004_993 and 1004_997 show more diffuse or vertically extended distributions, with material spread more evenly across levels and projectile points present at multiple depths. In 1004_997, the main peak is in level three, with smaller but meaningful concentrations above and below. This broader distribution may reflect moderate vertical movement, varying rates of sediment accumulation, or excavation practices.

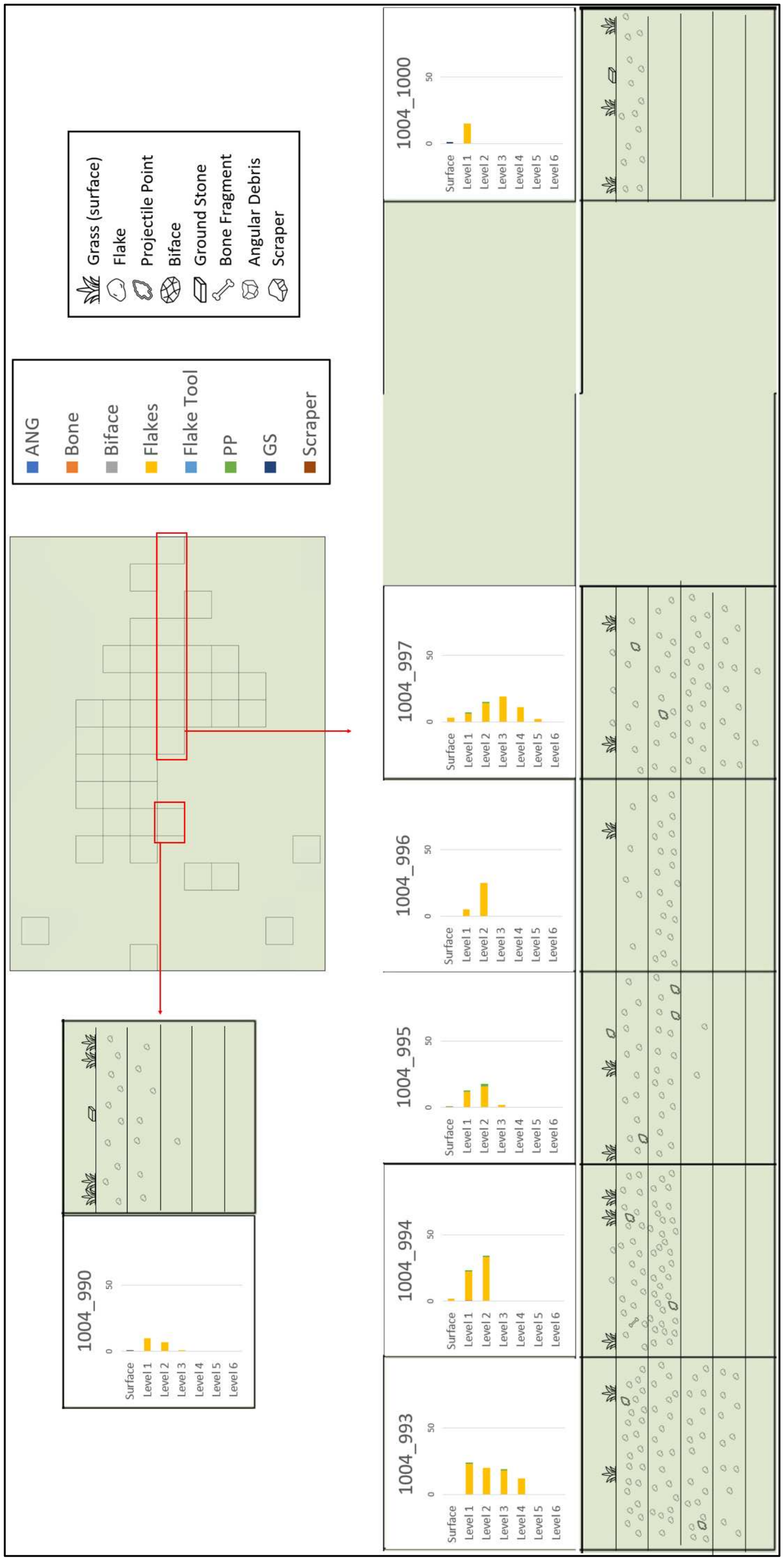

Figure 83 Vertical artifact distributions in the fourth row (Units 1004_990 to 1004_1000) of the main excavation block, showing predominantly unimodal patterns with most concentrations in the upper 20–30 cm.

Row 1003

The vertical distributions of artifacts in the fifth row of the main excavation block are discussed here. This includes units (from left to right or west to east), 1003_988, 1003_994, 1003_995, 1003_996, and 1003_998 (Figure 84).

1003_988 produced artifacts from 0–30 cm below the surface, with a total of 16 artifacts recovered (Figure 84). The highest concentration occurred in level two (10–20 cm), which held 50% (n = 8) of the assemblage. Level one (0–10 cm) contained 37% (n = 6), and level three (20–30 cm) held 31% (n = 5). The distribution is broadly unimodal, with a peak in level two and moderate artifact presence above and below.

1003_994 produced artifacts from the surface to 30 cm below the surface, with a total of 53 artifacts recovered (Figure 84). The highest concentration occurred in level one (0–10 cm), which held 45% (n = 24) of the assemblage, followed closely by level two (10–20 cm) with 39% (n = 21), including two bone fragments and one projectile point. The surface and level three (20–30 cm) each contained fewer than five artifacts. The distribution is unimodal, with a broad peak across the upper 20 cm of the profile.

1003_995 produced artifacts from the surface to 30 cm below the surface, with a total of 53 artifacts recovered (Figure 84). The highest concentration occurred in level one (0–10 cm), which held 56% (n = 30) of the assemblage, including two projectile points and one angular debris fragment. Levels two and three each contained around 20% of the artifacts (n = 10 and n = 11). The distribution is unimodal, with a strong peak near the surface of the profile.

1003_996 produced artifacts from the surface to 20 cm below the surface, with a total of 86 artifacts recovered (Figure 84). The highest concentration occurred in level two (10 – 20 cm), which contains 51% (n = 44) of the unit's assemblage, including four bone fragments. This is closely followed by level one, which contains 46% (n = 40) of the units assembled, including three bone fragments. The distribution is unimodal, with a broad peak across the upper 20 cm of the profile.

1003_998 produced artifacts from the surface to ten cm below the surface, with a total of 26 artifacts recovered (Figure 84). The highest concentration occurs in level one, with 92% (n = 24) of the units' assemblage. The surface of the unit contains two projectile points, which are less than one percent of the unit's total assemblage. The distribution is unimodal, with artifacts tightly clustered near the surface.

The vertical distributions of the fifth row of the main excavation block, spanning Units 1003, 1003_994, 1003_995, 1003_996, and 1003_998 (west to east), display consistent unimodal patterns with varying peak depths across the row (Figure 84). Units 1003_994, 1003_995, and 1003_998 show strong concentrations near the surface, with peaks in level one (0–10 cm), suggesting a shallow deposition event. In contrast, Units 1003_988 and 1003_996 exhibit peaks in level two (10–20 cm), although both show similar artifact presence above and below their peaks. This may reflect either slightly deeper depositional surfaces or some vertical movement of materials. Tool presence across these units generally aligns with the primary artifact concentrations, though Unit 1003_998 uniquely preserves two projectile points on the surface, distinct from its subsurface peak. Overall, the vertical patterning in this row suggests light use of this area of the site.

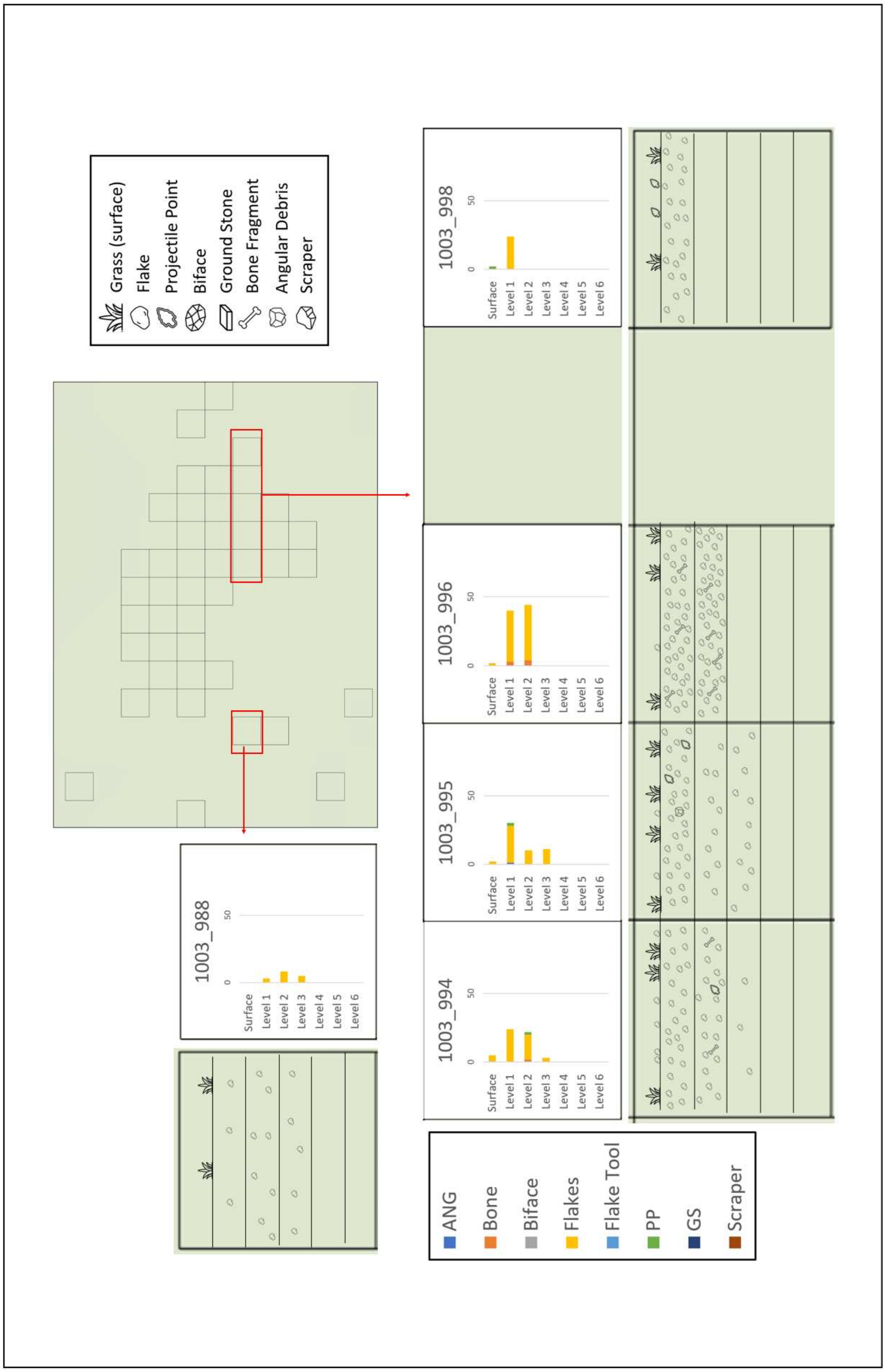

Figure 84. Vertical artifact distributions for the fifth row of the main excavation block (Units 1003_988 to 1003_998), showing consistent unimodal patterns with peaks in the upper 10–20 cm. Icons used in this figure were obtained from Flaticon (www.flaticon.com).

Row 1002

The vertical distributions of artifacts in the sixth row of the main excavation block are discussed here. This includes units (from left to right or west to east), 1002_988, 1002_994, 1002_995, and 1002_996 (Figure 85).

1002_988 produced artifacts from the surface to 30 cm below the surface, with a total of 17 artifacts recovered (Figure 85). The highest concentration occurred in level two (10–20 cm), which held 52% (n = 9) of the assemblage. Level one (0–10 cm) contained 30% (n = 6), and level three (20–30 cm) held 11% (n = 2). A single projectile point was recovered from level one. The distribution is unimodal, with a peak in level two and minor presence above and below.

1002_994 produced artifacts from 0 – 20 cm below the surface, with a total of 43 artifacts recovered (Figure 85). The highest concentration occurred in level one (0 – 10 cm), with 88% of the units' artifacts, which include two projectile points. Level two (10 – 20 cm) contains 11% (n = 5) of the unit's assemblage. The distribution is unimodal, with a peak in level one, and a small number of artifacts above and below.

1002_995 produced artifacts from 0 – 30 cm below the surface, with a total of 25 artifacts recovered (Figure 85). The highest concentration occurs in level one (0 – 10 cm), with 88% of the units' artifacts, which include four projectile points and one bone fragment. The levels below, level two and level three, each contained less than 1% of the units' assemblage (n = 2 and n = 1). The distribution is unimodal, with a strong peak near the surface.

1002_996 produced artifacts from the surface to 30 cm below the surface, with a total of 43 artifacts recovered (Figure 85). The highest concentration occurred in level one (0–10 cm), which held 67% (n = 29) of the assemblage, including one biface and one projectile point. Level two (10–20 cm) contained 18% (n = 8), while the surface and level three (20–30 cm) held fewer than five artifacts each. The distribution is unimodal, with a strong concentration near the surface and minor artifact presence in lower levels.

The vertical distributions of artifacts in the sixth row of the main excavation block, moving west to east through Units 1002_988, 1002_994, 1002_995, and 1002_997, consistently display unimodal patterns, reflecting shallow depositional events (Figure 85). Unit 1002_988 shows a peak in level two (10–20 cm), with minor presence in levels above and below, and a single projectile point on the surface, suggesting either brief modern surface use or post-depositional exposure. In contrast, 1002_994 and 1002_995 exhibit strong peaks in level one (0–10 cm), each with projectile points concentrated near the surface, pointing to activity tightly confined to the uppermost deposits. Similarly, 1002_997 has a pronounced level one peak, with two projectile points distributed between levels one and three and a small biface in the upper level, suggesting moderate vertical mixing. Overall, this row reflects a consistent pattern of artifact clustering in the upper 10–20 cm, with tool distributions generally aligning with the densest artifact concentrations.

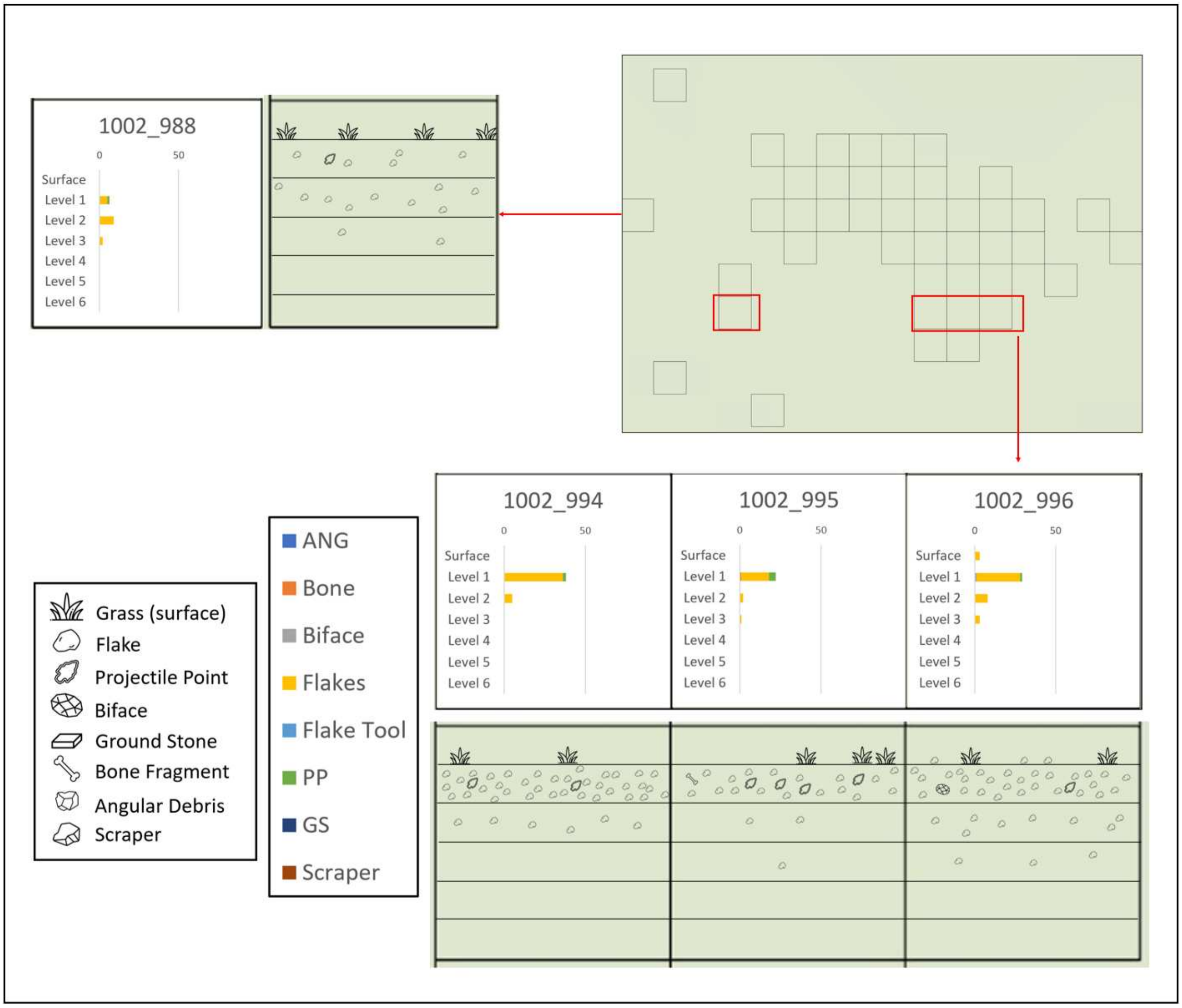

Figure 85. Vertical artifact distributions in the sixth row (Units 1002_988 to 1002_997), showing consistent unimodal patterns with peaks in the upper 10–20 cm, suggesting shallow site use. Icons used in this figure were obtained from Flaticon (www.flaticon.com).

Row 1001

The vertical distributions of artifacts in the fifth row of the main excavation block are discussed in this section. This includes units (from left to right or west to east), 1004_994 and 1001_995 (Figure 86).

1001_994 produced artifacts from 0–20 cm below the surface, with a total of 17 artifacts recovered (Figure 86). The highest concentration occurred in level one (0–10 cm), which held 52% (n = 9) of the unit's assemblage, while level two (10–20 cm) contained 47% (n = 8). The distribution is unimodal, with artifacts broadly concentrated in the upper 20 cm, suggesting a shallow depositional event.

1001_995 produced 28 artifacts from 0–20 cm below the surface. Most (57%, n = 16) were recovered from level one, which includes a single projectile point, while 42% (n = 12) came from level two (Figure 86). The distribution is unimodal, with a broad concentration across the upper 20 cm.

The vertical distributions of artifacts in the fifth row of the main excavation block, spanning units 1001_994 and 1004_995 (west to east), are both unimodal, with artifacts broadly concentrated within the upper 20 cm (Figure 86). Unit 1001_994 shows a near-even split between levels one and two, while 1004_995 has a slight peak in level one, which also contains a projectile point. These patterns suggest shallow deposition across this portion of the block, with moderate vertical dispersal.

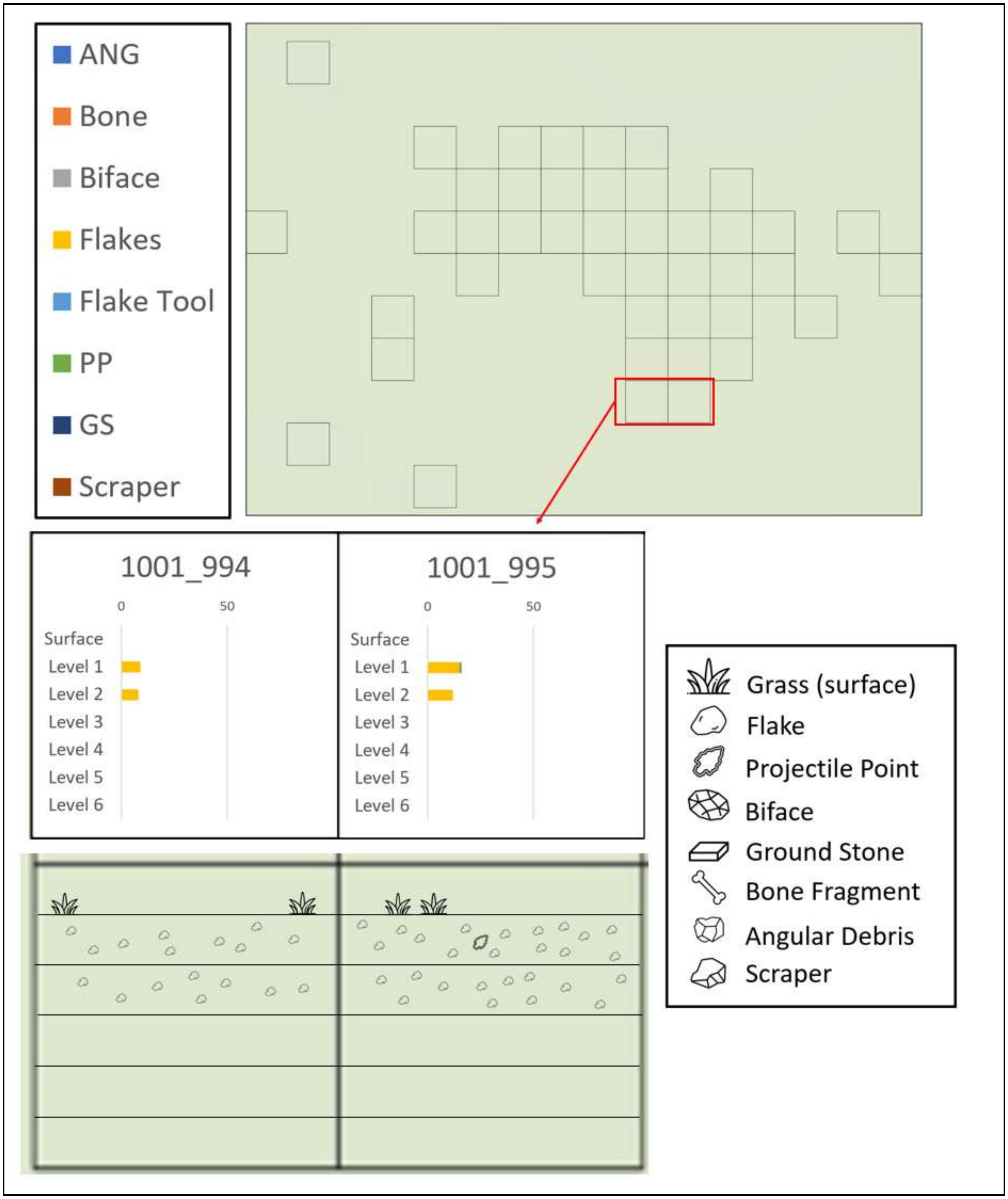

Figure 86. Vertical artifact distributions in the fifth row (1001_994 to 1004_995) show shallow, unimodal patterns concentrated within the upper 20 cm. Icons used in this figure were obtained from Flaticon (www.flaticon.com).

Row 1000

The vertical distributions of artifacts in the sixth row of the main excavation block are discussed in this section. This includes a single unit, 1000_986, which is an isolated excavation unit a few meters southwest of the main excavation block (Figure 87).

1000_986 produced ten artifacts from 0–30 cm below the surface. The highest concentration occurred in level one (0–10 cm), which held 70% (n = 7) of the unit's assemblage, which also includes a single projectile point (Figure 87). Level two (10–20 cm) contained 20% (n = 2) while level three contained 10% (n = 1). The distribution is unimodal, with artifacts concentrated near the surface, suggesting moderate vertical dispersion.

The sixth row contains a single isolated unit, 1000_986, positioned several meters southwest of the main block (Figure 87). Its artifact distribution is shallow and tightly clustered, consistent with a limited depositional event and moderate vertical mixing.

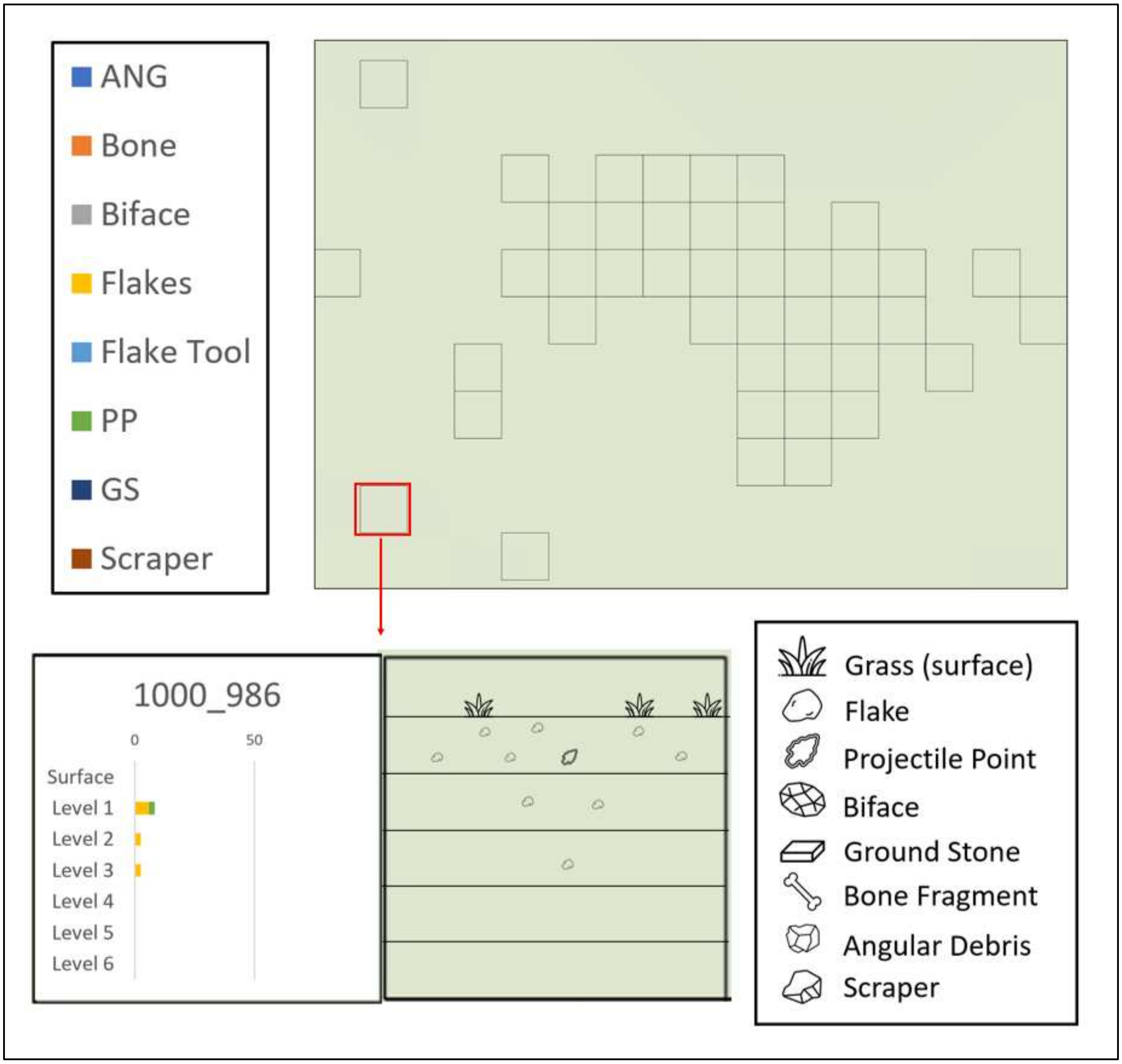

Figure 87. Vertical distribution of the sixth row of the main excavation block (1000_986) shows a shallow unimodal pattern within the upper 20 cm. Icons used in this figure were obtained from Flaticon (www.flaticon.com).

Conclusion: Vertical Patterning in the Main Excavation Block

The vertical artifact distributions across the 39 excavation units of the main excavation block reveal a consistent pattern of unimodal deposition within the upper 20 cm of the site's excavation levels (Figure 88 and Figure 89). Specifically, 16 units (41%) exhibit primary concentrations in level one (0-10 cm), while eight units (21%) show broad, continuous peaks spanning both levels one and two (0-20 cm), and another eight units (21%) have concentrated peaks exclusively in level two (10-20 cm). These distributions suggest that artifact deposition occurred during brief periods of site use.

Only one unit, 1005_993, within the block shows a peak concentration in level three (20-30 cm), suggesting that deeper, concentrated activity was less common and localized (Figure 88 and Figure 89). This unit is the second most artifact-dense in the site, with 167 total artifacts, including five projectile points, one biface, and primarily flakes, which suggests a substantial and potentially distinct episode of site use or accumulation that sets it apart from the predominantly shallower deposits. Additionally, just one unit (1006_993), located in the northern center of the block, shows slight variation across levels but no distinct peaks, suggesting possible vertical mixing rather than a true bimodal pattern. In contrast, four units exhibit diffuse vertical spreads without a clear peak, suggesting either moderate post-depositional mixing, disturbance, or coarse excavation practices.

Unit 1005_993 is centrally located within the main excavation block, forming a focal point in the vertical patterning. Notably, it is bordered to the north by several diffuse units that lie immediately to its west and south (Figure 88 and Figure 89). This spatial arrangement suggests a localized cluster of varied depositional and post-depositional processes within this central zone, reflecting excavation practices or natural disturbances affecting artifact vertical distribution. Within the main excavation block, there is a notable cluster of five adjacent units (surrounding 1002_995) that all display artifact concentrations primarily in level one (0–10 cm). Surrounding these units are broader distributions spanning levels one and two (0–20 cm), suggesting a focused area of intense activity or discard near the surface within a more diffuse depositional context. Immediately to the north, three consecutive units exhibit artifact peaks in level two (10–20 cm).

The dominance of unimodal patterns across the excavation block, along with the shallow depth of artifact concentrations, suggests that artifacts roughly retained their vertical relationships, even if the deposits have been subject to some disturbance. The presence of surface-level concentrations in a small number of units further supports the potential for localized artifact displacement near the site's upper 20 cm. The widespread presence of tools and diagnostic artifacts within or just above these concentrations reinforces the notion of a short-duration occupation, likely reflecting brief activities in this space. This will be further explored in the following chapter.

This vertical analysis builds on the horizontal spatial patterns established in the previous chapter, which identified the main excavation block as the densest and most artifact-rich area at Porcupine Peak. The block contains the majority of artifact types, including bifaces, bone fragments, groundstone tools, projectile points, and flakes, showing its significance as a focal area of site activity. The vertical data show that while high-density artifact clusters are spatially localized, they exhibit moderate vertical movement within excavation levels.

This pattern enhances confidence in the integrity and interpretive value of these deposits by indicating moderate vertical mixing and a stretched occupation surface. The horizontal and vertical analyses suggest a site with decent spatial and temporal resolution, offering critical insight into Late Archaic land use and site formation processes at high elevation. This pattern supports the integrity and interpretive value of the deposits by showing moderate vertical mixing and a stretched occupation surface.

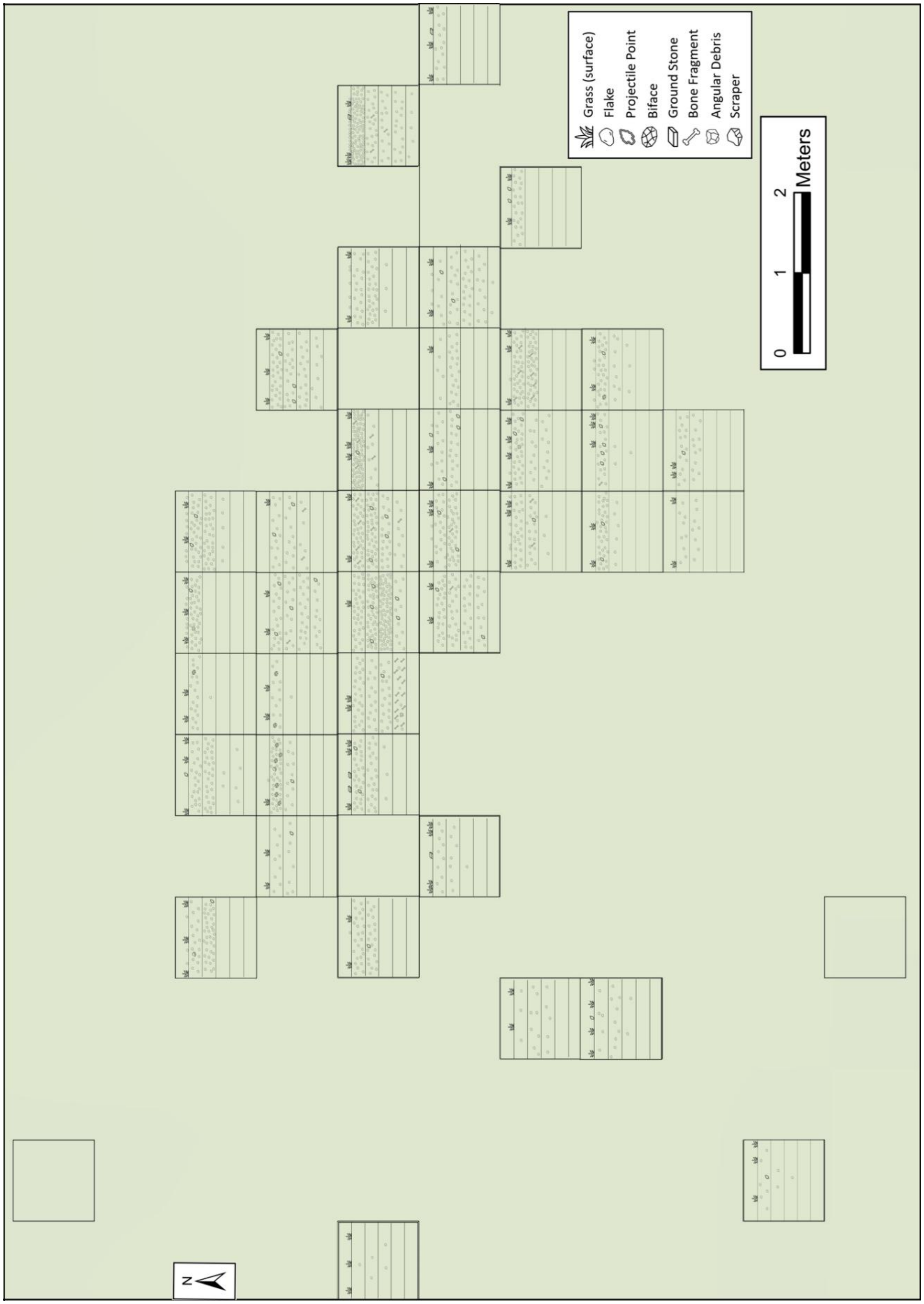

Figure 88. Vertical artifact distributions in the Main Excavation Block show mostly unimodal peaks within the upper 20 cm, with one deeper, dense concentration at 20–30 cm. Clusters of units indicate focused activity areas, while limited bimodal and diffuse patterns suggest moderate disturbance. Overall, the data reflect well-preserved, intact occupation surfaces. Icons used in this figure were obtained from Flaticon (www.flaticon.com).

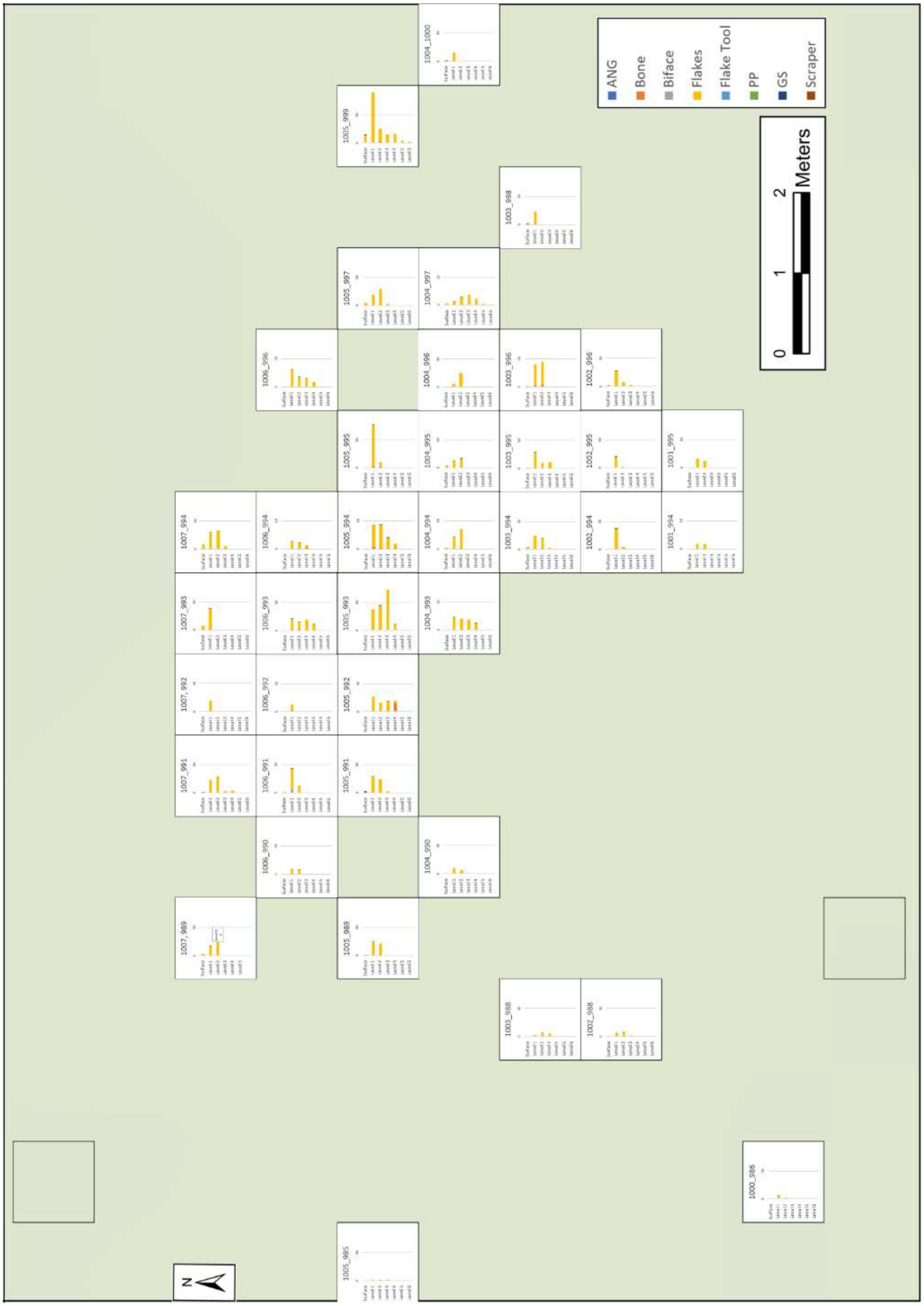

Figure 89. Vertical artifact distributions in the Main Excavation Block show mostly unimodal peaks within the upper 20 cm, with one deeper, dense concentration at 20–30 cm. Clusters of units indicate focused activity areas, while limited bimodal and diffuse patterns suggest moderate disturbance. Overall, the data reflect well-preserved, intact occupation surfaces.

Northeastern Excavation Block

Row 1019

The vertical distributions of artifacts in the first row of the Northeastern Excavation block are discussed in this section. This includes a single unit, 1019_1039 (Figure 90).

1019_1039 produced artifacts from 0–50 cm below the surface, with a total of 106 artifacts recovered (Figure 90). The vast majority of the assemblage (78%; n = 83) was concentrated in level four (30–40 cm). Levels one to three contained ten or fewer artifacts each (n = 1, 8, and 10), with a single projectile point recovered from each. Level five (40–50 cm) had only four artifacts. This strongly skewed distribution represents a pronounced unimodal pattern, centered at 30–40 cm.

Row 1018

The vertical distributions of artifacts in the first row of the Northeastern Excavation block are discussed in this section. This includes a single unit,1018_1039, and 1018_1040 (Figure 90).

1018_1039 produced 23 artifacts from 0–30 cm below the surface. The majority (69%; n = 16) was concentrated in level two (10–20 cm), which also yielded two projectile points and a biface fragment. Level one (0–10 cm) contained less than 10% (n = 2), while level three (20–30 cm) held 22% (n = 5), including one projectile point. This pattern reflects a unimodal distribution centered at 10–20 cm.

1018_1040 produced artifacts from 0 – 20 cm below the surface, with a total of 34 artifacts recovered (Figure 90). The highest concentration occurs in level one with 64% (n = 22) of the unit’s assemblage, which also includes a single projectile point. Level three holds 35% (n = 12) of the unit's artifacts. This pattern reflects a unimodal distribution within 0 – 10 cm.

Row 1017

The vertical distributions of artifacts in the first row of the Northeastern Excavation block are discussed in this section. This includes a single unit,1017_1039, 1017_1040, and 1017_1041 (Figure 90).

1017_1039 produced 112 artifacts from 0–20 cm below the surface. The vast majority (81%; n = 91) were recovered from level one (0–10 cm), while level two (10–20 cm) contained only 18% (n = 21) (Figure 90). This pattern indicates a strongly unimodal vertical distribution, with a dense concentration of artifacts near the surface.

1017_1040 produced artifacts from 0 – 20 cm below the surface, with a total of 34 artifacts recovered (Figure 90). The highest concentration occurs in level One with 58% (n = 20) of artifacts from the unit. Level two (10 – 20 cm) holds 41% (n = 14) of the unit's assemblage. This represents a broad, unimodal distribution with a slight concentration of artifacts near the surface.

1017_1041 produced artifacts from 0 – 20 cm below the surface, with a total of 24 artifacts recovered (Figure 90). The highest concentration occurs in level two (10 – 20 cm), with 54% (n = 13) of the units assemblage, which includes some fire-cracked rock. This is closely followed by level one (0 – ten cm), with 45% (n = 11) of the units' assemblage with a single projectile point present. The distribution is broad and nearly even, with a slight concentration of artifacts in the lower level.

Across the northeastern excavation block, the vertical distributions of artifacts in Rows 1019 through 1017 are predominantly unimodal, with artifact concentrations typically confined to a single excavation level in each unit. The deepest and most distinct peak appears in Unit 1019_1039, where 78% of the assemblage was recovered from level four (30–40 cm), making it one of the deepest concentrations recorded across the site (Figure 90). In contrast, units in Rows 1018 and 1017 show artifact peaks at much shallower depths, generally within the upper 20 cm. Most units exhibit peak concentrations in either level one (0–10 cm) or level two (10–20 cm), with some showing relatively broad but still unimodal distributions (e.g., 1017_1040 and 1017_1041).

This shift in artifact depth from deeply buried deposits in Row 1019 to shallow surface-level deposits in Rows 1018 and 1017 may reflect differences in local sedimentation rates, microtopography, or temporal variability in occupation. The consistent unimodal patterns across units suggest that artifact deposition occurred within discrete areas, though the duration or frequency of occupation episodes cannot be determined from these data alone. Notably, tools such as projectile points and biface fragments are distributed within or adjacent to the main artifact peaks, reinforcing the interpretation that these represent primary activity surfaces. Overall, these patterns support the interpretation of the northeastern block as an area of short-term, focused activity with moderate depositional integrity, though varying slightly in depth from west to east.

Conclusion: Vertical Patterning in the Northeastern Excavation Block

The vertical artifact distributions across the Northeastern Excavation Block (Rows 1019–1017) predominantly exhibit unimodal patterns, with artifact concentrations generally confined to single excavation levels within each unit. Unit 1019_1039 stands out with a deep, distinct concentration in level four (30–40 cm), accounting for 78% of its assemblage and representing one of the deepest deposits across the site (Figure 90). By contrast, units in Rows 1018 and 1017 have shallower peaks, mainly within the upper 20 cm, often concentrated in level one (0–10 cm) or level two (10–20 cm). Some units display broader but still unimodal distributions, indicating slightly more vertical spread.

This gradual shift from deeper deposits in Row 1019 to near-surface concentrations in Rows 1018 and 1017 may be attributed to excavation practices, localized sedimentation differences, or microtopographic variation. The unimodal dominance of artifact vertical distributions suggests limited use of these areas, with evidence of post-depositional disturbance. Importantly, diagnostic artifacts such as projectile points and biface fragments are found within or closely adjacent to peak artifact levels, supporting the interpretation that these assemblages reflect a stretched occupation surface. This will be further assessed in the following chapter.

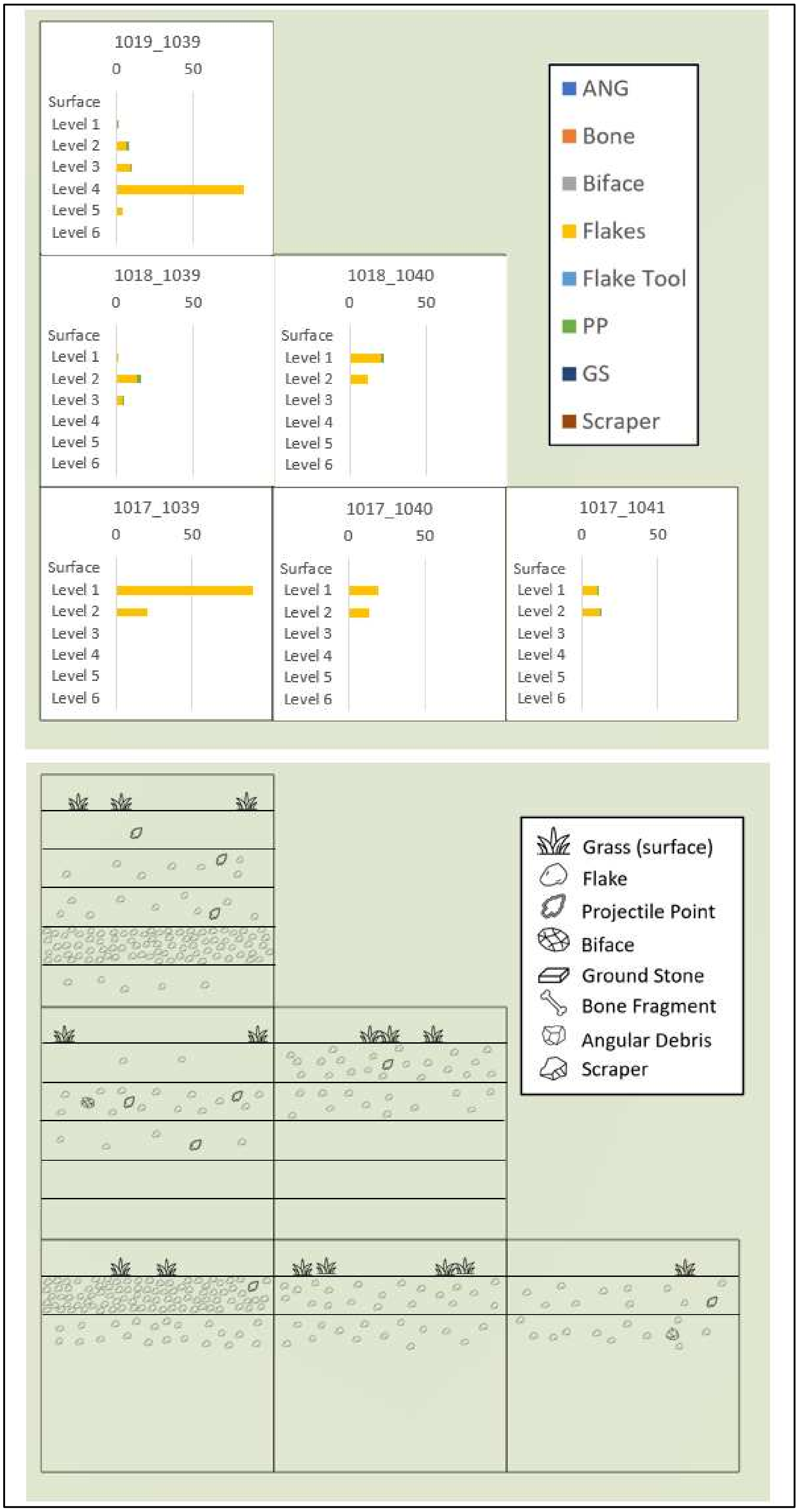

Figure 90. Vertical artifact distributions in the Northeastern Excavation Block, showing predominantly unimodal patterns with varying peak depths. Icons used in this figure were obtained from Flaticon (www.flaticon.com).

Southern Isolate

The vertical distributions of artifacts in the first row of the Northeastern Excavation block are discussed in this section (Figure 91). This includes a single unit, 983_994. While this unit is included here for documentation purposes, its sparse artifact assemblage precludes further analytical comparison with the main and northeastern excavation blocks. Accordingly, it will not be examined in detail in the following chapters.

983_994 produced only three artifacts from 0–20 cm below the surface: two in level one (0–10 cm) and one in level two (10–20 cm). Due to the low artifact count, no meaningful interpretation of vertical distribution can be made; however, this unit will be further analyzed in the following chapter due to the presence of a single projectile point.

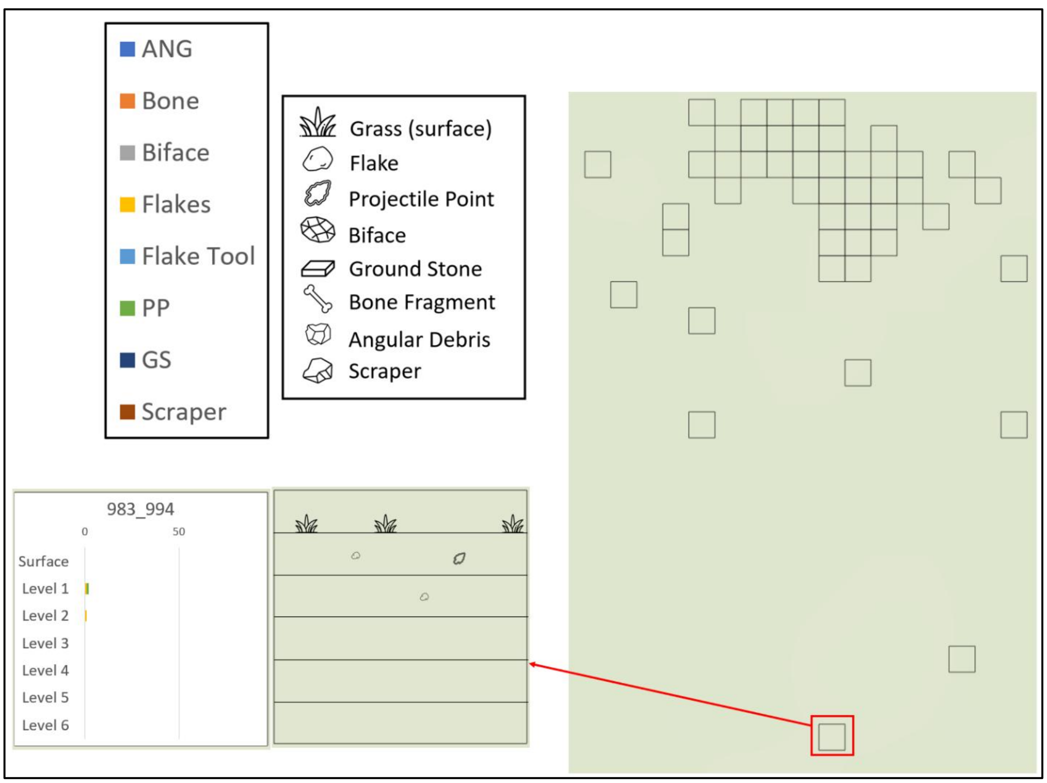

Figure 91. Vertical distribution of artifacts in unit [unit number]. Although this unit yielded only three artifacts, it is included for further analysis in a later chapter due to the presence of a projectile point. The artifacts recovered are consistent in depth with those found in other units across the site, contributing to broader pattern recognition. Icons used in this figure were obtained from Flaticon (www.flaticon.com).

Flake Size by Depth

To evaluate the vertical integrity of the deposits at Porcupine Peak, scatterplots of flake length by excavation level were generated for both the main and northeastern excavation blocks. Flake length serves as an effective indicator of post-depositional stability because larger, heavier artifacts often migrate downward in disturbed or compacted deposits. If such movement had occurred, larger flakes would be expected to cluster toward the lower levels. If consistent flake sizes across levels would suggest that vertical displacement has been minimal. By comparing flake size distributions by depth, these plots help assess the degree of vertical mixing and provide indirect evidence of the preservation of potential activity surfaces within the excavation blocks.

A scatterplot of flake length by depth from the main excavation block reveals a consistent pattern in artifact distribution and moderate site integrity (Figure 92). Depth is divided into six levels, each representing a ten cm increment, with level one starting at ten cm and level six reaching 60 cm. As discussed in Chapter VI, most artifacts are concentrated in levels one and two. These levels also display the greatest range and density of flakes, with most measurements falling between approximately five mm and 20 mm. The largest flake in the assemblage, measuring 54.5 mm, was recovered from level Two. The surface scatter (above level one) exhibits a narrower size range, primarily between five mm and 20 mm, with only one flake exceeding this at 27.7 mm. Lower levels (levels five and six) contain relatively few flakes, ranging from 4.5 mm to 16.1 mm. Importantly, large flakes are not concentrated near the base of the deposit, suggesting that heavier artifacts have not migrated downward through post-depositional processes. Instead, the overall distribution of flake sizes remains relatively consistent across levels, supporting the interpretation that there is moderate vertical movement.

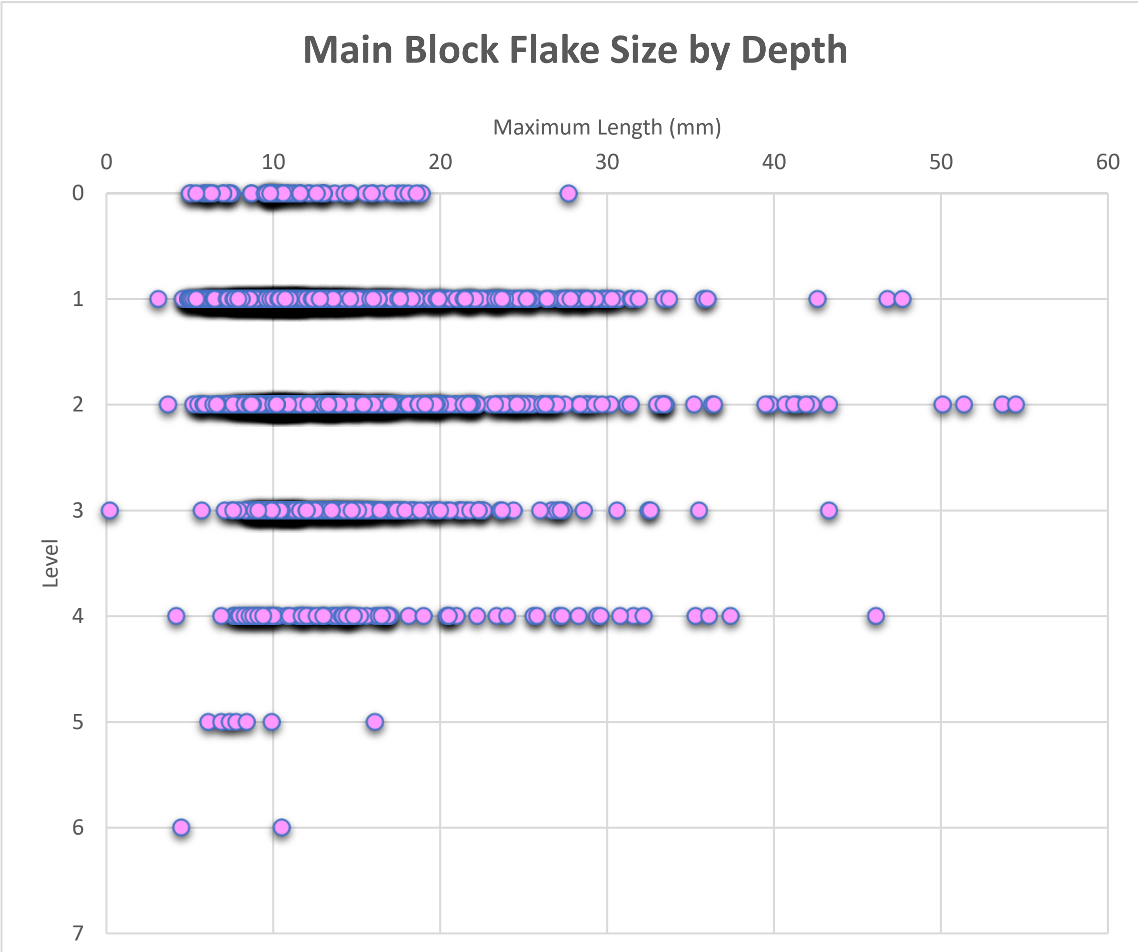

Figure 92. Flake length by depth in the Main Block. Most flakes fall between 5–20 mm and cluster in Levels one and two. The largest flake (54.5 mm) appears in Level 2; the smallest (0.2 mm) in Level three. Size variation across levels suggests minimal vertical sorting.

A corresponding scatterplot for the northeastern block shows average flake length by depth, in ten cm increments (Figure 93). Most flakes fall between 6.5 mm and 26.8 mm. The smallest outlier (0.2 mm) occurs in level two, while the largest (36.5 mm) appears in level one. As noted previously, unit 1019_1039 contributes a dense cluster in level four, dominated by flakes between 9.8 mm and 21.1 mm. This concentration represents a notable deviation from the broader pattern observed in both the northeastern and main excavation blocks, where artifact densities primarily occur in levels one and two. Levels one and two show a broader size range

(6.5–26.8 mm), while level five includes four flakes ranging from 20.6 mm to 35.8 mm. Level three contains fewer than 20 flakes, spanning a wide range (8.3–32.4 mm) but lacking any clear concentration. Overall, the general consistency in flake sizes across most levels suggests moderate post-depositional movement within the northeastern block.

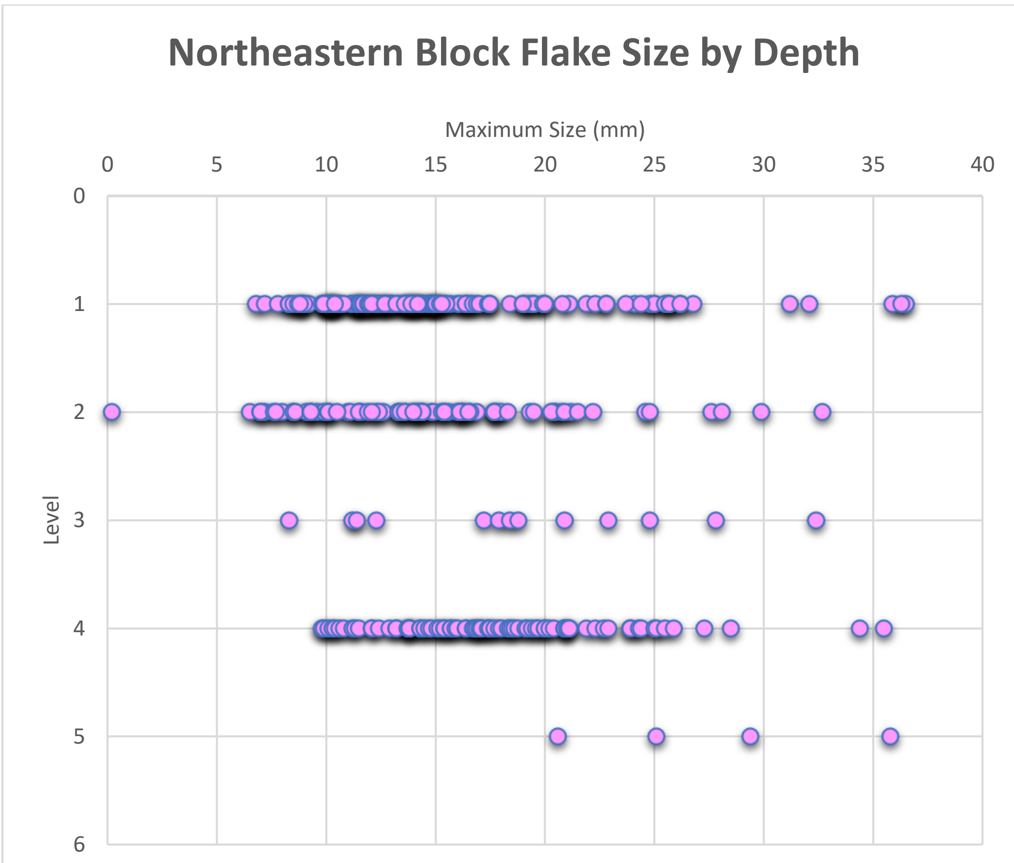

Figure 93. Scatterplot of average flake length by depth (cm) for the northeastern excavation block. Flake sizes range from 0.2 mm (smallest) in level two to 36.5 mm (largest) in level one.

Conclusion: Combined Vertical Analysis of the Main and Northeastern Excavation Blocks

Despite being separated by roughly 39 meters east and 14 meters north, the Main and Northeastern Excavation Blocks exhibit consistent vertical artifact patterns. In both blocks, most excavation units display unimodal vertical distributions, with artifact concentrations typically constrained to a single ten cm excavation level, most often within the upper 20 cm of the deposit.

These patterns suggest moderate vertical mixing and indicate that vertical artifact distributions were stretched across the upper 20 cm of the profile.

In the Main Excavation Block, 16 units (41%) have peak concentrations in level one (0-10cm), while eight units (21%) exhibit broad peaks across levels one and two (0-20 cm), and another eight units (21%) show concentrations solely in level two (10-20 cm) (Figure 94). Only one unit (1005_993) contains a substantial concentration in level three (20-30 cm), making it both vertically distinct and the second most artifact-dense unit at the site. A single bimodal unit (1006_993) and four diffuse units suggest moderate localized variation or disturbance, but overall, the block shows a consistent unimodal pattern within the excavation units.

In the Northeastern Block, six units spanning Rows 1019 through 1017 follow a similar pattern. The deepest artifact concentration across the site occurs in the northernmost unit (1019_1039), with 78% of its assemblage concentrated in level four (30–40 cm) (Figure 94). Southward from this point, artifact peaks become progressively shallower: one-unit centers in level two (10–20 cm), three in level one (0–10 cm), and one displays a broad distribution across levels one and two (0–20 cm). This gradation suggests localized variation in sediment accumulation or coarse excavation strategies.

These patterns are further supported when examining the total artifact counts across individual levels from surface through level six. Surface distributions are relatively sparse, with only the Main Block containing artifacts (21 units with one to 18 artifacts, and just one unit exceeding 19), and no surface artifacts recorded in the Northeastern Block (Figure 95). Level one exhibits the most widespread artifact presence, with all 46 units across both blocks showing some material (Figure 96). The densest concentrations, exceeding 76 artifacts, are in the Main Block (two units) and a single Northeastern unit (1019_1039). Level two contains fewer artifacts overall, with three moderately dense units (38–56 artifacts), all in the Main Block, and several units in the same area showing no artifact presence (Figure 97). At level three, a dense central cluster emerges within the Main Block, including one unit with 57–75 artifacts, surrounded by units with 19–37. Twenty units in the Main Block and four in the Northeastern Block are sterile at this depth (Figure 98). Level four shows fewer artifacts overall, but the dense cluster seen in level three continues with less intensity (Figure 99). One unit in the Northeastern Block stands out with an unusually high concentration (over 76 artifacts), while the rest of the block has little to no material at this depth. Deeper levels contain little material: level five includes only three units with one to five artifacts (two in the Main Block and one in the same Northeastern unit with the earlier level four peak), and level six shows artifact presence in just a single Main Block unit (one to two flakes) (Figure 100 and Figure 101). These level-by-level patterns reinforce earlier interpretations: artifact distributions are vertically narrow and concentrated in the upper 20 cm of the excavation, with few deeper deposits and moderate evidence of downward disturbance.

One pattern that stands out is a localized cluster of deeper and more vertically diffuse artifact distributions that occurs around Unit 1005_993 in the Main Excavation Block (Figure 102). This unit, which contains the second-highest artifact total on-site (n = 167), exhibits a strong peak in level three (20–30 cm) but includes significant material across levels one through four. Three projectile points were recovered from level three, and two more from level four, showing their distribution across multiple excavation levels.. It is surrounded by units that also show broader vertical spreads and deeper artifact presence: 1005_992 to the west has a diffuse profile with no clear peak and notable bone and lithic material in levels three and 4; 1005_994 to the east has a broad unimodal peak across the upper 20 cm, with projectile points and bones extending into level three and 4; and 1004_993 to the south shows an even vertical spread with artifact counts ranging from levels one to four, including projectile points at multiple depths. The one bimodal unit at the site (1006_993) lies directly to the north and exhibits distinct peaks in levels one and two. These units form a spatial cluster where artifact distributions extend deeper and are more complex, contrasting with the narrower, unimodal patterns seen elsewhere.

Interpreting artifact distributions relative to topography is somewhat limited due to the loss of the original site datum, which prevents precise elevation assignments for individual excavation units. Macrostrat (a publicly available geologic database) data indicates that the site area is generally flat, with modest elevation changes: 2,946 to 2,943 meters over a 0.11 km north–south transect (road to river) and 2,942 to 2,946 meters over 0.09 km east–west. During a site visit, I observed that the area is large and predominantly flat, rising gently toward the north. The ground was largely covered in lodgepole pine duff, with scattered rose shrubs and some exposed tree roots. Surface-level artifacts were visible in many areas, particularly where erosion had disturbed the duff layer. The southern edge of the site shows evidence of riverbank erosion, which may have affected artifact distributions near the river. While the site lacks pronounced microtopographic features, subtle slopes and local disturbances, such as tree roots and surface erosion, could have influenced artifact burial and preservation at a fine scale.

Across both the Main Excavation Block and the Northeastern Excavation Block, the vertical artifact distributions exhibit several consistent patterns. In both blocks, unimodal distributions are most common, with artifact concentrations typically confined to a single excavation level. The majority of units in each block show peaks within the upper 20 centimeters of the sediment profile. In the Main Block, 16 units peak in level one (0–10 cm), eight peak in level two (10–20 cm), and another eight display broad but still unimodal peaks spanning levels one and two (0–20 cm). Similarly, five of the six units in the Northeastern Block have concentrations centered within the upper 20 cm, primarily in level one or level two. Each block contains a single unit with a deeper artifact peak: Unit 1005_993 in the Main Block shows a concentration in level three (20–30 cm), while Unit 1019_1039 in the Northeastern Block has the deepest recorded concentration at the site, in level four (30–40 cm). Across both blocks, artifact distributions tend to be vertically narrow, often limited to one or two adjacent levels. Diagnostic artifacts such as projectile points and bifaces are consistently found within or adjacent to these peak concentrations in both areas. These shared characteristics indicate strong similarities in vertical patterning across the two excavation blocks.

This vertical analysis builds directly on the horizontal spatial patterns established earlier, which identified the Main Excavation Block as the densest and most artifact-rich area at Porcupine Peak. The consistency between horizontal and vertical patterns reinforces observations of concentrated artifact clusters within the top 20 cm of the excavation units. The following chapter builds on these patterns by analyzing artifact attributes, including flake size, cortex, burning, and tool distributions, to further investigate potential occupation surfaces and examine the behaviors, activities, and intensity of use represented across the site.

To further refine interpretations of occupation surfaces and assess site integrity, scatterplots of flake length by stratigraphic level were generated for both the Main and Northeastern Excavation Blocks. These visualizations enable a detailed examination of vertical artifact patterning within the site's densest areas, providing insights into artifact size distribution and potential vertical disturbance.

A scatterplot of flake length by depth from the Main Excavation Block reveals meaningful patterns in artifact distribution and site integrity. Depth is divided into six levels, each representing a ten cm increment, with level one starting at ten cm and level six reaching 60 cm. As discussed in Chapter VI, most artifacts are concentrated in levels one and two. These levels show the greatest range and density of flakes, predominantly measuring between approximately five mm and 20 mm. The largest flake in the assemblage (54.5 mm) was recovered from level Two. The surface scatter (above level one) exhibits a narrower size range, mostly 5–20 mm, with only one flake exceeding this at 27.7 mm. Lower levels (levels five and six) contain fewer flakes overall, ranging from 4.5 mm to 16.1 mm. Importantly, large flakes are not concentrated at the base of the deposit, indicating that heavier artifacts have not migrated downward through post-depositional processes. Instead, flake size distribution remains relatively consistent across levels, supporting interpretations of moderate mixing of excavation levels.

The scatterplot for the Northeastern Excavation Block similarly demonstrates average flake length by depth. Most flakes fall between 6.5 and 26.8 mm, with the smallest outlier (0.2 mm) found in level two and the largest (36.5 mm) in level one. As noted earlier, Unit 1019_1039 contributes a dense cluster of flakes concentrated in level four, predominantly between 9.8 mm and 21.1 mm. This cluster represents a deviation from the broader pattern observed elsewhere in both blocks, where artifact concentrations are primarily constrained to levels one and two. This outlier may reflect localized variation in deposition or moderate vertical mixing. Other levels in the Northeastern Block show broader size ranges, with level one and two flakes spanning 6.5–26.8 mm, level three containing fewer flakes but with a wide size range (8.3–32.4 mm), and level five featuring four flakes between 20.6 and 35.8 mm without a distinct cluster.

These scatterplots show that artifact deposition at Porcupine Peak reinforces the interpretation that the site's arbitrary levels have remained roughly intact. The unique cluster in Unit 1019_1039 shows localized variation in depth and depositional history, emphasizing that while the overall vertical patterning is unimodal and well-defined.

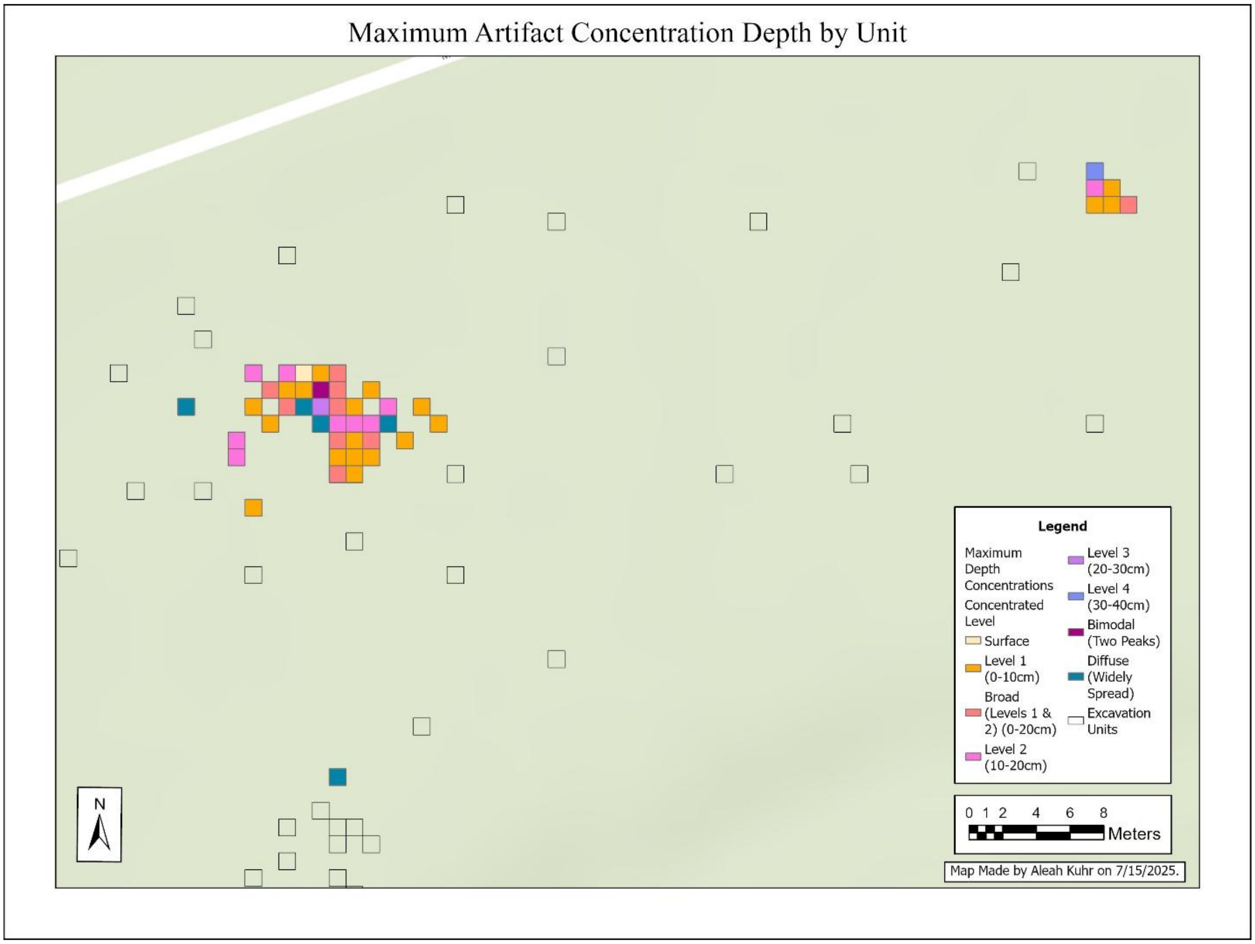

Figure 94. Both the Main and Northeastern Excavation Blocks exhibit predominantly unimodal vertical artifact distributions, with most concentrations confined to a single stratigraphic level within the upper 20 cm. Diagnostic artifacts occur consistently within these peak zones, indicating similar depositional and use patterns across both blocks. Only units within the designated focus areas (Main and Northeastern Excavation Blocks) retained for analysis are depicted; all other units were excluded from further consideration in Chapter V.

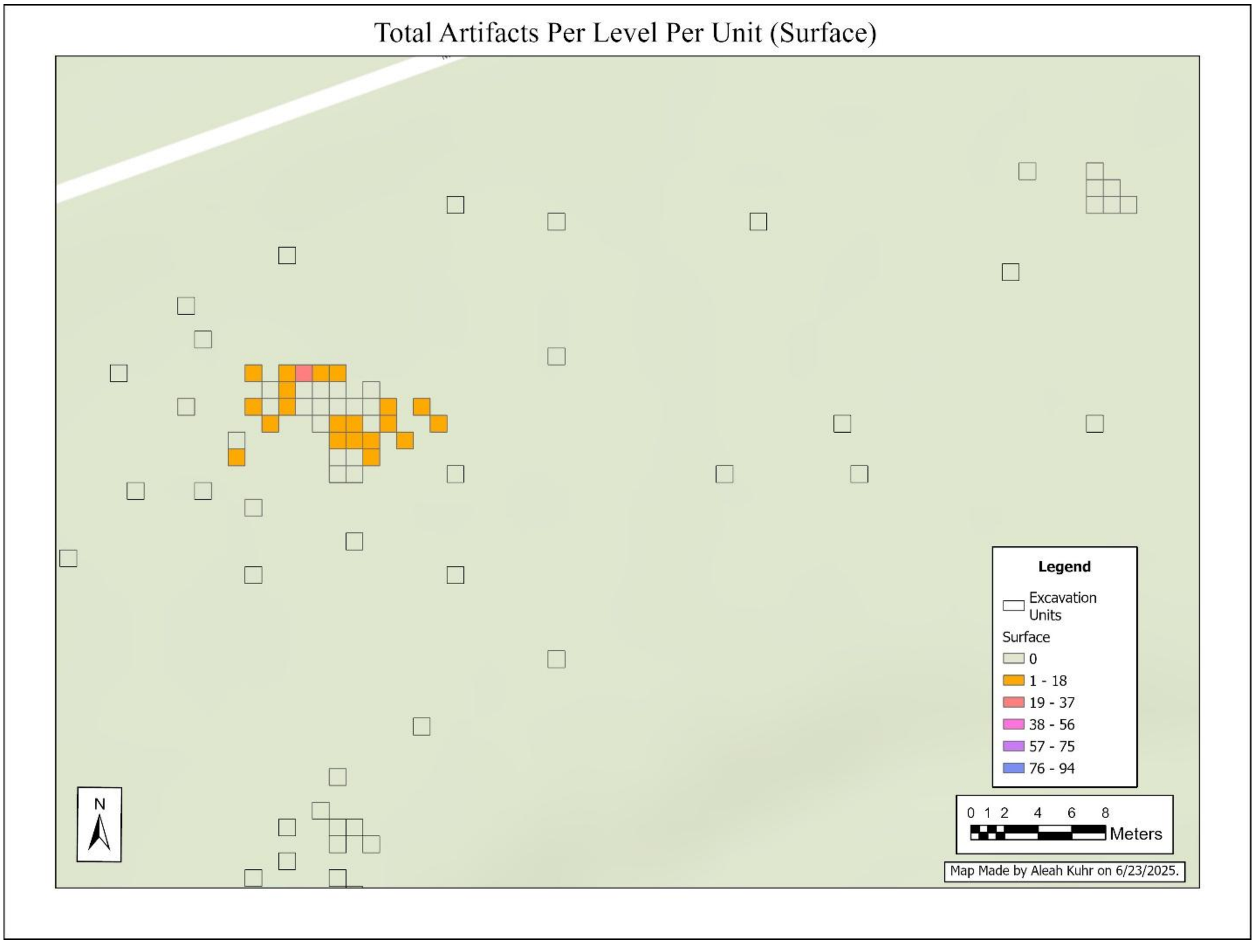

Figure 95. Artifact counts by unit on the surface. Surface artifacts are sparse, with low counts across 21 units in the Main Block and no presence in the Northeastern Block. Only units within the designated focus areas (Main and Northeastern Excavation Blocks) retained for analysis are depicted; all other units were excluded from further consideration in Chapter V

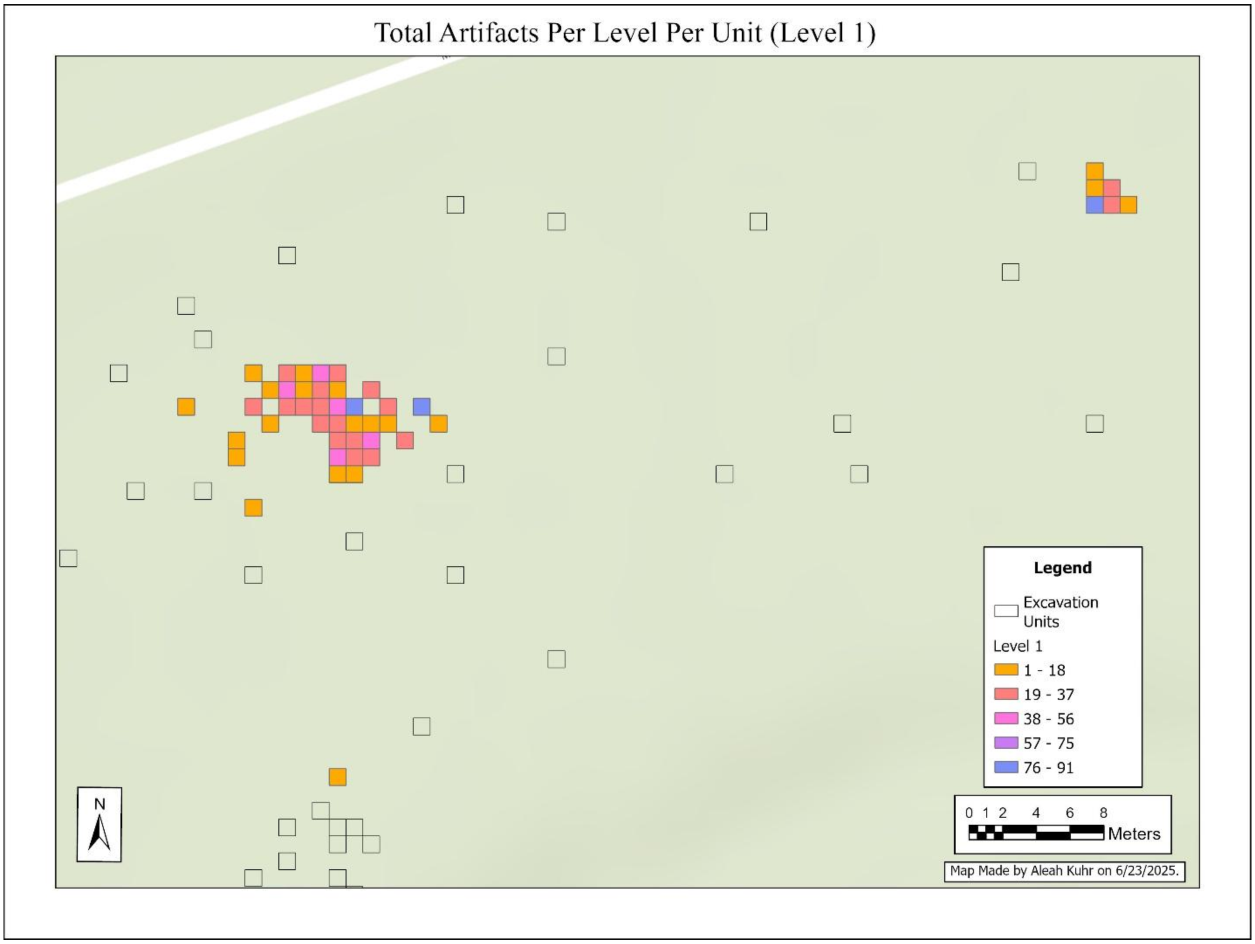

Figure 96. Artifact counts by unit in level one (0–10 cm). All units contain artifacts; the Main Block shows the highest densities, with two units exceeding 76 artifacts. Only units within the designated focus areas (Main and Northeastern Excavation Blocks) retained for analysis are depicted; all other units were excluded from further consideration in Chapter V

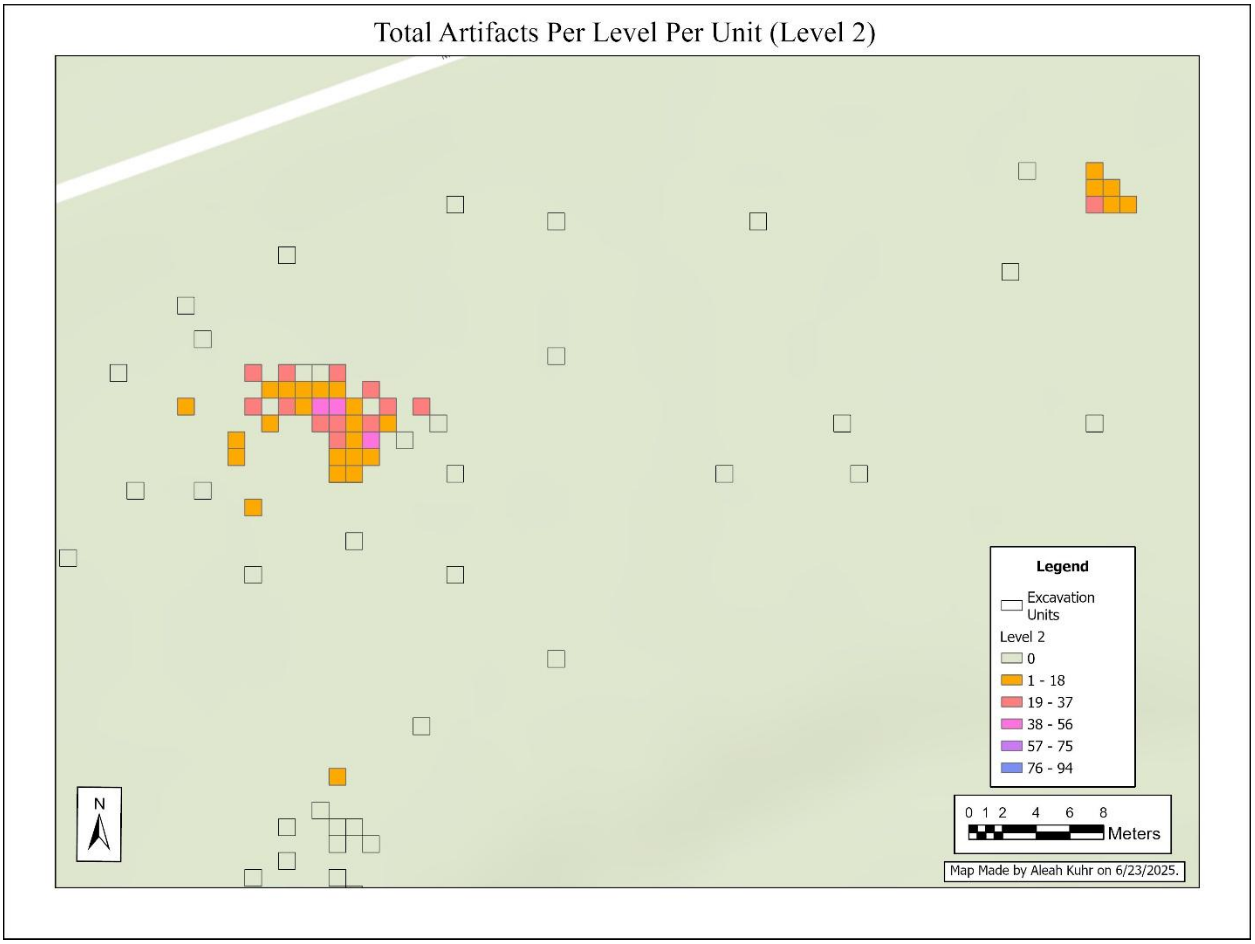

Figure 97. Artifact counts by unit in level two (10–20 cm). Artifact densities decrease overall; three moderately dense units are found in the Main Block. Only units within the designated focus areas (Main and Northeastern Excavation Blocks) retained for analysis are depicted; all other units were excluded from further consideration in Chapter V

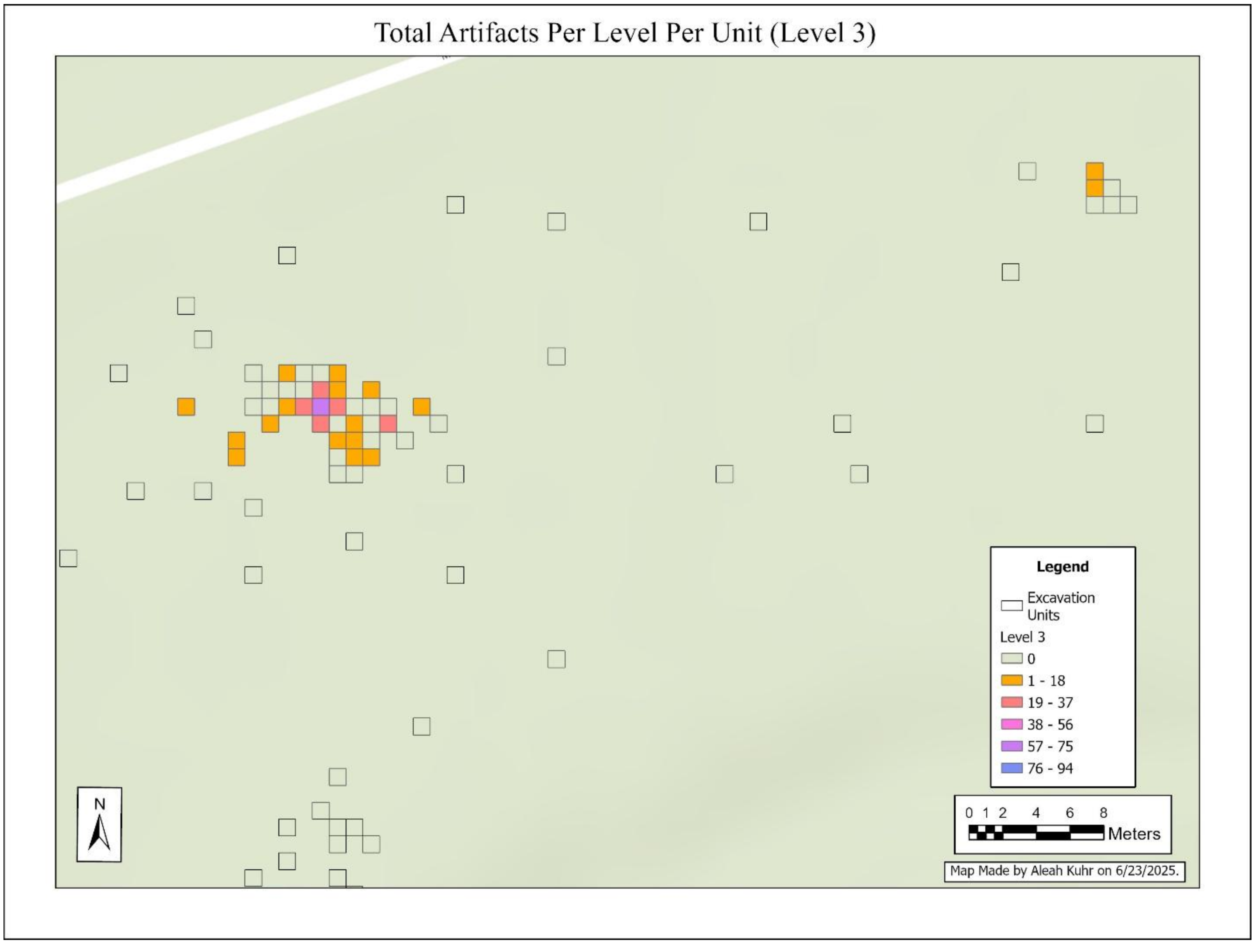

Figure 98. Artifact counts by unit in level three (20–30 cm). A central cluster in the Main Block emerges, with one unit exceeding 57 artifacts and several nearby units moderately dense. Only units within the designated focus areas (Main and Northeastern Excavation Blocks) retained for analysis are depicted; all other units were excluded from further consideration in Chapter V

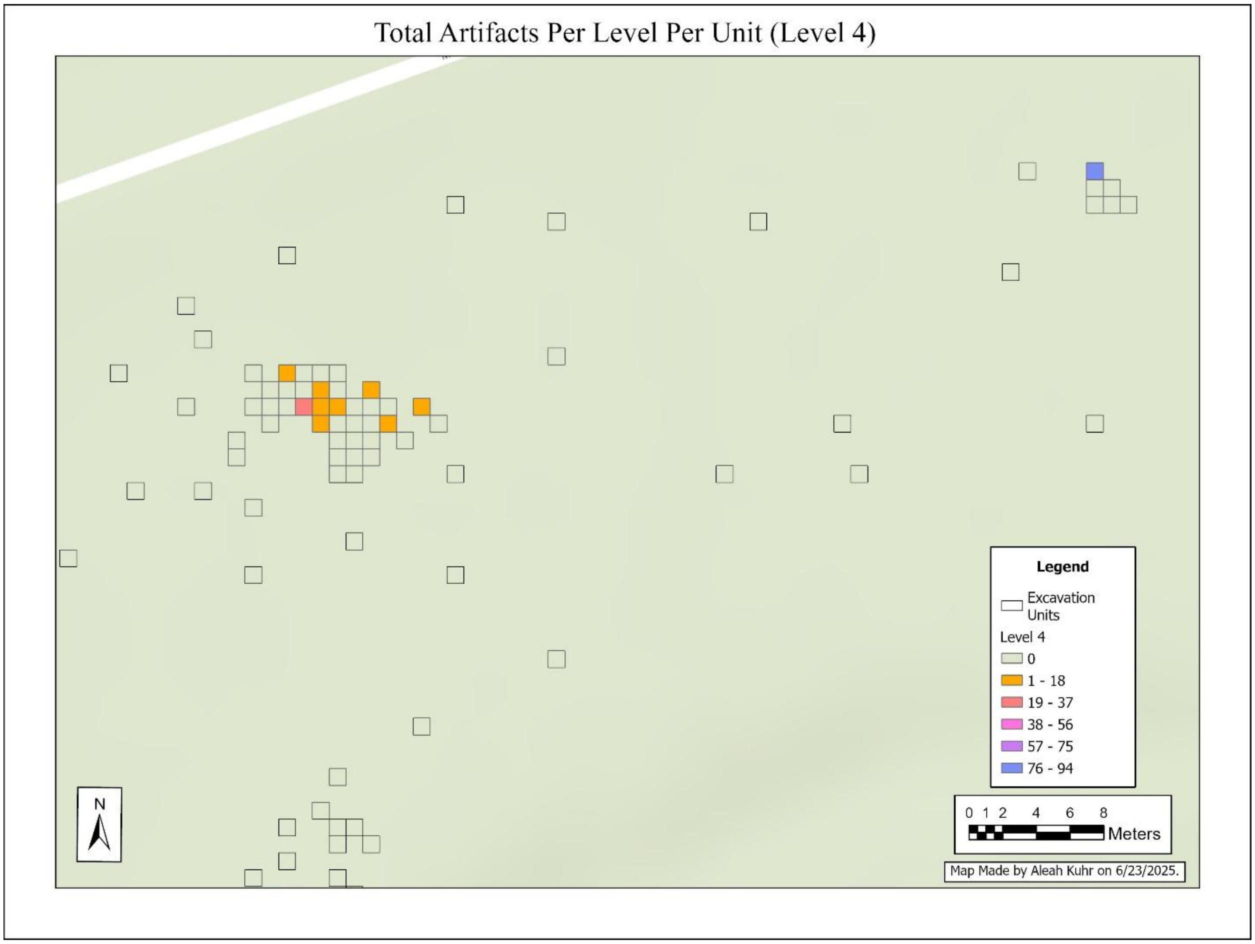

Figure 99. Artifact counts by unit in level four (30–40 cm). Artifact presence declines, except for one dense unit in the Northeastern Block and residual presence in the Main Block. Only units within the designated focus areas (Main and Northeastern Excavation Blocks) retained for analysis are depicted; all other units were excluded from further consideration in Chapter V

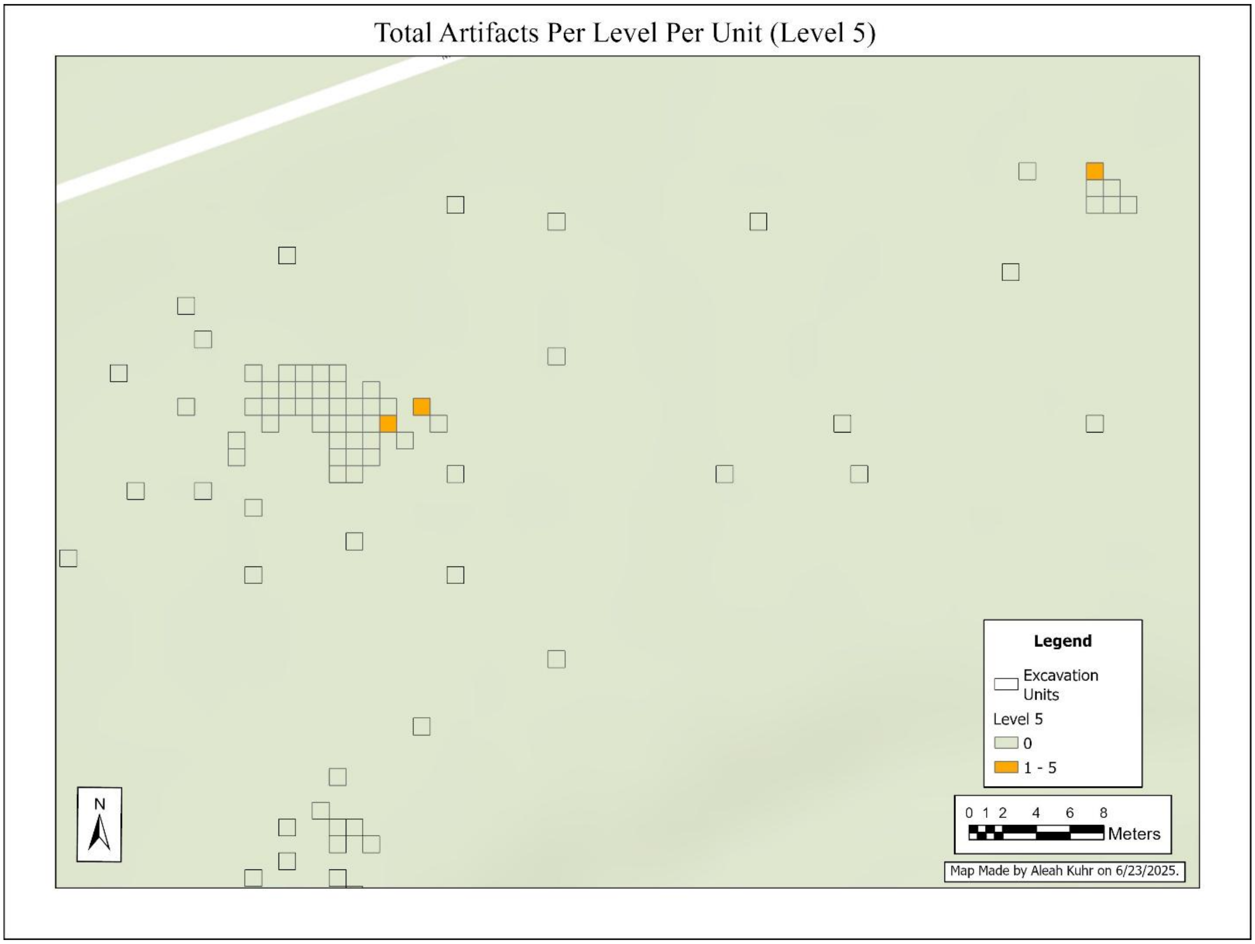

Figure 100. Artifact counts by unit in level five (40–50 cm). Minimal artifact presence, limited to three units with low counts. Excavation to this depth was limited to a subset of units, as soil became sterile in most areas; minimal artifact presence is observed in the units that were excavated. Only units within the designated focus areas (Main and Northeastern Excavation Blocks) retained for analysis are depicted; all other units were excluded from further consideration in Chapter V.

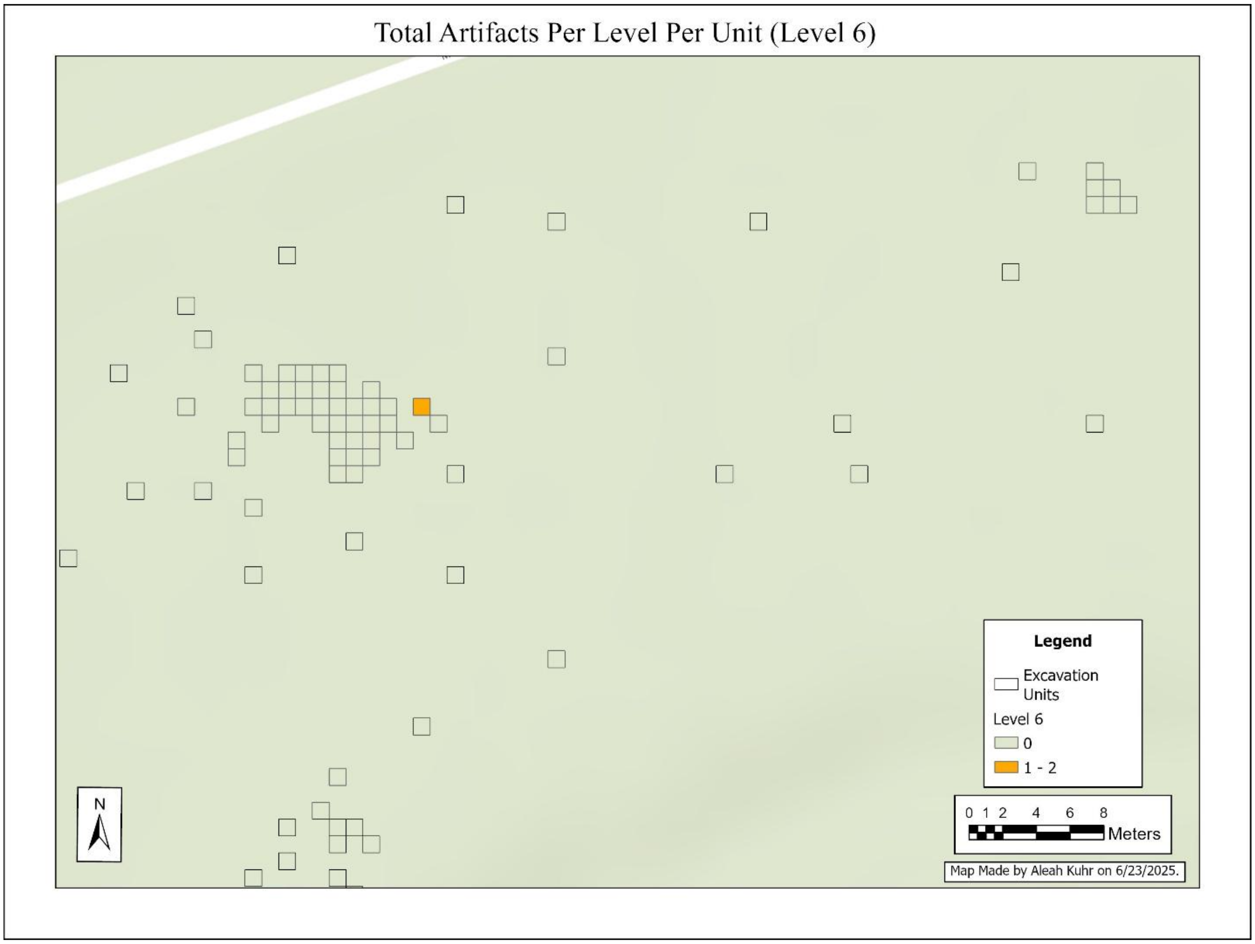

Figure 101. Artifact counts by unit in level six (50–60 cm). Only one unit in the Main Block contains artifacts, totaling just one to two flakes. Excavation to this depth was limited to a subset of units, as soil became sterile in most areas; minimal artifact presence is observed in the units that were excavated. Only units within the designated focus areas (Main and Northeastern Excavation Blocks) retained for analysis are depicted; all other units were excluded from further consideration in Chapter V

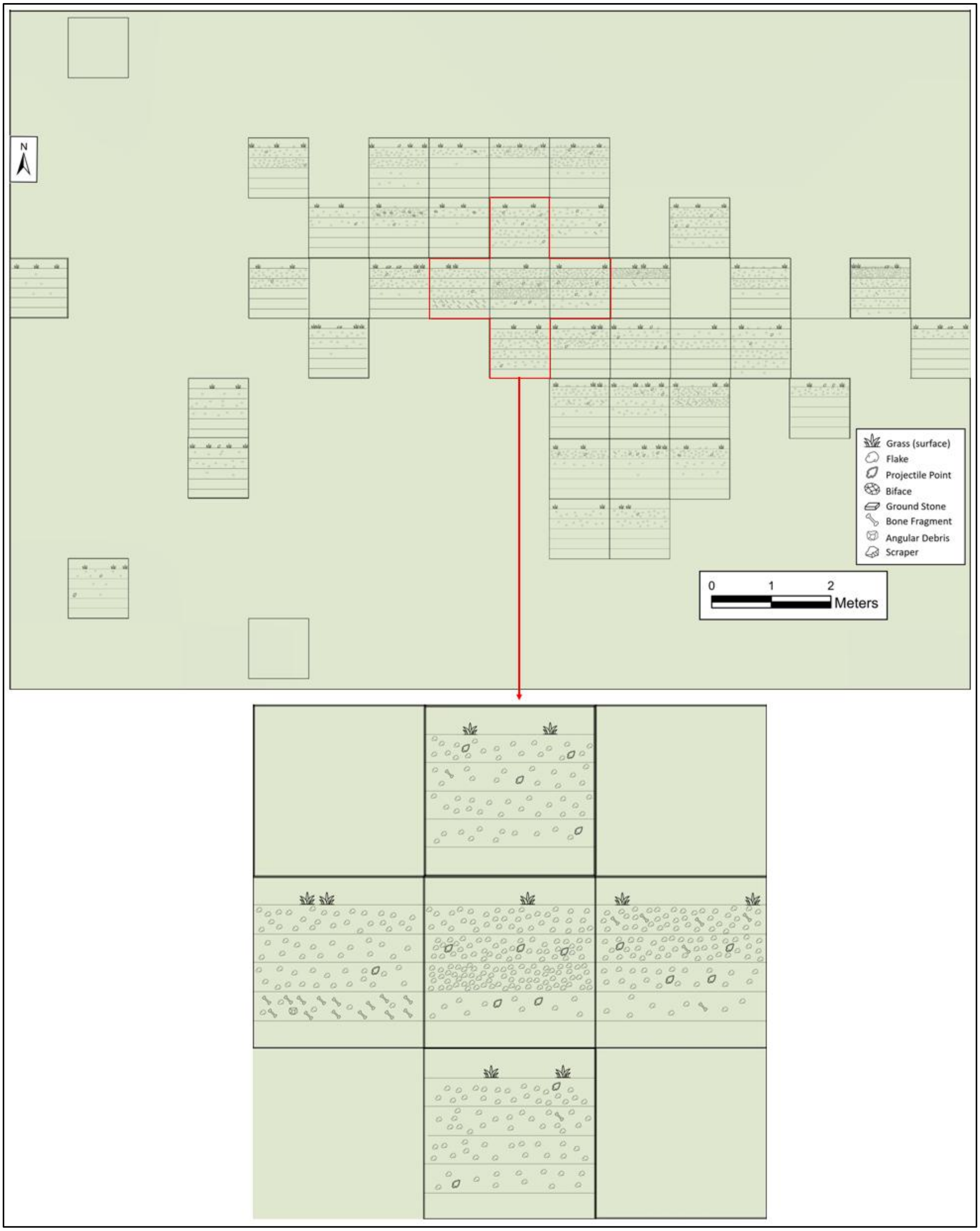

Figure 102. Cluster of vertically diffuse artifact distributions centered on Unit 1005_993. This area contains deeper artifact spreads across Units 1005_993, 1005_992, 1005_994, 1004_993, and 1006_993, contrasting with the narrower unimodal patterns seen elsewhere at the site. Icons used in this figure were obtained from Flaticon (www.flaticon.com).

CHAPTER VII – INTERPRETING SITE USE THROUGH ARTIFACT PATTERNING

Introduction

The purpose of this chapter is to examine patterns of artifact distribution and attribute variation within the main and northeastern excavation blocks to interpret occupation and site function. By analyzing characteristics such as flake size, cortex presence, burning, and the density and distribution of tools and bones, this section aims to identify specific activity areas. Particular attention is given to how different artifact classes co-vary, or appear in isolation, offering insights into activity organization and potential task-specific zones. Building on the broader spatial patterns outlined in Chapter V and the vertical distribution patterns discussed in Chapter VI, this analysis focuses on high-resolution areas to investigate how specific behaviors are expressed at a finer scale.

Site structure, defined here as the organization of physical spaces and materials at an archaeological site, shaped by both human activities and post-depositional processes, reflects how space was used for purposes such as food processing, production, and habitation (Sherratt 1989). Previous chapters have established Porcupine Peak as a site rich in projectile points, making it important to distinguish between bases, tips, and complete points to better understand the nature of tool use and discard at the site. The presence of numerous bifaces and flakes with cortex indicates areas where tool production and maintenance likely took place. Additionally, several burned artifacts suggest potential hearth locations, and when considered alongside bone distributions, they provide valuable clues about where food was processed and consumed. In high-elevation sites like this one, where preservation challenges and episodic use complicate interpretation, reconstructing site function contributes to broader questions about mobility, seasonality, and land-use strategies.

Flakes

Flakes are the most abundant artifact type at Porcupine Peak and offer valuable insights into site function. Their attributes reflect different stages of the tool-making process, allowing us to identify activity areas. For example, clusters of large flakes with cortex suggest early-stage reduction, likely indicating workshop zones where raw materials were initially processed. In contrast, smaller flakes with little or no cortex are often associated with later-stage tool production or maintenance. Burned flakes can also help identify areas of heating or food-related activities; concentrations of thermally altered flakes may point to locations where people worked near hearths or engaged in food preparation. In addition, flake raw material provides information about toolmakers' access to local resources, behavioral choices, and mobility patterns. A strong reliance on a single raw material could reflect short-term, intensive site use with dependence on nearby sources. Conversely, long-term or repeated occupations might be indicated by either diverse raw material presence or changes in raw material preferences across excavation levels, signaling shifts in behavior or resource availability over time.

Flake Size

Flake size within the main excavation block provides insight into the stages of lithic reduction and the spatial organization of tool production. The flake lengths range from a minimum of 9.38 mm to a maximum of 20.90 mm, with an average length of 14.41 mm and a median of 14.24 mm. These measurements suggest that most flakes fall within a moderate size range, consistent with middle to late stages of reduction (Andrefsky 2008; Henry 1989; Newcomer 1971; Stahle and Dunn 1982). However, variability across excavation units points to spatial differentiation in tool-making activity (Figure 103). For example, cells such as 1002_995 (avg. 18.27 mm) and 1006_992 (avg. 20.91 mm) contain larger flakes, likely representing areas where early-stage reduction was occurring. In contrast, units like 1005_999 (avg. 9.38 mm) and

1005_995 (avg. 9.73 mm) contain the smallest flakes, indicating later-stage tool production or resharpening. The presence of both large and small flakes across different units suggests that multiple stages of tool manufacture were taking place within the block, possibly in spatially distinct areas. The majority of cells in the main excavation block have average flake lengths ranging between 11.68 mm and 16.29 mm, with 29 cells falling within this range. These cells are predominantly concentrated in the center of the block, suggesting a core area of tool production or maintenance. Four cells with smaller average flake lengths (9.38–11.68 mm) tend to occur around the edges of the block, though they are somewhat scattered rather than forming a distinct boundary. Five cells exhibit larger average flake sizes (16.29–18.60 mm), mostly located toward the southern end of the block, indicating potential localized areas of earlier-stage reduction. Only one cell, situated in the northern center, contains an average flake length in the highest range (18.60–20.90 mm), possibly representing a focused early reduction or core preparation zone.

In the northeastern block, flake size ranges from 13.82 mm to 18.43 mm, with a median of 14.86 mm and an average of 15.61 mm. These measurements show slightly larger average flake sizes than those found in the main block and a narrower overall range. The consistently moderate-to-large sizes across units, such as 1017_1040 (avg. 17.23 mm) and 1019_1039 (avg. 18.43 mm), suggest a focus on earlier to middle stages of lithic reduction (Andrefsky 2008; Henry 1989; Newcomer 1971; Stahle and Dunn 1982). The apparent lack of very small flakes in this area may reflect the excavation methodology rather than behavioral absence: the original excavations employed a ¼-inch (≈6.35 mm) mesh screen, meaning flakes smaller than this threshold were not collected, potentially underrepresenting later-stage tool finishing or retouch activities (Figure 104). The relative uniformity in flake size across this portion of the site may reflect a more specialized activity area, such as initial tool production or core reduction.

Compared to the more variable flake sizes in the main block, the northeastern block appears to represent a more focused or task-specific use of space. In the northeastern excavation block, three of the six cells have average flake lengths ranging between 13.99 mm and 16.29 mm, but these are scattered rather than clustered. Two cells with larger average flake sizes (16.29–18.60 mm) are separated by approximately one meter, indicating isolated but spatially close activity areas potentially focused on earlier-stage reduction or core preparation. Only one cell has an average flake length between 11.68 mm and 13.99 mm. The more dispersed pattern of flake sizes in this block, combined with fewer total cells, may reflect a less intensive or more specialized lithic production area compared to the main block.

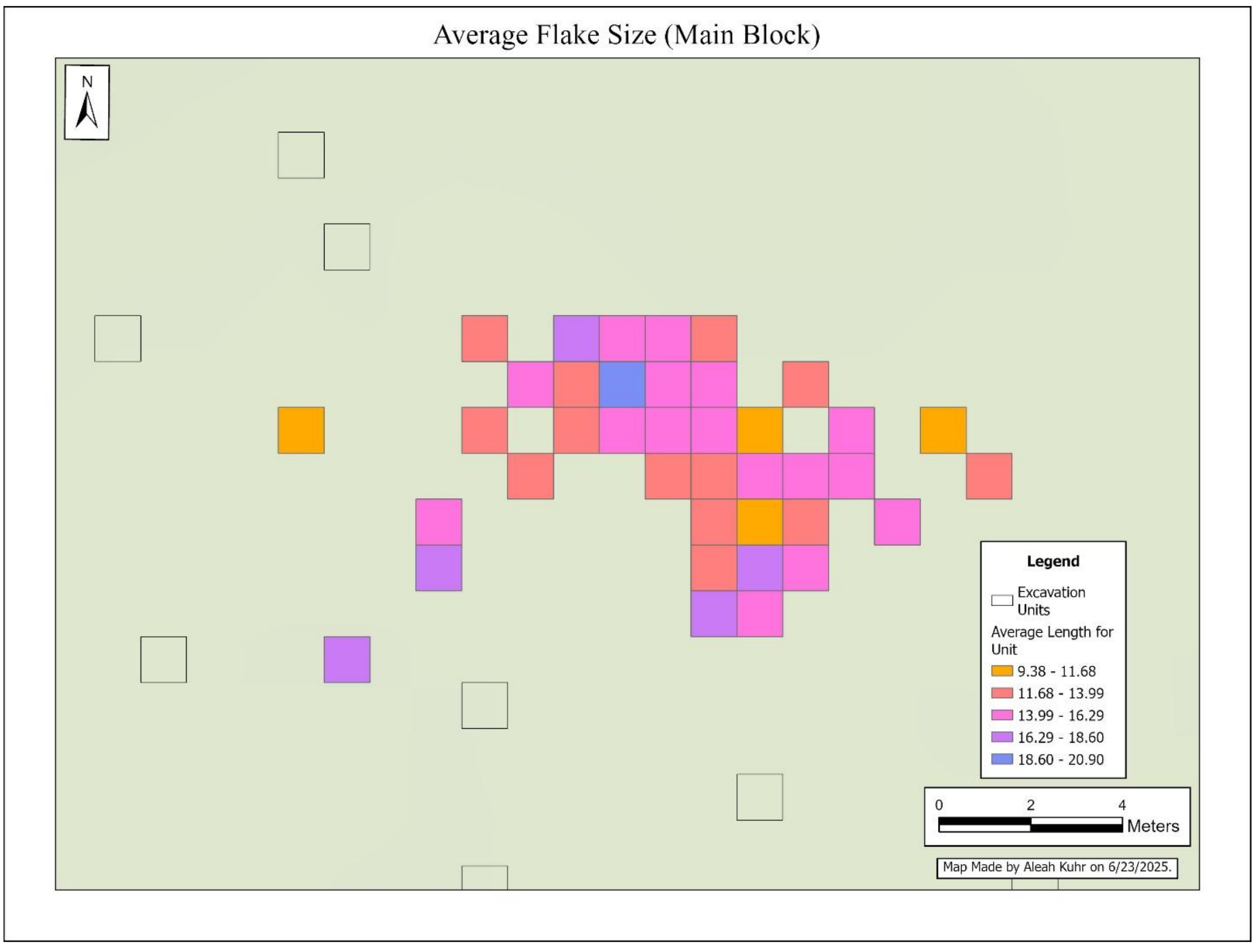

Figure 103.Average flake length by excavation unit in the main block. Flake sizes range from 9.38 mm to 20.90 mm, with an average of 14.41 mm. Darker colors indicate larger flakes, which may represent early-stage reduction areas, while lighter colors indicate smaller flakes, suggesting later-stage tool production or maintenance.

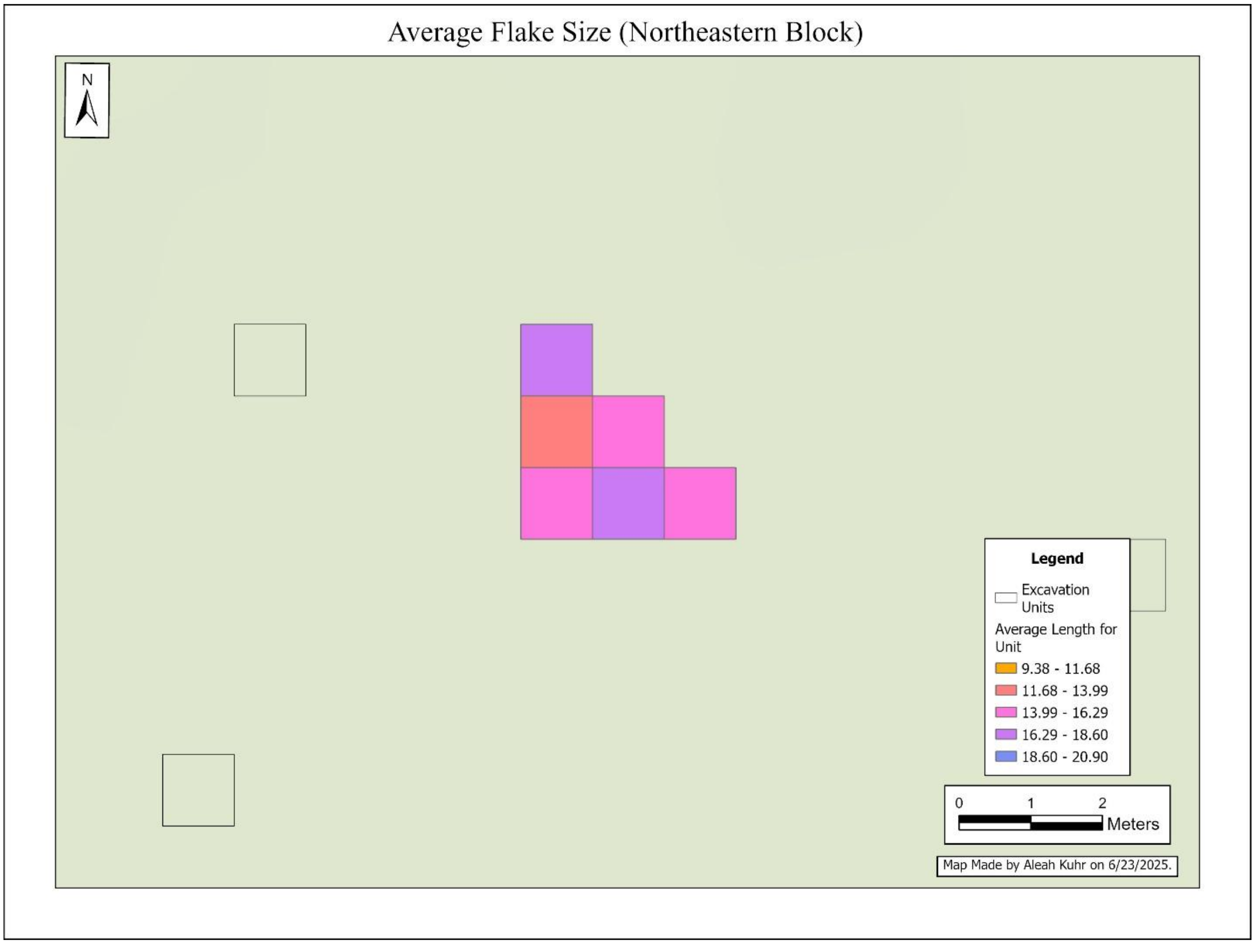

Figure 104. Average flake length by excavation unit in the northeastern block. Flake sizes range from 13.82 mm to 18.43 mm, with an average of 15.61 mm. Compared to the main block, the northeastern block displays a narrower size range and consistently larger flakes, suggesting a spatial focus on early to middle stages of lithic reduction.

A box-and-whisker plot was used to compare the maximum flake lengths (in millimeters) between the main excavation block and the northeastern block (Figure 105). The x-axis represents the two spatial blocks, while the y-axis displays maximum flake length in millimeters. The median flake length for the main excavation block is 11.9 mm, while the northeastern block shows a higher median value of 14.9 mm. The main excavation block has a minimum value of 3.1 mm and a maximum of 24.9 mm, with an interquartile range (IQR) of 9.8 to 15.9 mm. The northeastern block ranges from 0.2 mm to 29.9 mm, with an IQR of 11.675 to 19.42 mm.

Several outliers are present in both blocks. In the main excavation block, multiple upper-end outliers range from 25.2 mm to 43.3 mm, and a single lower-end outlier occurs at 0.2 mm. In the northeastern block, upper-end outliers range from 31.2 mm to 36.5 mm. Based on the IQR values, the northeastern block generally contains larger flakes than the main excavation block. However, the main excavation block displays greater variability in flake size, as indicated by its broader distribution of outliers. This variation may reflect differences in lithic reduction strategies or the intensity and focus of tool production between the two areas.

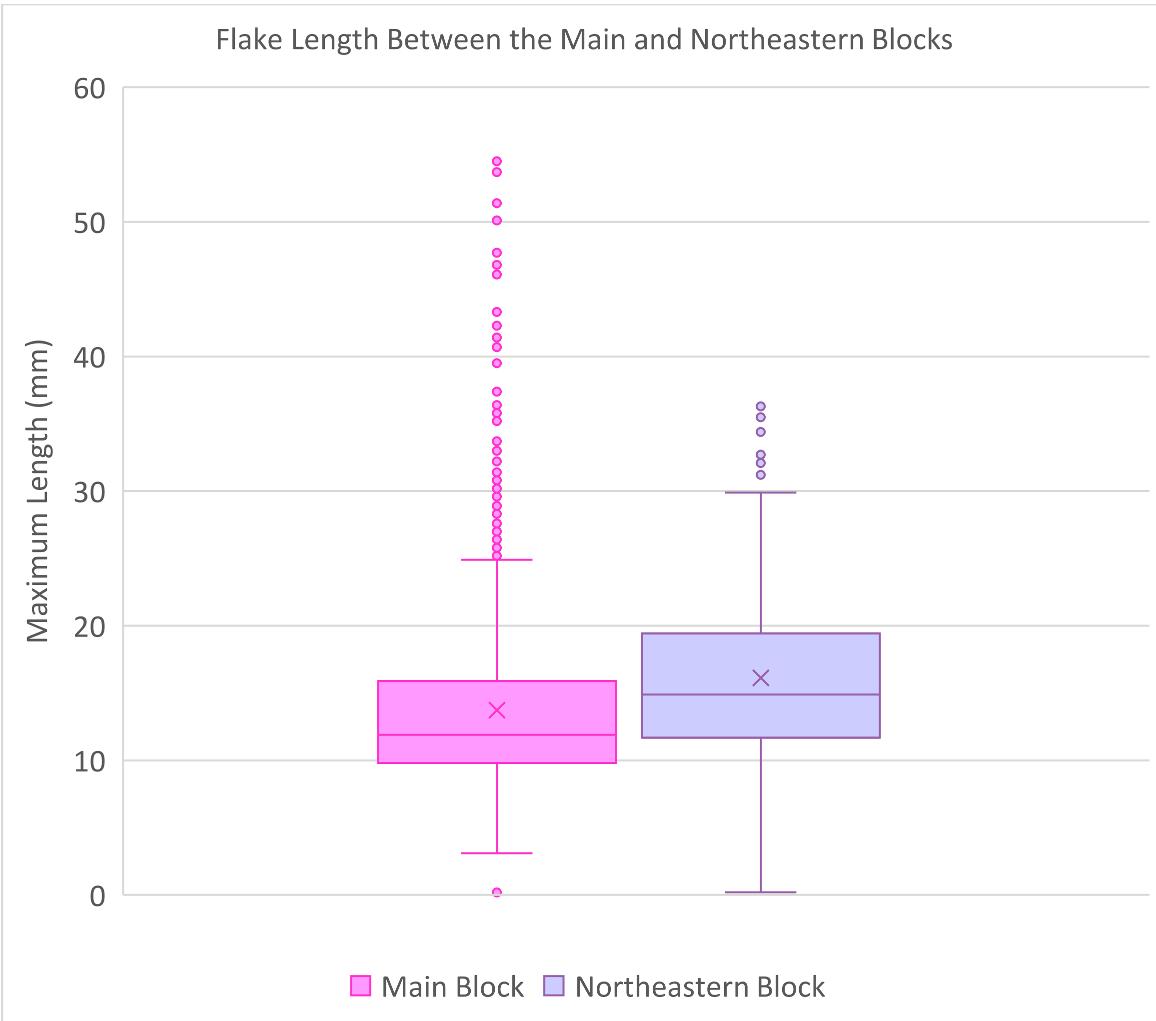

Figure 105. Box-and-whisker plot comparing maximum flake lengths (mm) between the main excavation block and the northeastern block. The northeastern block shows a higher median and larger interquartile range, while the main excavation block exhibits greater variability with more outliers.

Flake size analysis reveals distinct patterns of lithic production within and between excavation blocks. The main block exhibits greater variability in flake size, suggesting a range of reduction activities occurring in spatially differentiated zones. In contrast, the northeastern block is characterized by larger flakes and less variability, pointing to a more focused or specialized activity area. These differences highlight spatial distinctions in tool-making strategies and set the stage for further insight through cortex analysis.

Flakes and Cortex Presence

Out of the 2,420 flakes recovered across the site, only 127 flakes (5.2%) retain cortex, indicating that the majority of lithic reduction activities occurred during later stages, such as tool finishing, maintenance, or resharpening. In early-stage reduction, cortex is more prevalent as the outer rind of raw material is removed; its limited presence here suggests that initial core reduction was minimal or occurred off-site, likely closer to raw material sources (Andrefsky 1998; Dibble 2005; Odell et al. 2001; Sullivan and Rosen 1985; White et al 1963).

This low cortex percentage aligns with a short-term or task-specific occupation, where people arrived with prepared cores or finished tools and focused on reworking or maintaining them (Binford 1979; Cowan 1999). Alternatively, it may reflect a camp geared more toward tool use than primary reduction (Binford 1980). Overall, this pattern supports the interpretation that the site was not a raw material procurement location, but rather a place for later-stage lithic activities, consistent with curated technologies and mobile hunter-gatherer strategies (Bamforth 1986; Binford 1979). The spatial distribution of cortex-bearing flakes further supports this interpretation, particularly when comparing the main excavation block with the northeastern block.

In the main block, the cortex is unevenly distributed but shows two areas of modest clustering (Figure 106). The highest concentration occurs in cell 1005_993, which contains 14 cortex-bearing flakes out of 164 total. As noted in the previous chapter, this unit also exhibits a deeper concentration of artifacts in level three, suggesting that some early-stage reduction may have occurred at greater depth. Surrounding cells,1005_992 (4–6 flakes with cortex), 1005_994 (7–9 flakes), and 1004_994 (4–6 flakes), form a centralized cluster representing the densest concentration of cortex-bearing flakes in the block.

A secondary cluster is located to the southeast, including 1003_996, 1003_998, and 1004_997, each with 4–6 flakes with cortex. Although the adjacent cell 1003_997 was not excavated, it spatially separates this cluster. The consistent presence of cortex across these units suggests localized early-stage reduction or core trimming in this area. Beyond these clusters, cortex-bearing flakes in the main block are sparse and scattered. Four additional cells contain four to six flakes with cortex, while two others contain seven to nine, but these are not spatially grouped. An additional 19 cells have just one to three cortex-bearing flakes each, reinforcing the overall scarcity of early reduction debris.

In contrast, the northeastern block displays even fewer signs of cortex, consistent with a more focused area of later-stage lithic activity (Figure 107). Only two cells contain flakes with cortex: 1019_1039, located in the north, has 7–9 flakes with cortex, while 1017_1039, farther south, has just one to three flakes. The absence of clustering in this block supports the interpretation that this area was used primarily for later-stage tool production or maintenance, with minimal or no core preparation occurring on-site. This interpretation is further supported by the fact that only a single core was recovered from the entire site, representing the limited presence of early-stage reduction activities and the likelihood that raw materials were reduced at another location before being brought to Porcupine Peak.

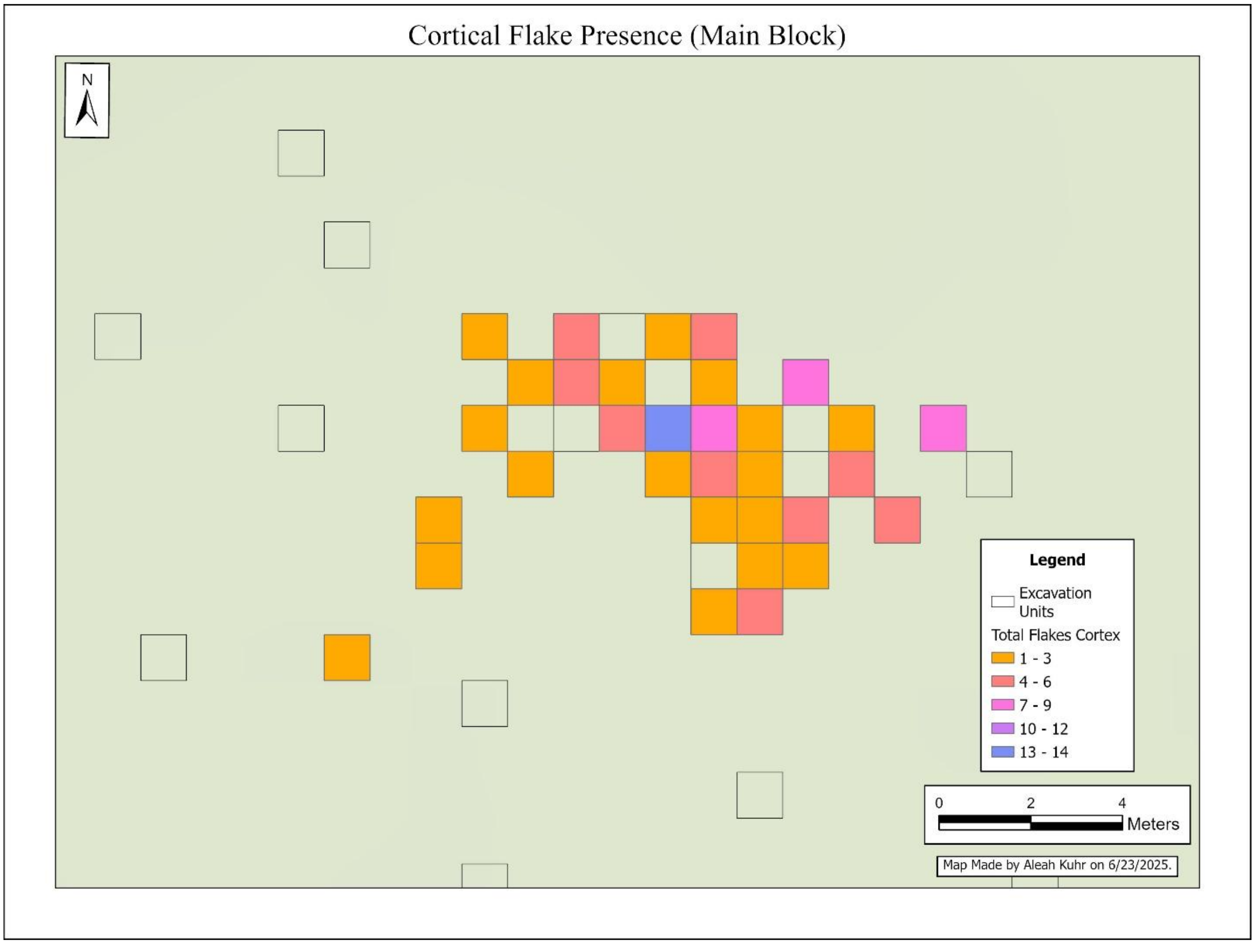

Figure 106. The Main Block has a scattered pattern of cortex presence, though minimal; two clusters represent some early-stage tool production.

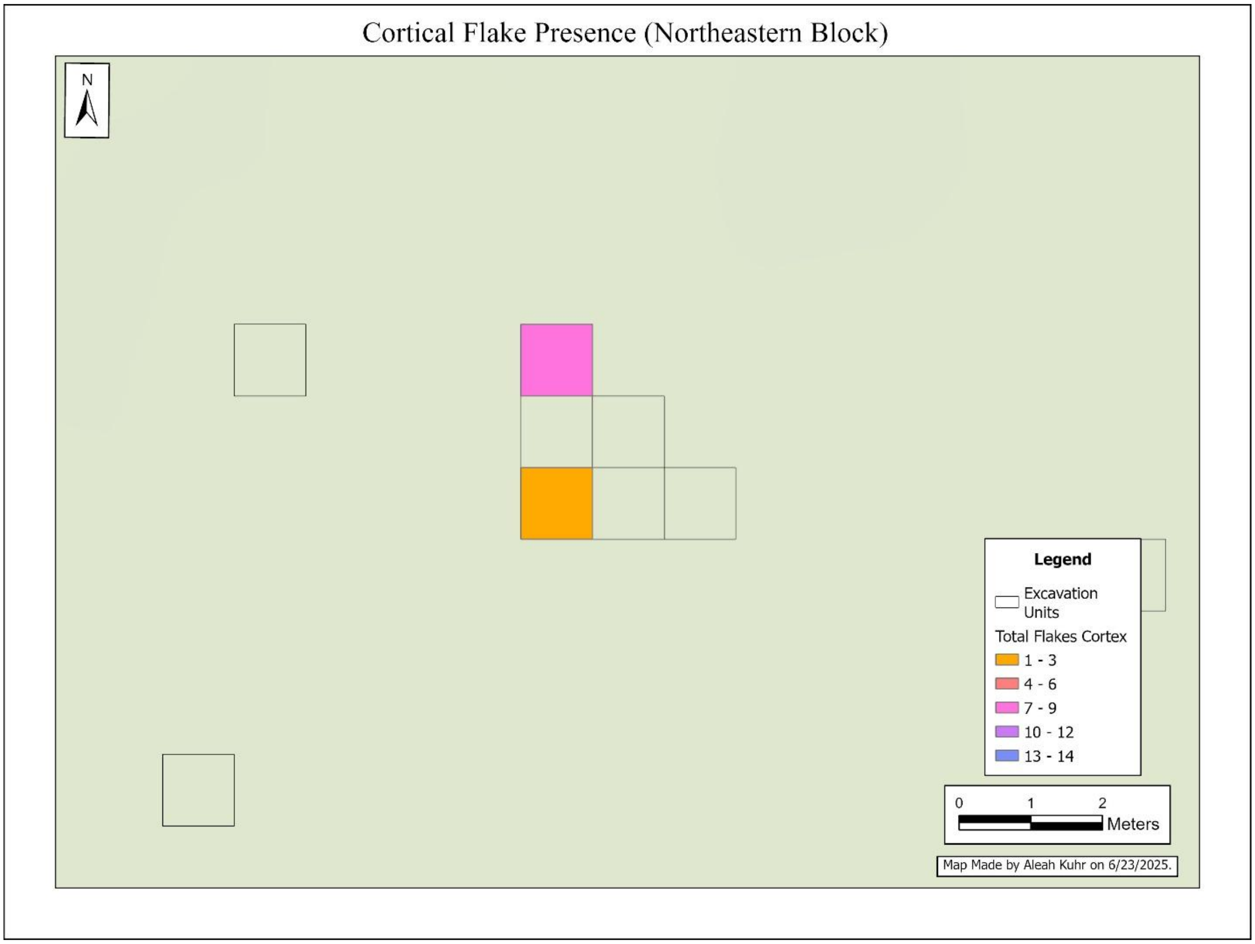

Figure 107. The Northeastern Block displays a small number of flakes with cortex, representing even less early-stage tool making within the area compared to the Main Block.

Of the 2,420 total flakes recovered from the site, only 127 (5.2%) exhibit cortex, indicating that late-stage lithic reduction was the predominant activity at Porcupine Peak. Among those with cortex, an overwhelming 93.7% (n = 119) are made of Troublesome chert, while only seven are of unknown material and one of Trout Creek chert (Figure 108, Figure 109, Figure 110, and Figure 111). This strongly suggests that early-stage reduction occurred primarily on Troublesome chert, likely a locally available raw material. In contrast, the near absence of cortex on Trout Creek and other materials supports the interpretation that these were introduced to the site in partially or fully reduced form, possibly as curated tools or preforms.

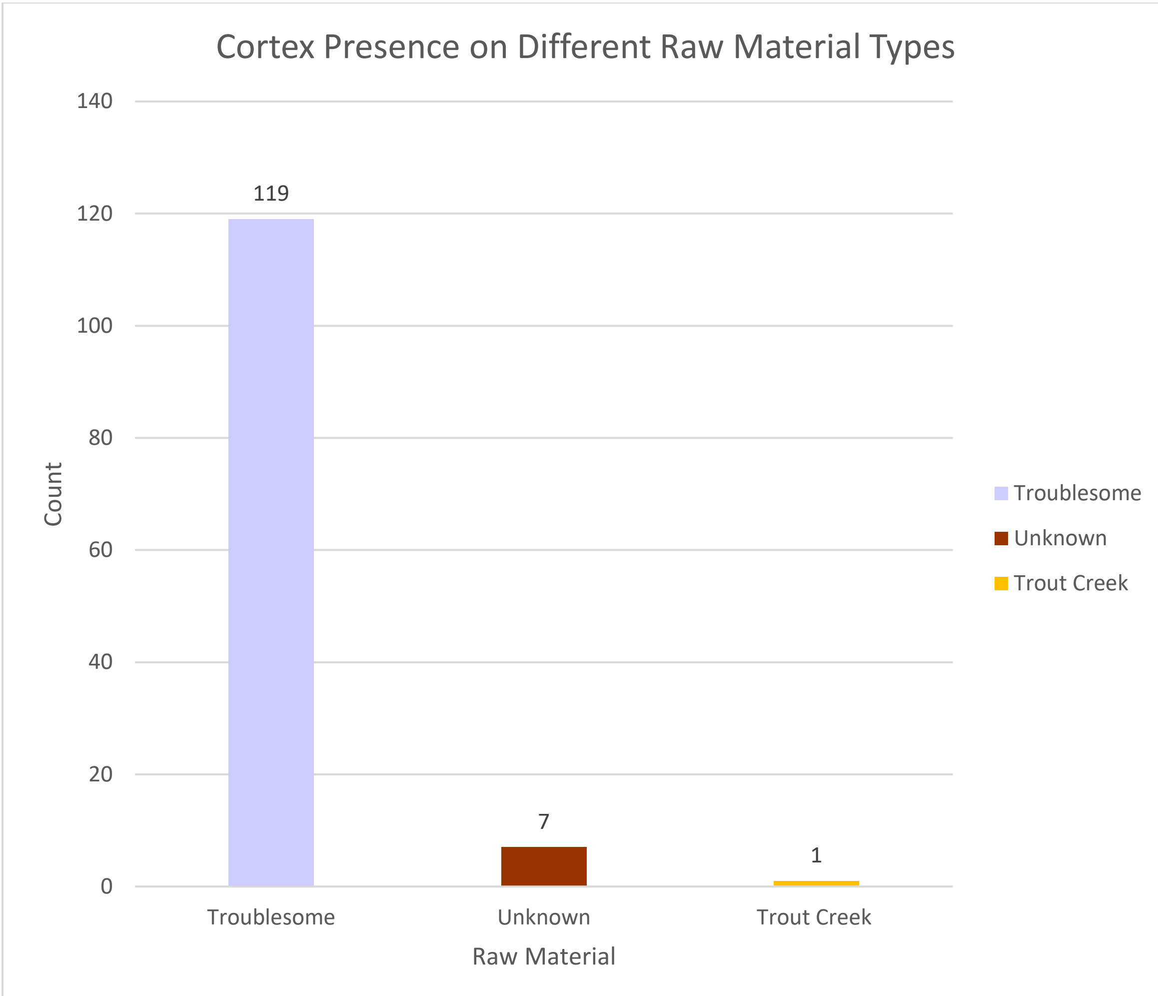

Figure 108. Count of cortical flakes by raw material type, exhibiting limited early-stage reduction at Porcupine Peak.

Cortex-bearing flakes show distinct spatial patterns when examined by raw material. Troublesome chert, which overwhelmingly dominates the site's assemblage (Chapter IV), exhibits the most widespread cortical presence, particularly in the Main Excavation Block. Concentrations in and around cell 1005_993 suggest localized early-stage reduction of troublesome chert. A smaller cluster appears farther southeast, reinforcing this pattern. Notably, a single Troublesome chert flake with cortex was recovered from the southern unit 983_994, where a Troublesome chert projectile point (5ST98.2435) was also found. This flake lies approximately seven meters from the only core recovered from the site, possibly indicating a rare, spatially proximate reduction event.

In contrast, the Northeastern Block contains very few troublesome chert flakes with cortex, only two isolated cells, which supports its interpretation as an area focused on later-stage production. Other raw materials with cortex, such as Trout Creek chert and unidentified types, are rare and confined to isolated occurrences in the Main Block. The near-total absence of cortex-bearing flakes, especially in other raw materials, in the Northeastern Block emphasizes spatial differentiation in reduction intensity and raw material processing across the site.

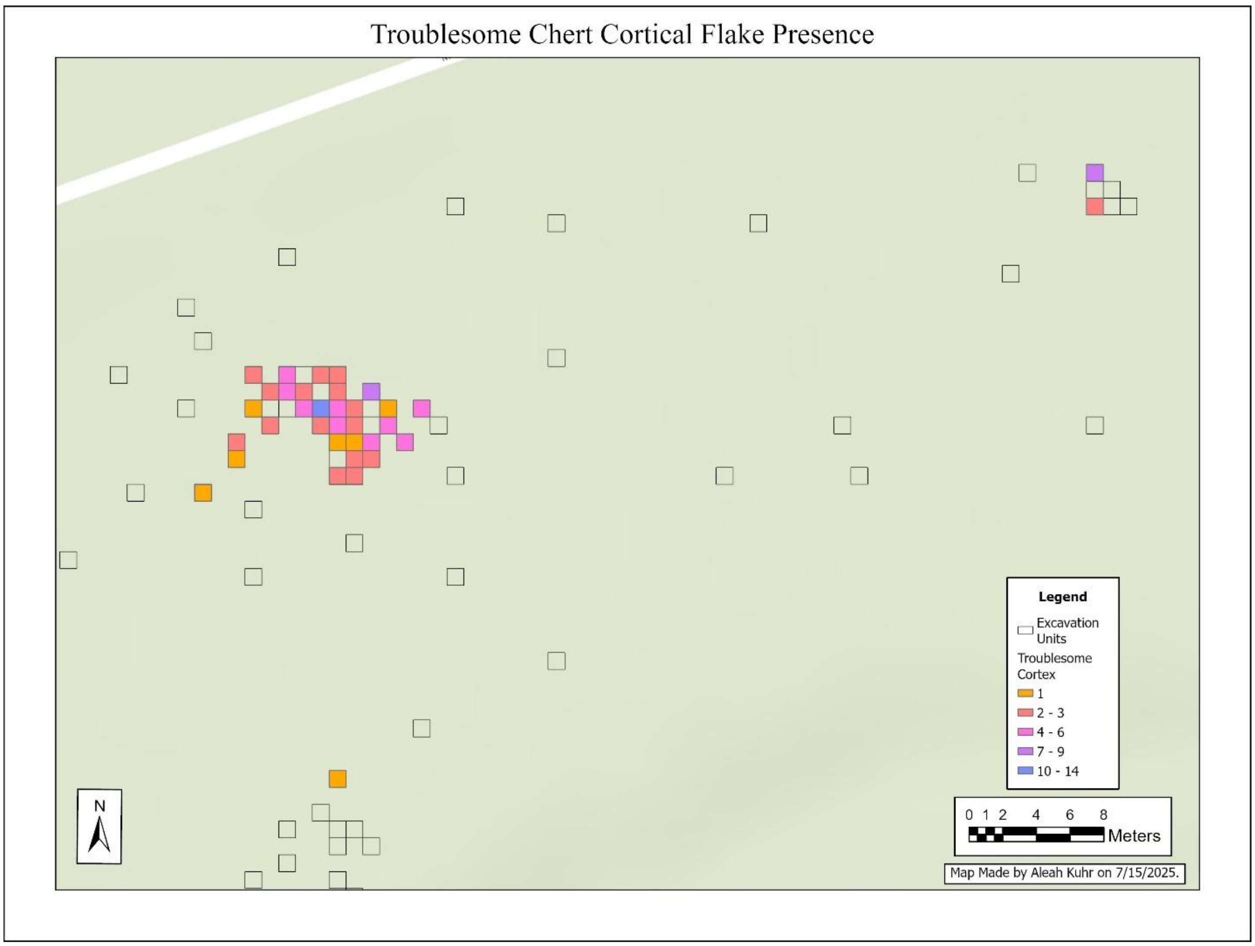

Figure 109. Distribution of troublesome chert flakes with cortex across excavation blocks.

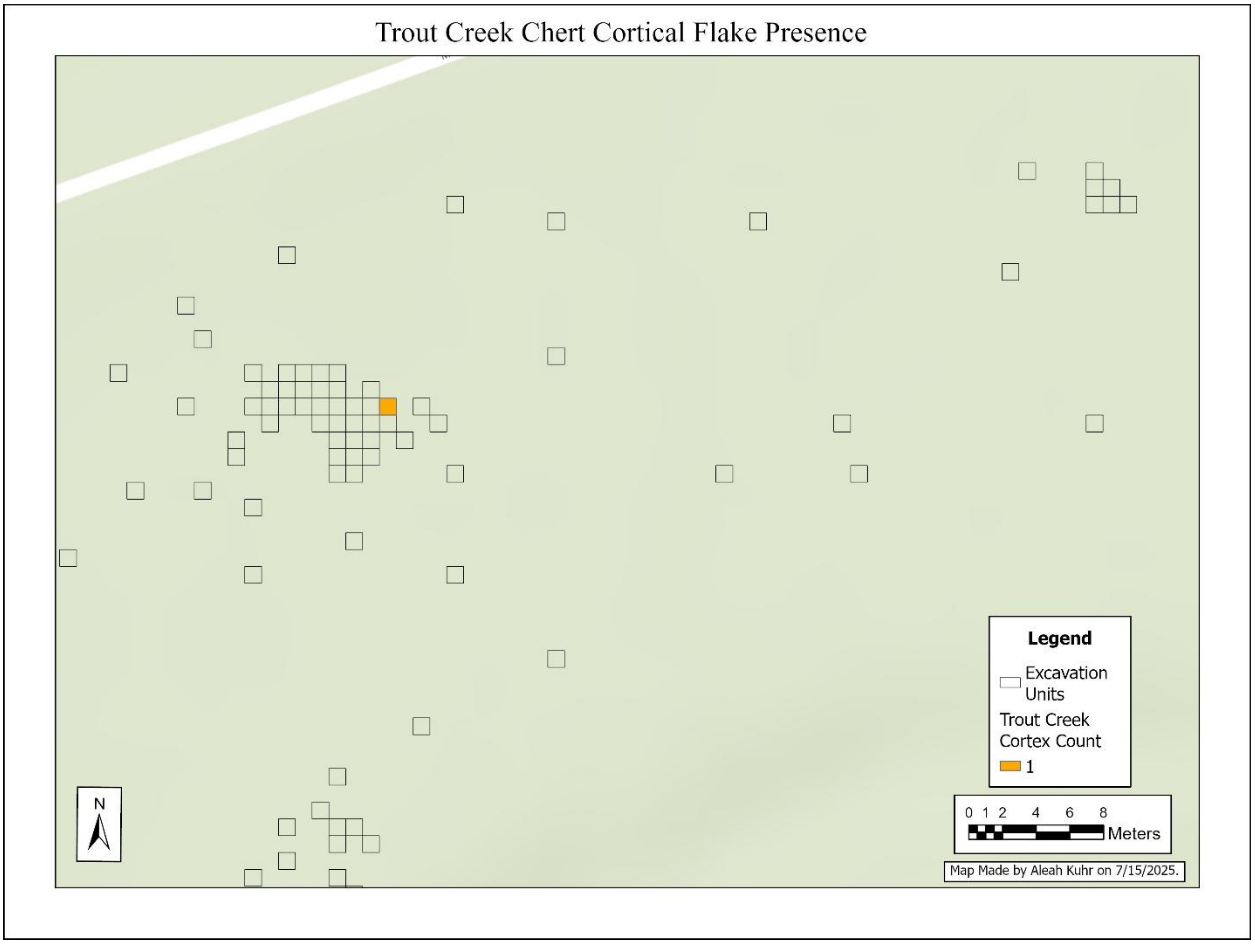

Figure 110. Distribution of Trout Creek chert flakes with cortex; only one found in the Main Block.

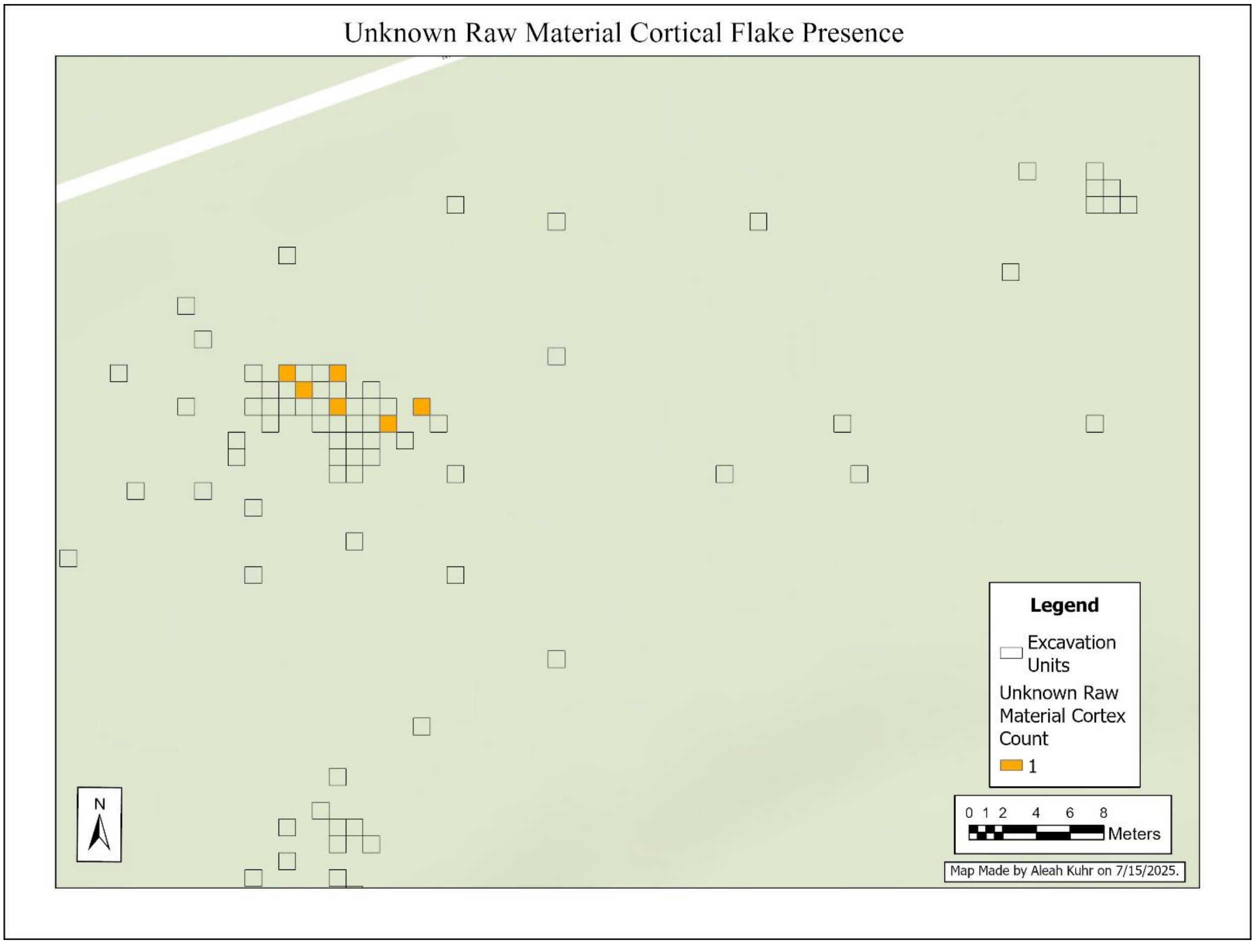

Figure 111. Distribution of unknown raw material flakes with cortex, limited to isolated cells in the Main Block.

The low frequency of cortex-bearing flakes (5.2%) at Porcupine Peak indicates that lithic activities were dominated by later-stage tool production, maintenance, and resharpening, with little evidence for early-stage core reduction. Cortex distribution is heavily skewed toward Troublesome chert, both in frequency and spatial clustering, particularly in the main excavation block, supporting the interpretation that this locally available material was occasionally reduced on-site. In contrast, non-local materials such as Trout Creek chert show virtually no cortex, suggesting they were introduced in more finished forms. The sparse and spatially limited presence of cortex, coupled with the recovery of only one core, reinforces the interpretation of Porcupine Peak as a location primarily used for curated tool maintenance within a broader mobile hunter-gatherer settlement system.

Flakes and Burn Presence

Burned lithics are often interpreted as indicators of proximity to hearths, refuse areas, or natural surface fires, but their spatial patterning can also reflect human behavior and activity organization within a site. While burning can result from both cultural and natural processes, archaeologists frequently use burned stone, especially when found alongside other thermally altered materials like bone or charcoal, as a proxy for fire use and domestic activity when in a spatial pattern. Surovell (2022) emphasizes that many hunter-gatherer hearths are morphologically "invisible," lacking clear features like oxidation or basin-shaped outlines. Instead, such hearths are more reliably identified through localized clusters of artifacts, especially stone and bone, that have been exposed to high temperatures (Surovell 2022). These clusters often sit near the center of broader artifact concentrations, reflecting the general tendency for hearths to act as focal points for a range of tasks (Surovell 2022). The rapid degradation of charcoal and ash means that burned lithics and bone may offer the most durable evidence of hearth locations, particularly in open-air contexts where geomorphological signatures are weak or absent (Surovell 2022). This section explores the spatial distribution and frequency of burned flakes to assess whether any such clusters suggest the presence of hearths or activity zones structured around fire.

In the Main Excavation Block, burned lithics are widely distributed, with 34 out of 39 excavation units yielding at least one burned flake (Figure 112). However, the frequency and density of burned artifacts vary considerably across the block. Most units contain between one and 11 burned flakes, suggesting a light and dispersed signature of burning throughout much of the area. A few key units stand out due to higher artifact concentrations and elevated burn percentages.

Unit 1005_999 contains the highest total flake count across the entire site (n = 167), with 8.89% of those flakes (n = 15) showing evidence of burning. To the west, unit 1005_993 holds 164 flakes, 6.1% of which (n = 10) are burned. Nearby units 1005_994 and 1004_993 also feature relatively high flake counts (n = 107 and n = 73) and moderate burn percentages of 14.02% and 13.70%. These three adjacent units together form a high-density cluster that may reflect an intensively used area, potentially structured around fire-related activities. The highest percentage of burned flakes in the Main Block appears in unit 1003_994, where 30% of the assemblage (n = 15 out of 50) is thermally altered. This unit does not correspond with the highest overall flake counts but stands out due to the intensity of burning. Similarly, unit 1003_996 holds 78 flakes, of which 29.49% (n = 23) are burned, the highest number of burned flakes recorded in a single unit in this block. Unit 1005_997 also shows a relatively high burn percentage at 20% (n = 12 of 60 flakes).

These patterns indicate that while burning is widespread, certain areas within the Main Block exhibit both higher absolute counts and elevated percentages of burned lithics. Units such as 1003_994, 1003_996, and 1005_994 may represent localized activity zones associated with hearth use or refuse deposition. The overlap between moderate-to-high artifact density and burn frequency in these units suggests a spatial association between flintknapping and fire-related behaviors, consistent with hearth-centered activity areas described in ethnographic and archaeological contexts (Surovell 2022).

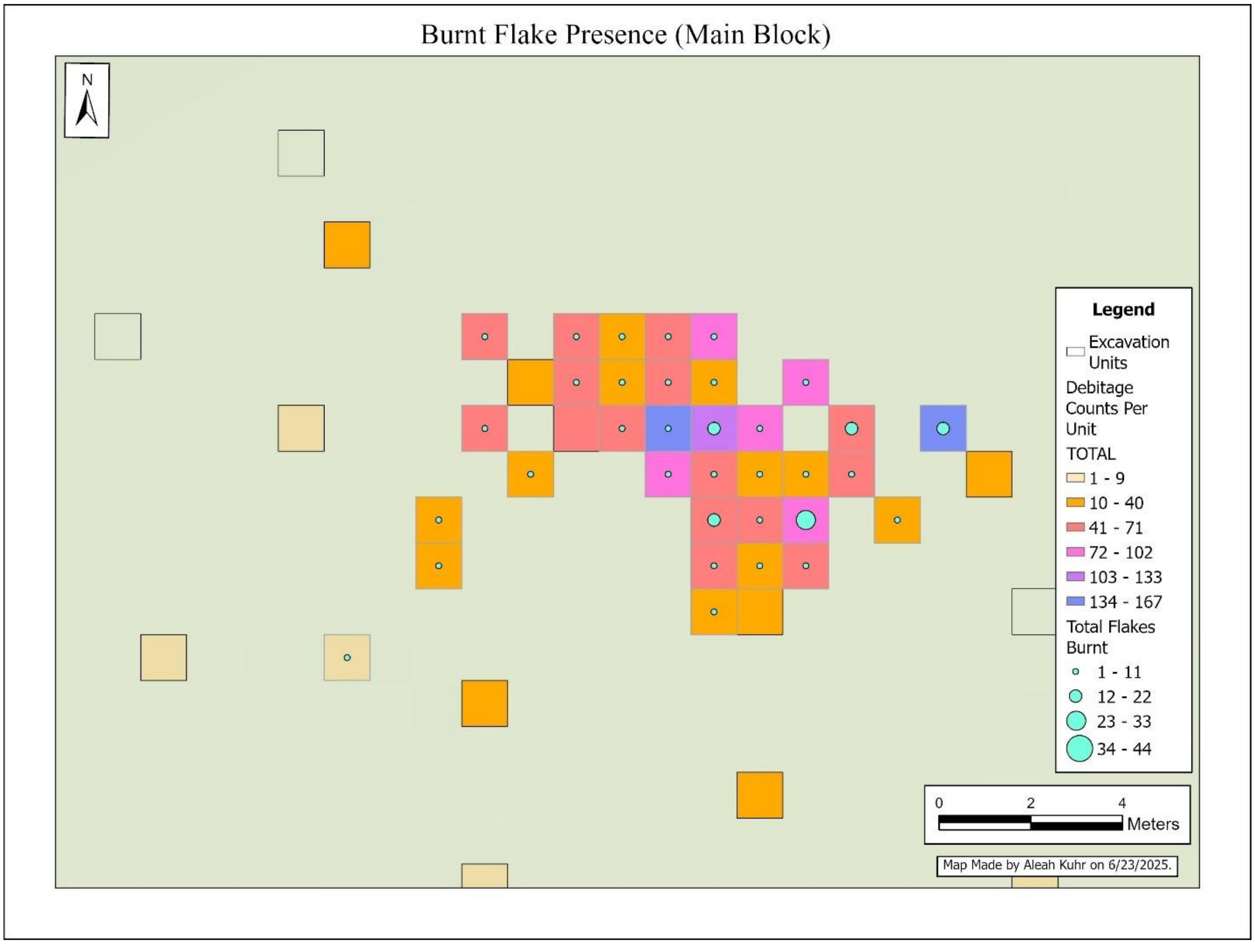

Figure 112.Burned Flake Distribution, Main Block. The map shows burned flake percentages by unit, overlaid on total flake counts. Localized burn concentrations in units like 1003_994 and 1005_994 suggest hearth-related activity.

To evaluate whether widespread burning across the Main Excavation Block could be attributed to a surface fire, such as a natural forest fire, burned flake frequencies were examined by stratigraphic level. If burning were the result of a recent surface fire, we would expect thermal alteration to be concentrated near the surface, with minimal penetration into deeper levels. However, the distribution of burned flakes suggests a different pattern (Figure 113).

Burned flakes are present from the surface through level five (50–60 cm), with most burned artifacts concentrated within the upper 30 cm of the deposit. Levels one and two (0–10 cm and 10–20 cm) show the highest total counts of burned flakes, with 115 and 76 thermally altered artifacts. These two levels account for the majority of burned material in the block. Level three (20–30 cm) also shows a substantial number (n = 26), while levels four and five contain smaller but notable quantities (n = 10 and n = 1). Only two flakes were recovered from level six (50–60 cm), none of which were burned.

This vertical pattern is inconsistent with a recent natural surface fire. Instead of being concentrated only near the surface, thermally altered artifacts appear across multiple excavation levels, with significant burning in levels one to three and some evidence continuing into deeper deposits. The distribution of burned material at multiple depths suggests culturally driven fire use over time rather than a single, recent fire event or non-cultural fire event. These patterns are more consistent with in situ hearth activity or episodes of burning associated with occupation and domestic activity (Surovell 2022).

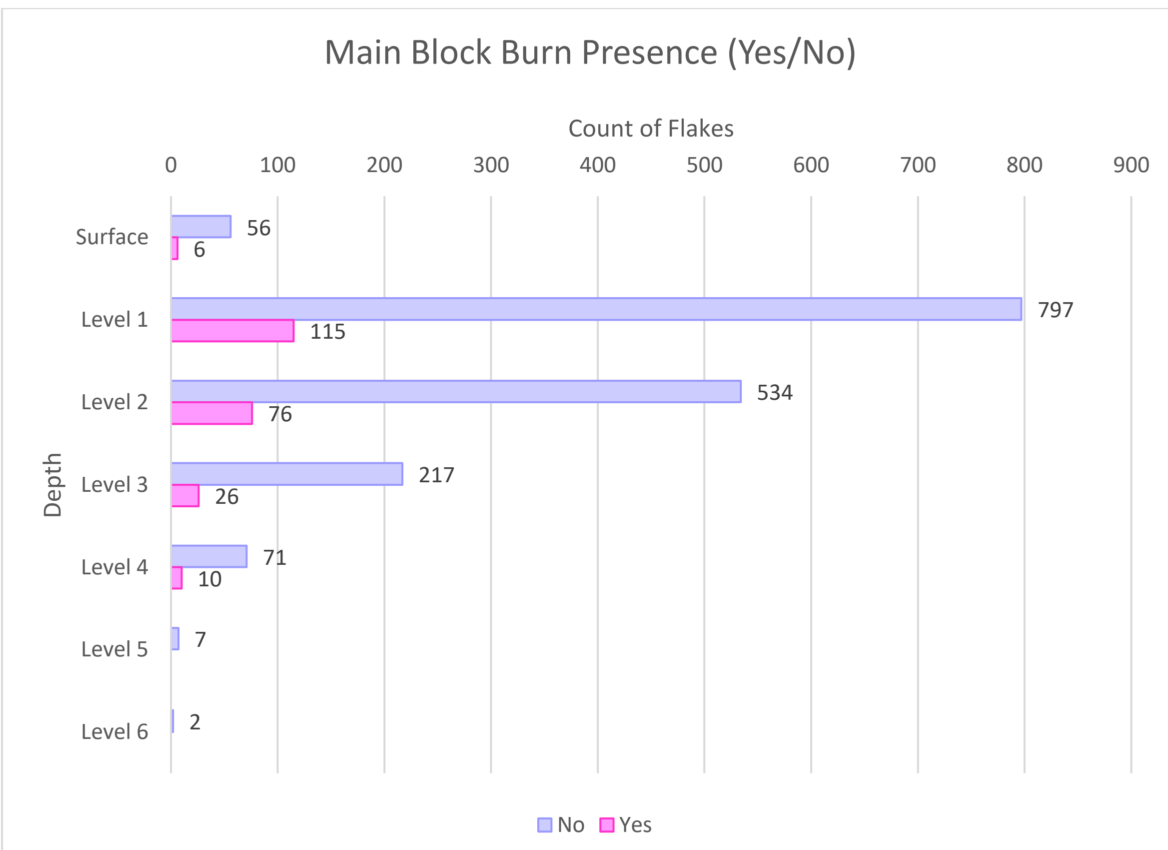

Figure 113. Burned Flake Counts by Depth, Main Block. Burned flakes (pink) appear from the surface through level five, with peaks in levels one to two. This vertical spread suggests cultural burning rather than a single surface fire.

To the north, unit 1018_1040 exhibits the highest burn percentage in the block, with 48.48% (16 of 33 flakes) thermally altered (Figure 114). Units 1017_1040 and 1017_1041 show lower burn frequencies of 11.76% and 8.70%. This pattern suggests a focal area of fire-related activity centered on 1017_1039, 1019_1039, and 1018_1040, possibly reflecting hearth use or thermal discard practices.

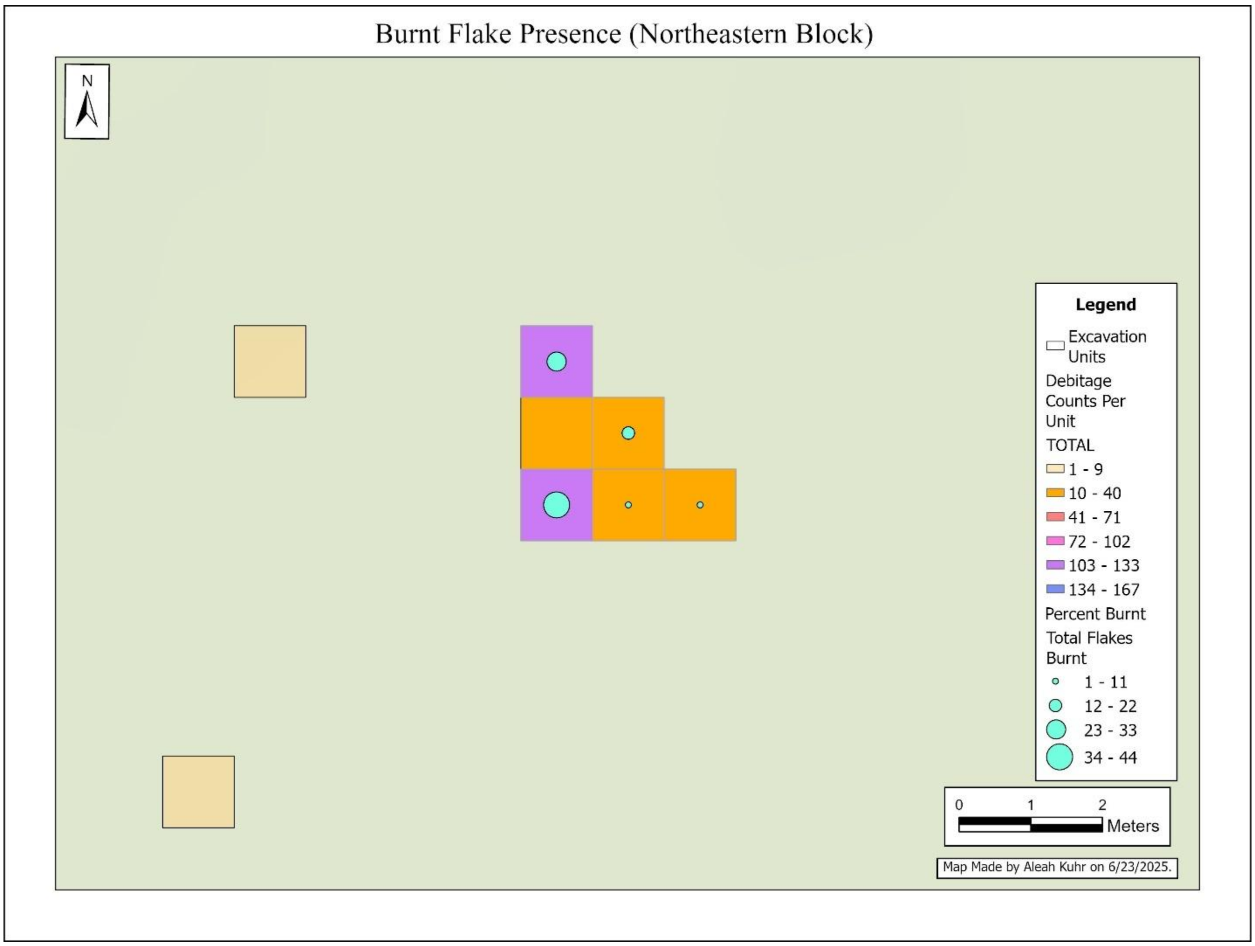

Figure 114. Five of six units in the Northeastern Block contain burned flakes. Highest burn concentrations occur in 1017_1039, 1019_1039, and 1018_1040, suggesting a focused zone of fire-related activity.

The vertical distribution of burned flakes in the Northeastern Block indicates thermal alteration across multiple levels, though it is heavily concentrated in the upper 20 cm. Level one contains the highest number of burned flakes (n = 53), followed by level two (n = 30). Smaller quantities persist through levels three and four (n = 5 and n = 2), while no burned flakes were recorded below level five.

Although burning is most frequent in the upper levels, its presence through at least 40 cm of the deposit suggests more than a recent surface fire (Figure 115). Like the Main Block, this pattern is more consistent with cultural fire use over time, likely associated with cooking activities, rather than a single post-occupational burning event such as a forest fire (Buenger 2003).

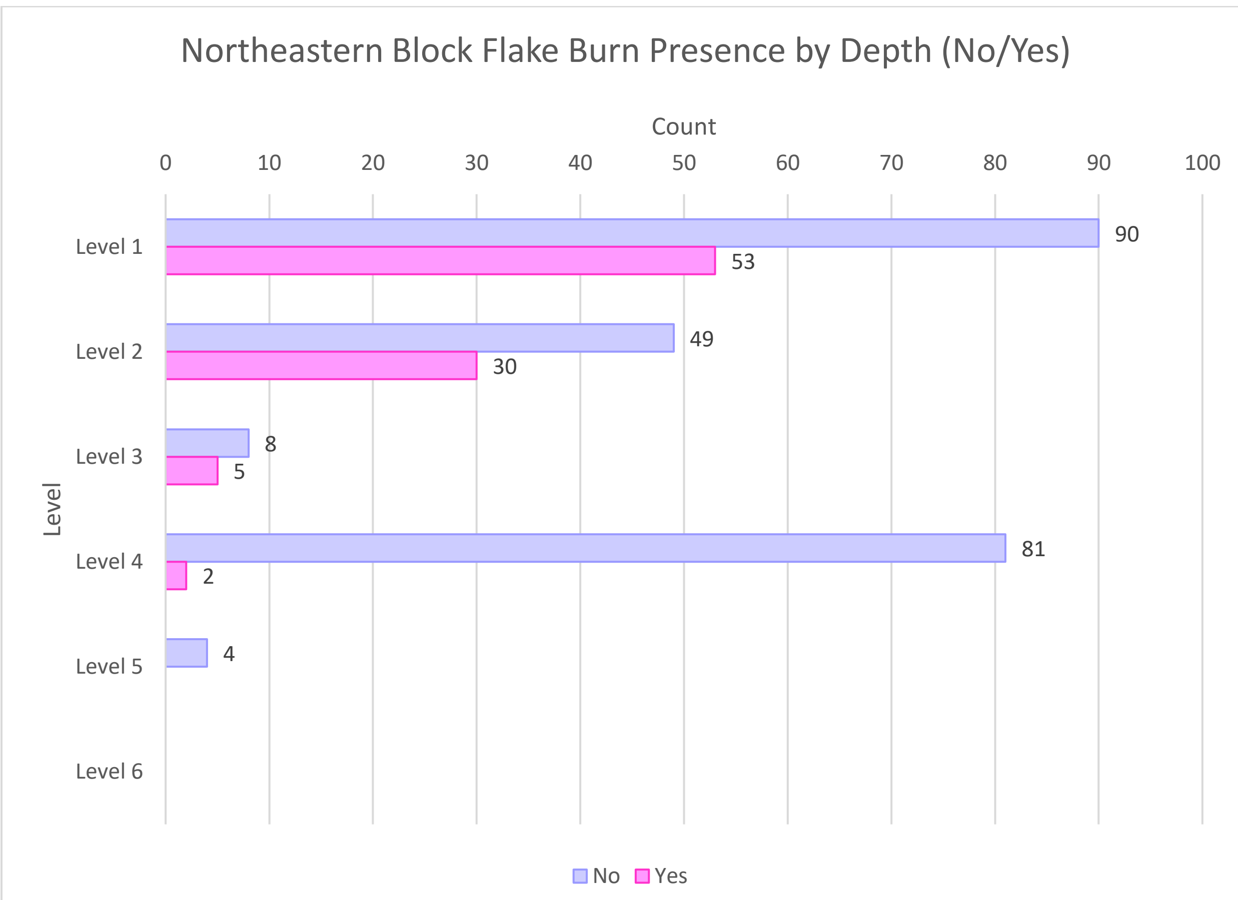

Figure 115. Burned flakes (pink) are concentrated in levels one and two but extend through level four, suggesting cultural burning rather than a recent surface fire.

Plotting artifact density (n/m²) against the percentage of burned flakes allows archaeologists to test for spatial relationships between activity intensity and proximity to heat sources, typically hearths. A positive correlation supports the idea that burning is the byproduct of cultural behaviors centered around fire use, such as cooking, tool production, or refuse disposal. A lack of correlation suggests either more dispersed activities, secondary burning events (e.g., wildfires), or post-depositional disturbances. Units that are high in both density and percentage of burned artifacts likely represent hearth-centered activity areas, whereas outliers can indicate unique events like dump zones or specialized tasks performed away from fire.

There is no clear positive correlation between flake count and percent burned (Figure 116). High-density units do not consistently have high burning. In fact, the highest-density units (right side of the graph, especially beyond 100 flakes) tend to have lower burn percentages (mostly under 15%). This pattern challenges the idea of hearth-centered activity, where intensive flake production would be expected near fire features. However, several outliers complicate this interpretation. In the Northeastern Excavation Block, unit 1018_1040 contains only 33 flakes, yet nearly half (48.48%) show evidence of burning. Similarly, unit 1017_1039 includes 113 flakes, with 44 (38.94%) burned, and unit 1019_1039 has 24 burned out of 104 (23.08%). The Main Block also features notable outliers: unit 1006_992 has four burned flakes out of 12 (33.33%), 1003_994 has 15 burned out of 55 (30%), and 1003_996 has 23 burned out of 78 (29.49%). These isolated high-burn units suggest the presence of localized fire-related activity.

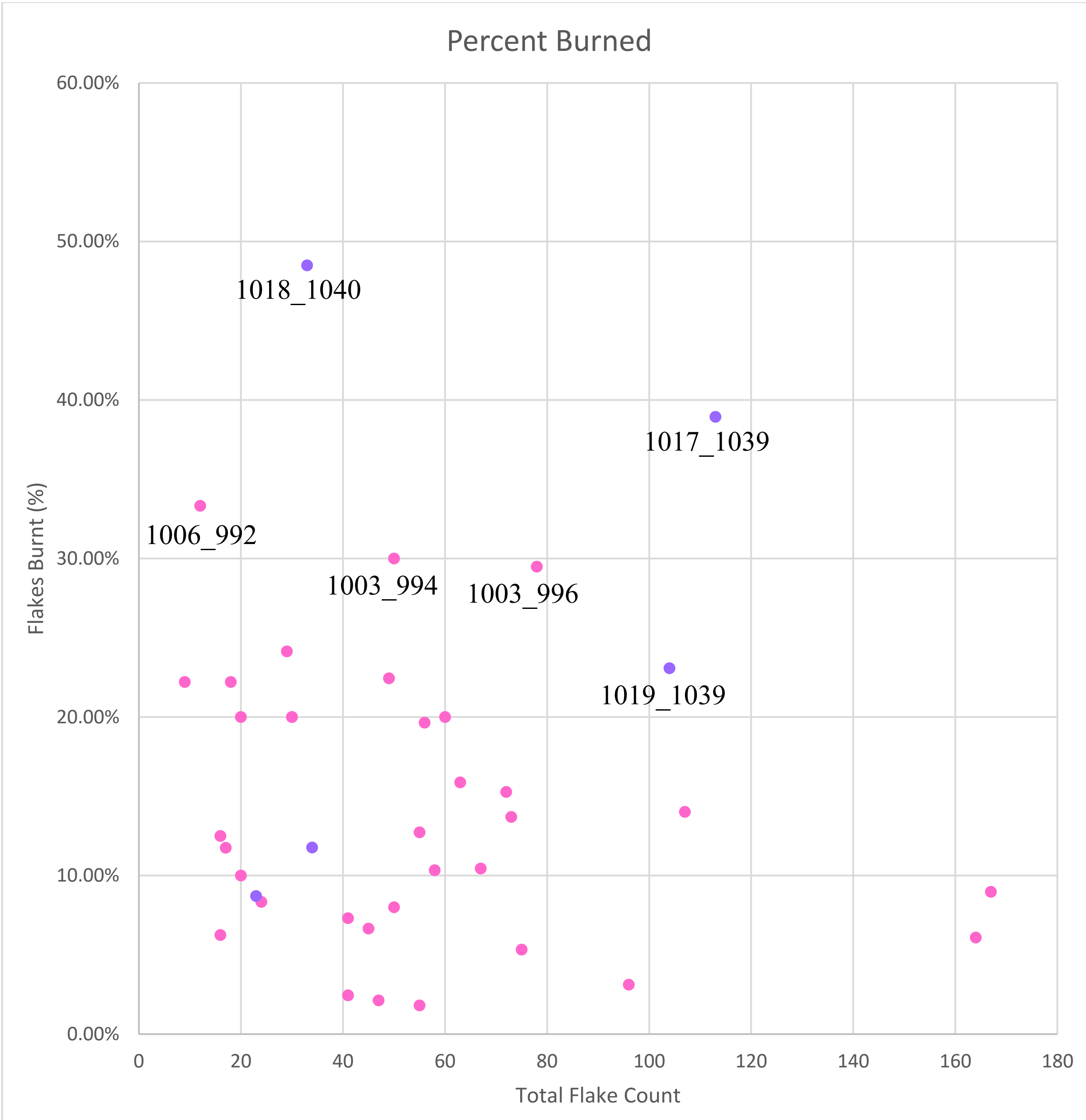

Figure 116. Purple (Northeastern Block) has fewer points, but includes the highest % burned values (e.g., one unit near 50% burned, another around 40%). Pink (Main Block) points are more tightly clustered between 10–30% burned, with most high-flake-count units having lower burn percentages, possibly suggesting more consistent knapping areas with less burning or burning offset from flaking zones.

Burning Trends

The spatial and vertical distribution of burned flakes across both the Main and Northeastern Excavation Blocks suggests that thermal alteration at the site is primarily of cultural origin rather than the result of a single post-occupational fire event such as a forest fire.

Burned lithics are widespread, but they vary in both frequency and concentration, forming clusters that possibly reflect localized fire use. While a clear positive correlation between flake density and burn percentage is absent, several outlier units in both blocks exhibit high burn percentages, even when total flake counts are low to moderate. These outliers likely represent heart-centered activity areas.

In the Main Block, units such as 1003_994 (30% burned), 1003_996 (29.49%), and 1006_992 (33.33%) demonstrate localized high burn signatures not directly tied to the densest artifact concentrations. In the Northeastern Block, units like 1018_1040 (48.48%), 1017_1039 (38.94%), and 1019_1039 (23.08%) show similar localized burning, possibly reflecting a distinct cluster of thermal activity. The vertical distribution of burned flakes, extending across multiple levels in both blocks, especially within the top 30–40 cm, further supports a scenario of recurrent cultural fire use over time, rather than a shallow-burning surface event.

Overall, these patterns reflect a site structured by small, hearth events most likely associated with food processing or tool maintenance tasks. The temporal spread of burned material across multiple excavated levels suggests that these fire episodes were not all simultaneous but instead reflect use of the site over time. To further explore these burning events, the following section examines how thermally altered flakes correspond spatially and with other burned materials such as faunal remains, projectile points, and tools to further understand how this site was utilized.

Burned Materials

To further evaluate the role of fire use at the site, the analysis now turns to other thermally altered materials, starting with burned bone. While burned flakes are widespread, making it difficult to pinpoint exact hearth locations, examining where they co-occur with other fire-modified artifacts, such as bone and other materials, can help refine the search for activity areas. If burned faunal remains overlap spatially and vertically with thermally altered lithics, these concentrations may represent past hearth locations (Bartram 1991). This approach offers a way to identify "invisible hearths" not through clear structural features, but through patterned associations of fire-altered materials related to activities like cooking or marrow extraction.

In the main excavation block, cell 1005_992 stands out with the highest concentration of bone fragments across the entire site, containing 14 fragments, all of which are burned (Figure 117). Several adjacent units also exhibit exclusively burned bone, including 1006_993, 1005_993, 1004_993, and 1004_994, each with a single burned fragment. Additional nearby cells, 1003_994, 1005_994, and 1006_994, contain higher bone counts with mixed burning patterns; for instance, 1005_994 contains six fragments, three of which are burned (50%). A northeastern cell, 1002_995, holds one fully burned fragment, and another cell to its northeast has seven bone fragments, six of which are burned (85.71%). Altogether, these units form a concentrated cluster of burned bone fragments within the main block, stretching approximately three to four meters and suggesting a localized zone of intense burning activity.

In the Northeastern Block, burned bone is extremely limited (Figure 118). Only one cell, located near the center-east portion of the block, contains bone fragments (n = 2), both of which are burned. No other units in the block yielded bone, suggesting minimal use of fire in this area for activities that leave behind bone.

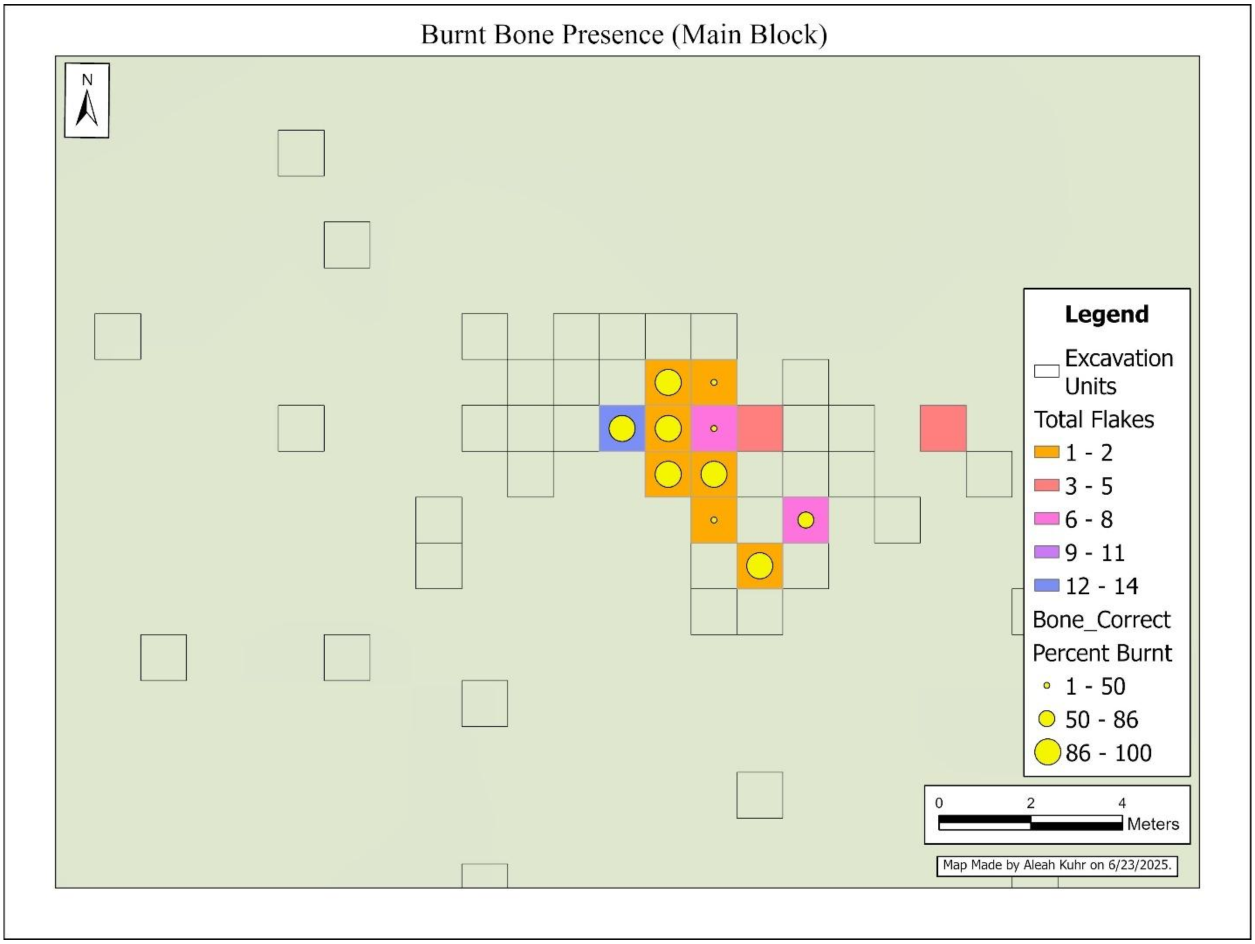

Figure 117. Map showing the total number of burned flakes per excavation unit (color gradient) and the percentage of burned bone (yellow circles). A cluster of high burning occurs east of unit 1005_992.

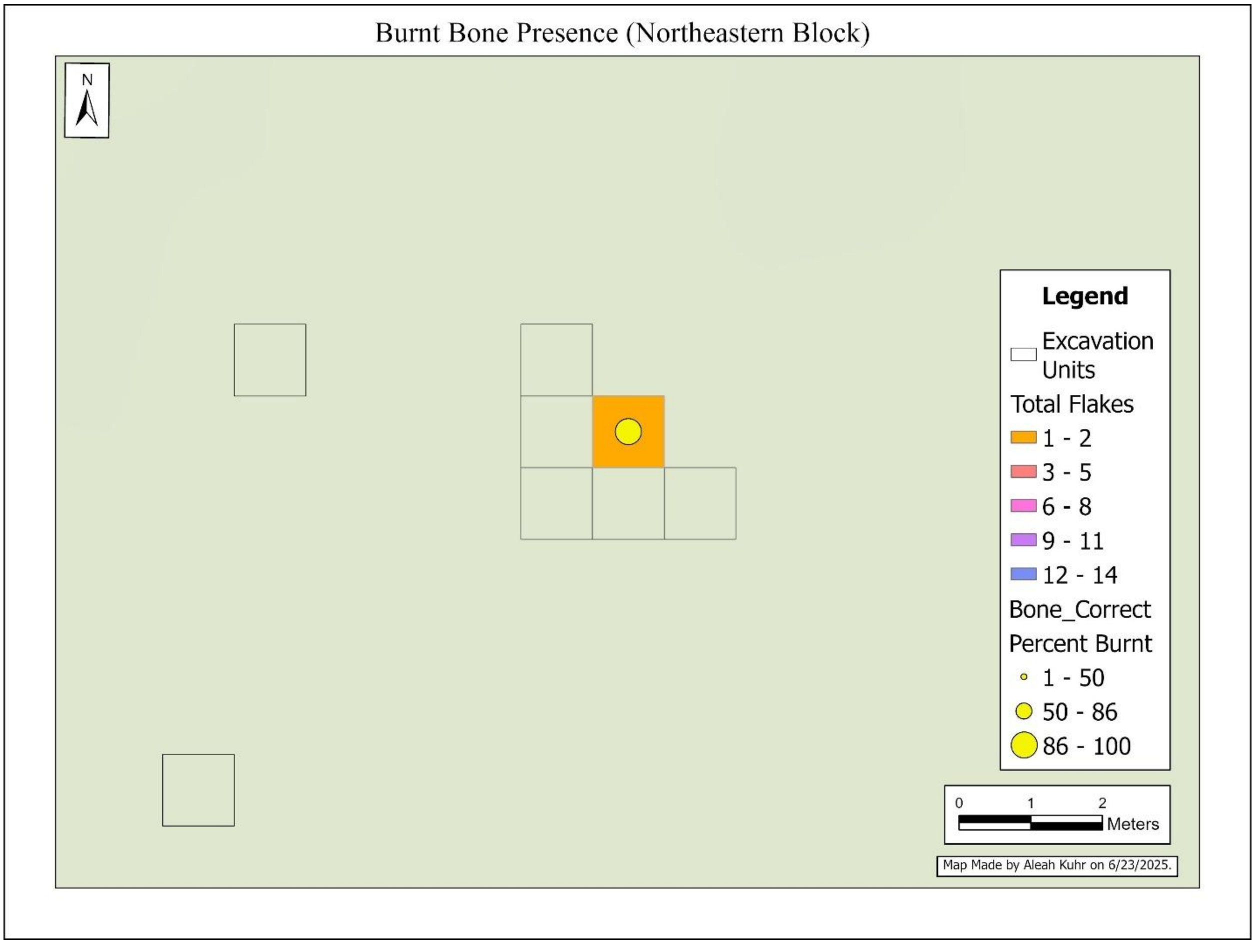

Figure 118. Burned bone distribution in the Northeastern Block. Only one cell contains bone (n = 2), both burned (100%).

A vertical analysis of burned versus unburned faunal remains shows multiple patterns of fire use across stratigraphic levels (Figure 119). At level four (40 cm), all bone fragments (n = 14) are burned and derive from a single unit, cell 1005_992, the densest bone concentration on site. This highly localized, intensely burned deposit strongly suggests a distinct burning event, likely representing the remnants of a hearth. In contrast, levels one and two show mixed burning patterns, with six unburned and five burned fragments at level one, and six unburned and eight burned at level two. These distributions may reflect more generalized discarding of materials affected by fire or lower-intensity near-surface-level burning activities. Level three presents very few bone fragments overall (n = 3), with just one showing signs of burning, which may indicate a limited occupation.

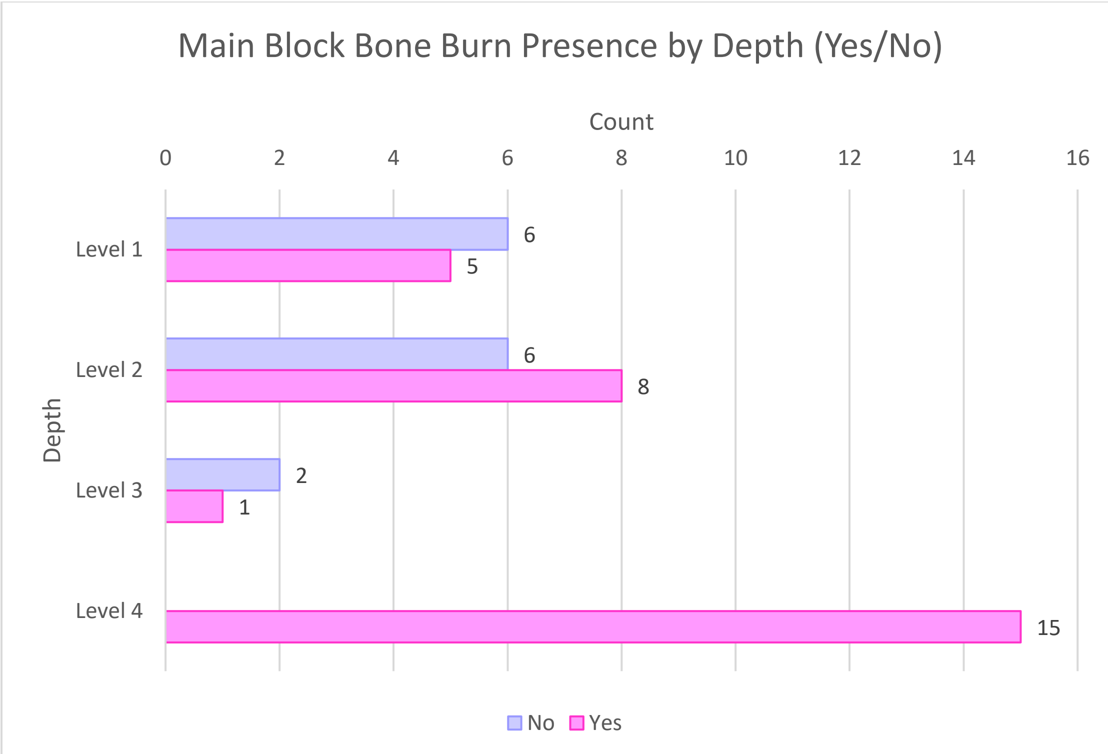

Figure 119. Bone presence in the main block is often followed by a high percentage of bones burned, which may help us refine the location of hearth-related activities.

To refine interpretations of fire-related activity areas, the analysis now turns to the spatial overlap between burned bone and thermally altered flakes, examining where these materials co-occur to identify possible zones of concentrated burning behavior (Figure 120). The most prominent faunal concentration is in cell 1005_992, which contains 14 burned bone fragments at 40 cm depth (level four); however, only one burned flake is found at that same depth. In contrast, neighboring cells, including 1005_994 (15 burned flakes, three burned bones), 1005_993, 1004_993, 1004_994, and 1003_994, exhibit a consistent pattern of high burned flake counts alongside isolated burned bone fragments. These patterns point to peripheral activity zones where tool manufacture or maintenance occurred near areas of faunal processing (Bennett 1999). Notably, cell 1003_996 contains six burned bones and six burned flakes, suggesting a more balanced fire-related activity area involving both lithic and faunal elements. These distributions support the identification of spatially structured burning activity at the site, including at least one 'invisible hearth' and adjacent zones of more diffuse use.

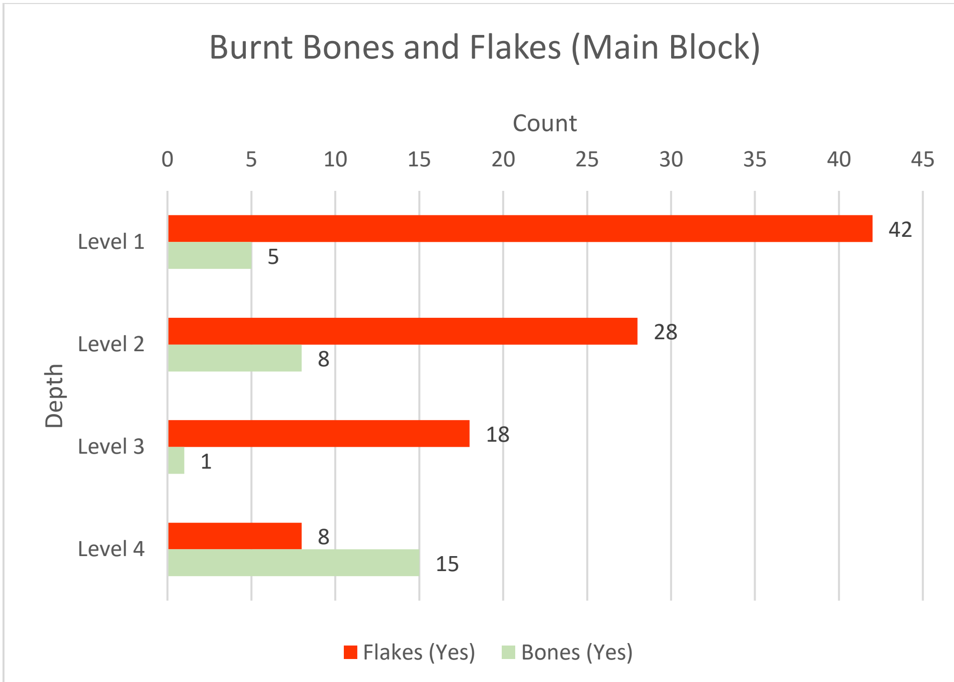

Figure 120. Burnt bones and flakes by depth with a clear dominance in the upper 20 centimeters.

While burned flakes and faunal remains offer the clearest evidence for fire-related activity due to their relatively high frequencies within the Porcupine Peak assemblage, they are not the only thermally altered materials present at the site. Other artifact types (projectile points, angular debris, bifaces, and fire-cracked rock), though less numerous, also show signs of burning and contribute to the overall spatial pattern of heat-altered materials. To build a more comprehensive picture of fire use and identify potential activity clusters, the following section examines the total number of burned artifacts per unit. By considering all thermally modified materials together, it becomes possible to pinpoint additional zones of concentrated burning that may not have been apparent through flake or bone data alone.

Mapping the total number of burned artifacts per unit in the Main Excavation Block reveals a prominent cluster (approximately 3 to four meters across) in the central portion of the block, which closely overlaps with the previously identified cluster of burned bone (Figure 117 and Figure 121). This central cluster is centered around units 1005_993 and 1004_993 and includes two particularly high-density cells, 1005_992 and 1005_994, each containing between 18 and 26 thermally altered artifacts, separated by only one meter. Bridging the space between these units are three adjacent cells, 1006_993, 1005_993, and 1004_993, each containing between nine and 17 burned artifacts. Extending southwest within the same cluster are cells 1003_994 and 1002_994, which also fall within the nine to 17 range. Surrounding this central cluster are 11 additional units with lower counts, each containing between one and eight burned artifacts, suggesting a gradient of burning intensity.

Outside the central cluster, a few smaller concentrations of burned material appear. To the northwest, unit 1006_991 also contains nine to 17 burned artifacts, while to the northeast, units 1006_996, 1005_997, and 1005_999 exhibit similar totals but are more spatially dispersed and not as tightly clustered. One outlier unit, 1003_996, stands apart with the highest total of burned artifacts in the block (27–35), including 23 burned flakes and six burned bones. This cell is surrounded by units with considerably lower counts (one to eight burned artifacts), marking it as a clear outlier in the block. As discussed earlier in the chapter, 1003_996 previously emerged as a potential burning locus based on its high flake and bone burn percentages, suggesting a localized and possibly discrete fire-related activity area.

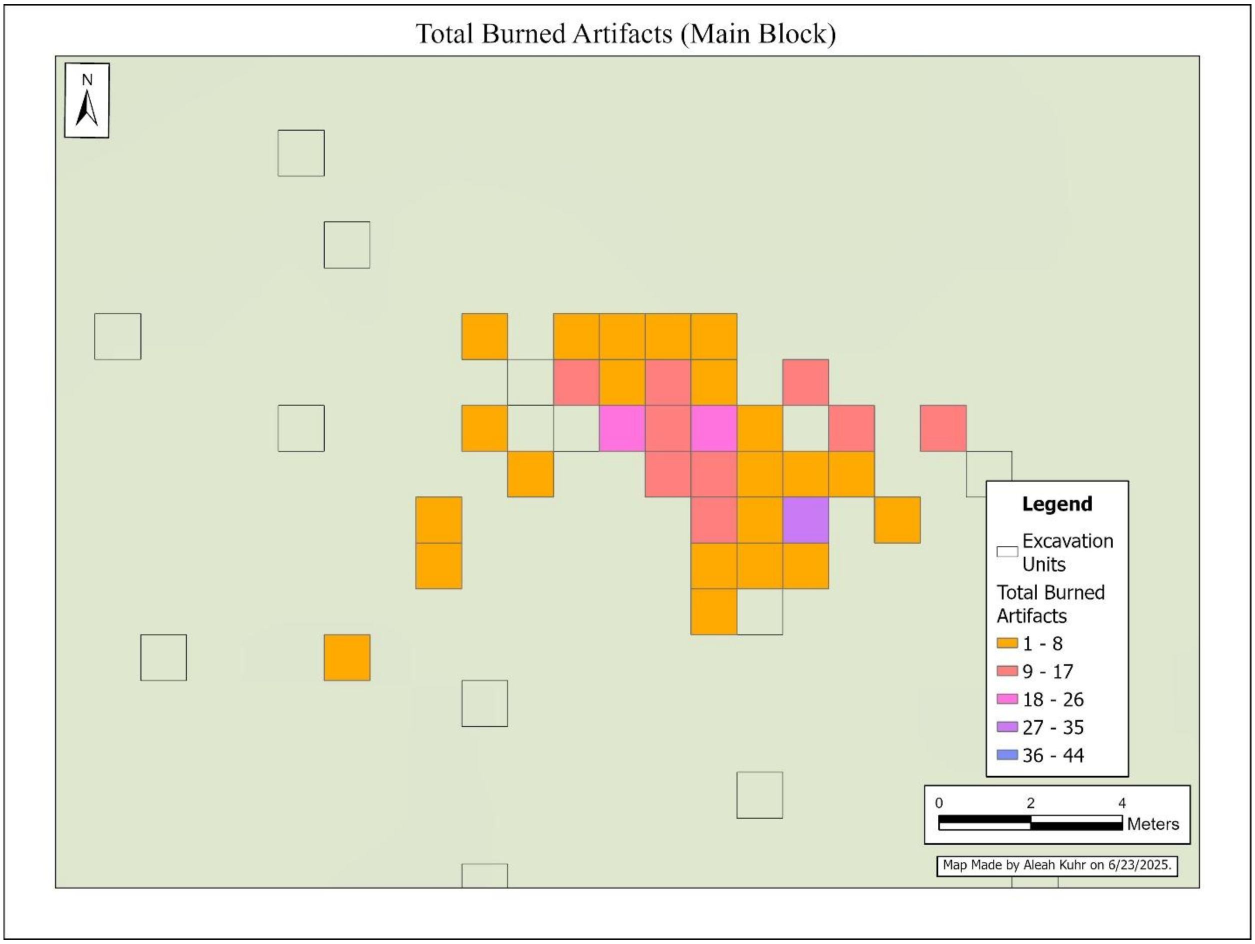

Figure 121. The main excavation block contains the total amount of burned artifacts per excavation unit, forming a prominent burn cluster.

Vertical analysis adds further insight into the central burn cluster. Most burned bones within this cluster are concentrated in levels one and two, with 12 fragments falling within the upper 20 cm of the deposit (Figure 122) (Appendix F). These upper levels also include a burned biface and a burned angular debris fragment, showing that burning affected a limited range of artifact types, including both lithic and faunal materials. All burned bone in the Main Block, except a single fragment in 1002_995, is located within this central cluster. However, some deeper deposits complicate this pattern. Unit 1005_992 contains 14 small burned bone fragments and one burned angular debris fragment in level four (30–40 cm), while 1005_994 and 1006_994 each contain a single burned bone fragment in levels four and three. These deeper finds suggest that while most burning occurred near the surface, some activity or post-depositional movement introduced thermally altered materials into deeper contexts.

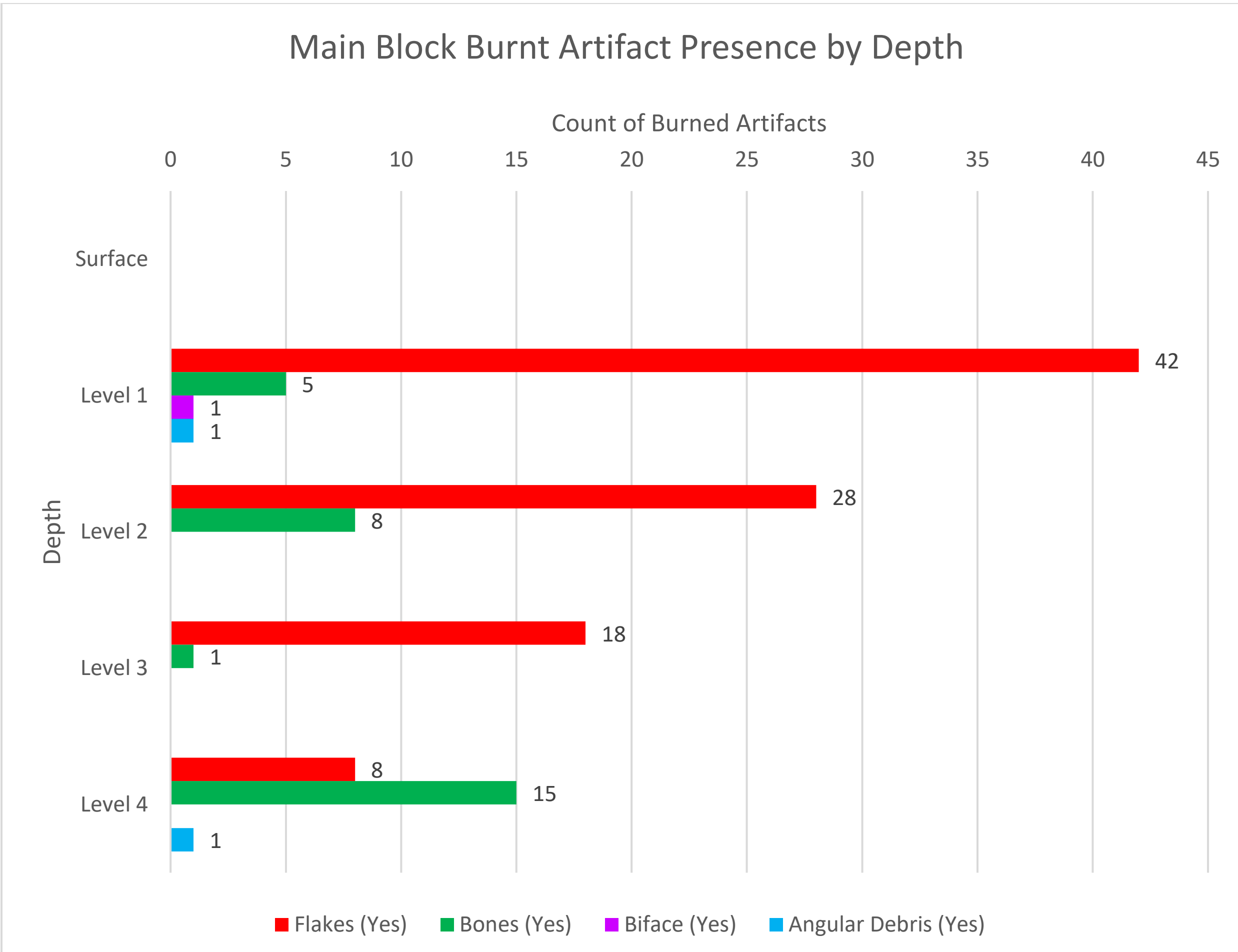

Figure 122. Vertical distribution of burned materials in the Main Block shows a strong concentration in the upper 20 cm, with most burned bone located in the central cluster.

Overall, the Main Block contains 22 cells with one to eight burned artifacts, nine cells with nine to 17, two cells with 18–26, and a single unit, 1003_996, with 27–35 (Figure 121). These patterns reinforce earlier findings, showing both a large central burn cluster with internal variability and smaller, possibly isolated hotspots that may represent discrete episodes of fire use. These spatial and vertical patterns likely reflect a level of hearth-centered activities as well as some discard behaviors (Binford 1983; Goldberg et al, 2017; O'Connell 1987). The central cluster's intensity and diversity, the overlap of flakes, bones, angular debris, and a biface, suggest use of a central fire area. The concentration of thermally altered materials within the upper 20 cm in much of this cluster further supports shallow, surface-level burning episodes. However, deeper deposits of burned bone and angular debris in units such as 1005_992 and 1005_994 likely represent earlier fire use rather than vertical displacement. Given the site's compressed mountain stratigraphy and prior evidence of vertical mixing, the deeper burned materials are best interpreted as remnants of cultural activity that extended into lower levels through vertical movement and excavation processes (Benedict 1992; Schiffer 1987). While these concentrated distributions provide strong evidence for, culturally driven fire use, the spatial resolution of burning patterns may also be shaped by preservation biases or excavation limits. Some lower-density areas could reflect incomplete preservation rather than an actual absence of burning. Nonetheless, aggregating burned artifact counts across material types has clarified broader trends that might be less visible when examining flakes or bones in isolation.

The Northeastern Block shows a prominent concentration of burned artifacts on its western edge, extending vertically from the top to the bottom of the block (Figure 123). The top row cell, 1019_1039, contains between nine and 17 artifacts, while in the middle row, cells 1018_1039 and 1018_1040 each contain between 18 and 26 burned artifacts. The third row continues this pattern, with cell 1017_1039 holding the highest density at 36–44 burned artifacts. However, the two adjacent cells to the east, 1017_1040 and 1017_1041, have noticeably fewer burnt artifacts, ranging from one to eight. Unlike the Main Block, this block contains very few bones; only two burned bones were identified in cell 1018_1040, both lacking provenience level data. Furthermore, the Northeastern Block contains four burned projectile points, a feature absent from the Main Block. Most burned materials are concentrated within the upper 20 cm of the profile and are dominated by burned flakes (Figure 124). At level one (1–10 cm), cell 1018_1040 contains one burned projectile point, and 1017_1041 includes some fire-cracked rock. At level two (10–20 cm), 1019_1039 contains a burned projectile point, while 1018_1039 includes both a burned biface and a burned projectile point. In level three (20–30 cm), artifact frequency drops, with only six burned artifacts recorded between cells 1019_1039 and 1018_1039. Among them, 1018_1039 holds a single burned projectile point.

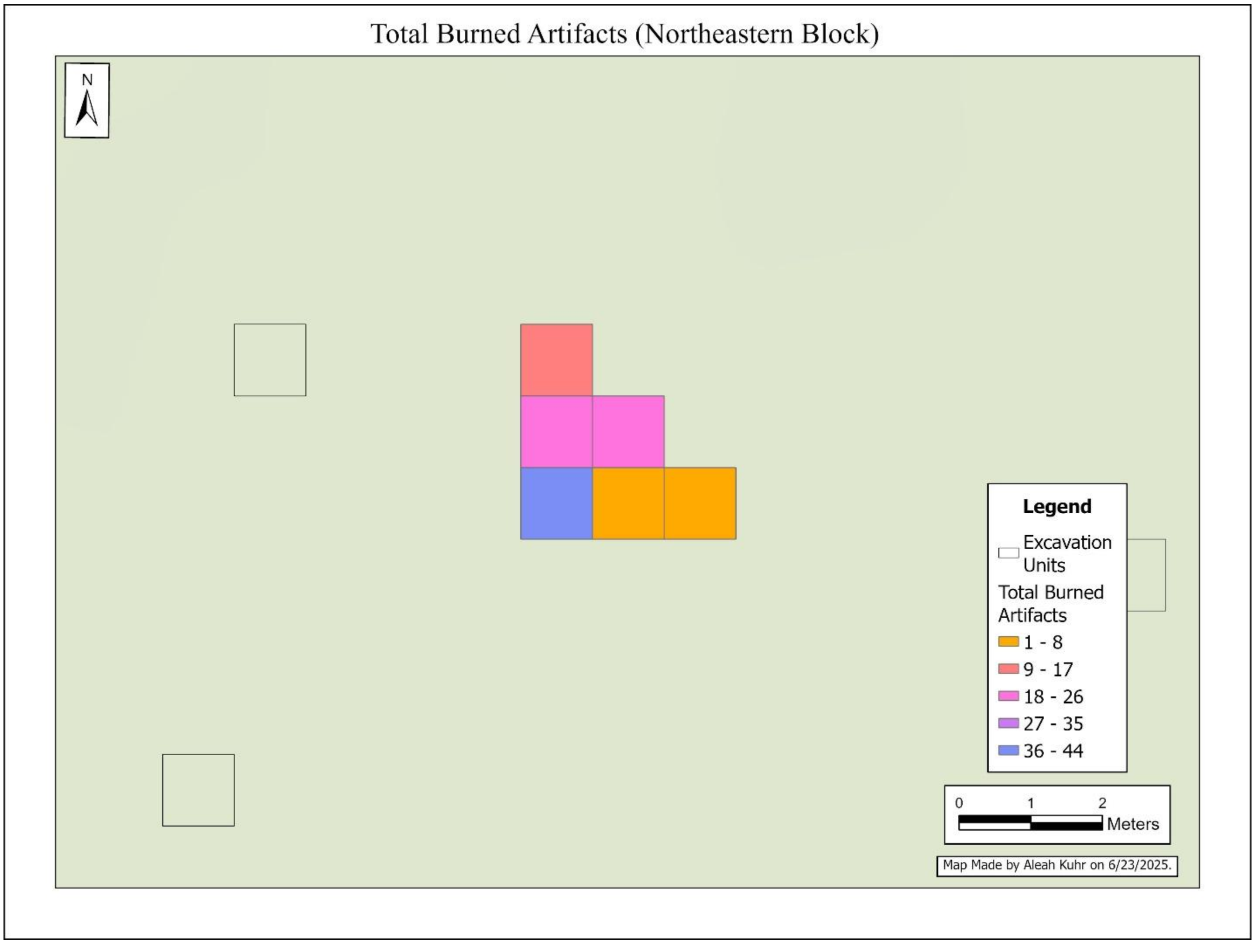

Figure 123. Northeastern Excavation block with totals of all burned artifacts demonstrating a cluster to the western edge of the block.

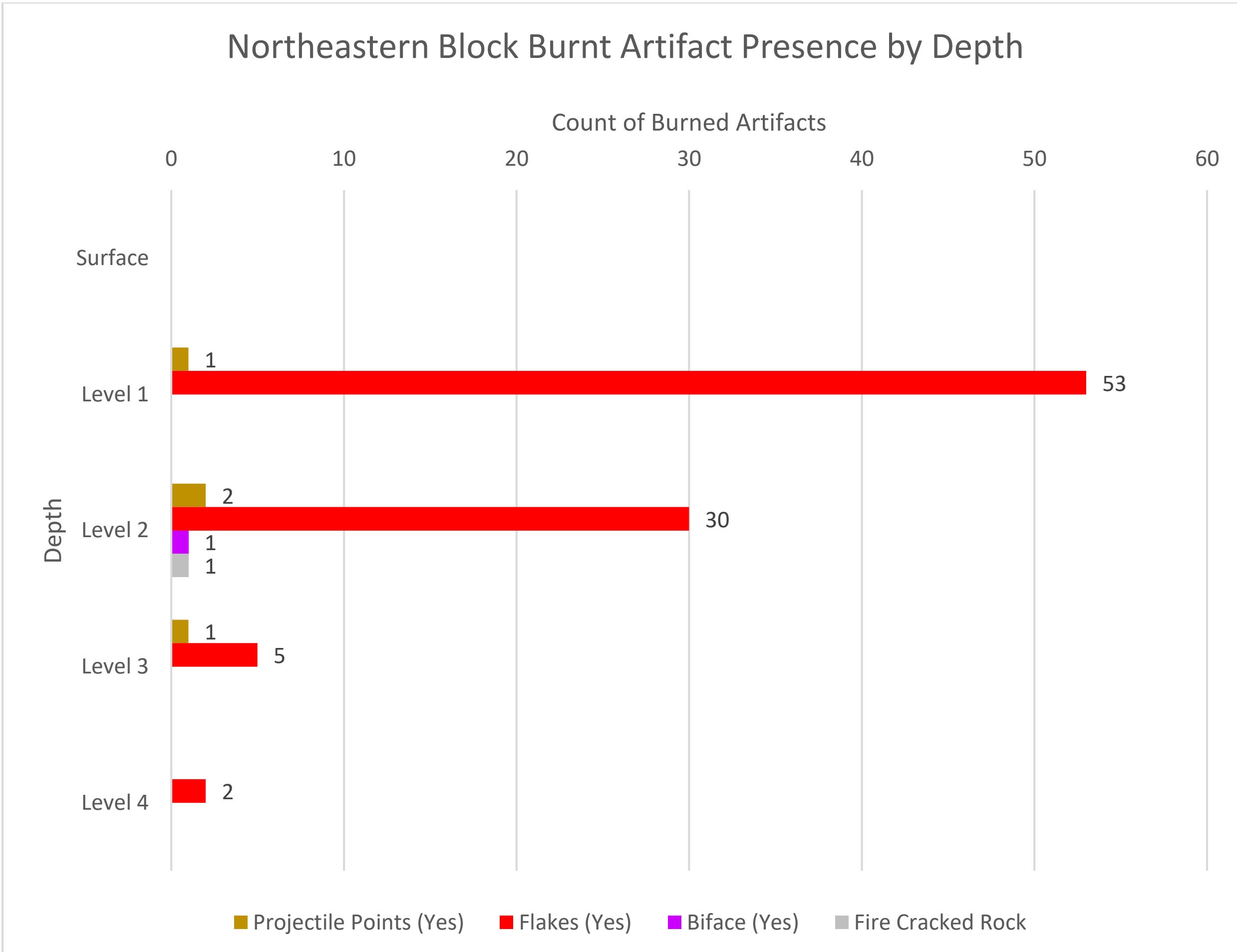

Figure 124. Burned artifacts in the Northeastern Block are densely concentrated along the western edge, especially in the upper 20 cm. This cluster includes burned flakes and four burned projectile points, with minimal burned bone present.

Overall, the northeastern block contains two cells with one to eight artifacts each, two cells containing 18 – 26 artifacts each, one cell containing nine to 17 artifacts, and one containing 36 – 44 artifacts. The vertical and horizontal concentration of burned artifacts, especially along the western edge, likely reflects a focused area of burning such as a hearth, fire use, or refuse disposal (Binford 1983; Goldberg et al, 2017; O'Connell 1987; Schiffer 1987). The continuity from top to bottom suggests some post-depositional movement downward. The dominance of burned flakes and the presence of four burned projectile points (absent from the Main Block) may indicate on-site tool production, use, or maintenance near a fire. Burning could result from intentional disposal in a fire, accidental exposure, or the use of fire in processing tasks. The scarcity of burned bone in contrast to the Main Block, and the presence of diagnostic tools, may point to differing activity areas. The Northeastern Block might have been more related to tool-related tasks, while the Main Block may reflect food processing or cooking.

Burning Patterns Conclusion:

The spatial and vertical distribution of burned materials across the site supports a pattern of culturally driven fire use rather than a single occupation or post-occupational event. In both the Main and Northeastern Excavation Blocks, thermally altered artifacts, including flakes, bone, projectile points, angular debris, and bifaces, form distinct clusters that reflect localized activity areas structured around fire. The Main Block exhibits a broad, artifact-rich central burn cluster likely associated with food processing or cooking, while the Northeastern Block presents a more tool-focused zone, defined by high burned flake counts and diagnostic artifacts but limited faunal material. Vertical distributions further reinforce these interpretations, with burned materials concentrated primarily in the upper 20–30 cm but also present in deeper levels, indicating multiple occupation episodes over time. Although burning intensity varies across units and not all high-density zones correspond with high burn percentages, the presence of key outliers and overlapping distributions of different burned materials helps identify hearth-related activity areas. These patterns reflect how fire shaped spatial organization and point to use of the site for varied cooking and technological activities.

5ST98 Projectile Points

Projectile points and related portions offer some understanding of site structure because they provide both temporal and behavioral information. Morphological characteristics help assign relative ages to points (refer to Chapter IV), allowing archaeologists to track changes in occupation over time and evaluate whether activity areas shifted or remained stable (Benedict

1990; Dinkel 2021). The vertical distribution of point types can reveal whether layers are intact or if artifact positions have been altered post-deposition. In addition to typology, examining the raw materials used for projectile point manufacture shows technological choices, mobility, and resource access (Benedict 1990; Metcalf et al, 1991). Certain materials may signal on-site tool production or maintenance, while others, especially non-local types, may reflect broader patterns of trade, transport, or curated toolkits (Benedict 1990; Nelson 1991). When combined, these data help identify narrow occupations, shifts in site use, or the persistence of certain behaviors tied to specific areas, furthering our understanding of how space was structured and used spatially and temporally.

To investigate how activities were organized across the site, I analyzed the distribution of projectile point portions by cell unit. Each projectile point was categorized based on its completeness and which part of the tool was preserved. The categories used include proximal portions (PR), which represent the base or hafting area; PR/MS, which includes the base, haft, and a substantial portion of the midsection; midsections (MS) alone; distal tips (DS); lateral edge fragments (LT); complete points (CO); and nearly complete points (ABC), which are missing only the smallest fragment. These distinctions offer valuable insight into tool use, breakage, and discard behavior. Distal tips often break upon impact and are typically left behind at kill or butchery areas. In contrast, proximal portions like PR and PR/MS are more likely to remain attached to hafting elements and thus tend to be transported back to camp areas for maintenance and eventual discard (Binford 1977, 1979; Binford and O'Connell 1984; Nelson 1991). Complete and nearly complete points may represent tools that were lost or discarded with minimal use. By comparing the spatial distribution of these point portions across the site, I can identify functional differences in how space was used, such as areas associated with hunting, processing, or tool maintenance.

The most common type of portions within projectile points at Porcupine Peak is PR/MS (base and midsection) (n = 17), with 14 present in the Main Excavation Block, two within the Northeastern Excavation Block, and one in the southern cell 983_994 (Table 20). The other common type is PR (proximal base) (n = 12), with 11 in the Main Excavation Block and one in the Northeastern Excavation Block. The next most frequent is ABC (all but complete) points (n = 10), with eight in the main block and two in the northeastern block. This is closely followed by CO (complete) points (n = 9), with all nine in the main block. Then we have DS (distal tips) (n = 8), with six present in the Main block and two in the northeastern block. Less common is MS (midsections) (n = 6), with four in the main block and two within the northeastern block. There is a total of five MS/DS (midsections with distal tips), with four in the main excavation block and two in the northeastern block. The rarest portion we have is one LT (lateral edge fragment), which was found in the main excavation block.

Table 20. Table representing what projectile point portions are present in each excavation unit.

Cell Unit	ABC	CO	DS	LT	MS	MS/DS	PR	PR/MS
1000_986		1						
1001_995							1	
1002_988					1			1
1002_994	1							1
1002_995		1						
1002_996	1		1					
1003_994			1				1	
1003_995							1	1
1003_998			1				1	
1004_993							1	1
1004_994				1				1
1004_995		1			1	1	1	
1004_997						1		1
1005_985		1						
1005_989			1					
1005_991								2
1005_992							1	
1005_993	3	2						
1005_994		1			1	1	1	
1005_995			1					
1006_990	1							
1006_991								1
1006_993		1				1	1	1
1006_994	1				1			
1006_996	1							2
1007_989			1					
1007_991							1	
1007_993								2
1007_994		1					1	
1017_1039			1					
1017_1041								1
1018_1039	1		1		2			
1018_1040						1		
1019_1039	1						1	1
983_994								1
Total	**10**	**9**	**8**	**1**	**6**	**5**	**12**	**17**

Mapping the distribution of projectile point portions across the excavation grid reveals meaningful spatial patterning tied to distinct activity areas within the site. Starting with the ABC (all-but-complete) points, these are relatively scattered, appearing on the peripheries of the Main Block (e.g., cells 1006_990, 1002_994, 1002_996), with one moderate concentration at 1005_993, where three ABCs were found, and a nearby ABC point in 1006_994. This could suggest localized activity involving near-complete tools, possibly curated or only slightly damaged during manufacture. The Northeastern Block also exhibits a small adjacent pair of ABCs in cells 1018_1039 and 1019_1039, indicating some mirrored tool-use or discard behavior away from the main occupation zone.

Complete (CO) points exhibit a more defined central clustering in the Main Block, particularly in 1005_993 (n = 2 CO), surrounded by single occurrences in 1006_993, 1007_994, 1005_994, and 1004_995, forming a tight cluster of complete projectile points. Two more COs in 1005_985 and 1000_986, eight meters west. Their absence in the Northeastern Block reinforces the idea that the Main Block served as the central activity area, where curated tools were in circulation or deposited.

Distal tips (DS) appear more scattered across the Main Block (e.g., 1007_989, 1005_989, 1003_994, 1005_995, 1002_996, 1003_998), lacking strong clustering, which may suggest more dispersed discard after use. However, the Northeastern Block has a potential micro-cluster in 1017_1039 and 1018_1039. Midsection/distal tip fragments (MS/DS) form a diagonal cluster in the Main Block (1006_993, 1005_994, 1004_995) with a possible extension into 1004_997. A lone MS/DS is present in 1018_1040.

Midsections (MS) show clearer clustering, notably in central cells 1006_994, 1005_994, and 1004_995, which are diagonally aligned, creating a line across the block. A lone MS in

1002_988 might reflect low-density activity or outlier discard. Meanwhile, the Northeastern Block again shows tool-related use in 1018_1039 with two MS fragments, matching its ABC and DS content and strengthening the case for light, task-specific use in that area. Only one lateral edge fragment (LT) was identified in the Main Block (1004_994), offering little interpretive value on its own, though its proximity to PR and PR/MS occurrences may associate it with the broader tool maintenance zone.

The proximal fragments (PR) present one of the most prominent spatial trends: a broad, dense concentration in the Main Block between 1007_994, 1006_993, 1005_994, 1004_995, and 1004_993, suggesting this area was a major hub of hafted tool maintenance, rehafting, or discard. Surrounding cells, 1007_991, 1003_998, 1001_995, may represent spillover or more dispersed discard events. A single PR fragment was found in unit 1019_1039 of the Northeastern Block, with no associated clustering.

Finally, PR/MS fragments form three tight clusters in the Main Block. The first, between 1005_991 (n = 2) and 1006_991 (n = 1), suggests a localized tool discard or rehafting spot. The second, just east, spans 1006_993 (n = 1) and 1007_993 (n = 2), aligning spatially with the MS/DS cluster. The third cluster, in 1004_993, 1004_994, 1003_995, and 1002_994, appears southeast of the others and may mark a secondary zone of tool discard. Scattered PR/MS in 1002_988, 1006_996 (n = 2), and 1004_997 could reflect occasional off-cluster discard events or maintenance in less frequently used cells. The Northeastern Block again shows light but patterned presence in 1019_1039 and 1017_1041.

When grouping the projectile point portions into broader functional categories, spatial overlaps between different parts of the points become more apparent. The ABC and CO categories, which represent complete or nearly complete projectile points, create two larger clusters within the main excavation block (Figure 125). The first cluster is located in the upper center of the block and includes cells 1007_994, 1006_993, and 1004_995, each of which contains one complete point. Cell 1006_994 also stands out for having both one complete point and one all-but-complete point, while cell 1005_993 contains a concentration of three ABC points and two complete points, marking it as a notable hotspot. The second cluster is found on the southern end of the main block, where cells 1002_994 and 1002_996 each contain one ABC point, and cell 1002_995 contains a single complete point. In contrast, the northeastern block shows no overlapping cluster of these types (Figure 126). It contains only two ABC points located in cells 1019_1039 and 1018_1039, and it lacks any complete points altogether, suggesting that nearly complete or complete point fragments are less frequent in this portion of the site.

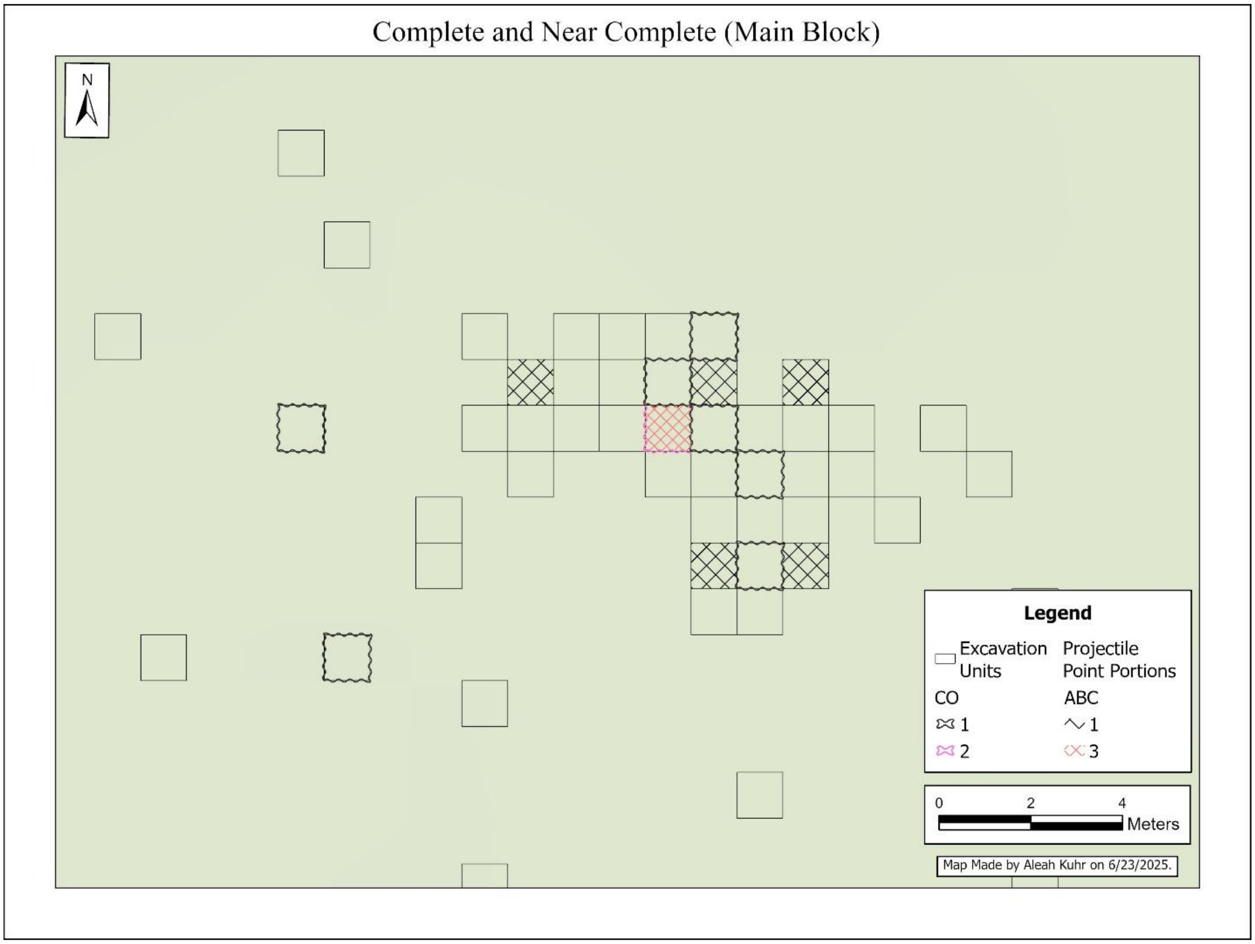

Figure 125. Projectile points that are complete and nearly complete cluster within the upper portion of the main block; this may represent an area with high tool manufacture, maintenance, and discard after minimal use.

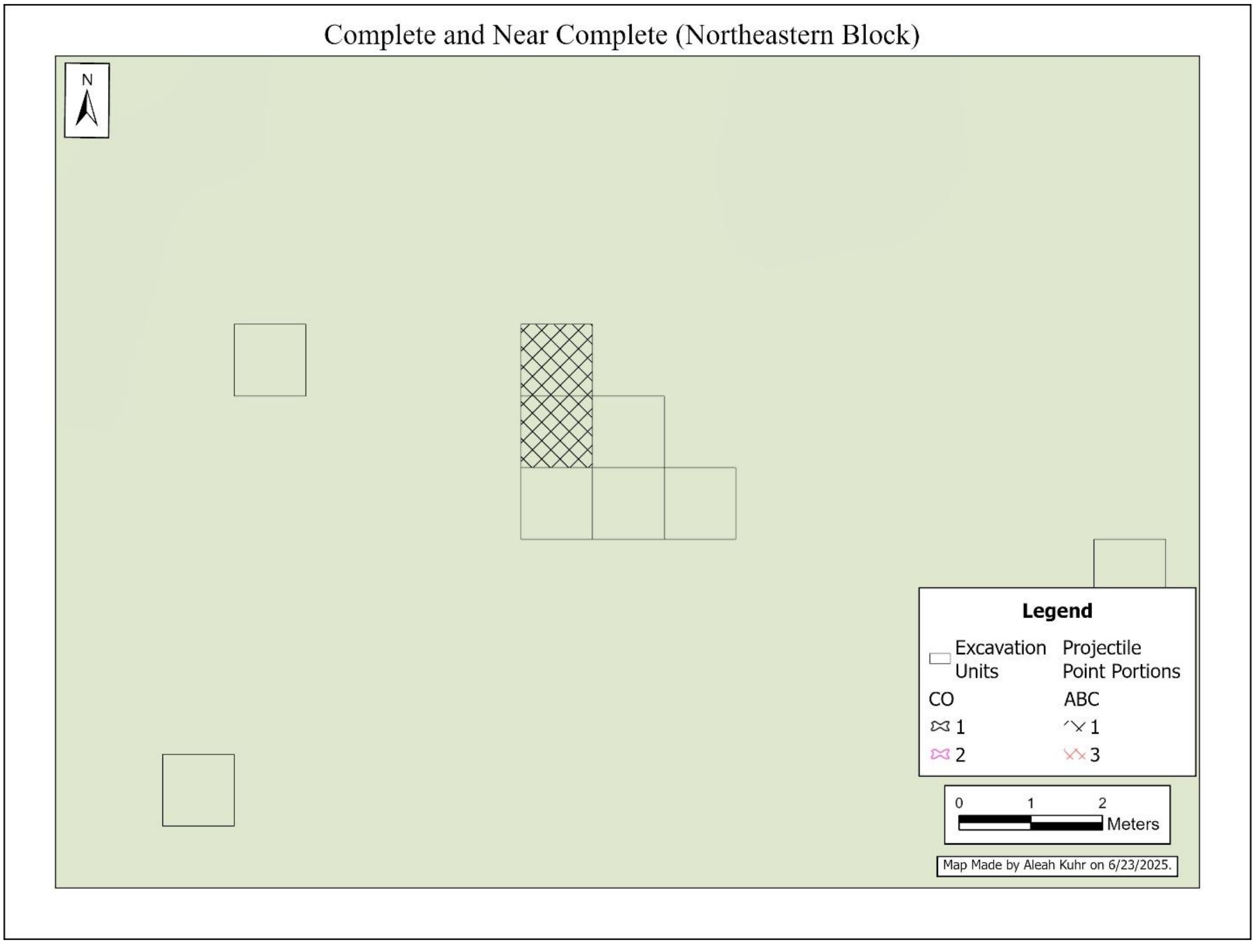

Figure 126. The Northeastern Excavation Block has minimal near-complete projectile points (n = 2), which shows that this part of the site may not have had as much tool maintenance for slightly damaged projectile points.

In the second map showing DS and DS/MS (distal tips and distal tips with midsections), the main block retains the diagonal cluster pattern seen previously between cells 1006_993, 1005_994, and 1004_995, each contains one MS/DS (Figure 127). This pattern is extended by the presence of DS in cells 1005_995 and 1003_994, indicating a slightly broader cluster of distal tool fragments. Additionally, there may be a smaller, more isolated cluster to the east, consisting of cells 1004_997 (n = 1 MS/DS) and 1003_998 (n = 1 DS). In the northeastern block, the cluster is more defined, with cells 1018_1039 and 1017_1039 each containing one DS, and 1018_1040 contributing one MS/DS (Figure 128). Overall, these points suggest possible activity areas focused on tool use or discard, particularly in the southwestern and northeastern portions of the excavation grid.

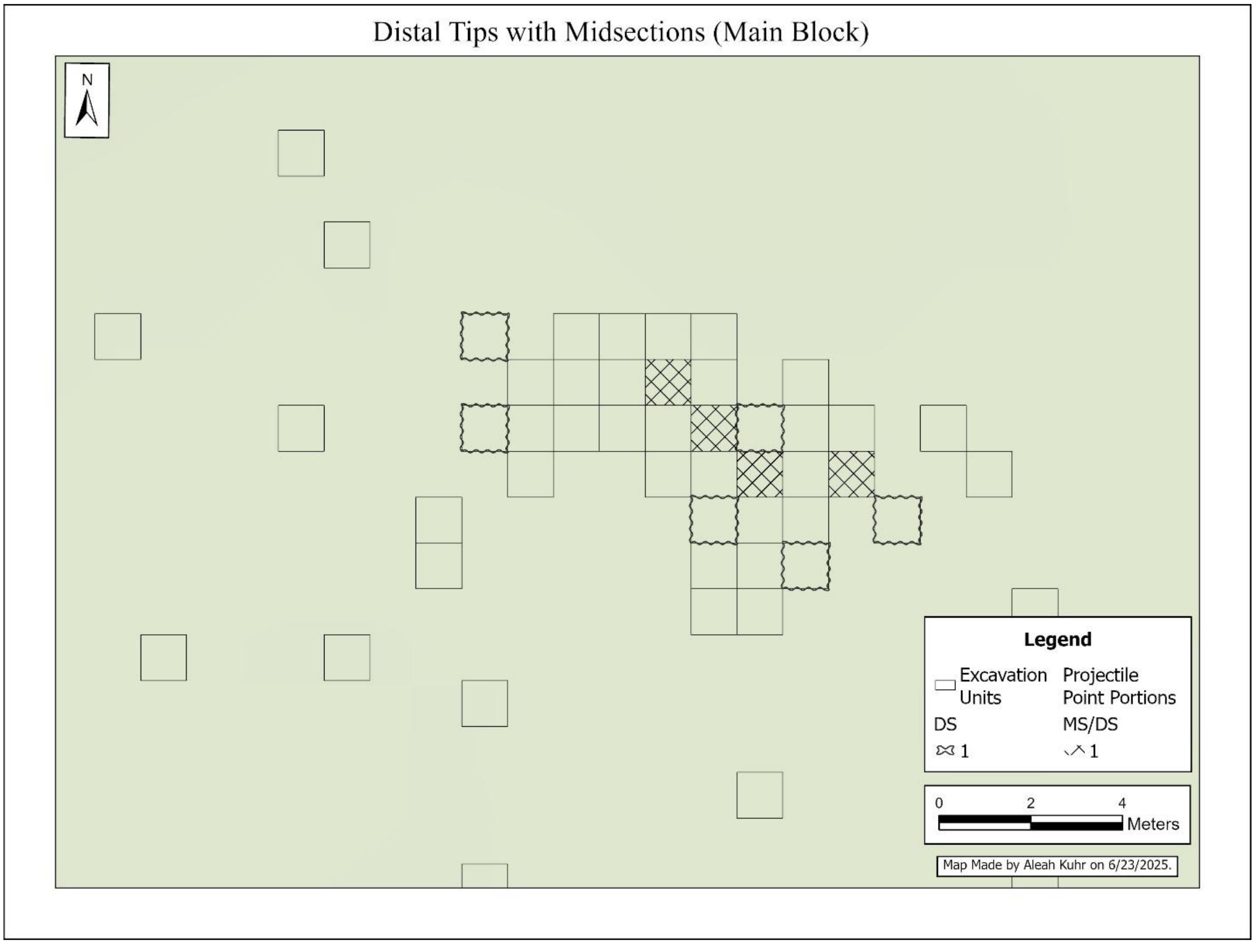

Figure 127. Distal Tips with Midsections are still fairly scattered within the main block, but do tend to cluster together more in the center of the main excavation block.

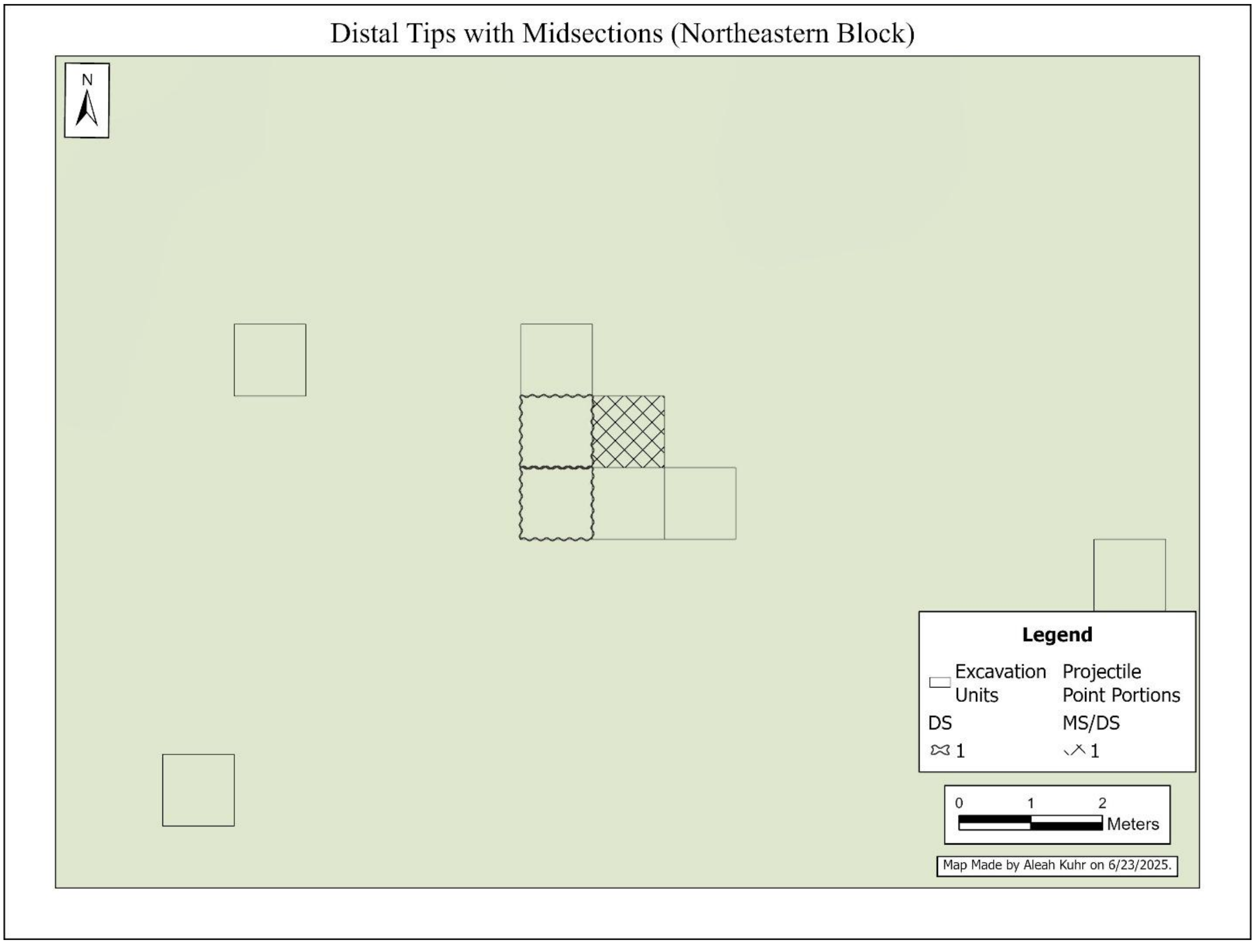

Figure 128. The northeastern block has a small cluster of tip fragments but no overlapping within a single cell.

The distribution of proximal bases (PR) and proximal bases with midsections (PR/MS) in the main block shows a dense and spatially coherent cluster centered in the central and north-central portion of the excavation area (Figure 129). PR fragments are present in at least seven distinct units, including 1007_991, 1007_994, 1005_992, 1005_994, 1004_994, 1003_994, and 1001_995. PR/MS fragments are slightly more common and densely clustered, appearing in ten units. Cells 1006_991, 1004_994, and 1002_994 each have one PR/MS, while 1007_993 and 1005_991 contain two PR/MS fragments each, as indicated by red cross-hatching on the map. Importantly, several cells display overlapping presence of both PR and PR/MS types, including 1006_993, 1004_993, and 1003_995. These units form a strong overlap zone in the middle of the main block, with a high density of basal-end portions likely associated with rehafting and discard areas where weapon bases were removed or repurposed. The overall spread creates a strong east–west and slightly diagonal band across the central excavation grid, with intensive activities involving projectile base discard or maintenance.

This portion category accounts for the largest segment of the projectile point assemblage, with PR (n = 12) and PR/MS (n = 17) comprising 42% of all recorded fragments. The overwhelming majority of these (86%) are found within the main block, while only a small minority (13%) appear in the northeastern block, including a lone, isolated PR/MS in cell 983_994 (Figure 130). This heavy concentration of basal fragments in the main excavation area shows their importance in reconstructing activity areas related to hunting tool maintenance and reconfiguration at Porcupine Peak.

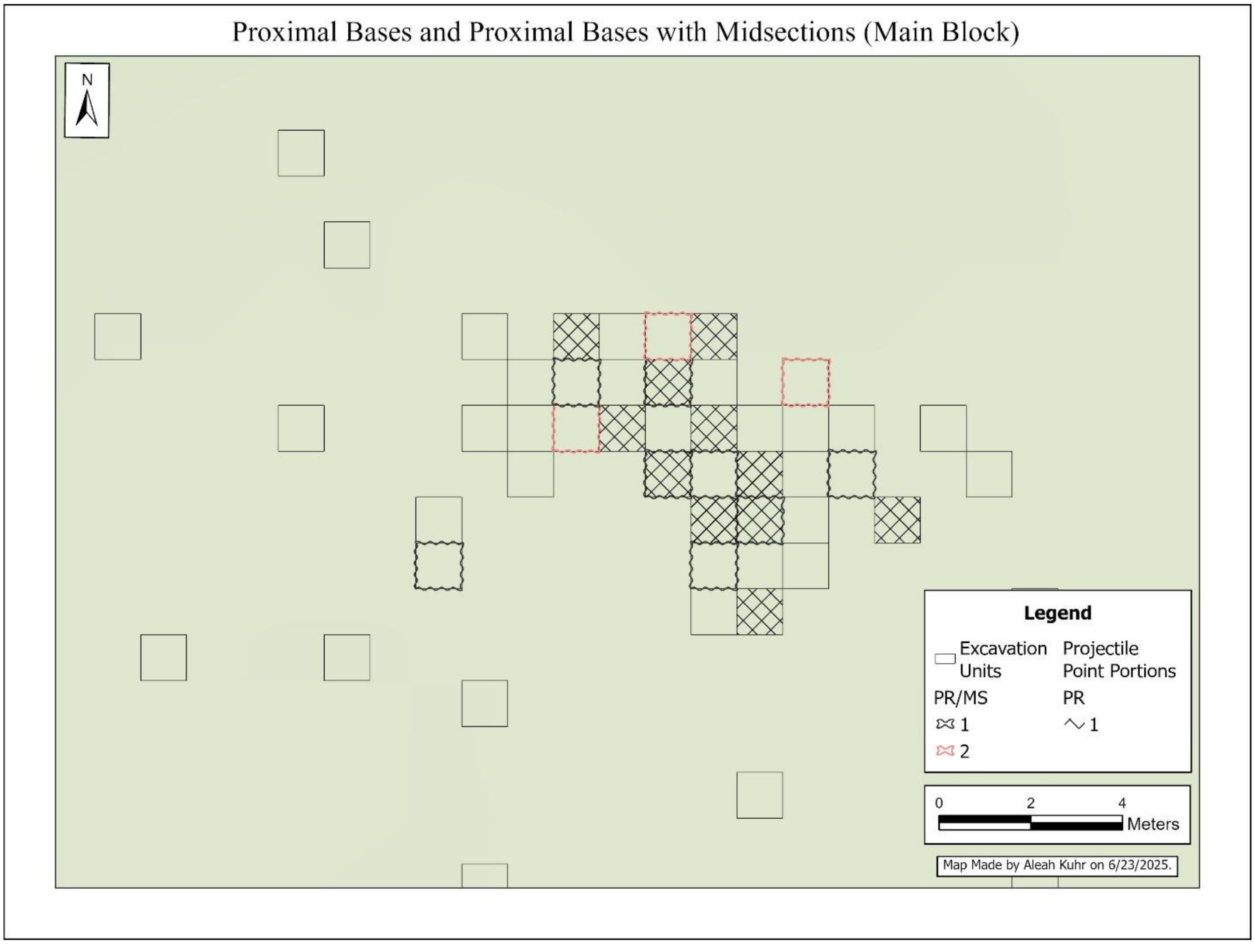

Figure 129. The Main block has a high prevalence of basal projectile point fragments, which may indicate a lot of rehafting of tools and tool maintenance.

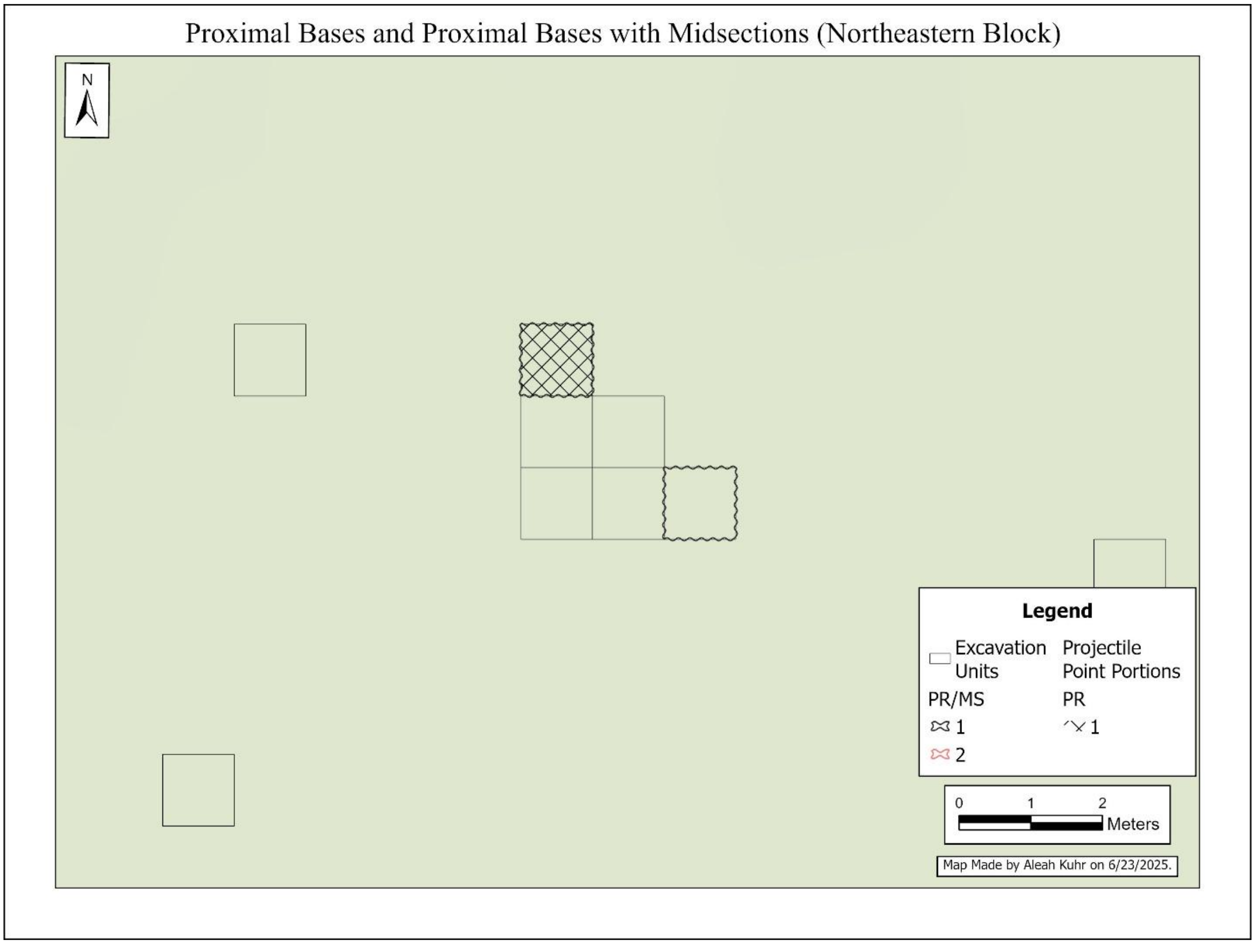

Figure 130. The Northeastern block only has three basal projectile point fragments, which may indicate minimal rehafting of tools.

The last map combines midsections and lateral edge fragments of projectile points (Figure 131 and Figure 132). A small cluster appears in the main block, where three adjacent cells, 1006_994, 1005_994, and 1004_995, each contain one midsection. Additionally, cell 1004_994 contains a lateral edge fragment, contributing to the small, localized cluster in that area. The northeastern block displays one cell 1018_1039 with two midsections, a very localized concentration.

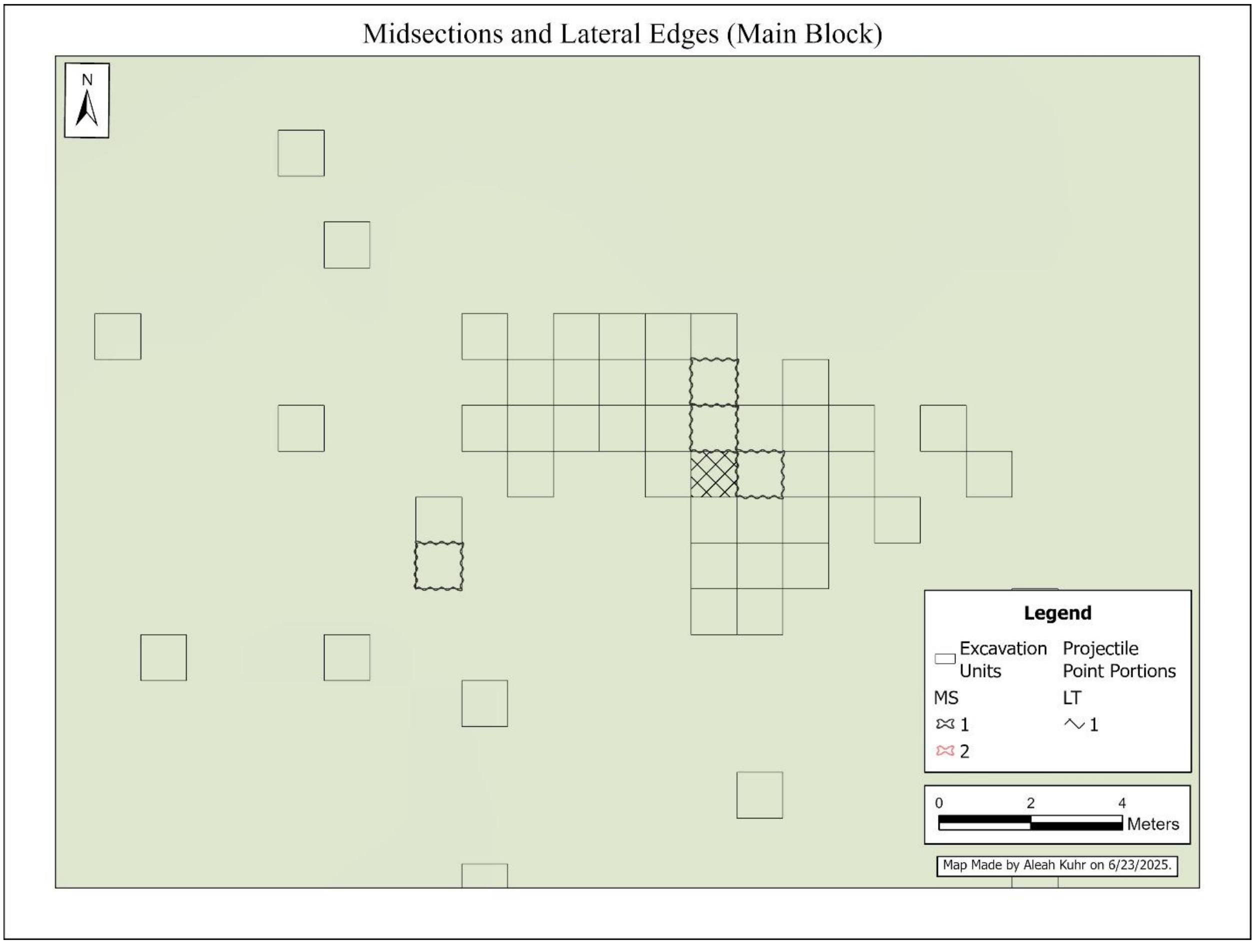

Figure 131. Midsections and lateral edges in the Main Excavation Block.

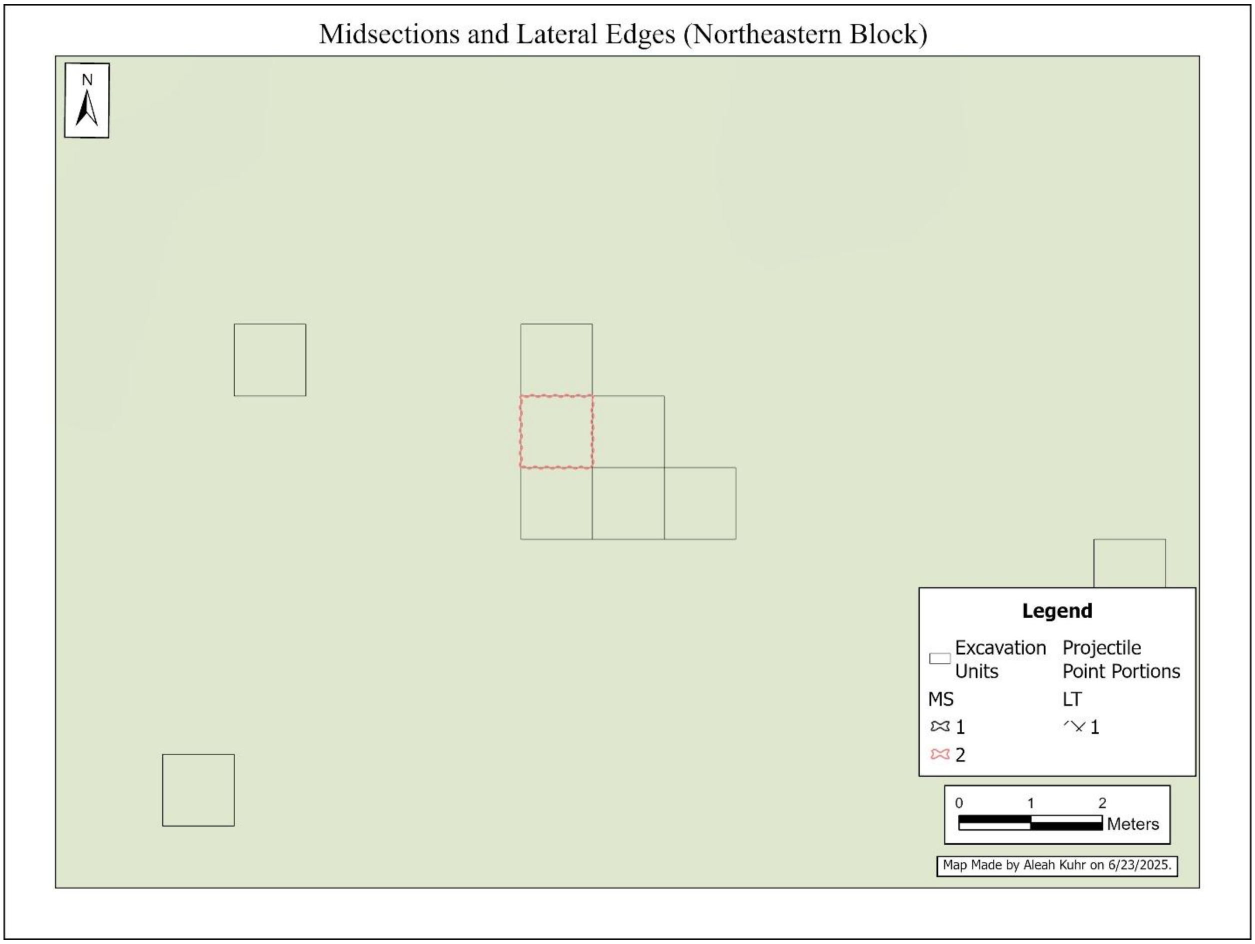

Figure 132. Midsections and lateral edges in the Northeastern Excavation Block.

The spatial distribution of projectile point portions at Porcupine Peak reveals patterning that provides insight into the site's function and activity organization. The dominance of proximal fragments (PR and PR/MS), which make up 42% of the total projectile point assemblage, strongly indicates that the Main Excavation Block was a hub for tool maintenance and rehafting activities. These portions, often associated with camp contexts in ethnographic and archaeological models (Binford 1977, 1979; Nelson 1991), appear in dense, overlapping clusters across the central portion of the main block, particularly within cells 1004_994, 1005_994, and adjacent units. This pattern suggests intensive use of the space for weapon preparation and repair, likely by individuals stationed at the camp.

In contrast, distal fragments (DS and MS/DS), which are typically discarded at kill or butchery areas after projectile impact, show more dispersed distributions. Although present throughout the site, these fragments lack the concentrated clusters seen in the basal portions, particularly within the main block. Their relatively low frequencies and broader spread support interpretations of these zones as areas where broken tips were discarded following hunting episodes or limited processing. The diagonal cluster observed between 1006_993, 1005_994, and 1004_995 may represent a small processing or discard zone.

The presence of complete (CO) and nearly complete (ABC) projectile points provides additional insight. The fact that all complete points and the majority of ABC points were recovered in the Main Block further reinforces its interpretation as a central, possibly longer-term occupation and tool production area. These tools may have been manufactured on site, which is especially possible with the prevalence of flakes and bifaces. The tools may have also been lost during activity or discarded after light use. The tight cluster of ABC and CO points in and around cell 1005_993 points to a dense workspace or short-term discard spot.

The Northeastern Excavation Block, by contrast, shows much lower frequencies of all portion types and lacks the tightly clustered spatial patterns found in the Main Block. The presence of a few ABC, DS, and MS fragments, particularly within cells 1018_1039 and 1019_1039 suggests task-specific activities in this area. These may represent short-term, specialized events like light tool use, discard, or isolated hunting-related tasks rather than extended occupation or repeated reuse.

The projectile point portion patterns support a model of functional spatial differentiation at Porcupine Peak (Binford 1978, 1980; Lane 2014; Surovell 2016). The Main Excavation Block was likely the locus of the camp area, where tools were manufactured, maintained, and occasionally discarded in near-complete form. Clusters of basal fragments and overlapping tool portions suggest use of particular areas for rehafting or maintenance tasks (Nelson 1991). In contrast, the Northeastern Block shows lighter and more dispersed tool-related activity, possibly related to short-term tasks such as hunting returns or field processing, though it is unclear whether these events were contemporaneous with other site activity. This aligns with broader interpretations of hunter-gatherer camps as internally organized spaces, where tool-related behaviors cluster according to functional needs and reuse intensity.

Relative Age and Distribution of Projectile Points

While the spatial distribution of projectile point portions reveals distinct functional zones within Porcupine Peak, these patterns alone cannot determine whether activities occurred during a single occupation or across multiple visits. The same spatial arrangement could result from contemporaneous behaviors or from unrelated episodes separated by years or centuries (Benedict 1981, 1985, and 1990; Metcalf et al. 2012). In an attempt to address this, the next section examines the relative age of projectile points about their horizontal and vertical provenience. By integrating temporal indicators, such as typological classification established in Chapter IV, into the spatial framework established above, it becomes possible to assess whether artifact concentrations reflect short-term activity or are the cumulative result of several occupations. This step is critical for understanding site function within high-elevation land-use strategies, where intermittent occupation and compressed stratigraphy make interpretation challenging.

To assess whether the spatial patterns identified above reflect single or multiple occupation events, I examined the distribution of projectile point types across successive excavation levels. Because point typology provides a relative chronological framework, plotting these types by provenience, both horizontally and vertically, offers a means to integrate temporal and spatial data. This approach makes it possible to evaluate whether activity zones persisted through time or shifted between occupations, and to identify potential mixing due to compressed stratigraphy, excavation strategies, or moderate post-depositional mixing.

The surface assemblage includes two projectile points, both recovered from the Main Excavation Block, with none identified on the surface of the Northeastern Block (Figure 133). Both points are Late Archaic (3,000–1,800 BP) corner-notched dart points. The points are spatially scattered across the Main Block without discernible clustering, suggesting that the surface finds do not represent an intact occupational surface but rather isolated artifacts likely deposited on or brought to the surface through post-depositional processes. Although limited in number, these points reinforce the need to examine vertical distributions to determine whether similar mixing occurs within subsurface contexts.

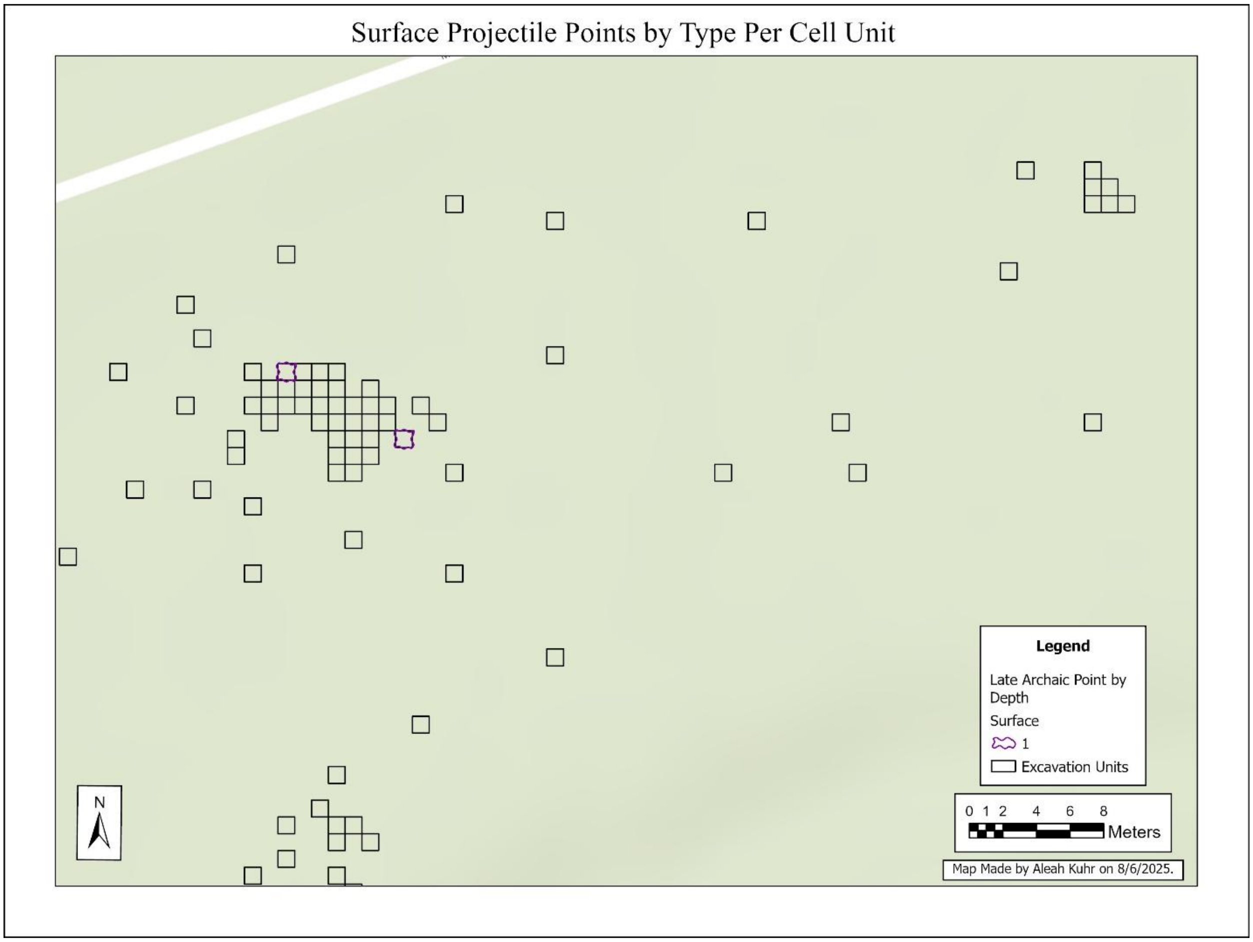

Figure 133. Spatial distribution of the two Late Archaic projectile points recovered from the surface of the Main Excavation Block. No projectile points were identified on the surface of the Northeastern Block.

The next map shows the distribution of projectile points across both excavation blocks within level one (0–10 cm) (Figure 134). The Northeastern Block shows limited activity, with only one Late Archaic Corner-Notched Dart Point (ca. 3,000–1,800 BP) and one Late Prehistoric Corner-Notched Point (ca. 1,800–410 BP), scattered roughly one meter apart. All points in this block are made from Troublesome chert. The Main Block contains fourteen Late Archaic Corner-Notched Dart Points, two Late Prehistoric Side-Notched Points, and two fragments of a single Paleo point (ca. 12,000–7,500 BP) made from Table Mountain jasper. Of the Late Prehistoric points, one is made from Troublesome chert and the other from an unknown raw material. Within this block, the points are concentrated in two clusters. The first cluster, in the northern-central portion of the excavation unit, contains four Late Archaic points. The second cluster, located south of the first, includes seven Late Archaic points, the two Late Prehistoric points, and the Paleo point fragments. Overall, the assemblage is overwhelmingly dominated by Late Archaic points, with only a few non-Late Archaic specimens present.

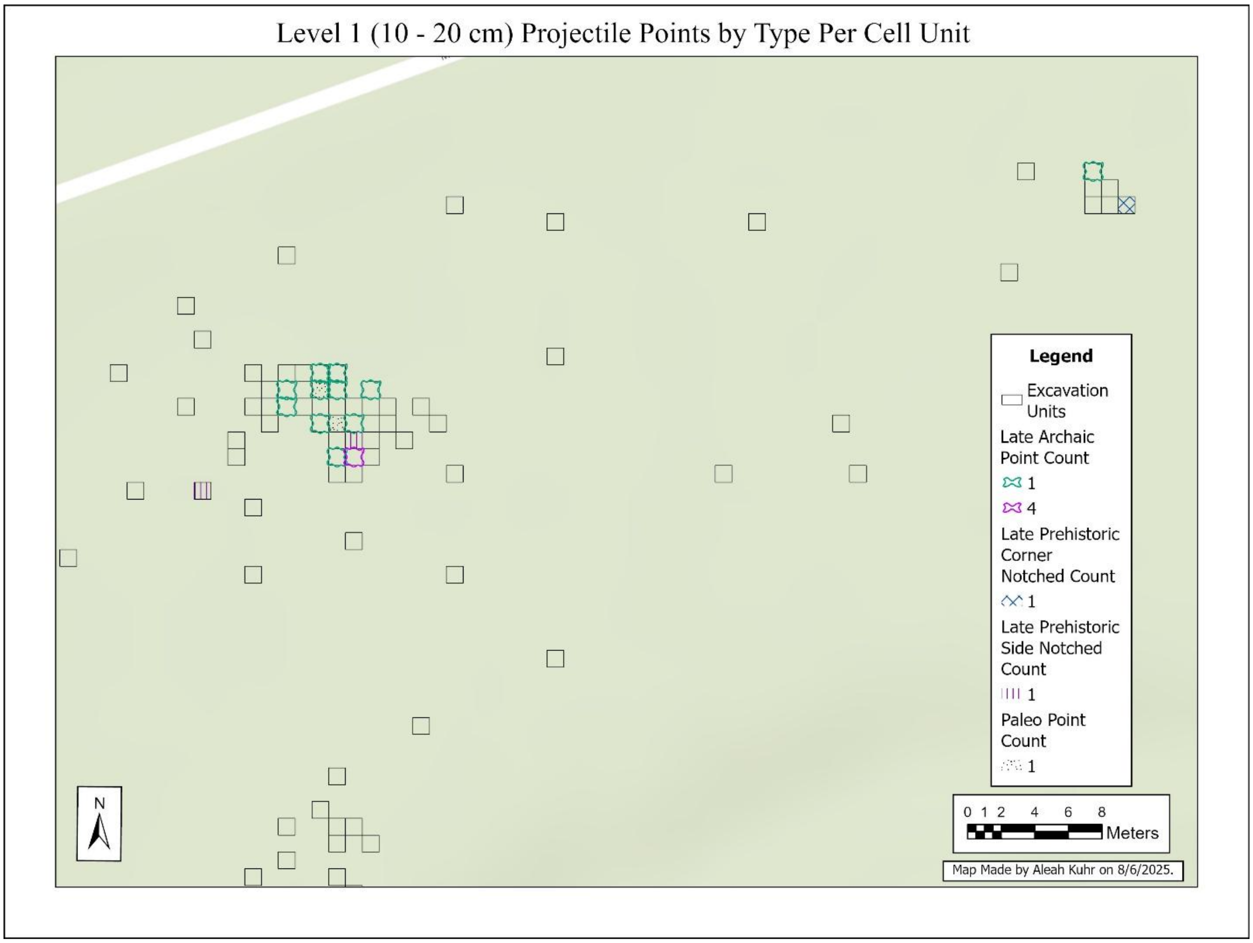

Figure 134. Projectile point distribution at Level one (0–10 cm). Two points appear in the Northeastern Block, while the Main Block contains two dense clusters featuring Late Archaic, Late Prehistoric, and Paleoindian types. The close spatial overlap of points from multiple periods suggests vertical mixing and complex depositional history.

The next map shows the distribution of projectile points across both excavation blocks within level two (10-20 cm) (Figure 135). In the Northeastern Block, a small cluster occurs across two adjacent cells, containing one Late Archaic Corner-Notched Dart Point (ca. 3,000–1,800 BP) and one Late Prehistoric Corner-Notched Point (ca. 1,800–410 BP). All Late Archaic points from both blocks are made from Troublesome chert, while the Late Prehistoric point is made from an unknown raw material. The Main Block contains a larger cluster composed of six Late Archaic Corner-Notched Dart Points, one Late Prehistoric Side-Notched Point, and a fragment of a Paleo point (ca. 12,000–7,500 BP) made from Table Mountain jasper. Within this cluster, the westernmost cell (1005_992) holds two Late Archaic points; the adjacent cell to the east (1005_993) contains the Late Prehistoric Side-Notched Point; and the next cell to the east (1005_994) contains a Late Archaic point. Although points from different temporal periods occur in proximity, the assemblage is dominated by Late Archaic points, and the non-Late Archaic points are both few in number and made from distinct raw materials. Although points from multiple temporal periods occur in close proximity, the assemblage is strongly dominated by Late Archaic points.

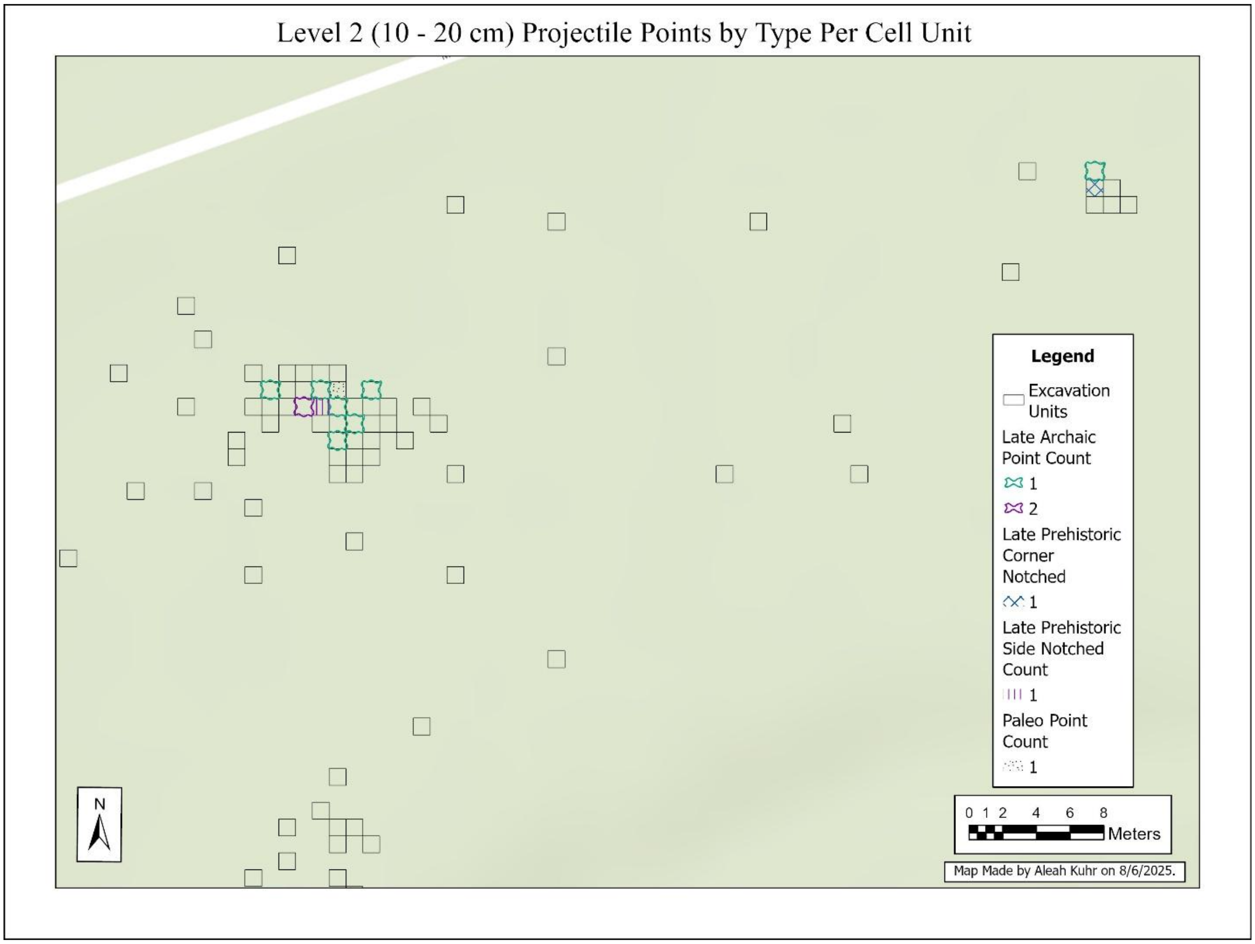

Figure 135. Projectile point distribution at level two (10–20 cm). The Northeastern Block contains a small cluster of Late Archaic and Late Prehistoric points, while the Main Block hosts a larger cluster of Late Archaic, Late Prehistoric, and Paleoindian points. The co-occurrence of these types within adjacent cells indicates shallow deposition and mixing of deposits.

The next map shows the distribution of projectile points across both excavation blocks within level three (20-30 cm) (Figure 136). The Northeastern Block contains no projectile points at this level. In the Main Block, a small cluster is present along the same north–south alignment as higher-level concentrations. This cluster begins in cell 1005_992 with two Late Archaic Corner-Notched Dart Points (ca. 3000–1800 BP) and continues two cells to the east in cell 1005_994, which contains one additional Late Archaic Corner-Notched Dart Point. The uniform typology and tight spatial grouping suggest a localized Late Archaic activity area; however, its vertical proximity to mixed-type clusters in overlying levels raises the possibility that these points may also have been affected by downward displacement or compression of deposits.

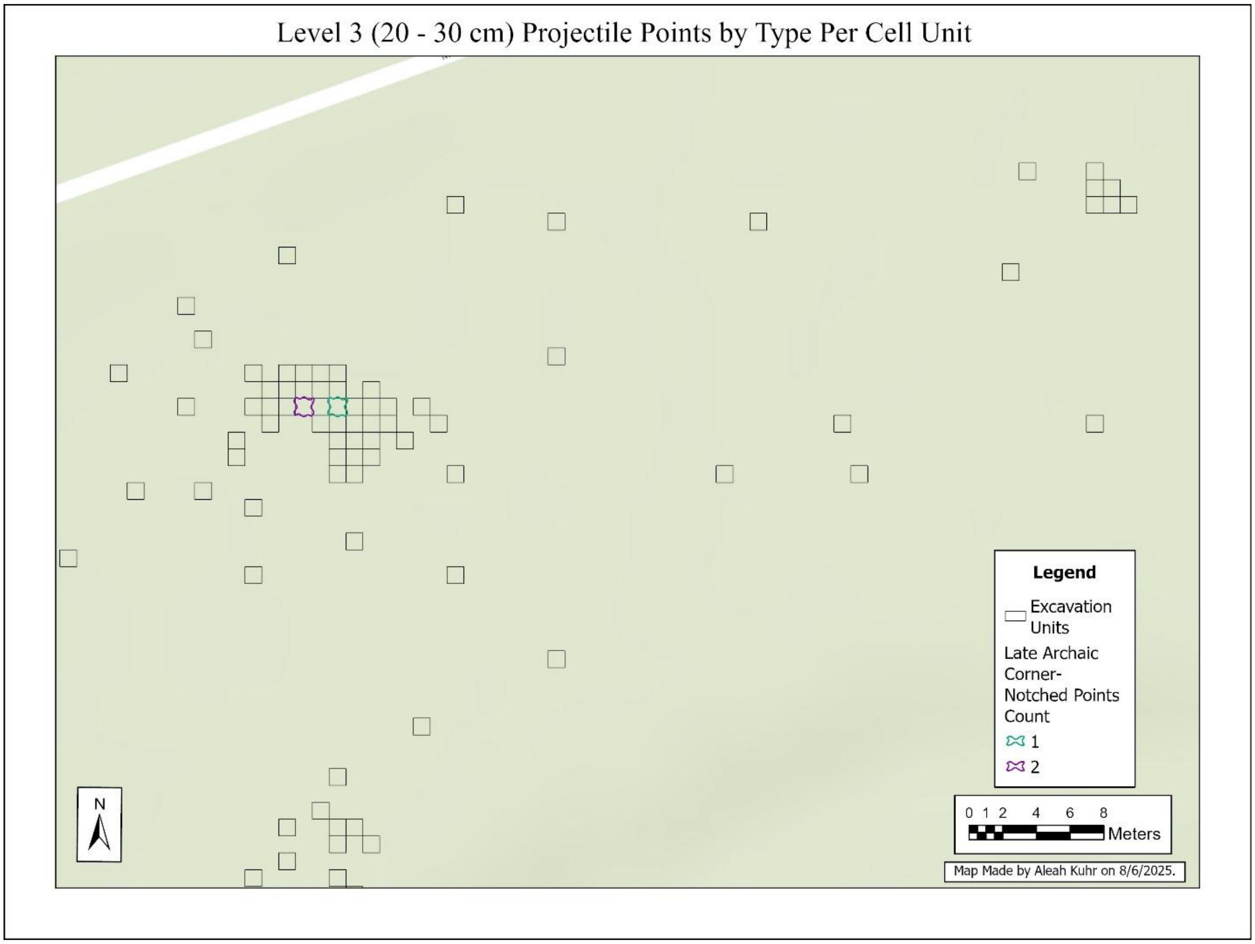

Figure 136. Projectile point distribution at level three (20–30 cm). No points are present in the Northeastern Block. The Main Block contains a small cluster of Late Archaic Corner-Notched Dart Points aligned north–south, suggesting a localized activity area possibly affected by post-depositional displacement.

No projectile points are present in the Northeastern Block at level four. In the Main Block, the only artifact recovered is a single Late Archaic Corner-Notched Dart Point (ca. 3000–1800 BP) located in cell 1004_993 (Figure 137). The isolated occurrence, combined with the absence of other points in surrounding cells, suggests minimal activity at this depth. Given its typology and solitary nature, the point may represent a residual artifact from a Late Archaic occupation, though downward movement from higher levels cannot be ruled out.

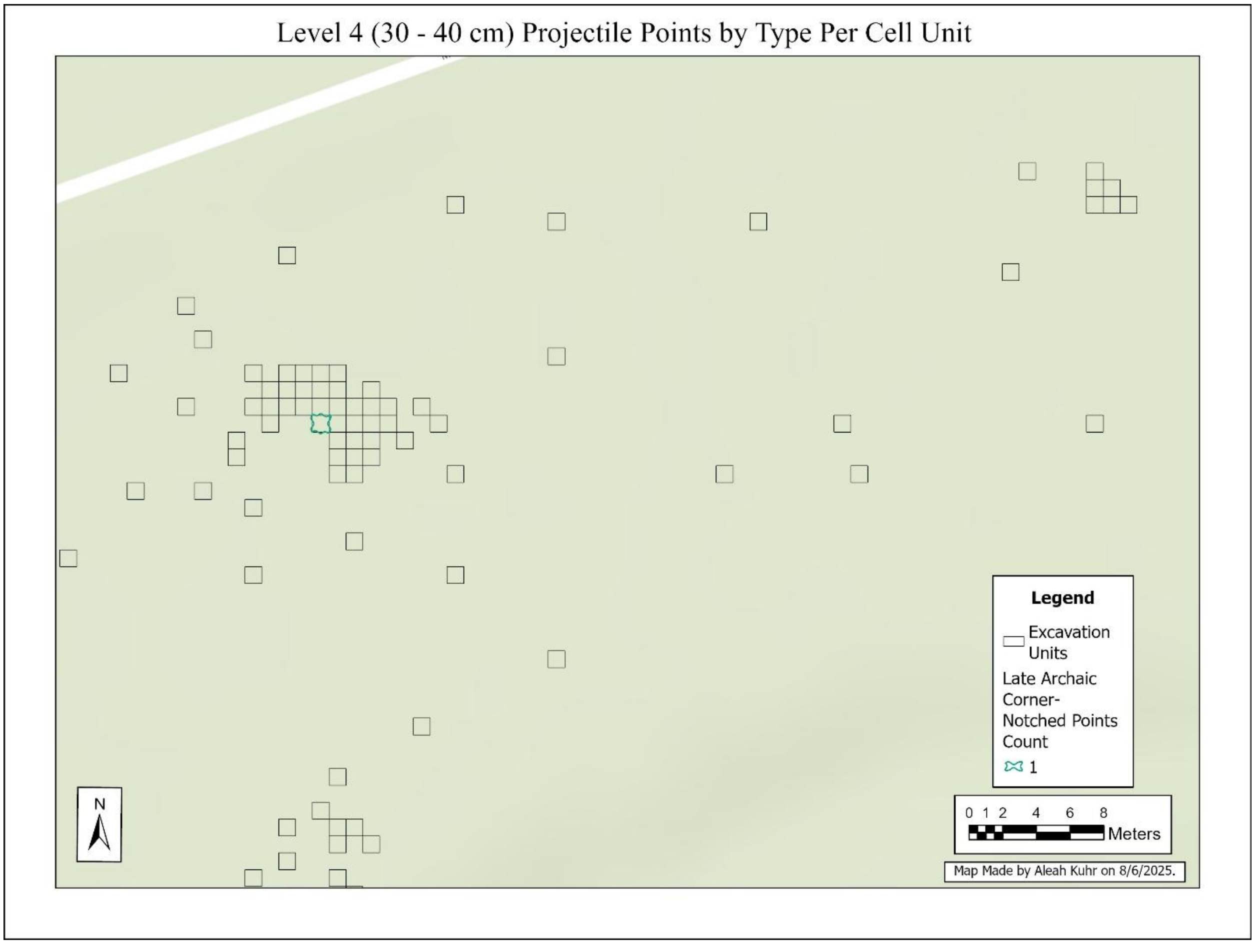

Figure 137. Projectile point distribution at level four (30–40 cm). No points occur in the Northeastern Block, and a single Late Archaic Corner-Notched Dart Point is found in the Main Block. The isolated find suggests minimal activity or downward movement from upper levels.

Overall, the projectile point distributions at Porcupine Peak are overwhelmingly dominated by Late Archaic Corner-Notched Dart Points (ca. 3,000–1,800 BP), reflecting the primary period of site use (Figure 138 and Figure 139). Sparse Late Prehistoric and Paleoindian points are also present, particularly in the upper two levels, but they occur in low numbers and are scattered, forming no meaningful clusters. Concentrations such as the Late Archaic grouping in Level three and the northernmost cluster in level one illustrate discrete areas of Late Archaic activity. While these other temporal types are present, the sheer dominance of Late Archaic points suggests that they represent the primary occupational signal, with the non-Late Archaic specimens likely representing isolated or curated artifacts rather than widespread mixing. These patterns make it difficult to delineate distinct activity areas for periods other than the Late Archaic. The predominance of Late Archaic points may reflect more intensive use of Porcupine Peak during this time, with occupations likely distributed across the site rather than concentrated in a single location, potentially linked to seasonal mobility patterns, resource availability, or favorable environmental conditions. The limited presence of other point types shows that Late Archaic activity largely defines the spatial and vertical patterning observed across the excavation blocks, with minor temporal variation contributing minimally to overall site structure.

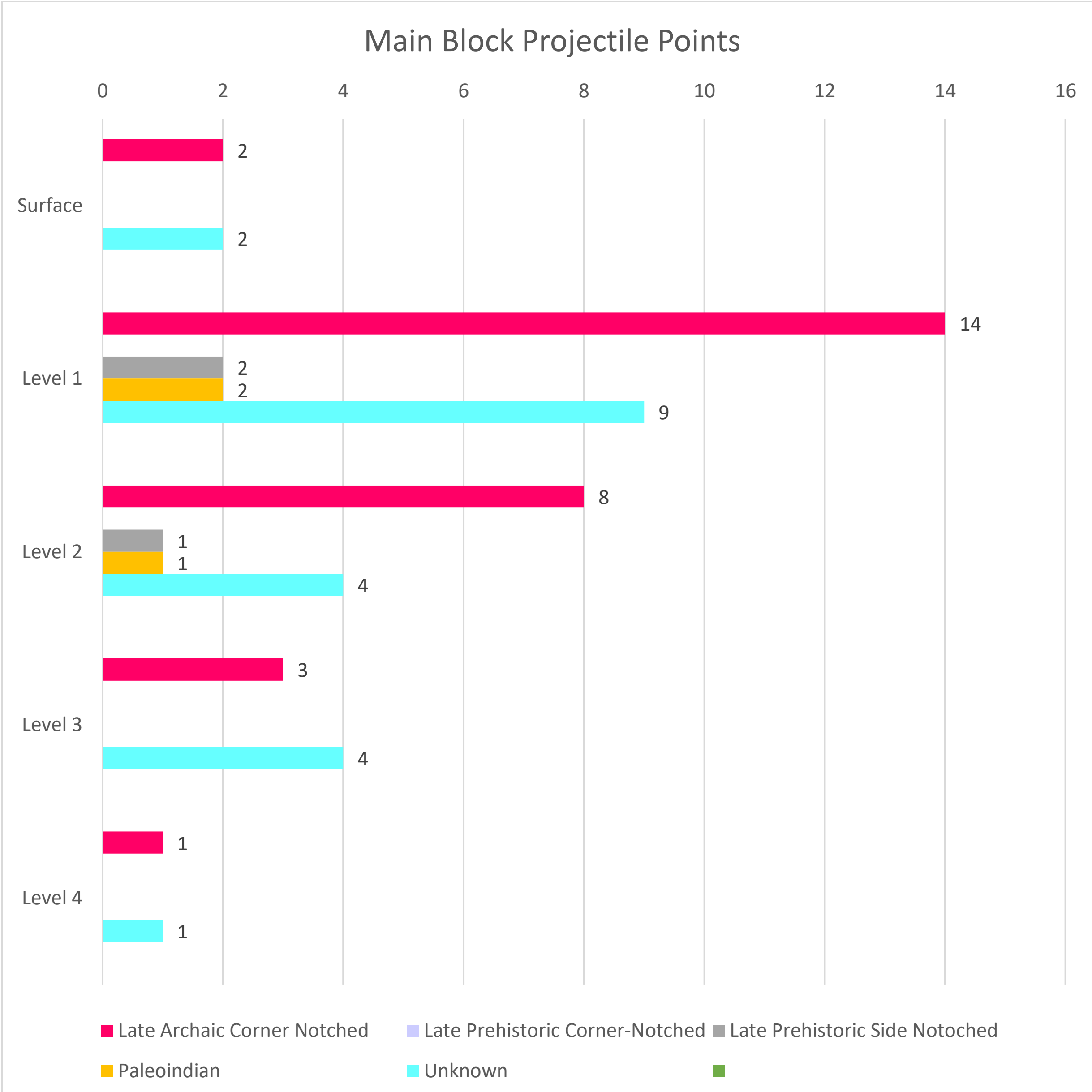

Figure 138. Late Archaic Corner Notched Dart Points are present within the surface and four levels below, blending with other typological projectile points from different periods, demonstrating vertical mixing.

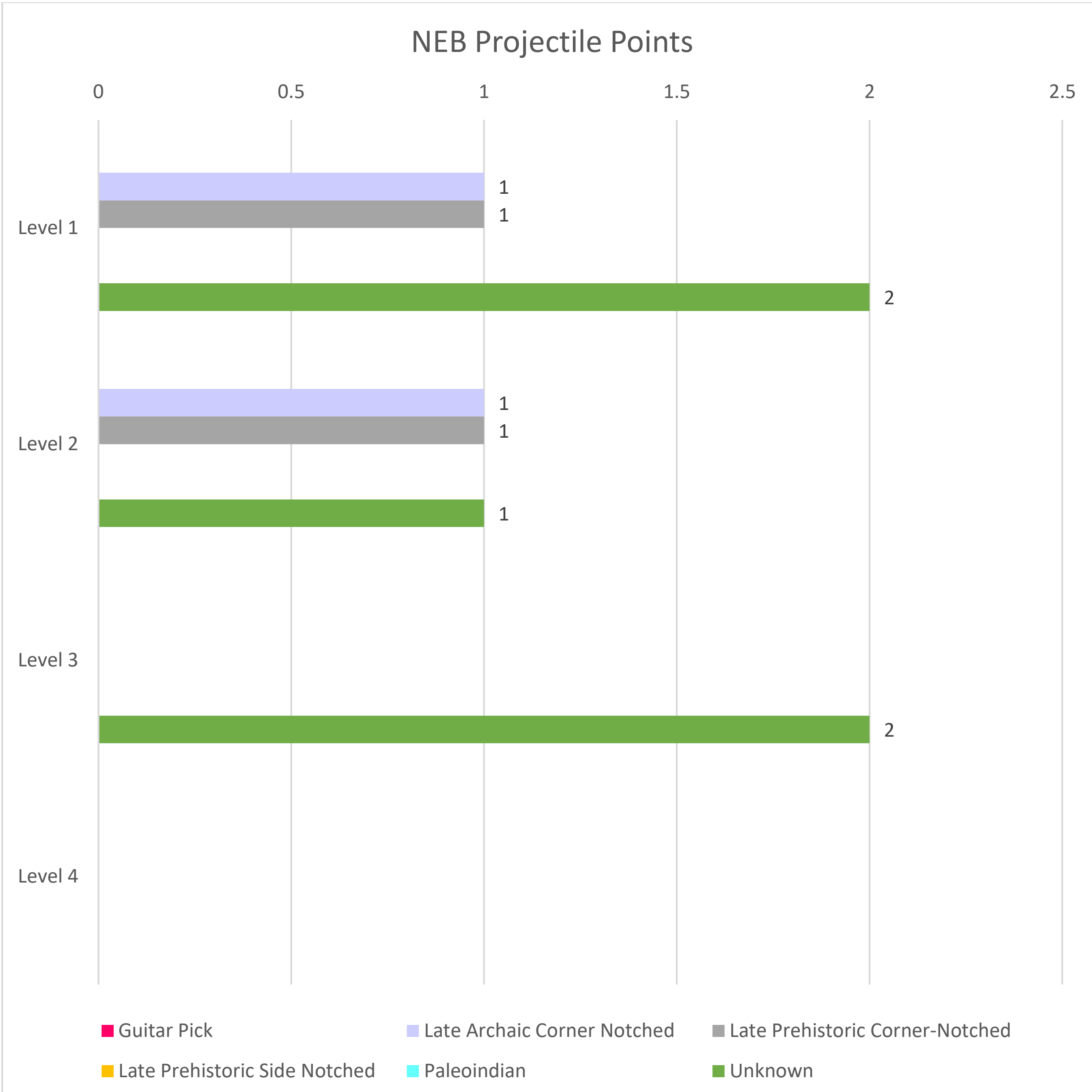

Figure 139. Late Archaic Corner Notched Dart Points and Late Prehistoric Corner Notched Points tend to stay within the upper 20 centimeters of the Northeastern excavation block.

The presence of matching Paleo point fragments, specifically, the midsection recovered in cell 1004_994 at level one (5ST98.2493), the tip from cell 1006_993 at level two (5ST98.2494), and the proximal base with midsection from cell 1006_994 at level two (5ST98.2492), provides direct evidence of vertical mixing within the site's excavation levels (Figure 140). The dispersal of components from a single projectile point across adjacent cells and different excavation levels indicates post-depositional disturbance and sediment displacement, complicating interpretations of discrete occupational layers based solely on vertical provenience.

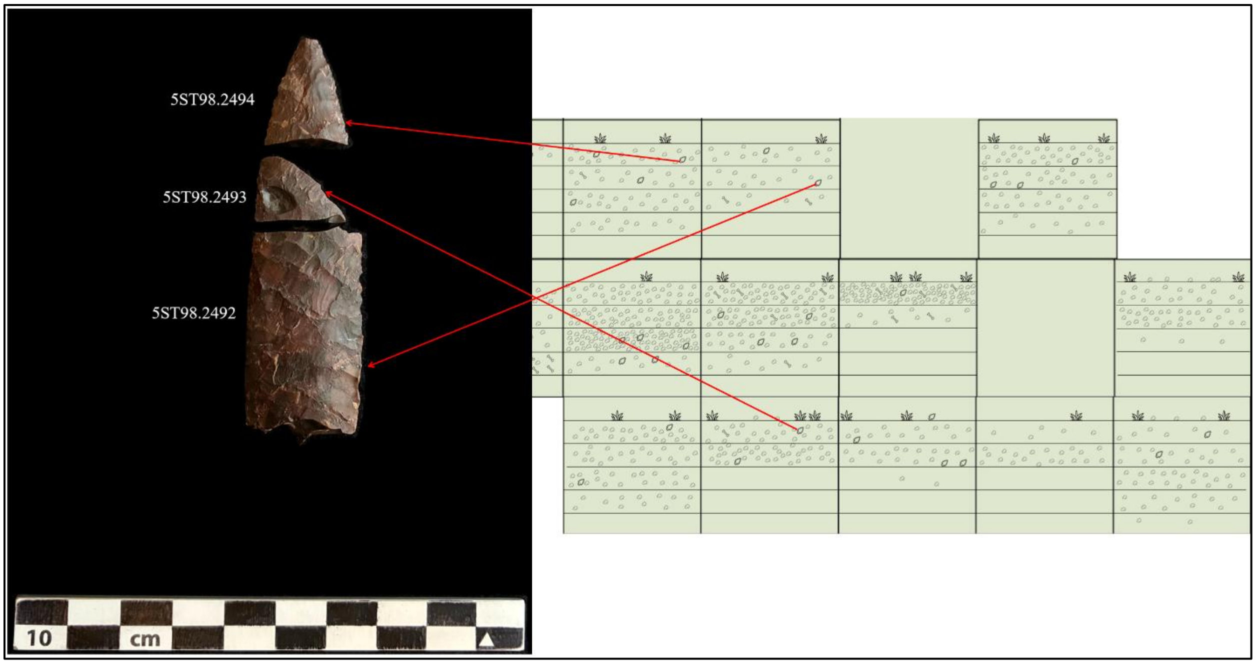

Figure 140. A single fragmented Paleo-point demonstrates vertical mixing within the Porcupine Peak Site.

Another point, though undiagnostic, has two midsections with provenience data that refit with one another (Figure 141). Meanwhile, the tip has no provenience data, but we can still discern vertical mixing patterns. The midsection recovered in cell 1004_995 at level two (5ST98.2459), and the midsection recovered in cell 1005_994 at level two (5ST98.2467) provide direct evidence of horizontal mixing within the site's excavation levels. The dispersal of components from a single projectile point across adjacent cells indicates post-depositional disturbance and sediment displacement, complicating interpretations of discrete occupational layers based solely on horizontal provenience.

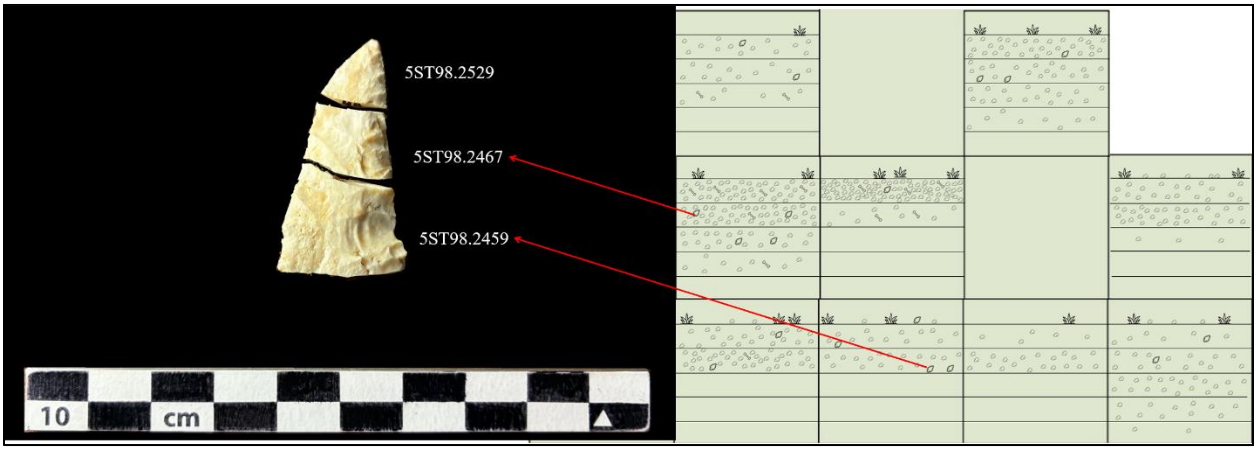

Figure 141. A single fragmented undiagnostic point demonstrating horizontal mixing within the Porcupine Peak Site.

Co-Variation of Artifact Classes

Although the site shows strong evidence of mixing, likely the result of compressed mountain stratigraphy and shallow deposition, and coarse excavation practices, certain patterns remain identifiable. Paleoindian and Late Archaic points occur within the same levels, Late Archaic artifacts appear in deeper deposits, and one refit projectile point spans two excavation levels, all pointing to post-depositional disturbance. Even so, the assemblage is overwhelmingly dominated by Late Archaic material, with 33 points recovered across multiple depths. This dominance provides an opportunity to explore site activities despite the challenges posed by mixing. To do so, this section looks at how tools and other materials overlap across the site, including scrapers, projectile points, bifaces, groundstone, bone, fire-cracked-rock, and cortex-bearing flakes. Examining co-variation through the spatial overlap of different artifact classes provides direct evidence of how activities were organized and integrated within the site. For example, when burned bone, thermally altered flakes, and hearth features occur together, they suggest that food preparation and tool production were carried out in the same locality, pointing to multipurpose activity areas. Similarly, the association of bifaces and cortex-bearing flakes can indicate early-stage tool production zones. In contrast, the separation of materials, such as ground stone found apart from hearth debris, signals more task-specific use of space. These relationships make it possible to distinguish between generalized activity areas, where multiple activities were concentrated, and specialized locations tied to narrower tasks.

Projectile points dominate the assemblage, occurring in 29 of the 39 cells. In many cases, they are found alongside other artifact types, appearing in nearly every cluster across the block (Figure 142). Bone is concentrated in the central to eastern portion of the excavation, forming a cluster in cells 1006_993, 1006_994, 1005_992, 1005_993, 1004_994, 1005_995, 1004_993, 1003_994, 1003_996, and 1002_995. One additional cell containing bone (1005_999) lies approximately three meters east of this cluster. Bifaces occur in two small clusters. The first lies northwest of the bone concentration, in cells 1007_992, 1006_991, 1006_992, 1006_993, and 1005_993. This cluster overlaps slightly with the bone cluster in cells 1006_993 and 1005_993. The second biface cluster (n = 2) is southeast of the first, spanning cells 1003_995 and 1003_996, with partial overlap in the latter. One additional biface was recovered in isolation in cell 1001_994.

Scrapers are rare, represented only in two cells (1007_989 and 1006_991) on the northwestern edge of the block. Although separated by one meter, these scrapers are both made of limestone with iron inclusions. One was recovered from the surface and the other from level One. This cluster also slightly overlaps with the biface cluster at 1006_991. Groundstone occurs in two distinct clusters. The first lies on the western edge of the block (1005_991 and 1004_990), adjacent to but not overlapping the main bone cluster. The second is on the eastern edge (1005_999 and 1004_1000). In cell 1005_999, groundstone and bone were present but in separate levels. Other artifact classes are sparse.

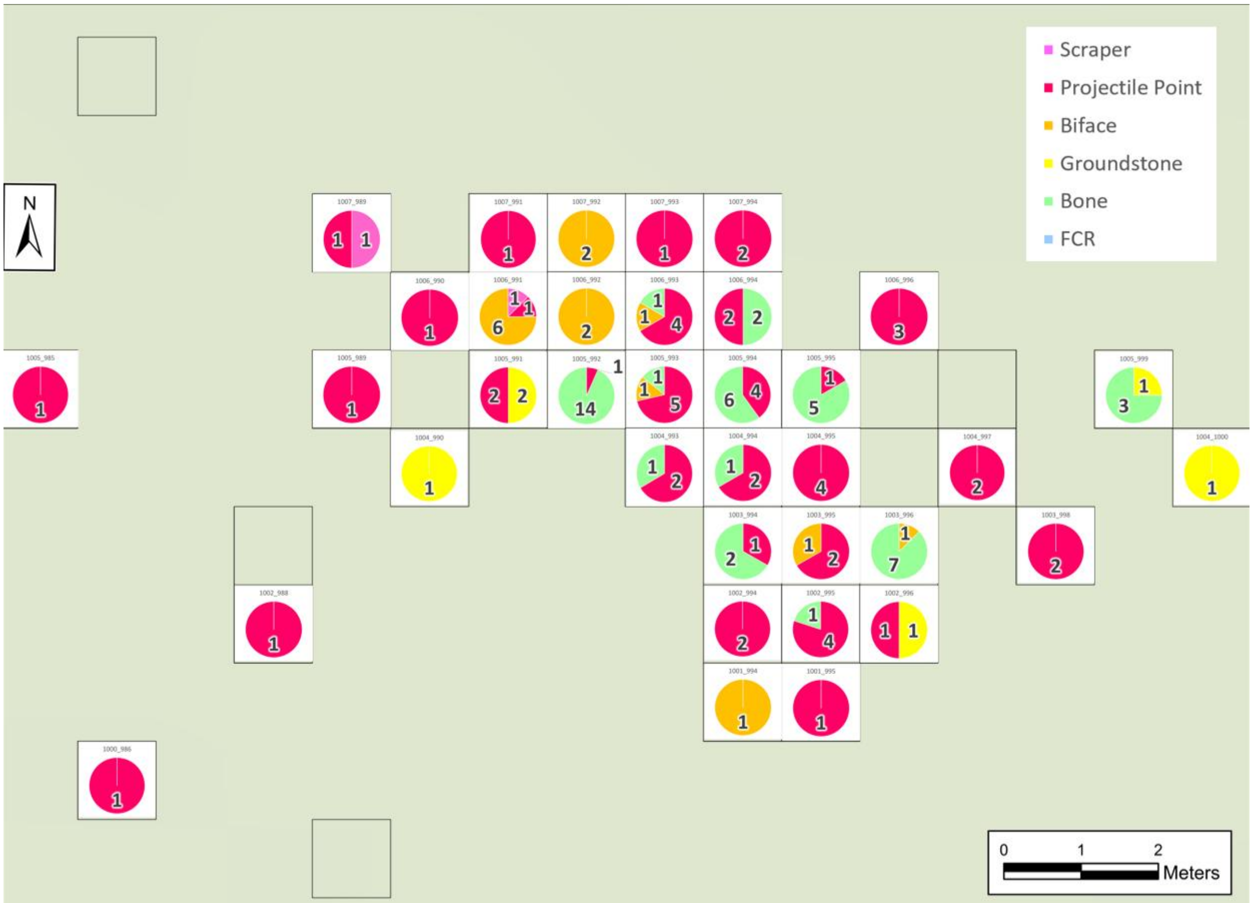

Figure 142. Pie charts representing various artifact types that overlap within the Main Excavation block. There is a clear cluster of bone that overlaps heavily with burnt artifacts discussed earlier in the chapter.

Within the northeastern block, a similar pattern is retained with projectile points, which dominate the excavation and are present in nearly every cell, five of six. One cluster is evident in this block, between cells 1019_1039 and 1018_1039; there are two bifaces. These two cells contain the highest number of projectile points in the excavation block. 1019_1039 has three, and 1018_1039 has four. Bone and fire-cracked rock are also present in the block, but occur in isolation. Bone was recovered from cell 1018_1049, and fire-cracked rock from cell 1017_1041, adjacent but overlapping with more projectile points.

General patterns in site structure suggest distinct clusters of activities across the excavation blocks. In the central block, the concentration of bones in the middle of the excavation indicates cooking activities. Immediately west of this cluster, groundstone tools appear, suggesting food processing took place near the fire. A second groundstone cluster to the east of the bone concentration may represent another food processing locale, perhaps used at a different time or for a different task. Northwest of the central bone cluster, a concentration of bifaces points to an area of lithic production. This activity area slightly overlaps with the main bone cluster, hinting at some integration of tasks, while remaining distinct from the hearth-related debris. Just west of this biface cluster are the two scrapers, which further indicate a lithic production zone. The northeastern block presents a more restricted activity pattern. While projectile points dominate the assemblage, the only clear cluster is formed by bifaces and multiple projectile points in cells 1019_1039 and 1018_1039. Bone and fire-cracked rock are also present, but both occur in isolation, suggesting more episodic or task-specific activities compared to the multipurpose activity zones seen in the central block.

Projectile points are the most ubiquitous artifact class, present in 33 cells, across 29 of the 39 cells in the central block and in five of the six cells in the northeastern block (Figure 143). Their widespread occurrence contrasts with the more localized clustering of other artifact types. This pattern likely reflects a combination of factors. Hunter-gatherers often carried projectile points as part of their toolkits and maintained or discarded them when the tool was no longer being used for its specific need (Nelson 1991; Pool and Reed 2020). If Porcupine Peak were a camp, broken or discarded points may show up almost anywhere tasks were carried out, not just in a single "knapping" or discard area. This would broadly scatter the points across the site, both vertically and horizontally. Projectile points are fragile compared to groundstone or scrapers. Breakage during hunting, rehafting, or resharpening means they enter the archaeological record more frequently, which could inflate their presence across cells. If the site was used as a hunting camp or a staging area, projectile points might dominate simply because hunting technology was the most consistently used and discarded tool type there. Other activities (grinding, scraping, etc.) are less well represented in the artifact record, so their actual frequency of use cannot be determined.

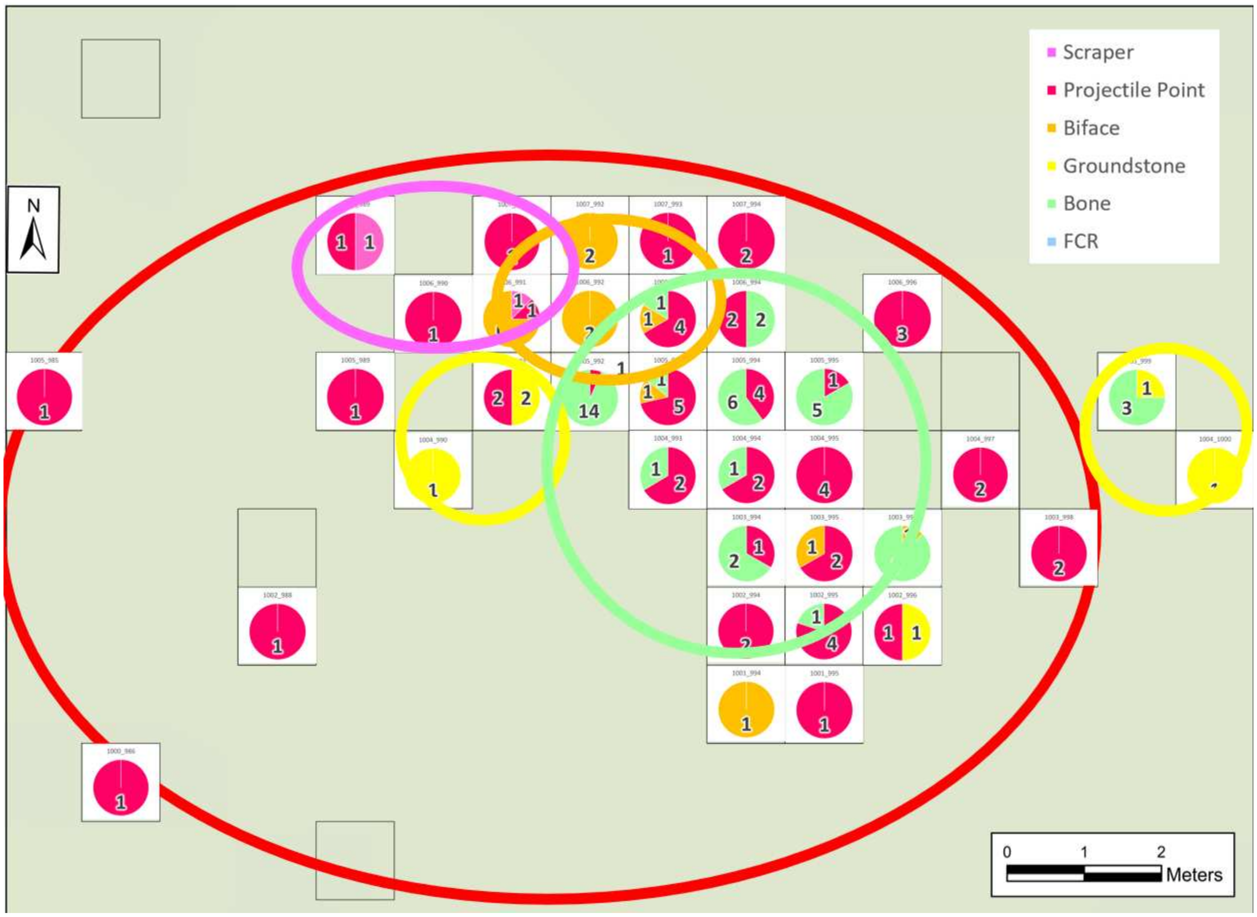

Figure 143. Pie charts show artifact counts by excavation unit. Colored circles indicate clusters: pink = scrapers, orange = bifaces, yellow = ground stone, green = bone, red = projectile points. Clustering suggests central cooking areas, with food processing occurring to the west and east of the Main Excavation Block.

Discussion: What is the Porcupine Peak Site and How Was It Organized?

Although Porcupine Peak was intermittently occupied from the Paleoindian period (12,000–7,500 BP) through the Late Prehistoric Period (1,800 to 410 BP), the strongest evidence of intensive use derives from the Late Archaic period (3,000 to 1,800 BP). The clearest indicators of Late Archaic occupation are the dated hearth features. Feature one contained three charcoal samples, which returned radiocarbon dates of 2625 ± 60, 2845 ± 75, and 3555 ± 215 RCYBP (Morris 1978; Marcotte n.d.) (Appendix E). A second feature, feature three, returned a radiocarbon age of 2425 ± 85 RCYBP.

Projectile point data further supports the intensity of Late Archaic use. A total of 33 Late Archaic Corner-Notched Dart Points have been recovered across the site, spanning surface contexts to approximately 40 cm below ground. Nearly all are manufactured from Troublesome chert, with only a single example (artifact 5ST98.2498) produced from an unidentified material. This reliance on Troublesome chert directly links the projectile point assemblage to broader raw material procurement strategies documented at the site.

Considering radiocarbon-dated hearth features and a large assemblage of Late Archaic projectile points (though spatially separated) demonstrates that Porcupine Peak may have served as a camp during this period. The overwhelming reliance on Troublesome chert for projectile point manufacture directly connects these diagnostic artifacts to broader lithic procurement and reduction strategies at the site. To fully understand how Late Archaic groups organized their technological activities at Porcupine Peak, it is necessary to examine the raw material data in the context of Binford's (1980) collector model. Binford's (1980) collector model emphasizes that collectors procure and/or process raw materials at source locations, often transporting partially reduced materials back to a camp for further manufacture and use. The lithic assemblage from Porcupine Peak aligns closely with this pattern.

Binford's (1980) Collector Model and the Late Archaic

The majority of the assemblage is manufactured from Troublesome chert, a raw material located approximately 72 km from the site. Site excavations recovered a diverse array of artifact types, including angular debris (n = 7), bifaces (n = 25), a single core, 2,246 provenience flakes (plus 1,326 non-provenienced), and 83 projectile points. Out of the 2,420 provenience flakes, only 127 (5.2%) retain cortex, indicating that lithic reduction at Porcupine Peak was dominated by later stages such as tool finishing, maintenance, and resharpening rather than initial core reduction. This pattern is reinforced by the presence of large bifacial blanks manufactured from Troublesome chert, suggesting that earlier reduction activities occurred nearer to the source (Figure 144).

Figure 144. Example of bifaces found during the excavation in unit 1006_991 (7n9w).

Such a scenario is consistent with excavations at the Troublesome chert quarries, where Metcalf et al. (1991:96–100) documented short-term “field camps” established by logistically organized collectors. At these source locations, initial reduction was carried out before partially prepared blanks were transported to camps for further manufacture. The Porcupine Peak assemblage mirrors this organizational strategy, with evidence of later-stage reduction occurring on-site.

Flake size data further supports this interpretation. In the Main Excavation block, flake lengths range from 9.38 mm to 20.90 mm, with an average of 14.41 mm and a median of 14.24 mm. These dimensions are consistent with middle-to-late stages of reduction (Andrefsky 2008; Henry 1989; Newcomer 1971; Stahle and Dunn 1982). The Northeastern block, however, exhibits slightly larger average flake sizes and a narrower range, with averages of 17.23 mm in unit 1017_1040 and 18.43 mm in unit 1019_1039. These values suggest an emphasis on earlier to middle stages of reduction compared to the Main block.

These patterns suggest a clear sequence of logistical organization: (1) Troublesome Chert was procured and initially reduced at the source, (2) bifacial blanks were transported to Porcupine Peak, and (3) later stages of manufacture, maintenance, and resharpening were conducted at the site. The low overall frequency of cortex-bearing flakes, the variability in flake size between excavation blocks, and the presence of large bifaces are all consistent with Porcupine Peak functioning as a camp. Cortex-bearing flakes cluster spatially in the Main block and are disproportionately associated with Troublesome chert, suggesting that this locally available material was occasionally reduced on-site, but these activities were secondary to the dominant reliance on imported blanks.

The lithic evidence at Porcupine Peak establishes that Late Archaic groups were engaged in organized, later-stage tool production and maintenance consistent with a camp. This technological behavior is further reinforced by the condition of the projectile point assemblage. The predominance of broken and fragmented points, particularly proximal bases (PR) and base-plus-midsection fragments (PR/MS), demonstrates that tools were repeatedly used, maintained, and repaired on-site rather than produced and discarded in a single task area. In combination with the lithic reduction patterns, the fragmentary state of the points provides a complementary line of evidence that the site functioned as a camp, possibly a post-hunt camp where groups returned with acquired resources and partially used tools requiring ongoing maintenance.

Porcupine Peak exhibits a high frequency of broken and discarded projectile points, a pattern consistent with post-hunt camp use. Projectile points are inherently fragile compared to other tool types, such as groundstone or scrapers, and frequently break during hunting, rehafting, or resharpening. Although many fragments retain usable portions, they were likely abandoned as part of a broader replacement strategy typical of mobile groups who carried spare tools and preferred to make new points rather than invest time in repair. Consequently, fragments enter the archaeological record more often than complete tools, providing a record of ongoing tool use, maintenance, and discard.

The dominance of proximal fragments (PR) and base-plus-midsection fragments (PR/MS), which together make up 42% of the total projectile point assemblage, is particularly informative. This prevalence strongly indicates that the Main Excavation Block served as a central hub for tool maintenance and rehafting activities. The presence of these fragments demonstrates that Late Archaic groups were not only using tools at the site but also returning to the camp with newly acquired resources and partially used or fragmented tools that required repair or replacement after use.

Other portion types, including midsections (MS), distal tips (DS), and near-complete points (ABC), are less frequent but complement the picture of ongoing tool use and maintenance. The fragmentary nature of the assemblage, dominated by PR and PR/MS portions, reflects post-hunt activities, where groups transported, used, and repaired tools rather than producing or discarding them in a single task area.

Additional support for interpreting Porcupine Peak as a camp for Late Archaic groups comes from the sheer size of its artifact assemblage. In particular, the site contains one of the largest Late Archaic projectile point assemblages documented in the region (Barnes and Henss 1985; Black 1995; Morris and Marcotte 1975). As Elizabeth Morris and James R. Marcotte observed, “We have rarely seen an area of prehistoric occupation in a high-altitude location which is so large…” (Morris and Marcotte 1975).

The regional context further reinforces this interpretation. The nearest known large Late Archaic occupation that likely functioned as a camp is the Vail Pass Camp site (5ST85), located roughly 43 km, about a two-day walk according to Bob Madden, from Porcupine Peak (Gauthier 2023; Gooding 1981). Given the size of the Porcupine Peak assemblage and the distance to Vail Pass Camp, it is unlikely that Porcupine Peak functioned merely as a logistical procurement location or short-term field camp supporting a larger base elsewhere. Instead, the assemblage size, in combination with the evidence for maintenance of tools and structured lithic reduction, strongly supports its interpretation as a camp used by Late Archaic groups.

Another line of evidence supporting the designation of Porcupine Peak as a post-hunt camp is the presence of ground stone tools. The site contains six netherstones and one handstone with provenience data, in addition to three netherstones, four handstones, and one unidentifiable ground stone fragment without provenience information. Ground stone tools are commonly found in high-elevation sites in the Southern Rocky Mountains and were often transported long distances from their sources (Pelton 2017). Their presence at Porcupine Peak likely reflects intentional provisioning, defined as supplying a location with tools to enhance foraging efficiency during repeated returns (Pelton 2017). This behavior aligns with Binford’s (1980) collector model, whereby partially reduced resources are transported to camps for further use.

Furthermore, ground stone tools indicate specialized procurement strategies within a climatically unpredictable landscape, reflecting the use of prior knowledge of edible plant locations surrounding the camp (Benedict 1980; Pelton 2017).

Evidence of burning and possible hearth features within the Main Excavation Block indicates that fire-related activities took place at Porcupine Peak. Hearths often served as focal points of domestic or task-related activity, providing heat, light, and facilities for cooking and processing resources (Surovell 2022). Although the radiocarbon-dated hearths located along the riverbank cannot be directly associated with the Main or Northeastern Excavation Blocks due to their distance, localized burning and artifact concentrations in the Main Block suggest that similar short-term hearth use occurred there. The combination of burned artifacts, flake concentrations, and numerous discarded projectile points implies that Porcupine Peak functioned as a camp where people processed and consumed resources and maintained their toolkits. It is possible that this area served as a post-hunt camp where individuals returned to retool and replace damaged points embedded in game. The dominance of Late Archaic projectile point styles across the site further supports that these activities most likely took place during the Late Archaic period.

Organization of Activities at Porcupine Peak

The distribution of burned materials at Porcupine Peak provides strong evidence for fire use activity areas across the site. Burned lithics, faunal remains, and tools occur widely, yet their clustering patterns suggest that hearth use created localized zones of activity rather than reflecting a single burn event such as a forest fire. In both the Main and Northeastern Excavation Blocks, concentrations of thermally altered artifacts occur in units with moderate overall artifact densities, indicating that burning was tied to specific fire events rather than simply following artifact abundance. These localized burn signatures align with expectations for hearth-centered activity areas, where tasks such as cooking, food processing, tool maintenance, and social interaction took place around fires (Surovell 2022).

The vertical distribution of burned artifacts further reinforces this interpretation. Thermally altered flakes and faunal material extend across multiple stratigraphic levels, concentrated within the upper 0 - 20 cm but also appearing in deeper deposits (20 – 40 cm). Importantly, hearth-related activity areas are not static. Hearths can shift gradually during the course of an occupation as fires are rebuilt in slightly different locations, and thermally fractured lithics may be ejected outward from the hearth, dispersing burned material beyond the immediate fire feature (Waguespack and Surovell 2014). These processes create diffuse but overlapping zones of thermal alteration.

Such dynamics are evident at Porcupine Peak. The Main Block exhibits a broad central burn cluster, where high proportions of burned flakes and faunal remains likely reflect cooking and food processing (Figure 145). In contrast, the Northeastern Block presents a more tool-focused cluster, with high frequencies of burned flakes and diagnostic artifacts but fewer faunal remains. These differences indicate functional variability within hearth-centered areas, where specific tasks may have been emphasized depending on group needs during occupation. Viewing hearth-related activities as structured zones rather than single, discrete features provides a more accurate model for interpreting Porcupine Peak. As Henry (2012) emphasizes, hearth-centered activity areas are often composed of several overlapping zones, reflecting the cumulative effects of repeated fire use, artifact discard, and shifting activity loci. The patterns at Porcupine Peak, burned clusters across both blocks, vertical recurrence of thermal alteration, and overlapping distributions of lithics, faunal remains, and tools, fit this model well.

When examining the Northeastern Block, several excavation cells provide clear evidence of burning activity (Figure 146). Cell 1018_1040 contains two burnt bone fragments, while the adjacent cell, 1017_1041, yielded a fire-cracked rock. Burned lithics are also present: both cells 1018_1040 and 1018_1039 contain a burnt projectile point that is nondiagnostic to a specific time period, and cell 1018_1039 additionally includes a burnt biface.

The strongest evidence for burning in the Northeastern Block, however, comes from cell 1017_1039. This unit contains the highest concentration of burned artifacts not only within the Northeastern Block but also across the Main Excavation Block. A total of 44 burned flakes were recovered from this cell, with 36 occurring in level one (0–10 cm) and the remaining eight in level two (10–20 cm). The density of thermally altered materials strongly indicates localized fire activity in this area, reinforcing the association of burning with cells 1018_1040, 1018_1039, and 1017_1041. This evidence suggests that the Northeastern Block primarily represents a secondary hearth locus at the Porcupine Peak site. Although the Northeastern Block consists of only six excavated cells, compared to 39 in the Main Excavation Block, the evidence points to hearth use. The distribution of burned material here is consistent with the dynamic nature of hearth loci, where shifting fire locations produce overlapping zones of thermal alteration.

In addition to evidence for burning, the Northeastern Block also suggests the presence of a small hearth-side activity zone, possibly focused on biface production. This spatial relationship implies that tool manufacture and food processing were organized around a common feature, likely a hearth, but remained partially separated into distinct work areas. This pattern corresponds with what Henry (2012) describes as “hearth-side activity zones.” The widespread dispersal of projectile points across nearly all cells in the Northeastern Block reflects another important site-wide pattern previously discussed. Unlike the Main Excavation Block, the

Northeastern Block exhibits less diversity in tool types, with only bifaces and projectile points present. This limited range of overlapping tool classes may reflect another specialized manufacturing area organized around a hearth.

The clustering of bone suggests that the central area of the main excavation block served as a focal cooking and processing locus. This interpretation is reinforced by its overlap with the burned concentration discussed previously. Within this cluster, four cells contained diagnostic projectile points directly associated with faunal remains, often burned. In cell 1006_993, a Late Archaic Corner-Notched Dart Point (5ST98.2479) was recovered from level two (10–20 cm), along with a burned bone fragment (5ST98.1957). Cell 1005_994 yielded two Late Archaic Corner-Notched Dart Points (5ST98.2465 and 5ST98.2468) within level two, accompanied by a burned bone fragment (5ST98.2393). In cell 1003_994, a Late Archaic Corner-Notched Dart Point (5ST98.2455) was recovered from level two, together with two bone fragments: one burned (5ST98.931) and one unburned (5ST98.929). Finally, cell 1002_995 produced a Late Archaic Corner-Notched Dart Point (5ST98.2444) from level one (0–10 cm), alongside a burned bone fragment (5ST98.277). All projectile points associated with faunal remains in this cluster are Late Archaic in age and occur within levels one and two. The consistent overlap of projectile points and faunal remains, particularly burned bone, indicates that cooking and butchering activities were carried out during the Late Archaic occupation. This association further implies that food preparation and tool-related tasks were integrated in the same locality, forming a multipurpose activity zone. Despite evidence of post-depositional mixing across the site, the central block retains strong indications of Late Archaic use, likely reflecting a hearth locus where subsistence and technological activities converged.

In several cases, artifact concentrations only partially overlap with the broad burn cluster within the Main Excavation Block, for example, clusters of bifaces found adjacent to, but not completely coincident with, clusters of bone. This kind of spatial relationship suggests that tool production and food processing were integrated around a common feature (likely a hearth) but were not fully intermixed. Instead, people appear to have organized tasks into distinct yet adjacent work areas within the camp. This pattern fits what Henry (2012) describes as "hearth-side activity zones," where small groups carried out a range of tasks in close proximity to a fire. Within such zones, activities like butchering, hide processing, and tool maintenance could all occur in overlapping rings around the hearth, creating partial rather than complete spatial convergence.

In contrast, another important pattern at Porcupine Peak is the separation of certain artifact clusters from the central hearth and bone deposits, suggesting task-specific or episodic activities. For example, ground stone concentrations are spatially offset from areas with dense bone and hearth features. This distribution indicates that food processing activities were not always integrated into the same hearth-centered activities. Similarly, the presence of an isolated scraper cluster in the northwestern portion of the block suggests a task-specific lithic maintenance or hide-processing area, distinct from primary domestic loci. The northeastern block, characterized by high densities of projectile points but little faunal material, likely functioned as a staging or hunting-preparation zone rather than a cooking or refuse area. These patterns demonstrate that while the site contained several overlapping activities, spatially discrete zones reflect the varied needs of mobile groups, including hunting preparation, food processing, and tool maintenance.

Overall, the spatial patterning of artifacts at Porcupine Peak demonstrates that site structure is best understood not by the presence of single artifact types but by the co-variation of multiple classes across space. Central hearth-centered clusters, where burned bone, lithics, and projectile points overlap, reflect the core of the camp, places where food preparation, cooking, and tool maintenance converged. Adjacent but only partially overlapping clusters, such as bifaces near bone concentrations, illustrate hearth-side activity zones in which different but complementary tasks were organized into discrete work areas around shared fires. In contrast, spatially separated clusters, ground stone concentrations offset from hearth debris, scraper clusters on the block margins, and projectile-point concentrations in the northeastern block, represent task-specific loci tied to food processing, tool maintenance, and hunting preparation.

This pattern aligns closely with expectations of post-hunt camps. At Porcupine Peak, the space was organized around hearths, while specialized activity zones were distributed across the site to accommodate different needs. The integration of multipurpose domestic areas with distinct, task-specific loci reflects the flexible organization of Late Archaic groups, who returned repeatedly to this high-altitude area with partially processed resources and curated toolkits. The structured variability observed, overlap, adjacency, and separation of activity areas show the role of Porcupine Peak as a camp, where technological and subsistence tasks were coordinated within the landscape.

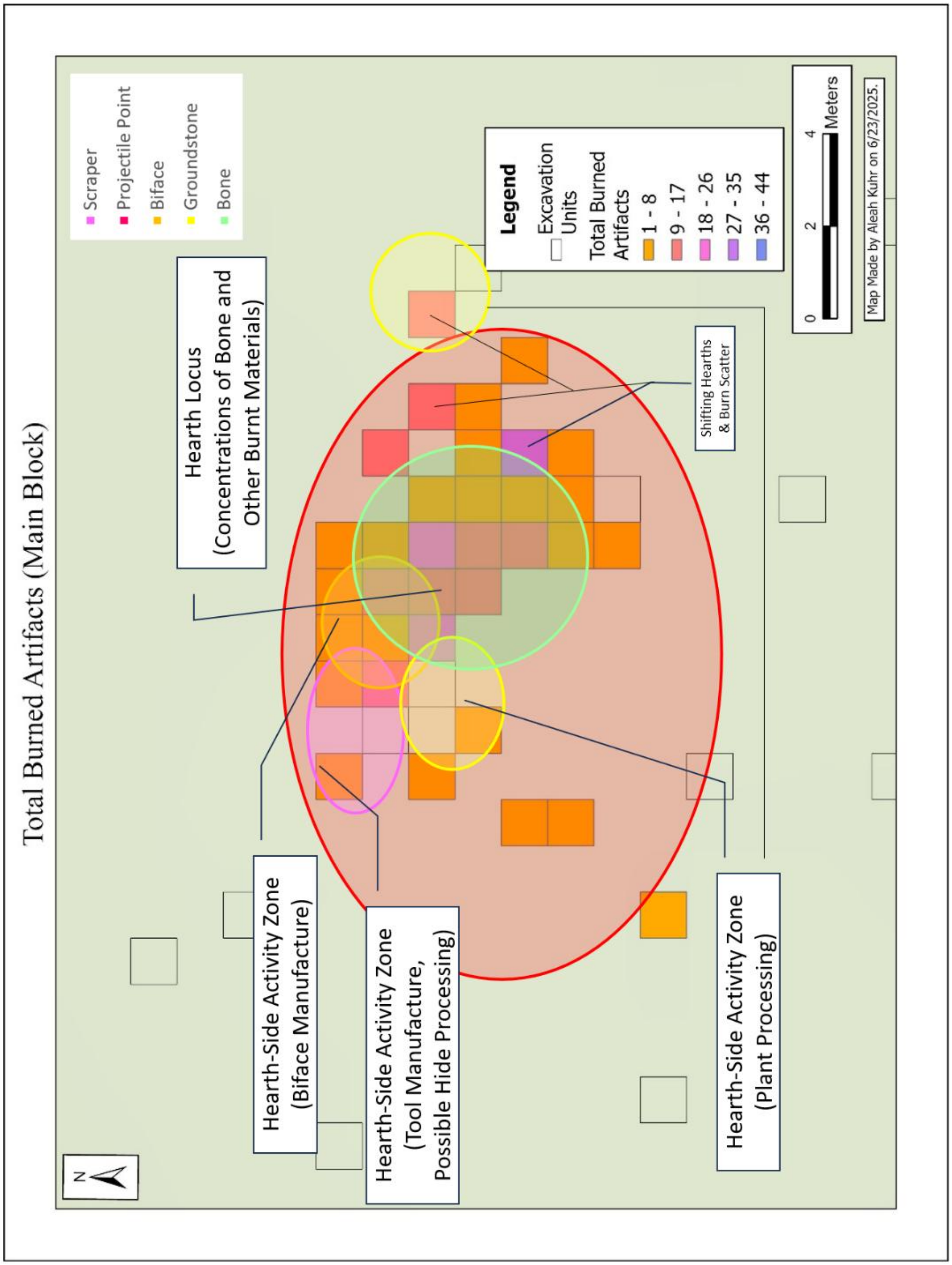

Figure 145. Burned materials in the Main Excavation Block extend beyond the immediate hearth due to the use of fires and outward dispersal of thermally fractured lithics, reflecting shifting hearth locations during occupation. Overlapping and adjacent artifact clusters reveal multiple activity zones, including hearth-centered cooking and food-processing areas and tool manufacturing.

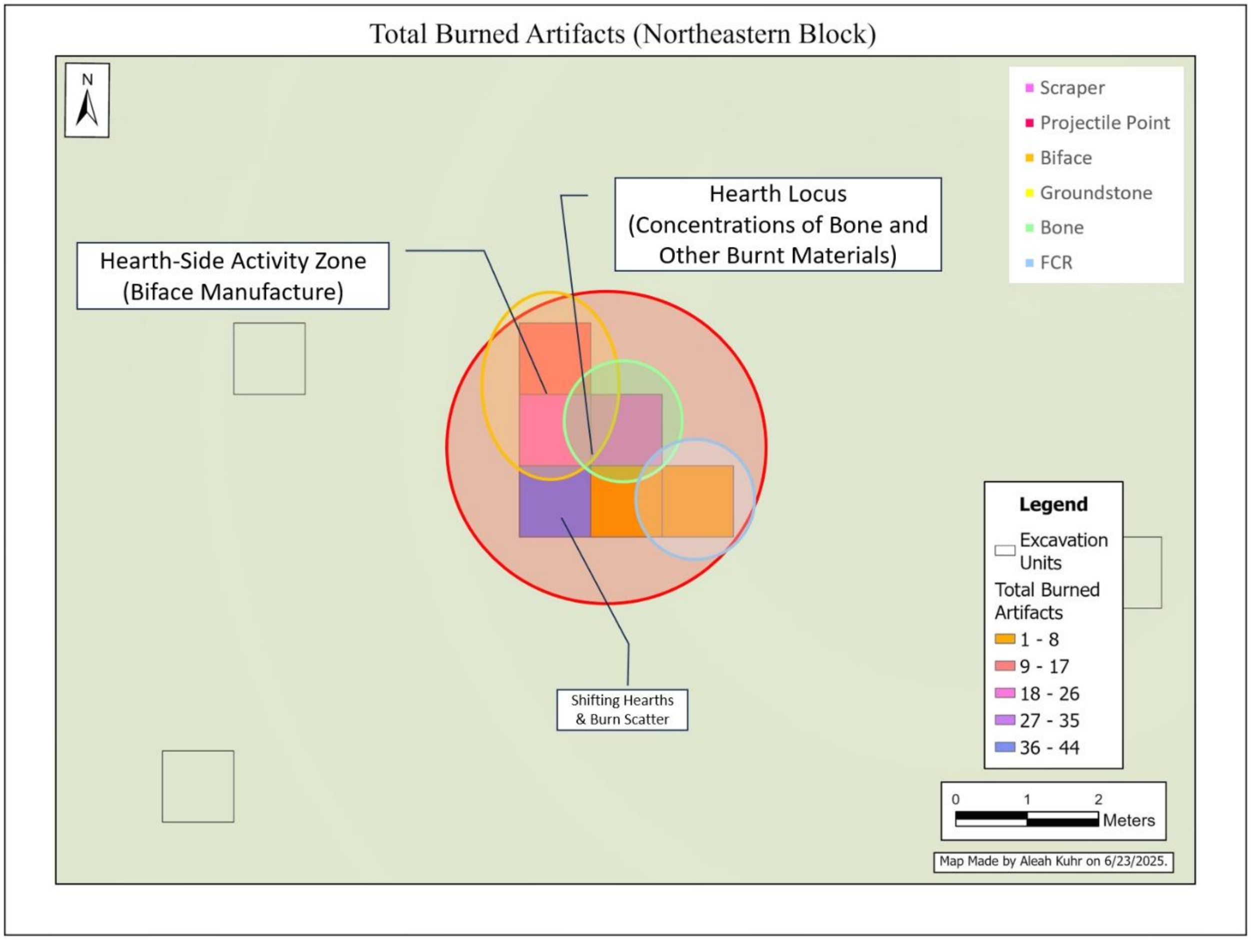

Figure 146. Burned materials in the Northeastern Block are well spread across the Northeastern Excavation Block due to the use of fires and outward dispersal of thermally altered materials, reflecting shifting hearth locations during occupation. One overlapping section, hearth-side activities, reflects the manufacture of tools such as bifaces and projectile points.

Conclusion

The analyses presented in this chapter demonstrate that the organization of space at Porcupine Peak reflects technological, subsistence, and fire-related activities. Artifact distributions reveal that the Main Excavation Block functioned as a central camp locus, where hearth-centered cooking and processing overlapped with lithic maintenance and rehafting. The clustering of burned bone and projectile points directly associated with Late Archaic hearths suggests that this area was the hub of domestic and subsistence activity. By contrast, the Northeastern Block exhibits a smaller-scale but distinct activity area, defined by concentrated burning, biface production, and a restricted tool assemblage, consistent with a secondary hearth locus and more specialized tasks.

Patterns in flake size and cortex frequency further clarify the technological role of the site. The dominance of later-stage reduction debris, combined with the scarcity of cortex-bearing flakes and cores, indicates that Porcupine Peak was primarily a location for tool finishing, resharpening, and maintenance rather than initial core reduction. These patterns align closely with Binford's (1980) collector model, in which partially reduced blanks were transported from raw material sources to camps for further manufacture. The prominence of Troublesome chert in the assemblage directly links Porcupine Peak to regional procurement strategies and shows its significance within broader mobility systems.

Burned materials provide an additional line of evidence for camp occupation. Clusters of thermally altered flakes, bone, and tools appear across both excavation blocks and extend through multiple stratigraphic levels, reflecting recurrent use of fire rather than a single fire event. Outlier units with high burn percentages, even in contexts of low overall artifact density, suggest localized hearth features around which tasks were organized. These patterns support models of hearth-centered spatial organization, in which activities were arranged in overlapping but distinct hearth-side zones (Henry 2012; Surovell 2022).

Finally, projectile point distributions emphasize the site's role as a possible post-hunt camp. The dominance of proximal and base-plus-midsection fragments in the Main Block indicates ongoing tool maintenance and rehafting, while the more dispersed distal fragments reflect discard from hunting episodes. Vertical mixing complicates efforts to isolate discrete occupations, but the overlap of Late Archaic forms with burned contexts and hearth features shows this period as the most intensive phase of site use.

These lines of evidence point to the following interpretation: Porcupine Peak served as a Late Archaic camp within a high-altitude landscape. Here, groups returned to maintain curated toolkits, process transported resources, and organize daily activities around hearths that structured the spatial layout of the camp. The variability between the Main and Northeastern Blocks illustrates how hunter-gatherers created multipurpose domestic cores alongside more specialized task areas, reflecting the flexible organization of mobile groups. As a result, Porcupine Peak provides a valuable case study in how high-elevation camps were structured, offering insight into broader patterns of mobility, seasonality, and land-use in the Rocky Mountains.

The spatial and material patterns at Porcupine Peak demonstrate how Late Archaic groups organized activities, occupied resource-rich locations, and dealt with the challenges of a high-elevation landscape. These dynamics cannot be understood in isolation, however. To fully grasp the role of Porcupine Peak, it is necessary to situate the site within the larger context of Late Archaic mobility and land-use in the Rockies. The following chapter turns to this broader scale, examining strategies that shaped seasonal movements and how Porcupine Peak fits into these wider patterns.

CHAPTER VIII - BROADER SPATIAL PATTERNS: STEEPER ANGLES AND LONGER JOURNEYS

Introduction:

Previous chapters have documented clear evidence of activities at Porcupine Peak, including hunting, butchering, and cooking, demonstrating that the site was a camp. But why were Late Archaic groups occupying a high-altitude site at 2,959 meters (9,708 feet)? This chapter addresses that question by situating Porcupine Peak within broader regional mobility and resource-use patterns. I hypothesize that Porcupine Peak was not an isolated occupation but a component of a wider strategy for exploiting mountainous environments.

Examining mobility and material use is essential for understanding why Late Archaic groups occupied high-altitude sites like Porcupine Peak. Mobility patterns reveal how groups moved across the landscape to exploit seasonal resources, while patterns of lithic procurement, reduction, and transport provide insight into mobility strategies and resource management. These patterns can help us understand how groups selected sites and managed the challenges of mountainous environments. By linking tool use and mobility, we can reconstruct broader patterns of behavior and occupation that go beyond the specific activities observed at a single site.

To test this broader hypothesis and evaluate how lithic data reflect mobility decisions, I focus on the relationship between raw material use and distance from the source. Specifically, I hypothesize that the degree of reduction in Late Archaic projectile points made from Kremmling Chert, as measured by blade-tip angles (defined as the edge of a projectile point between the tip and the shoulder above the hafting area), will increase with greater distance from the source quarry. This is due to the cumulative effects of transport, use (such as breakage in a hunting event), and resharpening, which are expected to alter the morphology of the points over time and distance. If Late Archaic groups were transporting high-quality Kremmling Chert across a broad territory, we should expect to see higher blade-tip angles at sites located farther from the source. These higher angles would indicate more intensive resharpening and prolonged use of the tools. This measurable pattern provides a means to evaluate how Porcupine Peak fits within regional mobility and resource-use strategies.

Sample Selection and Study Sites:

To examine broader regional patterns in lithic use and mobility, this study focuses on Late Archaic corner-notched dart points made from Kremmling Chert. Kremmling Chert, particularly the porcellanitic variety, was commonly used for Late Archaic corner-notched dart points due to its superior flaking properties (see Appendix O for a full description of raw material and point typology used for this study). The analysis includes projectile points from seven sites located within 100 km of the Kremmling Chert quarry: Porcupine Peak (5ST98), 5ST303, Flattop Mountain Game Drive, Coney Lake, Devils Thumb, Fourth of July Mine Site, and the Horn Ranch Site. Sites were selected based on three criteria: (i) they contained Late Archaic corner-notched dart points made from Kremmling Chert, (ii) the artifacts were recovered through controlled excavation, and (iii) the sites had radiocarbon dates consistent with the Late Archaic period. These sites span a range of elevations and environmental contexts, providing a comparative framework for understanding how distance from the quarry influenced tool reduction, maintenance, and curation. By examining these sites together, we can link patterns of lithic modification to mobility strategies, resource management, and site selection, situating Porcupine Peak within broader regional behaviors rather than treating it as an isolated occupation.

Theoretical Framework and Ethnographic Insights:

This choice of sample is grounded in prior research demonstrating the utility of lithic analyses for reconstructing mobility and resource-use strategies. Studies have shown that quarry sources and raw material distributions can reveal patterns of logistical planning, site selection, and tool curation among highly mobile hunter-gatherers. By selecting sites across a range of distances and environmental contexts, this study follows established analytical frameworks that use lithic data to evaluate mobility patterns, test ethnographic analogs, and situate individual sites, such as Porcupine Peak, within broader regional strategies.

Conceptual models of mobility proposed by Benedict (1992) provide useful frameworks for interpreting Late Archaic site use in the Colorado Mountains. The 'up-down' model describes family groups moving between foothill winter camps and ecotone summer camps, while the 'rotary engine' model envisions multiple residential moves north along the Front Range in spring, south through North and Middle Parks in summer, and back across the Front Range in late summer and fall. While these models offer valuable insights, their main limitation is limited testability (Reed & Metcalf 1999). Subsequent researchers (Larson 1997; Eckerle 1997; Madsen & Metcalf 2000) have emphasized using analytical approaches, such as lithic measurements and transport cost estimates, to evaluate mobility more rigorously. Lithic materials and quarry sources, in particular, provide a means to reconstruct independent mobility systems (Benedict 1992), and regional patterns in raw material distribution have been used to hypothesize Late Archaic mobility and territorial use across the Front Range and San Luis Valley (Black 1995). Although direct evidence remains incomplete, it is generally accepted that populations were highly mobile, adapting their movements to environmental and seasonal conditions.

Understanding these models and regional patterns provides a framework for situating Porcupine Peak within broader mobility strategies and resource-use patterns.

Ethnographic research demonstrates that patterns of lithic use and curation are often closely tied to mobility strategies and access to raw material sources. For many hunter-gatherer groups, stone materials are categorized as “local” or “exotic.” Local materials are typically abundant, easily accessible, and require minimal modification, whereas exotic materials are transported over longer distances and often show evidence of extended use and resharpening. Such patterns illustrate how distance from a raw material source can influence tool morphology and technological strategies, offering valuable analogs for interpreting Late Archaic lithic assemblages and mobility in the Colorado Mountains.

It is important to note that what constitutes a “local” or “non-local” material can vary depending on the scale of the group’s mobility and the productivity of the environment. Materials considered non-local in small, resource-rich territories may be readily available within the broader home range of groups occupying less productive or more variable environments (Stanley 2005). Ethnographic cases, such as central Australian hunter-gatherers documented by Gould and Saggers (1985), show that long-distance transport to flaked stone quarries was not unusual, reflecting both practical and social motivations. These studies highlight the flexibility and context-dependence of raw material procurement strategies, suggesting that distance alone does not fully determine technological choices. For the purposes of this study, a threshold of >40 km is applied to distinguish local from non-local lithic procurement, with consideration of the challenges posed by harsh environments in both ethnographic and archaeological contexts. Sites within 0–40 km of the Kremmling Chert quarry are classified as using local resources (Horn Ranch and 5ST303), while those located beyond 40 km (Fourth of July Mine Site, Devils

Thumb, Coney Lake, Flattop Mountain Game Drive, and Porcupine Peak) are considered to utilize exotic materials.

Ethnographic data from Richard Gould and Sherry Saggers (1985), shows the importance of mobility and long-distance interactions in shaping material procurement. The Kremmling Chert quarry example, where tool attributes such as blade angles varied based on distance from the quarry, reflects the social and environmental adaptations seen within the Australian case. The study showed that long-distance transport of stone materials often occurred for both practical and social reasons, which could be present at sites like Porcupine Peak and Coney Lake, which are located farther from the quarry and show higher blade angles. This pattern suggests that, like the Aboriginal groups, Late Archaic groups may have been engaging in similar strategies of mobility and material procurement, focusing on practical tool performance with the social and logistical demands of their environment (Gould and Saggers 1985). The steep elevations and dispersed resources likely required strategies that prioritized durable, versatile tools to minimize frequent replacements during mobility. Furthermore, harsh winters would have heightened the need for efficient resource management

In this study, the distribution of angle measurements at Porcupine Peak and Coney Lake suggests a level of consistency in tool production. This pattern can be compared to how raw materials were procured and used in different environments. For example, the study in Central Australia presents the importance of both technological qualities and social practices in material selection (Gould and Saggers 1985). This idea can be applied to the patterns seen in the angle measurements. For instance, at Porcupine Peak, the moderate variation in blade angles and the stable distribution could be linked to a consistent approach to tool production, reflecting a well-established technological strategy, similar to the focus on material durability and tip-angle-holding efficiency seen in the Australian study.

Another ethnographic case study that could be utilized to explain similar patterns is Binford and O'Connell's (1984) observations of the Alyawara. The Alyawara also present a case where high-quality materials are selected at quarries and the transport of cores or partially worked blanks to residential camps (Binford and O'Connell 1984). With a porcellanitic variety being found at each site within Colorado, the Late Archaic groups sought high-quality materials (as compared to other common materials found within the mountains, e.g., Windy Ridge quartzite). Sites like Porcupine Peak and Flattop Mountain Game Drive may demonstrate this pattern, where higher average blade angles reflect the greater investment in distant materials, such as Kremmling Chert, which had to be transported over long distances and thus were used more intensively. In contrast, tools made from local materials, like those observed at 5ST303, tend to exhibit lower blade tip angles, reflecting less reduction and greater ease of replacement due to the proximity of raw material sources. Furthermore, the Alyawara's strategy of transporting cores to residential camps aligns with the idea that exotic materials were curated for tools requiring extended use, which the scatterplot data supports. As distance from the quarry increases, so does tool longevity and the degree of resharpening, resulting in higher blade tip angles at more distant sites like Porcupine Peak. On the other hand, local materials closer to quarries were likely shaped and discarded more readily, as seen at 5ST303, where tools show smaller blade angles.

These ethnographic examples demonstrate that mobility, raw material availability, and environmental constraints strongly influence lithic strategies. By examining how forager groups manage local versus distant materials, maintain tool functionality, and prioritize resource use, we can develop expectations for similar behaviors in the archaeological record. In the context of the Colorado Mountains, these analogs provide a framework for interpreting Late Archaic patterns of projectile point reduction, curation, and transport across sites at varying distances from the Kremmling Chert quarry. The following analysis applies these ethnographic insights to the selected sample of seven sites, situating Porcupine Peak within broader regional mobility and resource-use strategies.

Results:

Seven dated sites from the Northern Colorado Mountains were found to meet the criteria laid out above. This includes, Porcupine Peak (5ST98), 5ST303, Flattop Mountain Game Drive (5LR6), Coney Lake (5BL94), Devils Thumb (5BL3440), The Fourth of July Mine Site (5BL153), and the Horn Ranch Site (5GA869) (Figure 147). A total of 39 corner-notched dart points were analyzed in this study, all of which retained complete tips and margins to allow accurate measurement of blade-tip angles, ensuring that comparisons of reduction intensity across sites reflect actual tool use rather than post-depositional breakage. The majority of points derive from Porcupine Peak (25), followed by Coney Lake (5), the Fourth of July Mine Site (3), Flattop Game Drive (2), Horn Ranch Site (2), and 5ST303 (one) (Figure 148).

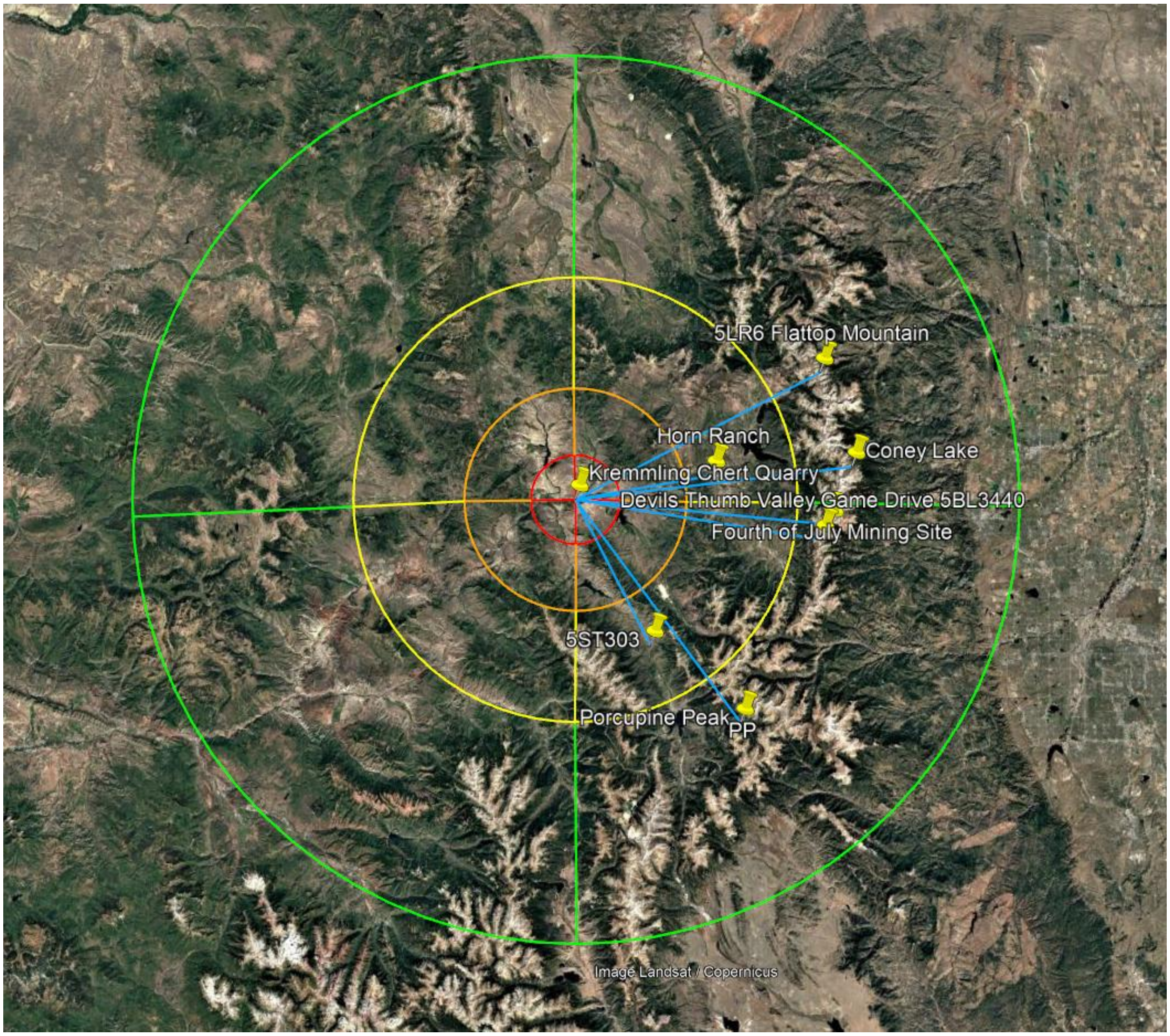

Figure 147. Map showing concentric circles around the Kremmling Chert Quarry in Colorado, representing varying distances. The red circle indicates a ten km radius, the orange circle represents 25 km, the yellow circle marks 50 km, and the green circle outlines a 100 km radius. These circles illustrate the spatial distribution of potential quarry exploitation and tool use in relation to the site's proximity.

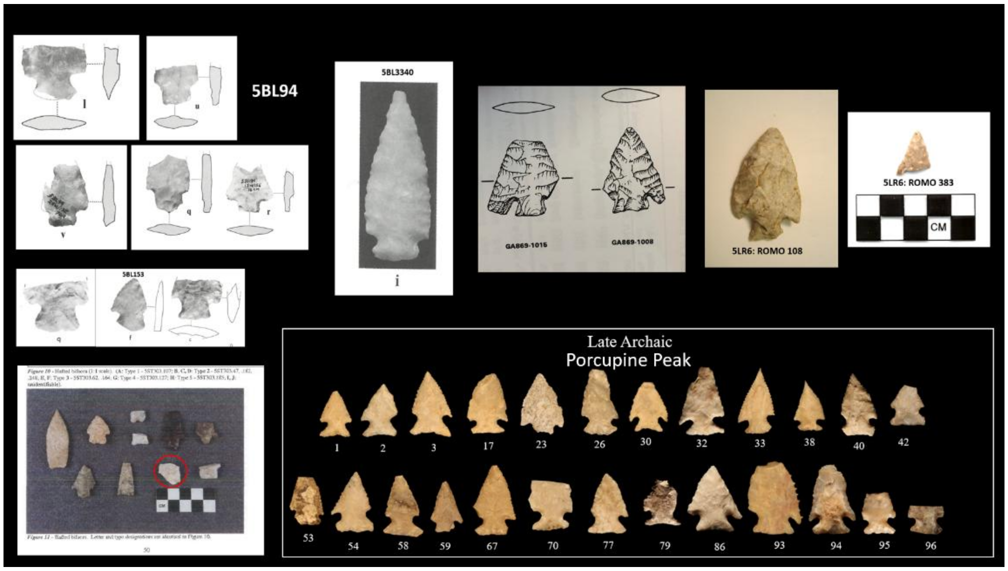

Figure 148. Photograph showing the various projectile points analyzed in this project.

The box and whisker plot for Porcupine Peak, which provided the largest sample size, illustrates the distribution of angle variation at this site (Figure 149). The minimum value is 27.162, while the maximum value is 57.009. The interquartile range (IQR) is within Q1 (38.458) and Q3 (51.7305), with the median (Q2) at 44.392. Notably, there are no outliers present in this dataset. The plot suggests a relatively even spread of angle values across the sample, with the majority of values falling between the lower quartile (Q1) and the upper quartile (Q3).

The box and whisker plot for Coney Lake, which provided the second-largest sample size, depicts the distribution of angle variation at this site (Figure 150). The minimum value is 23.005, and the maximum value is 45.128. The interquartile range (IQR) is defined by Q1 (23.038) and Q3 (42.8265), with the median (Q2) at 25.236. There are no outliers present in this dataset. The plot reveals a distribution where the majority of angle measurements fall between the first and third quartiles, with a noticeable gap between the median and the upper quartile.

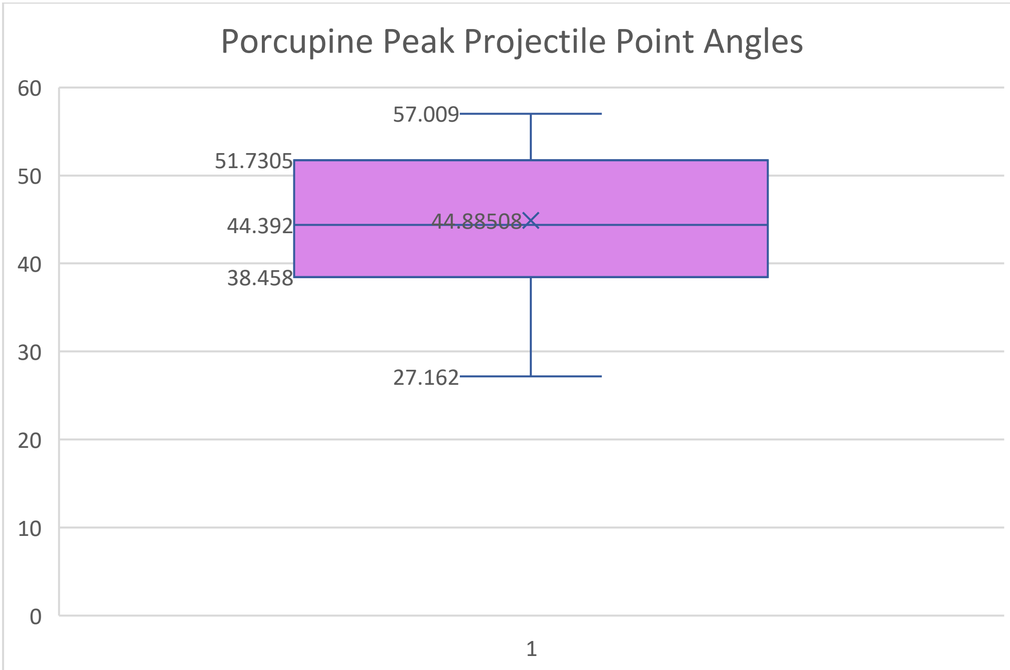

Figure 149. Boxplot displaying the distribution of projectile point angles from Porcupine Peak. The central line within the box represents the median angle (44.89°), while the box spans the interquartile range (IQR), from 38.46° to 51.73°. The whiskers indicate the range of values, from 27.16° to 57.01°, with an outlier marked by the X at 44.39°.

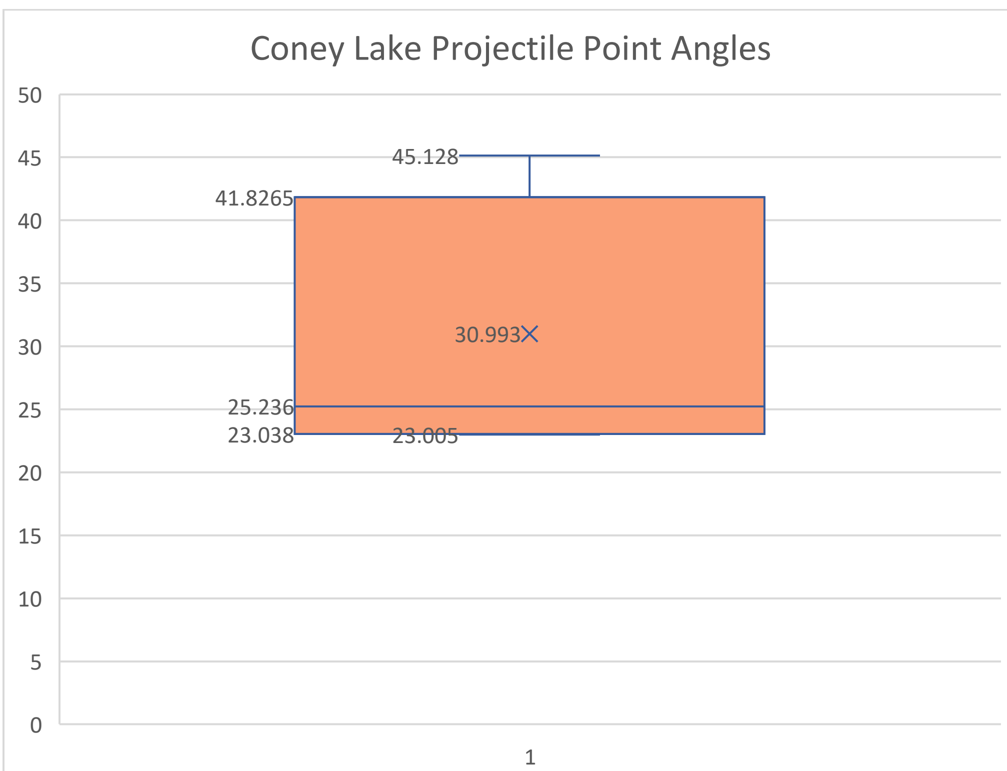

Figure 150. Boxplot displaying the distribution of projectile point angles from Coney Lake. The central line within the box represents the median angle (30.99°), while the box spans the interquartile range (IQR), from 23.04° to 41.83°. The whiskers extend from 23.01° to 45.13°, with an outlier marked by the X at 30.99°.

The box and whisker plot for the Fourth of July Mine Site, which provided the third largest sample size, shows the distribution of angle variation at this location (Figure 151). The minimum value is 29.703, while the maximum value is 55.449. The interquartile range (IQR) is defined by Q1 (29.703) and Q3 (55.449), with the median (Q2) at 37.129. There are no outliers present in this dataset. The plot indicates that the distribution is skewed toward the higher end of the range, with most of the angle measurements clustered near the lower quartile.

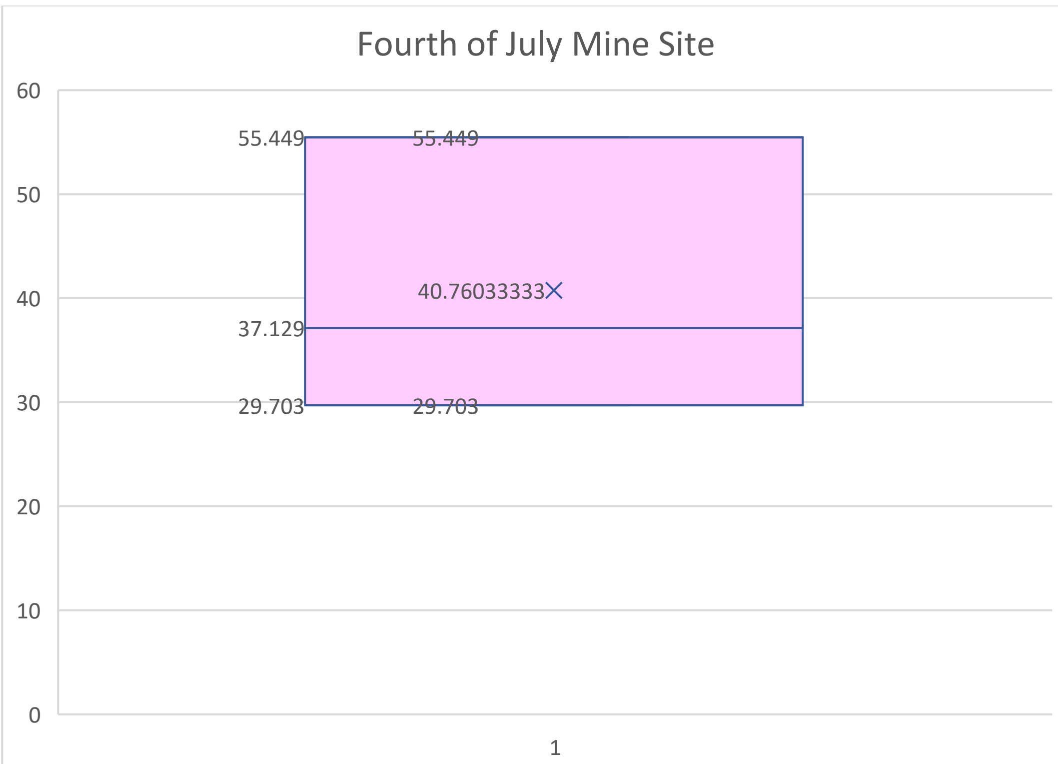

Figure 151. Boxplot displaying the distribution of projectile point angles from the Fourth of July Mine Site. The central line within the box represents the median angle (40.76°), while the box spans the interquartile range (IQR), from 29.70° to 55.45°. The whiskers extend from 29.70° to 55.45°, with an outlier marked by the X at 40.76°.

The sites show variability in lithic tool characteristics, distances, and chronological contexts when compared to one another (Figure 152) (Appendix H). Porcupine Peak exhibits an average blade angle of 44.89°, a distance of 62.65 km, and multiple radiocarbon dates for two features, ranging from 3555 ± 215 BP to 2425 ± 85 BP (Appendix I). Similarly, Flattop Mountain Game Drive records the highest average blade angle (53.10°), a comparable distance of 62.25

km, and a radiocarbon date of 2620 ± 60 BP. Coney Lake features a moderate average blade angle (30.99°), the farthest distance (62.95 km), and a radiocarbon date of 3660 ± 130 BP. In contrast, 5ST303 has the lowest average blade angle (14.62°), a shorter distance of 36.93 km, and radiocarbon dates spanning 4500–2850 BP. Horn Ranch Site, with the second-highest average blade angle (49.47°) and the shortest distance (31.35 km), exhibits the widest range of radiocarbon dates, spanning from 6910 ± 60 BP to 340 ± 60 BP. Devil's Thumb shows a mid-range blade angle (38.37°), a medium distance of 56.25 km, and two radiocarbon dates: 1850 ± 50 BP and 2155 ± 55 BP. Finally, The Fourth of July Mine Site, with a blade angle of 40.76° and a distance of 57.89 km, yielded a radiocarbon date of 2650 ± 50 BP.

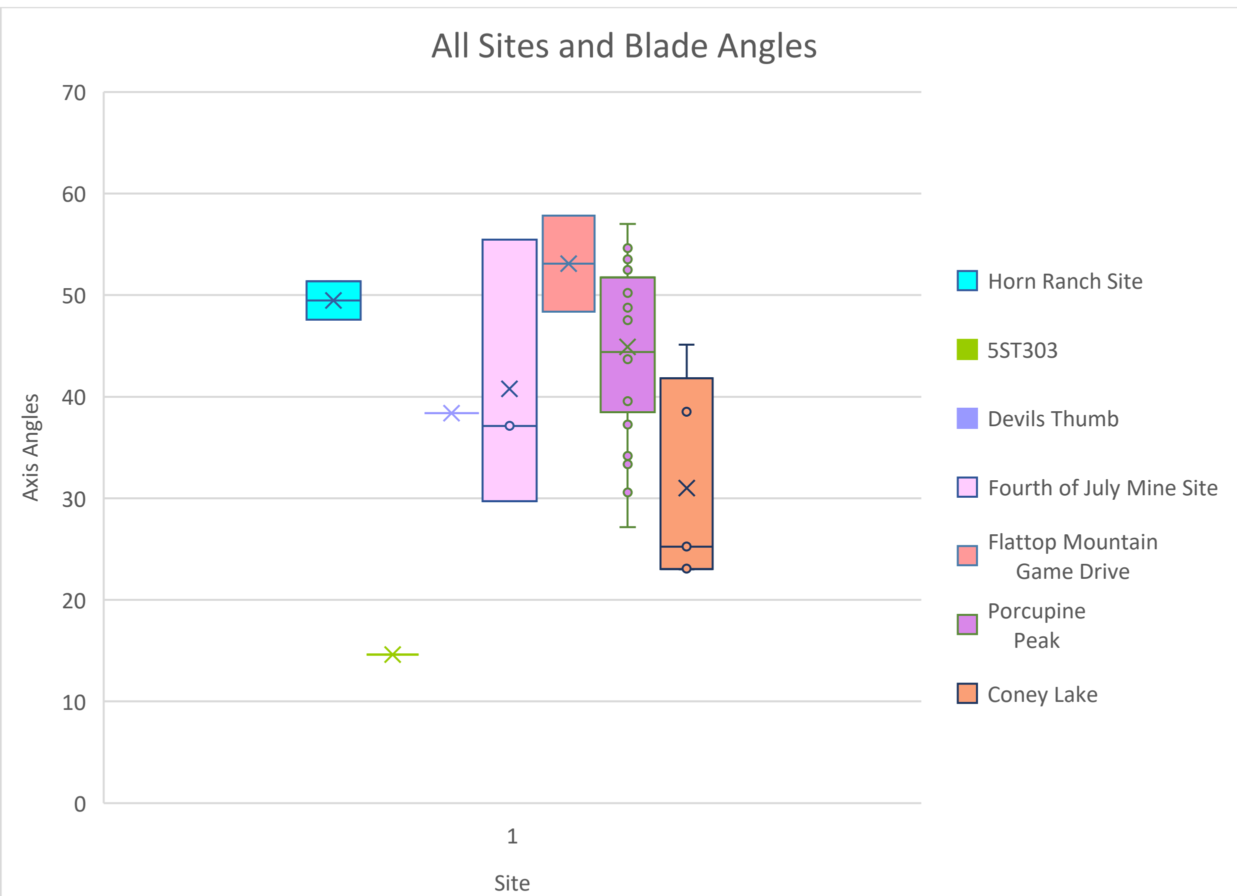

Figure 152. Box and whisker plots side by side, with the closest to furthest distance from left to right.

The scatterplot depicts the relationship between the average blade angle of projectile points and their distance from the Kremmling Chert quarry (Figure 153). The data points, representing different archaeological sites, show a positive trend: as distance from the quarry increases, the average blade angle also increases. Sites such as Porcupine Peak (62.65 km) and Flattop Mountain Game Drive (62.25 km) exhibit higher blade angles, consistent with the hypothesis that points further from the quarry have undergone greater reduction through transport, use, and resharpening. On the other hand, Horn Ranch Site (31.35 km), despite being relatively close to the quarry, shows a high blade angle (49.47°), making it the outlier in terms of its proximity to the quarry. This may indicate that these points were heavily used and resharpened over time as groups traveled back toward the quarry to restock, reflecting a round-trip movement rather than a one-way transport from source to site.

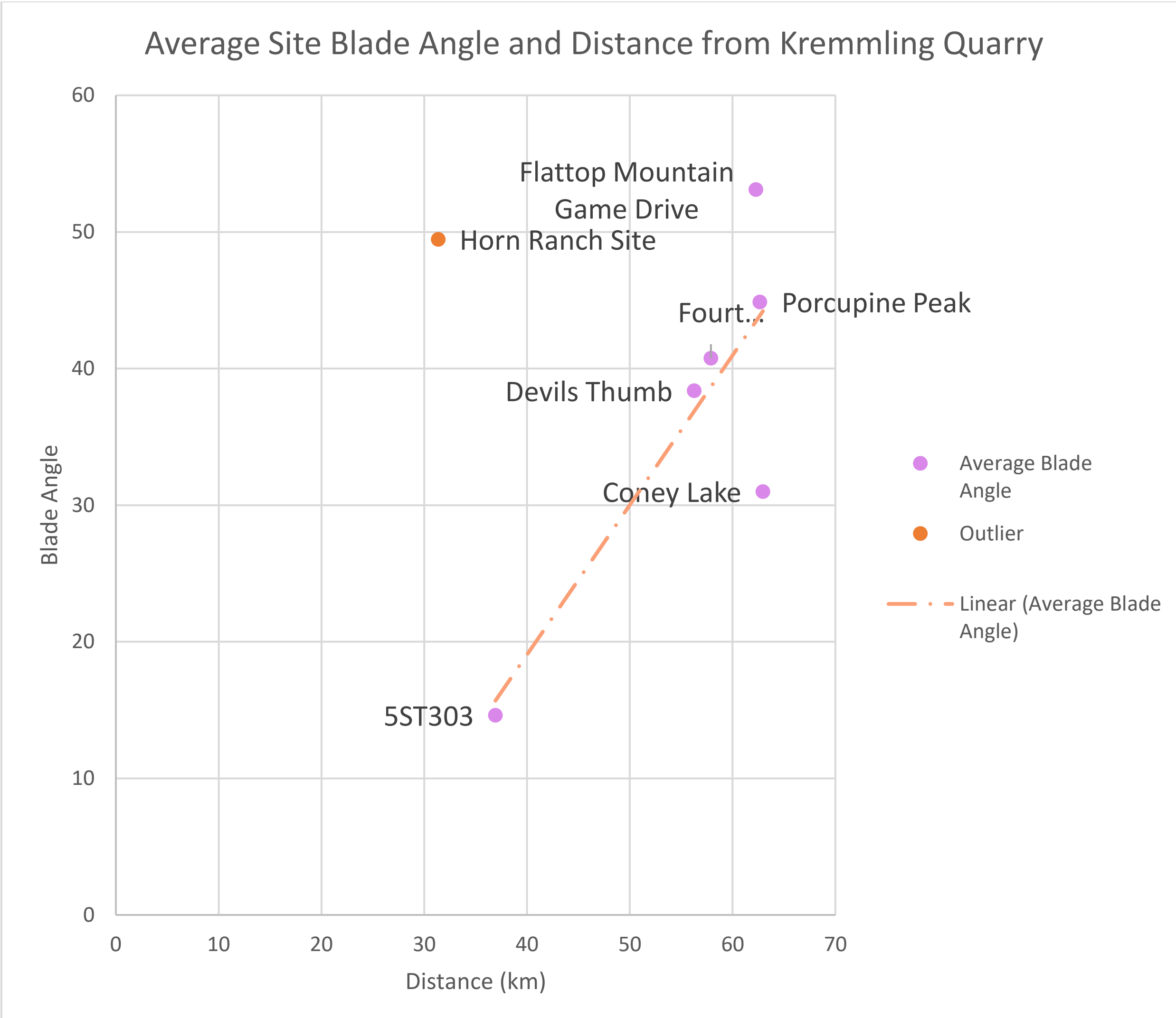

Figure 153. The scatterplot provides strong support for the hypothesis that the degree of reduction in projectile points, measured by blade-tip-angles, increases with distance from the Kremmling Chert quarry.

Discussion:

The box and whisker plots for Porcupine Peak and Coney Lake show distinct differences in the distribution of angle measurements (Figure 155). At Porcupine Peak, the plot shows a moderate range of variation in angle measurements, with the median (44.392) located closer to the upper half of the distribution, suggesting that most of the angle measurements tend to skew toward the higher range of the data. The distribution between Q1 (38.458) and Q3 (51.7305) is consistent, and there is no extreme clustering in the interquartile range. The absence of outliers further supports the conclusion that the data is relatively homogeneous, with no significant anomalies influencing the results. This uniformity suggests that the angle variation at Porcupine Peak is stable, which may reflect standardized practices in shaping or modifying tools.

In contrast, Coney Lake shows a relatively tight clustering of angle measurements, with the median (25.236) closer to the lower quartile (Q1 = 23.038). This positioning indicates that a significant portion of the data falls within the lower range of values. The spread between Q1 (23.038) and Q3 (42.8265) indicates a moderate level of variation, but the range in the upper quartile is larger, suggesting that the distribution skews toward higher angle measurements. Like Porcupine Peak, there are no outliers in the data, which points to a consistent pattern in the measurements. The tighter variation in angle measurements at Coney Lake, compared to Porcupine Peak, may be due to a smaller sample size as compared to Porcupine Peak.

For the Fourth of July Mine Site, the plot shows a distribution where most of the angle measurements are concentrated toward the lower end of the range, with the median value (31.129) being close to the lower quartile (29.703). The data goes from a minimum value of 29.703 to a maximum of 55.449, with a larger gap between the median and Q3 (55.449), indicating that the distribution is somewhat positively skewed, with a few higher angle measurements pulling the range upward. As with the other two sites, the absence of outliers suggests that the data is not influenced by extreme values. Comparing these distributions across the sites will help contextualize the degree of variation in angle measurements and offer further understanding of site-specific behaviors.

The data represent variability in site distances and chronological contexts across the region. Porcupine Peak, with an average blade angle of 44.89°, stands out as being similar in proximity and tool attributes to Flattop Mountain Game Drive (53.10°). Both sites are located around 62 km from the reference point. This similarity could reflect shared Late Archaic mobility strategies, but it may also result from a general distance-decay effect, as both sites lie within the 50–100 km range from the Kremmling Chert quarry. Although their proximity to the quarry is similar, the radiocarbon dates from each site suggest slightly different time frames, which may point to differences in the longevity or intensity of occupation at these sites, with varying amounts of time the tools were used, affecting how much they were worn down or reshaped. The low average blade angle at 5ST303 (only 36.93 km distance), (14.62°) contrasts sharply with that of other sites, possibly reflecting this study's hypothesis, with the most acute angles being close to the Kremmling Chert Quarry.

The scatterplot provides strong support for the hypothesis that the degree of reduction in projectile points, measured by blade-tip-angle, increases with distance from the Kremmling Chert quarry. As predicted, sites such as Porcupine Peak and Flattop Mountain Game Drive, located farther from the quarry, show higher average blade angles (44.89° and 53.1°), suggesting that these points underwent greater resharpening and wear through extended use and transport. On the other hand, Horn Ranch Site, located relatively closer to the quarry (31.35 km), serves as an outlier with a higher average blade angle (49.47°) than would be expected based on its proximity. This unexpected result may be due to the unique morphological characteristics of the projectile points from this site, which do not align with the typical patterns observed in this study. For example, GA869-1015 exhibits deep basal notching and features wide, square tangs, while GA869-1008 has a single, narrower, rounder tang, contrasting with the square tangs (Reust 1998). Despite these differences, both point types are indicative of occupations during the Late Archaic era (Reust 1998). Within the context of the Horn Ranch Site, these points are most strongly associated with the Late Archaic period, similar to the diagonal-basal notch type identified at sites like Vail Pass Camp Site and MM27 at Magic Mountain (Reust 1998). The site also includes a range of radiocarbon dates that may not accurately reflect the occupation phase represented by these points, suggesting that the association between the dates and artifacts may be suspect. Nevertheless, these points were included in the analysis because they met the criteria of being made from Kremmling Chert and appear to fall within the desired radiocarbon range for the Late Archaic period.

The other sites in the maximum-range distances, such as Coney Lake (62.95 km) and Devil's Thumb (56.25 km), more closely follow the predicted trend, with blade angles that increase in line with the greater distance from the quarry (Figure 154). This suggests that, in most cases, distance from the Kremmling Chert quarry is relevant to shaping lithic tool morphology through processes like tool-use and resharpening during travel. As these tools were carried farther from the source, they likely faced greater wear and resharpening, which would result in a larger angle compared to tools used closer to the quarry. The consistent pattern of increasing blade angles with distance supports the idea that tool reduction is a cumulative process, influenced by both the physical distance and the repeated use and modification of the tools. Additionally, this pattern might also reflect the mobile and technological strategies of Late Archaic groups, where the need for efficient, multipurpose tools could drive the continued resharpening and adjustment of tool forms over time and distance from the quarry.

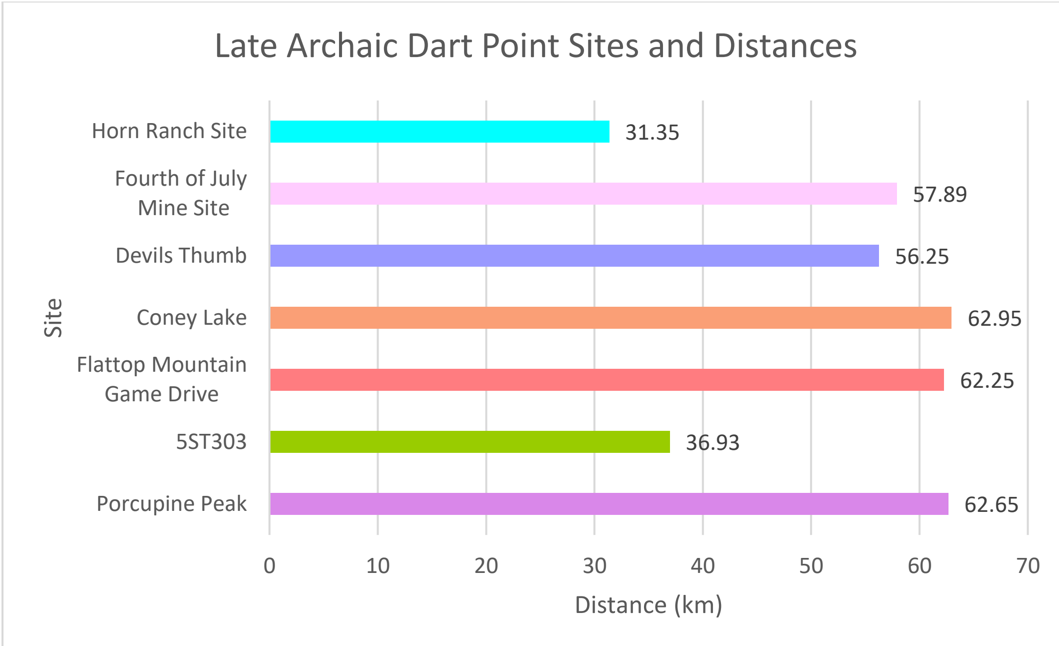

Figure 154. Chart depicting the various distances of sites studied in this paper, 5ST303 and Horn Ranch are close to the Kremmling Chert Quarry, while the other sites are far

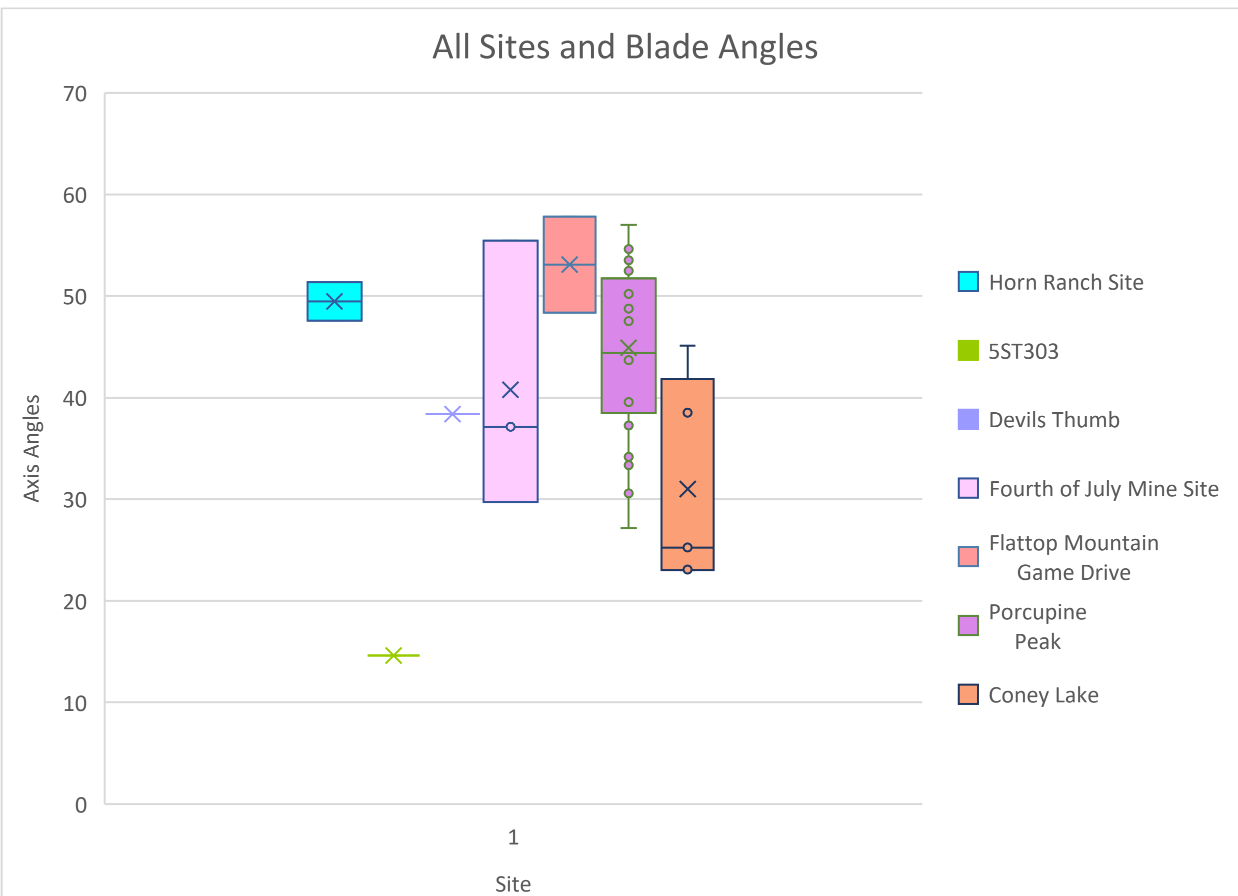

Figure 155. Box and whisker plots side by side, with the closest to furthest distance from left to right.

Conclusion:

The analysis of Kremmling Chert projectile points demonstrates a clear pattern of increasing blade-tip angles with distance from the quarry, reflecting the cumulative effects of transport, use, and resharpening. Porcupine Peak, located 62 km from the source, exhibits higher average blade angles, indicating that tools at this distant site underwent more extensive modification and maintenance. In contrast, sites closer to the quarry, such as 5ST303, show sharper angles, reflecting limited reduction and easier tool replacement.

These results support the hypothesis that Porcupine Peak was not an isolated occupation but part of a broader mobility and resource-use strategy. The assemblage reveals that Late Archaic groups carefully managed high-quality Kremmling Chert at distant sites, maintaining tools to meet the challenges of high-elevation life. Seasonal mobility likely shaped these strategies: groups transported curated tools to subalpine camps, conserving resources and ensuring reliable tool performance during extended occupations in resource-dispersed environments.

Ethnographic parallels, including the Alyawara and central Australian foragers, illustrate how mobility, distance from raw material sources, and environmental constraints influence tool curation and technological decision-making. By situating Porcupine Peak within these regional and ethnographic frameworks, we see that its assemblage reflects broader patterns of Late Archaic behavior: strategic site selection, careful resource management, and technological adaptation to the challenges of mountainous landscapes. Ultimately, Porcupine Peak exemplifies how mobility, raw material procurement, and tool maintenance intersected to structure Late Archaic lifeways across Northern Colorado, providing empirical support for the larger hypothesis that high-altitude sites functioned as integral nodes within expansive seasonal territories.

CHAPTER IX – CONCLUSION

Introduction

This chapter synthesizes the results of analyses conducted in previous chapters to address the central research questions of this thesis. By examining artifact composition, spatial and vertical distributions, and technological attributes at Porcupine Peak (5ST98), this study evaluates patterns of site use, activity organization, and broader strategies employed by Late Archaic hunter-gatherers in high-altitude environments. The following sections revisit the key questions posed in each analytical chapter, summarizing the evidence and interpreting patterns in occupation, tool use, and subsistence behavior both within Porcupine Peak and in a regional context.

In Chapter IV, the central question was: *What is the nature of the assemblage recovered from Porcupine Peak (5ST98)?* The assemblage represents one of the largest Late Archaic high-altitude collections documented in Colorado, comprising nearly 4,000 flakes and 168 tools. Projectile points dominate the tool assemblage, most of which are fragmented and associated with hunting, butchering, and tool maintenance. Ground stone, scrapers, and bifaces provide additional evidence for plant processing, hide working, and retooling. The overwhelming reliance on Troublesome chert, transported more than 70 km, suggests that occupants brought pre-reduced bifaces to the site for finishing and repair.

Chapter V addressed two questions concerning spatial distribution. First: *What is the spatial distribution of artifacts across Porcupine Peak (5ST98)?* The main excavation block contains the majority of artifacts, including 83% of angular debris, 82% of bifaces, 96% of bone fragments, 70% of groundstone artifacts, and 80% of projectile points. This makes it both the densest and most diverse area of the site. The northeastern block holds the second-highest concentrations, including projectile points, bifaces, flakes, and bone, indicating localized activity. Both blocks reveal patterned clustering consistent with activity zones for tool production, maintenance, and subsistence rather than random discard. The second question asked: *Where are the high-resolution (dense) areas that will be prioritized for further analysis?* Units distant from major clusters or lacking diagnostic artifacts were excluded. Analysis therefore focused on the main excavation block, the northeastern cluster, and a southern unit, as these areas contain the highest artifact densities and best represent sustained lithic and subsistence activities.

In Chapter VI, the analysis turned to vertical patterning. The first question asked: *What is the vertical distribution of artifacts in high-resolution excavation areas?* Most artifacts in the main excavation block are concentrated within the upper 20 cm of the excavation unit. Units display predominantly unimodal distributions in either level one (0–10 cm) or level two (10–20 cm), with only a few spanning both levels. One unit (1005_993) shows a deeper concentration in level three (20–30 cm), suggesting a distinct or intensive occupation episode, while another exhibits a bimodal distribution likely reflecting multiple occupations or vertical movement. In the northeastern block, units similarly show unimodal distributions, though Unit 1019_1039 stands out with a deeper concentration in level four (30–40 cm). The second question asked: *What does vertical analysis reveal about site integrity?* Flake size and depth distributions confirm that the site's excavation levels is largely intact. Large flakes are not disproportionately concentrated at lower levels, and diagnostic artifacts such as projectile points and bifaces remain vertically clustered, both of which indicate minimal post-depositional disturbance and good preservation of occupation surfaces.

Chapter VII focused on occupation function and organization. It first asked: *What do the assemblage and spatial distributions within high-resolution areas reveal about occupation* *function, site function, and site structure?* The evidence suggests that Porcupine Peak functioned primarily as a camp. The main excavation block shows dense clusters of projectile points, bifaces, flakes, and burned bone, reflecting integrated activities such as tool production, maintenance, cooking, and food processing. In contrast, the northeastern block is less diverse, with high projectile point densities but limited faunal remains, indicating short-term or task-specific activities. The next question was: *How were activities organized across the site?* Activity zones were structured around hearths, which served as focal points for multipurpose "hearth-side" areas where cooking, butchery, and tool-related tasks overlapped. Adjacent clusters of bifaces and groundstone tools highlight task-specific areas situated near, but not entirely intermixed with, hearth-centered spaces. Burned flakes and bone further point to fire use, supporting interpretations of recurrent occupation episodes.

The following question asked: *What do projectile point distributions indicate about site function and structure?* Proximal and complete points are concentrated in the main block, suggesting retooling and rehafting occurred there, while distal fragments are more widely scattered, reflecting secondary discard. The northeastern block exhibits more dispersed projectile points, consistent with episodic or task-oriented use. The final question asked: *How does the overall site structure reflect hunter-gatherer organization?* The site embodies the flexible organization of a camp. Hearth-centered activity zones integrated technological and subsistence tasks, while specialized or episodic activity areas were spatially separated. This arrangement illustrates the strategic organization of space and supports interpretation of Porcupine Peak as a high-altitude camp with multiple overlapping activity loci.

Chapter VII expanded the scope of analysis to a regional comparison. The first question asked: *Is Porcupine Peak an isolated occupation or part of a wider strategy for exploiting* *mountainous environments?* Porcupine Peak was not an isolated occupation but part of a broader strategy for exploiting mountainous environments. The curated lithic assemblage, extensive tool maintenance, and reliance on transported Kremmling Chert indicate that Late Archaic groups deliberately incorporated the site into regional mobility and resource-use systems. These patterns reflect strategic planning, seasonal movement, and technological adaptation to the challenges of high-elevation life in Northern Colorado. The second question asked: *Is there a relationship between the blade-edge angles of Late Archaic projectile points made from Kremmling chert and their distance from the source quarry?* The results show that blade angles increase with distance from the quarry, reflecting cumulative reduction through transport, use, and resharpening. At Porcupine Peak, located 62 km from the quarry, average blade angles (44.89°) indicate substantial modification compared to closer sites such as 5ST303 (14.62°). While exceptions such as Horn Ranch complicate the trend, most sites, including Coney Lake, Devil's Thumb, and Flattop Mountain, follow the expected distance–decay pattern.

The final question asked: *What do these patterns indicate about Late Archaic technological strategies?* The Porcupine Peak data demonstrate strategic resource management and strategic planning. Groups carried curated tools to distant sites, resharpened them as needed, and organized occupations around hearth-centered zones. These practices illustrate how environmental constraints, raw material distance, and conservation strategies shaped mobility, subsistence, and technological behavior in the Northern Colorado mountains.

Future Directions

Although this study has provided new insights into the nature, use, and organization of Porcupine Peak, it represents only a portion of the site's research potential. Many questions remain unanswered, and additional work could further clarify the site's chronology, technological practices, subsistence strategies, and spatial organization. The following recommendations for future research are intended to guide subsequent investigations, build on the findings presented here, and continue to enhance our understanding of Late Archaic occupation and adaptation in high-altitude environments.

Further Dating

One of the most promising avenues for future research at Porcupine Peak is radiocarbon dating of faunal remains directly associated with diagnostic Late Archaic projectile points. As noted in Chapter VII, four excavation cells contained projectile points in close association with burned bone fragments, providing ideal contexts for secure dating. For example, Cell 1006_993 yielded a Late Archaic Corner-Notched Dart Point (5ST98.2479) in level two (10–20 cm) alongside a burned bone fragment (5ST98.1957), while Cell 1005_994 produced two such points (5ST98.2465 and 5ST98.2468) with a burned bone fragment (5ST98.2393). Similarly, Cell 1003_994 contained a point (5ST98.2455) with both burned and unburned bone (5ST98.931, 5ST98.929), and Cell 1002_995 yielded a point (5ST98.2444) in level one (0–10 cm) with a burned bone fragment (5ST98.277). Directly dating these bone samples would not only confirm Late Archaic hunting and cooking activities at Porcupine Peak but also provide a more reliable chronological framework for the most prominent projectile point type at the site. In addition, a charcoal sample preserved within the Main Excavation Block offers another opportunity for secure radiocarbon dating. These samples present the potential to refine the occupational chronology of Porcupine Peak and to address broader questions about subalpine site integrity, including the “three Ifs” of subalpine archaeology articulated by James Benedict (Appendix A).

In Search of the Datum

Another important avenue for future research is locating the original site datum for Porcupine Peak, which is currently missing (see LaBelle and Kuhr 2025 for details). Establishing the datum would not alter the internal consistency of the existing grid or artifact distribution data, but it would improve the site's spatial precision relative to the surrounding landscape. While reviewing archived records at the CMPA, I identified a note indicating "from tower 91, site datum: 85.5m and 238°." Because the precise datum location has not yet been confirmed, my maps currently "float" within a few meters of where the excavations actually took place. Pinpointing the datum would refine the site's placement in relation to nearby features, such as the river, and enhance spatial accuracy for any future fieldwork.

Identification of Food Consumption

Another valuable direction for future research at Porcupine Peak would be to apply biomolecular techniques such as Zooarchaeology by Mass Spectrometry (ZooMS) and residue analysis. ZooMS, conducted on the site's bone assemblage, could provide species-level identifications of highly fragmented remains that are otherwise difficult to classify. This would show the range of animals exploited by site occupants and clarify subsistence strategies in a high-altitude environment. Beyond identifying what species were consumed, the technique could also refine temporal associations between faunal use and cultural materials, offering a more precise picture of hunting and processing activities through time. Complementing this, residue analysis on the ground stone fragments could help determine what plant or animal resources were being processed, whether seeds, tubers, or even bone for marrow extraction. These methods would expand our understanding of the breadth of food resources utilized at Porcupine Peak and provide insights into how Late Archaic foragers adapted to and thrived within the Rocky Mountain landscape.

Troublesome Source

Given the predominance of Troublesome chert at Porcupine Peak and the fact that the nearest documented source is located approximately 70 km away, a valuable avenue for future research would be to investigate the potential existence of previously unidentified, closer sources of this raw material. Determining whether alternative, more proximate sources were exploited could improve our understanding of Late Archaic mobility strategies, raw material procurement, and strategic planning. Such an investigation could involve a combination of regional geological surveys, petrographic analysis of lithic artifacts, and geochemical sourcing techniques to compare artifact material with known and hypothesized chert outcrops. Identifying closer sources would not only reveal the distances traveled by hunter-gatherers for this stone but also provide insight into the strategic choices made in the selection, transport, and maintenance of tools within the high-altitude environment of the Northern Colorado Rockies.

Refitting and Conjoin Studies of Lithic Artifacts

Another important avenue for future research at Porcupine Peak is refitting and conjoin analysis of lithic artifacts. The primary value of this approach lies in its ability to assess site formation processes, specifically, whether the deposits reflect mixing or multiple stratified occupations. Refits across excavation levels would help determine the extent of vertical artifact movement and provide critical evidence for evaluating the integrity of stratigraphic contexts. Beyond site formation, refitting could also reconstruct cores, flakes, and bifaces to reveal on-site tool production strategies, reduction sequences, and patterns of transport. This would clarify whether certain activity zones were devoted to early-stage reduction, finishing, or maintenance tasks, offering a more detailed understanding of how Late Archaic foragers organized technological work within a high-altitude camp. Additionally, refitting studies could show the degree of curation and reuse of raw materials, further informing interpretations of mobility and planning.

Technological Analysis of Projectile Points

Further study of projectile points represents another possibility in future research. Detailed morphometric analysis, combined with microwear and hafting studies, could show patterns of tool use, resharpening, and functional specialization. This research could clarify whether variations in point form corresponded to specific tasks or chronological phases. Furthermore, examining how projectile points were curated and maintained at Porcupine Peak would enhance understanding of technological decision-making, resource conservation, and strategic planning in high-altitude Late Archaic contexts.

Paleoenvironmental Reconstruction

Future research could also focus on reconstructing the high-altitude environment of Porcupine Peak during the Late Archaic. Unlike the previous avenues, which could be pursued using the existing artifact collection, this approach would require new fieldwork, such as collecting pollen, macrofossils, or sediment cores. These analyses could provide critical information about vegetation, climate, and seasonal conditions. Such reconstructions would offer important context for subsistence strategies, informing interpretations of plant and animal resource availability, site occupation timing, and mobility patterns. By understanding the environmental constraints and opportunities faced by hunter-gatherers, researchers can better assess the adaptive strategies that made repeated occupation of subalpine zones feasible.

Closing Thoughts:

Even more than fifty years after its excavation, Porcupine Peak (5ST98) continues to speak across time, revealing the strategies, choices, and ingenuity of people who likely occupied the high mountains during the Late Archaic. The site preserves evidence of post-hunt processing, cooking, and meticulous tool maintenance, while its curated lithic assemblage and spatial organization show that occupants planned for mobility, resource use, and survival in challenging subalpine environments. Beyond telling a general story of hunter-gatherer life, this collection allows us to potentially connect specific actions to particular times and places, offering a rare, tangible link to human behavior in a defined moment. Porcupine Peak is a powerful reminder that archaeological collections, even those sitting on shelves for decades, hold untapped potential: with careful study, they can demonstrate both the small, everyday decisions and the broader patterns that shaped past lives, showing how technology, mobility, and social strategies weave together to create a story that deepens our understanding of human adaptation

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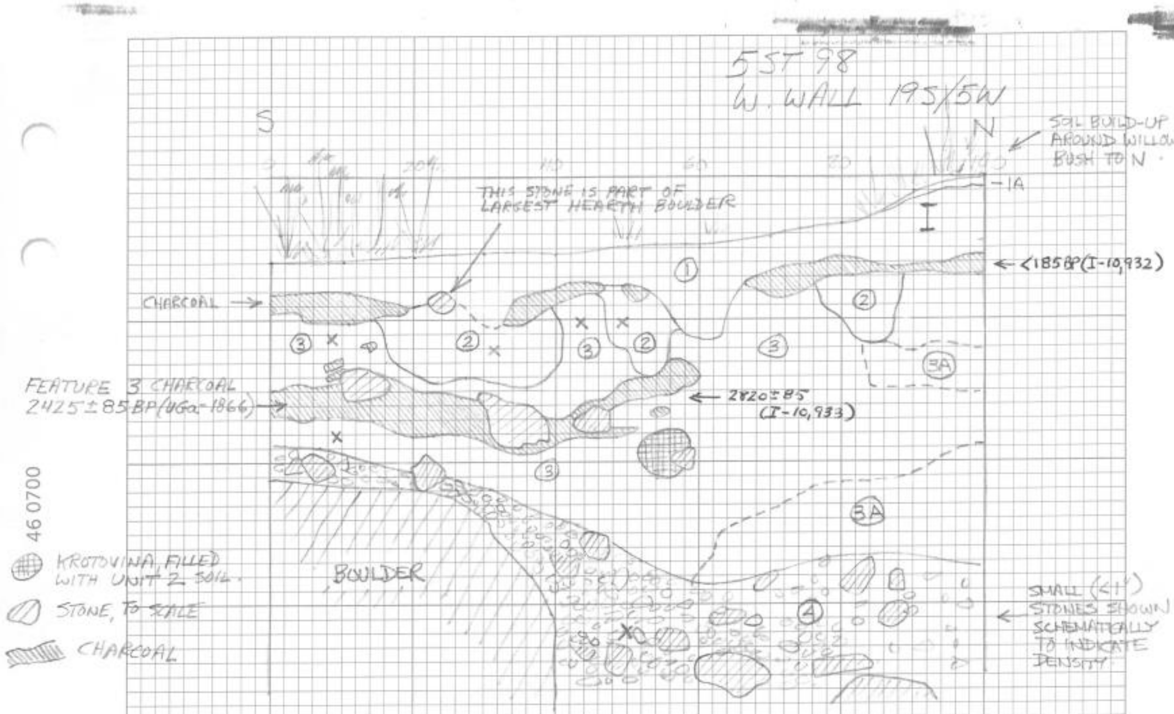
APPENDIX A:
JAMES BENEDICT'S ORIGINAL NOTES ON SITE GEOLOGY AND FEATURES

This appendix presents James Benedict's original field notes documenting the site's geology and excavated features. These notes provide valuable detail on stratigraphic observations and feature descriptions recorded during the initial investigations at Porcupine Peak. However, because the areas Benedict analyzed were located some distance from both the main and northeastern excavation blocks, his stratigraphic profiles could not be directly correlated with the analysis in this thesis. The notes are included here to preserve the original documentation and to provide additional context for understanding the site's broader geological and feature-based characteristics.



(1) 10YR 3/3(m), drying 10YR 5/3, loose, structureless A1 horizon. Contains sparse gravel up to 1cm in max dimension. There is a grass/willow leaf duff layer adjoining the bush at N end of profile line (unit 1A). Lower contact irregular. Scattered charcoal flecks. Loamy sand.

UPPER CHARCOAL 10YR 2/2-2/3(d) buried A1 horizon, rich in humus; dark colored because of abundant finely disseminated charcoal. Loose & structureless.

(2) 7.5YR 4/2(d) loose, structureless, fine gravelly loamy sand. Irregular lower contact suggests gopher disturbance. Dense root penetration compared to unit 3. Scattered charcoal flecks. Largest pebble is 1.5cm (excluding stone on surface).

(3) 7.5YR 5/3(d) compact sandy loam. Much firmer than unit 2. Grades to 10YR 6/4(d) where labeled 3A. Mod platy structure, but also breaks blocky. Stones are absent except where associated w/gopher tunneling or Feature 3. Largest pebble is ≈3cm. Local fine (<1mm) spherical vesicles.

LOWER CHARCOAL Feature 3 is a probable hearth. Dense large wood charcoal fragments contain burned cobbles, easily broken w/a shovel because of heating. The charcoal is clearly enveloped by unit 3

75

(4) 10YR 6/4 (d) very stony, gravelly loamy sand or gravelly sand. Loose & structureless. Poorly sorted. Tabular stones have weak subhorizontal orientation. Stones are subangular to subrounded – some have Mn mottles on under-surfaces

CONCLUSIONS: FEATURE 3

The hearth does originate in stratigraphic unit 3, which must have been in the process of being deposited 2425 ± 85 C^{14} yr. ago (UGa-1866). By analogy, Liz is probably correct in thinking that Hearth 1 (streambank) originated within unit 3. Its dates are 2625 ± 60 BP & 2845 ± 75 BP (Jim rejects a third date, 3555 ± 215 BP).

CONCLUSIONS: GENERAL

Unit 1 is variable in color & texture. It overlies a buried A_1 horizon containing forest fire (?) charcoal, & is thickest in the protection of the willow bush. It may represent soil blown from the dirt roadway directly to the west.

Unit numbers correlate directly with the streambank profile, ca. 3m to the SSE.

How did a boulder as large as the one in unit 4 get transported here? Unit 4 gravel appears draped over the top of it.

19S/6W　　　　30 Oct 78, J. Benedict

Notes on a 30-cm-wide strip along the east side of the grid square, excavated to obtain soil and charcoal samples to go with a profile of Feature 3.

Unit 1. Scattered charcoal occurs near base of unit. No artifacts or flakes. Soil sample collected from 3-7 cm depth at N side of profile.

Buried A_1 horizon. C-14 and soil samples were collected from the full expanse of this relatively thin unit, which occurs intermittently across the excavation area. No artifacts or flakes. Rotten wood fragments suggest a relatively recent age.

<185BP
I-10,932

Unit 2. Soil sample collected from the two concentrations marked on the profile drawing. No artifacts or flakes. When cleared, unit 2 can be seen to fill a series of interconnected rodent burrows, ca. 6-9 cm in diameter (photo).

Unit 3. The unit occurs both above and below Feature 3. A large soil sample was collected from two pillars of the material standing undisturbed between rodent tunnels at the S end of the excavation (marked with X's on the profile drawing). The sample from below the charcoal is smaller, also collected from the S end of the excavation area. The unit is penetrated by active ant tunnels, 5-9 cm in diameter – the role of ants in past disturbance and flake displacement may have been important.

Flakes:

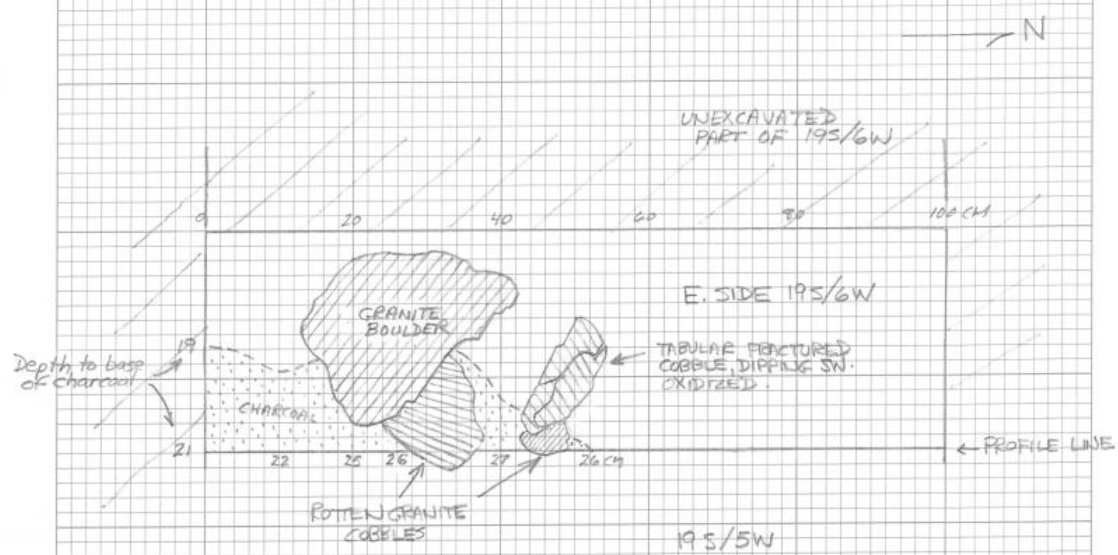
- Red chert flake at 13 cm in Unit 3, N half of excavation.
- White chert flake with heat spalls found in screening Unit 3 material from 13-15 cm depth above Feature 3 at S end of excavation.
- Very small white chert flake at 19 cm in Unit 3, N end of excavation.

Feature 3. Notes for this unit are written on the plan view of the hearth. A C-14 sample was collected at 19-26 cm depth.

2820±85
I-10,933

Unit 4. Not excavated. A soil sample was taken from the profile wall, as shown.

Excavations were stopped at 35 cm depth.



FEATURE 3

The charcoal filled a slight depression to the SE of the stone concentration. Minor amounts of additional charcoal occurred between the stones, as shown. Charcoal continued beneath the stones, which are burned, & clearly placed here by man. The feature overlies unit 3 material, without oxidation at the contact, & is overlain by additional unit 3 material. The charcoal deposit was up to 6 cm thick, consisting of wood charcoal fragments, without soil or stones. No flakes occurred within it. The largest boulder has a thin underlayer of frost-sorted cs. sand & very fine gravel (1-3cm). For depth & stratigraphic data, see profile W. wall 19S/5W

30 OCT 78

2S/5W

Notes on the stratigraphy of the N wall, just E of Marcotte's soil sample locality. 30 Oct 78, JBB.

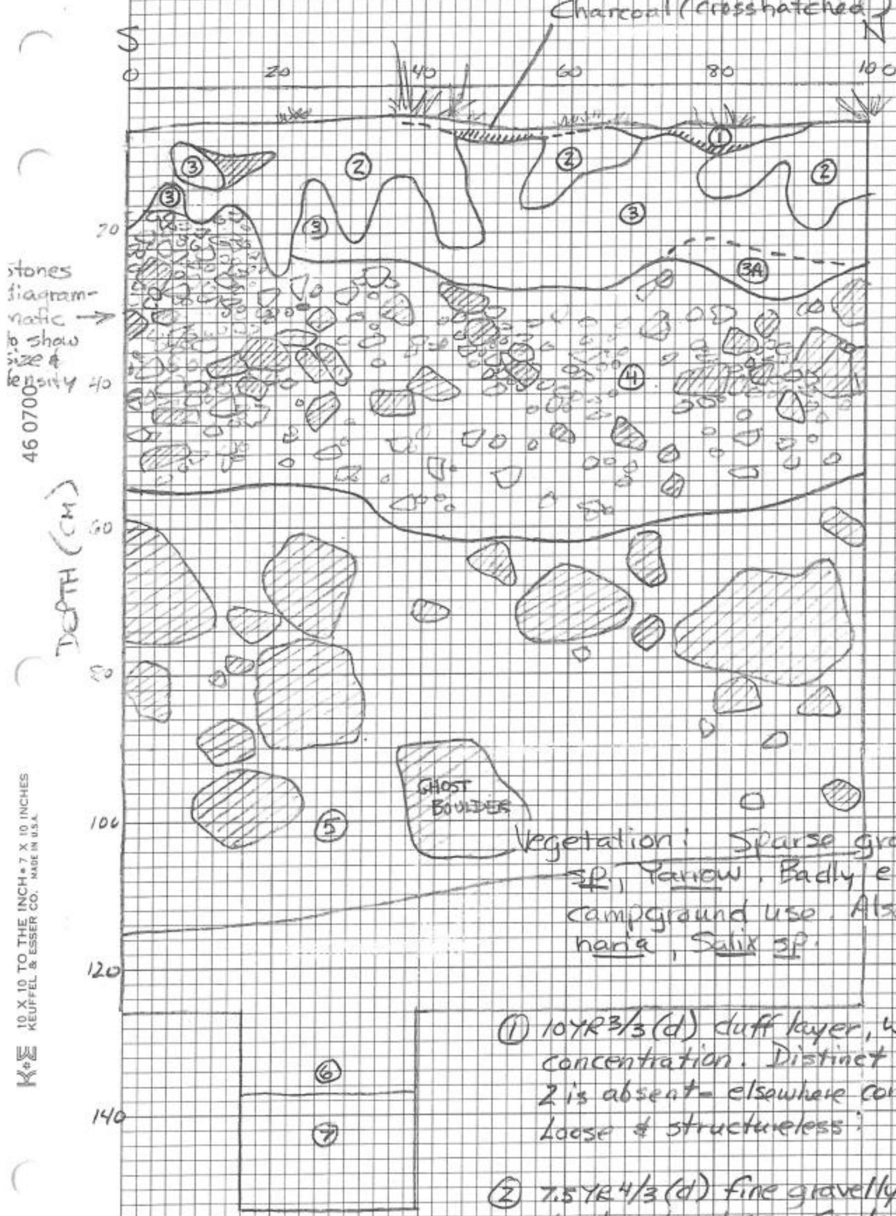
0-3 cm	10 YR 5/3 (d) loose, structureless sandy loam or loamy sand. No gravel larger than 1½ cm. Appears to be related to recent disturbance of the terrace surface.
3-7 cm	10 YR 4/2 (d) humus-rich sandy loam. Very sparse gravel as large as 2½ cm. Weak platy (felty) structure. Interpreted as buried A_1 horizon. Probably correlates with unit 1 in the streambank exposure, and with the buried A_1 horizon at 19S/5W.
7-10½ cm	7.5 YR 5/4 (d) loamy sand or sandy loam. Strongly indurated, with moderate to strong platy structure. Sparse gravel up to 1 cm. Contact with underlying material is gradual. Probably correlates with unit 3 at the streambank exposure and 19S/5W.
10½-15½ cm	10 YR 6/4 (d) loamy sand. Strongly indurated. Sparse gravel as large as 4 cm. Gravel is subangular to subrounded. Blocky structure. Lower contact is gradational. Probably correlates with unit 3A at the streambank exposure.
15½-23 cm	10 YR 6/4 (d), mottled 10 YR 5/6 (d). Firm, but not so strongly indurated as above. Sandy loam texture, with sparse subangular to subrounded gravel as large as 3 cm. Weak blocky structure. Correlates with unit 3A at the streambank exposure.
23 cm	10 YR 5/3.5 (d) loose (locally openwork), stony gravelly loamy sand or sand. Structureless. Correlates with unit 4 at streambank.

Conclusions:

Major textural breaks occur at 7 and 23 cm.

The profile is very similar to the streambank and 19S/5W exposures, the main differences being that (a) the buried A_1 horizon contains no charcoal; (b) unit 2 — the rodent tunnel fill — is absent here; (c) unit 3 shows somewhat greater color variation.

Color variation in the indurated material between 7 and 23 cm may be pedogenic, after deposition; or may be the result of erosion and redeposition of soil horizons with different original colors. I'm inclined to treat all three of the indurated horizons as facies of a single depositional unit (unit 3).



5ST98
PORCUPINE PEAK

PROFILE IN STREAMBANK OF ca. 2m TERRACE, 3-4m NORTH OF HEARTH LOCALITY.

7 TEXTURAL SAMPLES COLLECTED

Vegetation: Sparse grasses, Potentilla sp., Yarrow. Badly eroded due to campground use. Also Eriogonum, Antennaria, Salix sp.

① 10YR 3/3 (d) duff layer, w/ basal charcoal concentration. Distinct mainly where unit 2 is absent - elsewhere contact is gradational. Loose & structureless.

② 7.5YR 4/3 (d) fine gravelly loamy sand. Loose & structureless. Contains scattered charcoal flecks throughout. Largest pebble is 10 mm in max. dimension — pebbles show no preferred orientation. Irregular, distinct lower boundary suggests ground squirrel or pocket gopher disturbance.

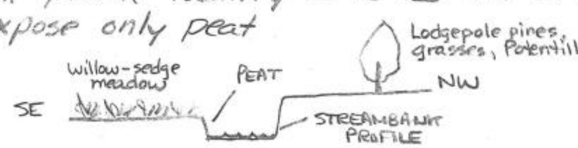
Stones sketched 29 Oct 78, on new line ca. 5cm behind original profile wall.

5ST98

TERRACE SLOPES TOWARD STREAM AT 3½–4°.

General Notes on site geology:

The site is N of the stream, on an outwash (?) terrace ca. 2 m above stream level. Across the creek from the streambank profile locality is a ca. 1m terrace; here stream-cuts expose only peat



A ridge along the stream margin on its SE side appears to be manmade – has the stream been altered? There is at least a meter of peat above gravels of the low, inset terrace. A basal date would be a minimum for deposition of unit 4. About ¼ mi. upvalley from 5ST98 there is a bouldery terminal moraine, probably of Pinedale age, that crosses the road. A borrow pit at the downvalley side of the moraine exposes stratified sediments that look like a mixture of waterlaid (crossbedded) & colluvial material (diamictons w/ angular & sub-rounded cobbles & boulders. These sediments have probably washed, & moved by mass wasting, from the front of the moraine. There are multiple charcoal layers, w/ could be dated. Till is exposed in road cuts farther downvalley. North of the road, across from 5ST98 & continuing downvalley, there is a probable lateral moraine – the power line follows its crest. This moraine crosses the road, & apparently the creek, just below the site. It is most probably the dam behind which outwash was impounded. The stream flows through a gorge where it crosses the moraine.

Conclusion: The terrace is probably outwash*. However, its proximity to the right lateral moraine has caused large boulders to be unusually prevalent, & the slope, toward the stream, to be unusually steep.

Boulders on the terrace are weathered & unpitted, w/ a variety of xline lithologies.

Driving downvalley, there is till for about 1 mi., w/ several terminal moraines – then an evenly graded major valley-fill outwash train

* See later interpretation as mixed colluvial- slopewash deposits (typewritten)

5ST98
STREAMBANK PROFILE (CONT.)

(3) 7.5YR 5/4 (d), grading to 10YR 6/4 (d) where labeled 3A. Slightly gravelly loamy sand or sandy loam. Very compact & indurated. Breaks blocky. Contains scattered charcoal flecks & rare pebbles, the largest pebble being 23 mm in max. dimension. Pebbles are subangular to subrounded. Easily distinguished from unit 2 by its light color & its induration.

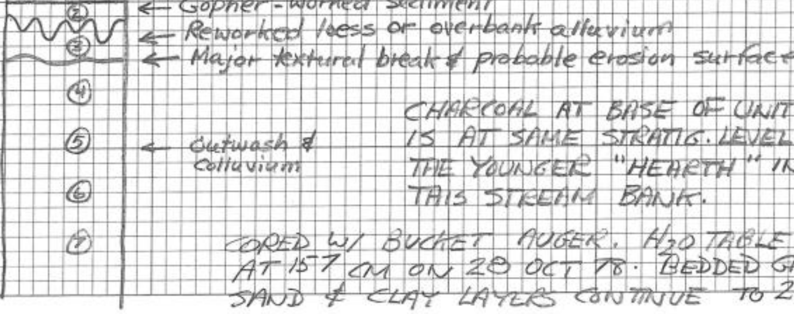
(4) 10YR 6/4 (d) very stony, gravelly loamy sand. Stones are subangular to subrounded & have an apparent subhorizontal preferred orientation. Structureless where fines are least abundant. Blocky & finely vesicular where silt is more common. Consistence varies in parallel – the unit ranges from loose to firm. Stones in profile wall range up to 10 cm. Most are a med. textured xline rk. w/ biotite, quartz, orthoclase – probably a granite. Mn. mottles on undersurfaces of some stones. *(SEE ROUNDNESS DATA ON REVERSE)

(5) 10YR 5/3.5 (m) mottled (ca. 50% visual estimate) 7.5YR 5/6 (m) very stony sandy loam or sandy clay loam. Sticky. Retains moisture better than unit 4, due to greater content of silt & clay. Very strong platy structure, w/ plates 2–4 mm thick. Stones are subangular to subrounded, similar to those in unit 4 (elsewhere along this streambank there are very large subrounded boulders). Mottling is coarse & blotchy. Less gravelly than unit 4. Mn mottles are present but not prominent.

(6) 10YR 5/3.5 (m), mottled 7.5YR 4/6 (m) stone-free gravelly loamy sand or gravelly sand. Loose.

(7) 10YR 5/3.5 (m), mottled 7.5YR 4/6 (m) stone-free, gravel-free very fine to coarse sand. Loose & moist.

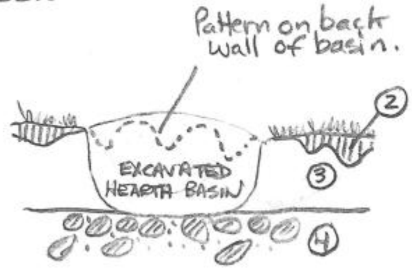
CONCLUSIONS



CHARCOAL AT BASE OF UNIT 1 IS AT SAME STRATIG. LEVEL AS THE YOUNGER "HEARTH" IN THIS STREAM BANK.

CORED W/ BUCKET AUGER. H_2O TABLE IS AT 157 CM ON 28 OCT 78. BEDDED GRAVEL, SAND & CLAY LAYERS CONTINUE TO 210 CM

IT'S NO LONGER POSSIBLE TO TELL WHERE, STRATIGRAPHICALLY, THE OLDER, BASIN HEARTH ORIGINATED. THE HEARTH PENETRATES UNIT 3 TO THE SURFACE OF UNIT 4. DID IT ORIGINATE <u>IN</u> UNIT 3? (JIM & LIZ THINK SO). OR AT THE SURFACE OF UNIT 3? THERE IS NO SPILLOVER CHARCOAL TO BE SEEN



DEPTH OF PEDOGENIC OXIDATION IS DIFFICULT TO GUESS, DUE TO GR. H_2O EFFECTS.

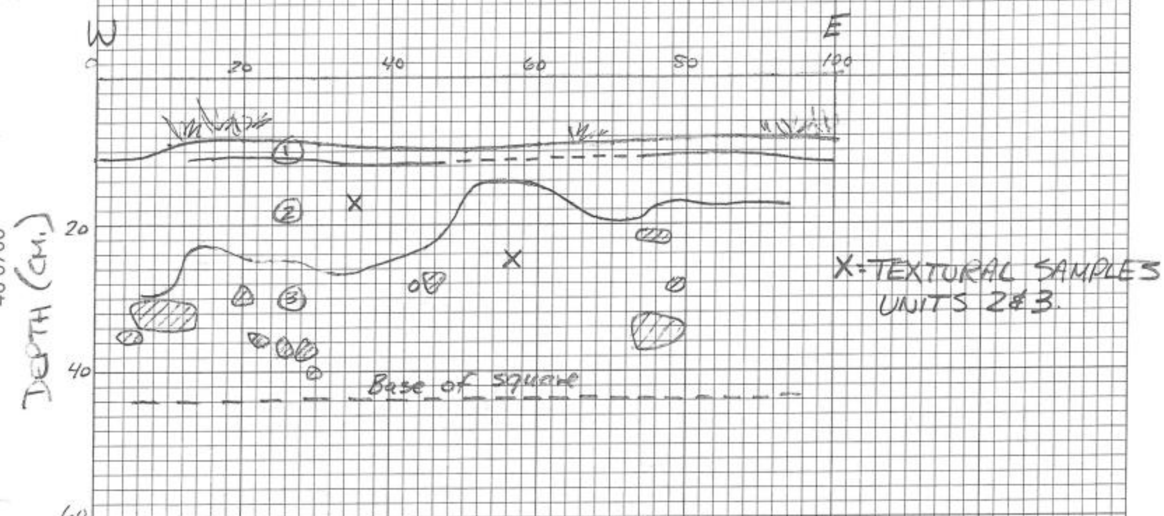
* <u>ROUNDNESS DATA</u> (COBBLES >2.5CM DIAMETER) 100 STONES

	ANGULAR	SUBANGULAR	SUBROUNDED	ROUNDED
GRAVEL BAR ON STREAM, JUST E. OF STREAMBANK PROFILE	0%	17%	62%	21%
UNIT 4, STREAM-BANK PROFILE	3%	71%	26%	0%

<u>CONCLUSION</u>: GRAVEL BAR DATA PROBABLY INFLUENCED BY UNIT 4 MATERIAL SLUMPED FROM CUTBANK. <u>EVEN SO</u>, UNIT 4 IS PROBABLY NOT UPVALLEY OUTWASH.

PS

DST 18
6N / 1W
N. WALL

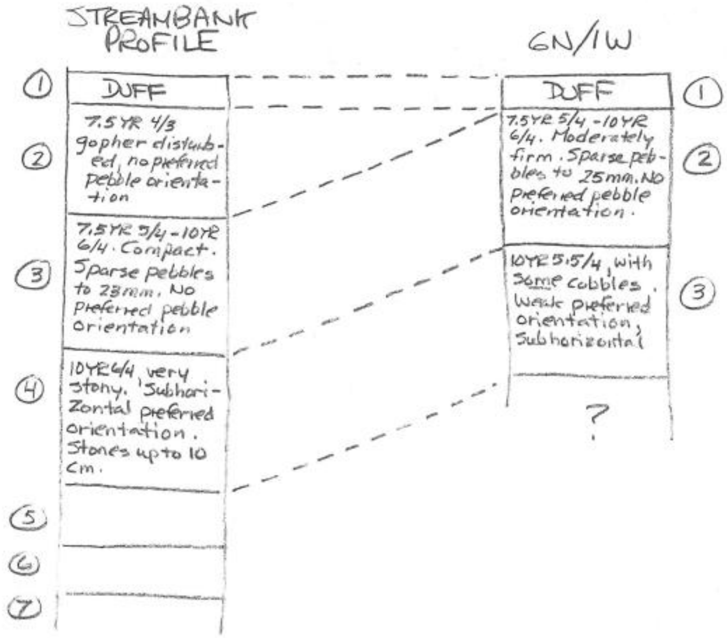


(1) 10YR 4/2 (d) loose pine needle duff. Dry & dusty

(2) 7.5YR 5/4 (d) - 10YR 6/4 (d) poorly sorted loamy sand, w/ sparse subangular & subrounded pebbles - largest in profile wall ca. 2½ cm. Very weak blocky structure, Mod. firm. Abundant roots. Nonstratified. Rotten tree roots. Sparse scattered char. grains. Contains artifacts & charcoal. Retains moisture than unit 3. Non vesicular. Lower bdy. distinct & irregular. No Mn stains noted. Possible loess component (check textural analyses).

(3) 10YR 5.5/4 (d) gravelly loamy sand, poorly sorted. Contains some cobbles. Weak preferred subhorizontal orientation of tabular pebbles. Mod. blocky structure. Non vesicular. No Mn stains noted. Scattered char. flecks & artifacts

POSSIBLE CORRELATIONS



IF THIS CORRELATION IS OK, & IF THE BASIN HEARTH (ca. 2700 BP?) IN THE STREAMBANK PROFILE ORIGINATED IN UNIT 3, & IF PORCUPINE PEAK COMPLEX ARTIFACTS TRULY BELONG IN UNIT 3 AT 6N/1W (= UNIT 4 IN STREAMBANK PROFILE), THEN PORCUPINE PEAK ARTIFACTS SHOULD BE OLDER THAN ca. 2700 BP. THREE LARGE IFS.

5 ST 98

ORIGIN OF THE TERRACE — a very tentative interpretation.

I think that the critical factors are (1) the steep slope of the terrace surface toward the valley axis, and its relationship to the lateral moraine N of the road; (2) the absence of rounded cobbles in the streambank profile, as compared to their abundance in the modern gravel bar; (3) the presence of a variety of rock types, presumably from an upvalley source; (4) the gross stratification seen in the streambank profile, with pure sand layers, etc.; and (5) the subhorizontal preferred orientation of pebbles and cobbles.

Three working hypotheses might be (a) that this is an outwash terrace; (b) a collapsed kame terrace; or (c) an apron of slopewash and colluvial sediments derived from the moraine to the north. Factors 1 and 2 argue strongly against the first hypothesis. If the feature were a kame terrace (see R.F. Flint's Glacial and Quaternary Geology, 1971 ed., p. 209-210) there should be an ice-contact face (perhaps there is), kettles, and I think a greater degree of rounding, sorting, and stratification. Also, it would be contemporary with deglaciation of the valley — making it hard to incorporate Porcupine Peak artifacts. The third hypothesis is consistent with all five factors. So would be a combination of the second and third hypotheses: i.e., colluvial deposition over a kame terrace deposit.

A possible analogue is exposed in the gravel pit ¼ mile upvalley. Here interbedded colluvial and alluvial deposits slope steeply away from the flanks of a moraine. The interbedded charcoal layers there are of some interest.

APPENDIX B: NUMERICAL CONVERSIONS

This appendix presents the numerical coordinate conversion table used to simplify the original excavation unit labels (e.g., 6N 5W) into a consistent coordinate system. The conversion was undertaken to facilitate spatial analysis and align the dataset with a more conventional grid structure while preserving the integrity of the original provenience information. The table provides a direct reference between the original and converted unit designations, ensuring that no contextual information was lost during data organization and analysis.

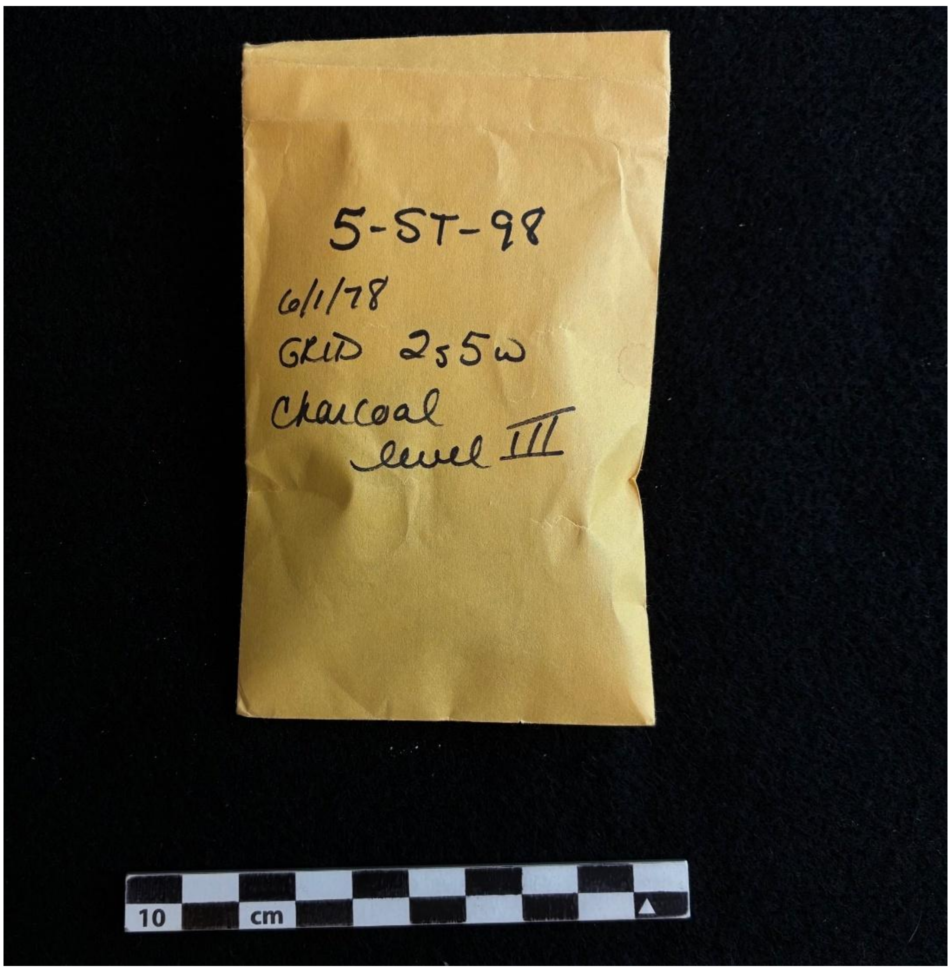
Y	X	Y	X	SW Corner Y	SW Corner X	SW Corner Y	SW Corner X	Unit ID
20N	35E	1020	1035	19N	35E	1019	1035	1019, 1035
20N	39E	1020	1039	19N	39E	1019	1039	1019, 1039
19N	39E	1019	1039	18N	39E	1018	1039	1018, 1039
19N	40E	1019	1040	18N	40E	1018	1040	1018, 1040
18N	1E	1018	1001	17N	1E	1017	1001	1017, 1001
18N	39E	1018	1039	17N	39E	1017	1039	1017, 1039
18N	40E	1018	1040	17N	40E	1017	1040	1017, 1040
18N	41E	1018	1041	17N	41E	1017	1041	1017, 1041
17N	7E	1017	1007	16N	7E	1016	1007	1016, 1007
17N	19E	1017	1019	16N	19E	1016	1019	1016, 1019
17N	47E	1017	1047	16N	47E	1016	1047	1016, 1047
15N	9W	1015	991	14N	9W	1014	991	1014, 991
14N	34E	1014	1034	13N	34E	1013	1034	1013, 1034
14N	49E	1014	1049	13N	49E	1013	1049	1013, 1049
12N	15W	1012	985	11N	15W	1011	985	1011, 985
10N	14W	1010	986	9N	14W	1009	986	1009, 986
10N	46E	1010	1046	9N	46E	1009	1046	1009, 1046
9N	7E	1009	1007	8N	7E	1008	1007	1008, 1007
8N	19W	1008	981	7N	19W	1007	981	1007, 981
8N	11W	1008	989	7N	11W	1007	989	1007, 989
8N	9W	1008	991	7N	9W	1007	991	1007, 991
8N	8W	1008	992	7N	8W	1007	992	1007, 992
8N	7W	1008	993	7N	7W	1007	993	1007, 993
8N	6W	1008	994	7N	6W	1007	994	1007, 994
7N	10W	1007	990	6N	10W	1006	990	1006, 990
7N	9W	1007	991	6N	9W	1006	991	1006, 991

7N	8W	1007	992	6N	8W	1006	992	1006, 992
7N	7W	1007	993	6N	7W	1006	993	1006, 993
7N	6W	1007	994	6N	6W	1006	994	1006, 994
7N	4W	1007	996	6N	4W	1006	996	1006, 996
6N	15W	1006	985	5N	15W	1005	985	1005, 985
6N	11W	1006	989	5N	11W	1005	989	1005, 989
6N	9W	1006	991	5N	9W	1005	991	1005, 991
6N	8W	1006	992	5N	8W	1005	992	1005, 992
6N	7W	1006	993	5N	7W	1005	993	1005, 993
6N	6W	1006	994	5N	6W	1005	994	1005, 994
6N	5W	1006	995	5N	5W	1005	995	1005, 995
6N	3W	1006	997	5N	3W	1005	997	1005, 997
6N	1W	1006	999	5N	1W	1005	999	1005, 999
5N	10W	1005	990	4N	10W	1004	990	1004, 990
5N	7W	1005	993	4N	7W	1004	993	1004, 993
5N	6W	1005	994	4N	6W	1004	994	1004, 994
5N	5W	1005	995	4N	5W	1004	995	1004, 995
5N	4W	1005	996	4N	4W	1004	996	1004, 996
5N	3W	1005	997	4N	3W	1004	997	1004, 997
5N	0W	1005	1000	4N	0W	1004	1000	1004, 1000
5N	24E	1005	1024	4N	24E	1004	1024	1004, 1024
5N	39E	1005	1039	4N	39E	1004	1039	1004, 1039
4N	12W	1004	988	3N	12W	1003	988	1003, 988
4N	6W	1004	994	3N	6W	1003	994	1003, 994
4N	5W	1004	995	3N	5W	1003	995	1003, 995
4N	4W	1004	996	3N	4W	1003	996	1003, 996
4N	2W	1004	998	3N	2W	1003	998	1003, 998
3N	12W	1003	988	2N	12W	1002	988	1002, 988
3N	6W	1003	994	2N	6W	1002	994	1002, 994
3N	5W	1003	995	2N	5W	1002	995	1002, 995
3N	4W	1003	996	2N	4W	1002	996	1002, 996
2N	6W	1002	994	1N	6W	1001	994	1001, 994
2N	5W	1002	995	1N	5W	1001	995	1001, 995
1N	18W	1001	982	0N	18W	1000	982	1000, 982
1N	14W	1001	986	0N	14W	1000	986	1000, 986
0N	11W	1000	989	1S	11W	999	989	999, 989
0N	1E	1000	1001	1S	1E	999	1001	999, 1001
0N	17E	1000	1017	1S	17E	999	1017	999, 1017
0N	25E	1000	1025	1S	25E	999	1025	999, 1025
2S	5W	998	995	3S	5W	997	995	997, 995
3S	22W	997	978	4S	22W	996	978	996, 978

4S	35W	996	965	5S	35W	995	965	995, 965
4S	11W	996	989	5S	11W	995	989	995, 989
4S	1E	996	1001	5S	1E	995	1001	995, 1001
9S	7E	991	1007	10S	7E	990	1007	990, 1007
12S	27W	988	973	13S	27W	987	973	987, 973
13S	37W	987	963	14S	37W	986	963	986, 963
13S	1W	987	999	14S	1W	986	999	986, 999
15S	53W	985	947	16S	53W	984	947	984, 947
15S	37W	985	963	16S	37W	984	963	984, 963
16S	55W	984	945	17S	55W	983	945	983, 945
16S	6W	984	994	17S	6W	983	994	983, 994
18S	7W	982	993	19S	7W	981	993	981, 993
19S	9W	981	991	20S	9W	980	991	980, 991
19S	5W	981	995	20S	5W	980	995	980, 995
20S	6W	980	994	21S	6W	979	994	979, 994
20S	5W	980	995	21S	5W	979	995	979, 995
21S	9W	979	991	22S	9W	978	991	978, 991
21S	5W	979	995	22S	5W	978	995	978, 995
22S	11W	978	989	23S	11W	976	989	976, 989
22S	7W	978	993	23S	7W	976	993	976, 993
24S	47W	975	953	25S	47W	974	953	974, 953
24S	43W	975	957	25S	43W	974	957	974, 957
24S	7W	975	993	25S	7W	974	993	974, 993
25S	41W	974	959	26S	41W	973	959	973, 959
25S	5W	974	995	26S	5W	973	995	973, 995
30S	7W	969	993	31S	7W	968	993	968, 993
48S	26W	941	974	49S	26W	940	974	940, 974

APPENDIX C: CHARCOAL SAMPLE

This appendix presents a photograph of the charcoal sample recovered from the site. Although the sample was not analyzed as part of this thesis, it was documented during cataloguing to ensure that all components of the assemblage are represented. The inclusion of this material shows its potential for future analysis, particularly for radiocarbon dating or other studies aimed at refining the site's chronological framework.



APPENDIX D: MASS ANALYSIS DATA

This appendix presents the mass analysis data collected for flakes lacking provenience information. These artifacts, many of which were recovered from the site surface, were not included in the primary analyses discussed in this thesis. However, their inclusion here ensures that all artifacts from Porcupine Peak are represented within the overall assemblage record. The dataset provides a basic quantitative reference for unprovenienced materials, offering a foundation for potential future analysis or reassessment.

Context	Raw Material	Size Grade	Cortex Count	Cortex Mass	Non-Cortical Count	Non-Cortical Mass	Total	Comment
"5ST98 Upper"	Banded Grey Chert	G3	1	1.4	0	0	1	1:0 This dark grey chert is heavily banded with very small bands of charcoal grey and a lighter grey. The overall grey color is matte.
"Surface Debitage"	Big Horn Chert?	G2	0	0	1	9	1	0:1 Used Jeb Taylor as a Reference
"5ST98 No Prov. Yellow Envelope"	Big Horn Chert?	G3	1	0.8	0	0	1	1:0
"Surface Debitage"	Black Chert	G3	0	0	3	0.4	3	0:3 This chert is made up of a smooth and glossy opaque black chert with a slight brown hue. No inclusions.
"5ST98 No Prov. Yellow Envelope"	Black Chert	G4	0	0	1	0.1	1	0:1
"5ST98 No Provenience"	Brown Quartzite	G3	0	0	1	0.8	1	0:1 This raw material is made up of a mild coarse-grained quartzite with a solid opaque brown color.
"5ST98 Upper"	Caramel Chert	G3	0	0	1	2.2	1	1:0 This raw material is made up of a opaque glossy caramel color with minimal vague grey speckles.
"5ST98 Upper"	Caramel Quartzite	G2	1	4.7	0	0	1	1:0 This raw material is made up of a matte caramel quartzite with some red and black inclusions

"Surface Debitage"	Charcoal Grey Chert	G2	0	0	1	5.6	1	0:1 This raw material is an opaque charcoal grey (graphite colored) with dark grey - almost black stripes that occur every so often. Also has white inclusions.
"Surface Debitage"	Charcoal Grey Chert	G3	1	0.6	2	0.2	3	1:2
"Surface Debitage"	Charcoal Grey Chert	G4	0	0	1	0.1	1	0:1
"Surface Debitage"	Clear Orange/White Chert	G3	0	0	1	0.4	1	0:1 This raw material is made up of translucent white and orange chert.
"5ST98 Upper"	Clear Orange/White Chert	G3	0	0	1	0.6	1	0:1 This raw material is made up of translucent white and orange chert.
"11/16/75"	Clear Orange/White Chert	G3	0	0	1	0.1	1	0:1
"11/18"	Clear Orange/White Chert	G3	0	0	1	0.1	1	0:1
"Surface Debitage"	Cream Grey Stripes	G2	0	0	1	6.9	1	0:1 This raw material is a light cream color with translucent dark grey stripes. The cream color within the material is opaque. Also has a slight brown hue overall.
"Surface Debitage"	Cream Grey Stripes	G3	0	0	3	1.5	3	0:3
"5ST98 Upper"	Cream Grey Stripes	G2	0	0	1	1.3	1	0:1 This raw material is a light cream color with translucent dark grey stripes. The cream color within the material is opaque. Also has a slight brown hue overall.
"5ST98 No Provenience"	Cream Grey Stripes	G3	0	0	5	2.7	5	0:5
"11/18"	Cream Grey Stripes	G3	0	0	1	0.2	1	0:1
"Surface Debitage"	Dusty Caramel Chert	G3	0	0	1	0.4	1	0:1 This raw material is made up of a glossy, predominantly light caramel tan with light grey marbling.

"Surface Debitage"	Light Grey Chert	G2	1	3.1	0	0	1	1:0 This raw material is made up of a light grey chert with several micro-inclusions throughout. The cortex is white with an orange (possible iron staining).
"Surface Debitage"	Light Grey Chert	G3	0	0	1	0.5	1	0:1
"5ST98 Upper"	Matte Black Chert	G2	1	5.1	0	0	1	1:0 This raw material is made up of a matte black chert that seems to flake in a stair-step-like pattern.
"5ST98 Upper" Yellow Envelop	Matte Black Chert	G3	0	0	1	0.4	1	0:1 This raw material is made up of a matte black chert that seems to flake in a stair-step-like pattern.
"Surface Debitage"	Orange Quartz	G3	0	0	1	1.7	1	0:1 This raw material is a glossy orange quartz with white inclusions.
"11/16/75"	Orange Quartz	G3	0	0	1	0.3	1	0:1
"Surface Debitage"	Pale Pink Chert	G3	0	0	2	1	2	0:2 This raw material is predominantly a pale and opaque pink, almost white chert with dark grey and brown inclusions.
"5ST98 SW8"	Pale Pink Chert	G3	0	0	1	0.2	1	0:1 This raw material is predominantly a pale and opaque pink, almost white chert with dark grey and brown inclusions.
"5ST98 No Prov. Yellow Envelope"	Pale Pink Chert	G3	0	0	2	0.8	2	0:2
"11/16/75"	Pale Pink Chert	G3	0	0	1	0	1	0:1
"Surface Debitage"	Petrified Wood	G2	1	4.6	0	0	1	1:0
"Surface Debitage"	Quartz Crystal	G3	0	0	2	3.7	2	0:2
"Surface Debitage"	Rose Quartzite	G3	1	0.1	0	0	1	1:0 This raw material appears to have a fine grain sugary texture to its surface which may indicate a quartzite material. This quartzite is a dusty rose color with small patches of white.

"5ST98 Upper" Yellow Envelop	Rose Quartzite	G4	0	0	1	0.1	1	0:1 This raw material appears to have a fine-grained sugary texture to its surface which may indicate a quartzite material. This quartzite is a dusty rose color with small patches of white.
"Surface Debitage"	Salmon Chert	G3	0	0	3	1.1	3	0:3 This raw material has an overall light salmon pink color with vague stripes of darker salmon colors. Also, some light peppering of black specks.
"5ST98 Upper"	Salmon Chert	G2	1	3.5	0	0	1	1:0 This raw material has an overall light salmon pink color with vague stripes of darker salmon colors. Also, some light peppering of black specks.
"5ST98 Upper"	Smokey Quartz	G2	0	0	1	2.7	1	0:1 This raw material is made up of a smoky quartz with orange stripes
"5ST98 No Prov. Yellow Envelop"	Smokey Quartz	G3	1	0.5	0	0	1	1:0
"Surface Debitage"	Table Mountain jasper	G1	0	0	2	18.2	2	0:2
"Surface Debitage"	Table Mountain jasper	G3	2	2.6	5	6.3	7	2:5
"5ST98 Upper" Yellow Envelop	Table Mountain jasper	G3	0	0	1	0.3	1	0:1
"5ST98 Upper" Yellow Envelop	Table Mountain jasper	G4	0	0	2	0.1	2	0:2
"5ST98 No Provenience"	Table Mountain jasper	G3	1	1.7	2	1.1	3	1:2
"5ST98 No Provenience"	Table Mountain jasper	G4	0	0	1	0.1	1	0:1
"11/16/75"	Table Mountain jasper	G3	0	0	1	0.3	1	0:1
"11/16/75"	Table Mountain jasper	G4	0	0	1	0.1	1	0:1

"Surface Debitage"	Table Mountain jasper?	G3	2	2.3	3	0.8	5	2:5 This raw material looks like TMJ based on its majority red color; however, it has a more orangish hue to it, with white and black inclusions/ stripes within it
"Surface Debitage"	Table Mountain jasper?	G4	0	0	2	0.1	2	0:2
"Surface Debitage"	Table Mountain jasper?	G5	0	0	1	0.1	1	0:1
"5ST98 SW8"	Table Mountain jasper?	G2	0	0	1	2.7	1	0:1 This raw material looks like TMJ based on its majority red color; however, it has a more orangish hue to it with white and black inclusions/ stripes within it
"5ST98 SW8"	Table Mountain jasper?	G3	0	0	5	1.6	5	0:5
"5ST98 SW8"	Table Mountain jasper?	G4	0	0	2	0.1	2	0:2
"5ST98 Upper" Yellow Envelop	Table Mountain jasper?	G4	0	0	3	0.1	3	0:3 This raw material looks like TMJ based on it majority red color; however, it has a more orangish hue to it with white and black inclusions/ stripes within it
"5ST98 No Provenience"	Table Mountain jasper?	G4	0	0	1	0.1	1	0:1
"5ST98 No Prov. Yellow Envelope"	Table Mountain jasper?	G3	1	1.8	0	0	1	1:0
"5ST98 No Prov. Yellow Envelope"	Table Mountain jasper?	G4	0	0	1	0.1	1	0:1
"11/16/75"	Table Mountain jasper?	G3	0	0	2	0	2	0:2
"11/16/75"	Table Mountain jasper?	G4	0	0	2	0.2	2	0:2
"11/18"	Table Mountain jasper?	G3	0	0	3	0.5	3	0:3
"Surface Debitage"	Troublesome	G1	1	18.5	0	0	1	1:0
"Surface Debitage"	Troublesome	G2	5	17.8	13	23.9	18	5:13
"Surface Debitage"	Troublesome	G3	14	8.6	231	113.1	245	14:231
"Surface Debitage"	Troublesome	G4	9	1.3	239	18.5	248	8:139
"Surface Debitage"	Troublesome	G5	22	0.2	0	0	22	22:0
"5ST98 SW8"	Troublesome	G2	1	1.3	3	3.9	4	1:3
"5ST98 SW8"	Troublesome	G3	3	2.2	31	12	34	3:31
"5ST98 SW8"	Troublesome	G4	2	0.1	41	2.8	43	2:41

"5ST98 SW8"	Troublesome	G5	0	0	2	0.1	2	0:2
"5ST98 Upper"	Troublesome	G1	1	13.4	0	0	1	1:0
"5ST98 Upper"	Troublesome	G2	0	0	1	3.5	1	0:1
"5ST98 Upper"	Troublesome	G3	3	2.2	17	10.4	20	3:17
"5ST98 Upper" Yellow Envelop	Troublesome	G3	2	0.3	6	1.2	8	2:6
"5ST98 Upper" Yellow Envelop	Troublesome	G4	1	0.1	84	4.6	85	1:85
"5ST98 Upper" Yellow Envelop	Troublesome	G5	0	0	7	0.1	7	0:7
"5ST98 No Provenience"	Troublesome	G2	2	5.2	5	6.7	7	2:5
"5ST98 No Provenience"	Troublesome	G3	2	1.3	10	5.9	12	2:10
"5ST98 No Provenience"	Troublesome	G4	1	0.2	18	1.3	19	1:18
"5ST98 No Provenience"	Troublesome	G5	0	0	1	0.1	1	0:1
"5ST98 No Prov. Yellow Envelope"	Troublesome	G2	4	18.9	4	9.4	8	4:4
"5ST98 No Prov. Yellow Envelope"	Troublesome	G3	7	4.7	42	23.8	49	4:49
"5ST98 No Prov. Yellow Envelope"	Troublesome	G4	2	0.2	22	2	24	2:22
"5ST98 No Prov. Yellow Envelope"	Troublesome	G5	0	0	1	0.1	1	0:1
"5ST98 Upper Surf"	Troublesome	G2	1	3.9	0	0	1	1:0
"5ST98 Upper Surf"	Troublesome	G3	1	0.2	21	7.1	22	1:21
"5ST98 Upper Surf"	Troublesome	G4	0	0	4	0.6	4	0:4
"5ST98 Lower"	Troublesome	G2	2	5.5	2	3.3	4	2:2
"5ST98 Lower"	Troublesome	G3	2	1.2	13	8.2	15	2:13
"5ST98 Lower"	Troublesome	G4	0	0	6	0.5	6	0:6
"11/16/75"	Troublesome	G3	4	2.1	55	16.6	59	4:53
"11/16/75"	Troublesome	G4	4	0.2	75	6.9	79	4:75
"11/16/75"	Troublesome	G5	0	0	11	0.1	11	0:11
"11/18"	Troublesome	G2	1	1.6	0	0	1	1:0
"11/18"	Troublesome	G3	3	1.1	56	11.1	59	3:56
"11/18"	Troublesome	G4	2	0.2	189		191	2:189
"11/18"	Troublesome	G5	0	0	13	0.1	13	0:13

"No prov. Or surface no prov."	Troublesome	G4	0	0	1	0.2	1	0:1
"Surface Debitage"	Troublesome?	G2	0	0	2	4.1	2	0:2 This looks like Troublesome; however, they are very opaque and easy to pick out from a troublesome pile. A little milkier white.
"Surface Debitage"	Troublesome?	G3	0	0	10	6.5	10	0:10
"5ST98 SW8"	Troublesome?	G3	1	0.1	1	0.1	2	1:1 This looks like Troublesome; however, they are very opaque and easy to pick out from a troublesome pile. A little milkier white.
"5ST98 SW8"	Troublesome?	G4	0	0	2	0.1	2	0:2
"5ST98 SW8"	Troublesome?	G5	0	0	1	0.1	1	0:1
"5ST98 Upper"	Troublesome?	G3	1	1	3	1.5	4	1:3 This looks like Troublesome; however, they are very opaque and easy to pick out from a troublesome pile. A little milkier white.
"5ST98 Upper"	Troublesome?	G4	0	0	1	0.2	1	0:1
"5ST98 Upper" Yellow Envelop	Troublesome?	G4	0	0	1	0.1	1	0:2 This looks like Troublesome; however, they are very opaque and easy to pick out from a troublesome pile. A little milkier white.
"5ST98 No Provenience"	Troublesome?	G3	1	0.2	2	0.9	3	0:3
"5ST98 No Prov. Yellow Envelope"	Troublesome?	G3	1	1.3	6	3.6	7	1:6
"5ST98 No Provenience"	Trout Creek	G3	0	0	11	1.4	11	0:1
"Surface Debitage"	White/Red Chert	G3	0	0	1	0.5	1	0:1 This chert has a mildly translucent white with medium-sized merlot-colored stripes and specks
"Surface Debitage"	Windy Ridge quartzite	G2	1	4.1	3	8.4	4	1:3
"Surface Debitage"	Windy Ridge quartzite	G3	1	2	3	1.6	4	1:3
"Surface Debitage"	Windy Ridge quartzite	G4	0	0	3	0.2	3	0:3
"5ST98 SW8"	Windy Ridge quartzite	G3	0	0	2	0.8	2	0:2

"5ST98 Upper" Yellow Envelop	Windy Ridge quartzite	G4	0	0	2	0.1	2	0:1
"11/16/75"	Windy Ridge quartzite	G4	0	0	2	0.3	2	0:2
"11/16/75"	Windy Ridge quartzite	G5	0	0	2	0	2	0:2
"11/18"	Windy Ridge quartzite	G3	0	0	1	0.2	1	0:1
"11/18"	Windy Ridge quartzite	G4	0	0	2	0.1	2	0:2

APPENDIX E: RADIOCARBON DATES

This appendix presents scans of the original data sheets documenting the results of radiocarbon analysis conducted on samples from Porcupine Peak. These scans are included to provide full transparency and allow readers to directly observe the primary data, supporting the chronological context discussed in the thesis.

PORCUPINE PEAK SITE (5 ST 98), Snake River, Summit Co., Colorado

Feature 1

UGa-1243	3555 ± 215 BP
UGa-1464	2845 ± 75 BP
UGa-1865	2625 ± 60 BP

All three dates are for charcoal from the same depth range (15-40 cm), at progressively greater distances back from the streambank exposure through a steep-walled basin hearth, at approximately 22S/5W. The hearth is 3-4 m south of my streambank stratigraphic profile. Jim Marcotte and Liz Morris do not know the reason for the discrepancies in dating, but mistrust the older date. They feel that the hearth originated in unit 3.

Feature 3

UGa-1866 2425 ± 85 BP.

The date is for charcoal from 17 cm depth in a shallow-basin or unprepared hearth. The sample was collected from the portion of the hearth excavated in grid square 19S/5W. It is clearly enclosed within stratigraphic unit 3.

I-10,933 2820 ± 85 BP

The date is for charcoal from 19- to 26-cm depth collected from feature 3, in a 30-cm-wide strip along the east side of grid square 19S/6W. Its stratigraphic position, within unit 3, is shown on a profile of the W wall of grid square 19S/5W. Collected 30 October 78 by JBB.

Upper Charcoal Layer

I-10,932 <185 BP

The date is for charcoal from a thin buried A_1 horizon between stratigraphic units 1 and 2 in a 30-cm-wide strip along the E side of grid square 19S/6W. The charcoal may be of forest-fire origin; unit 1, overlying the sample, is thought to represent soil blown from the dirt roadway west of the sampling locality. Sample location is shown in the profile of the W wall of grid square 19S/5W.

I-10,932

< 185 BP

Porcupine Peak site (5 ST 98). Wood charcoal from buried A_1 horizon at 4-8 cm depth in 30-cm-wide strip along E side of grid square 19S/6W. The soil horizon is developed in stratigraphic unit 2, and is buried by unit 1, which is interpreted as debris blown from the dirt roadway just west of the sample locality. Date is consistent with field interpretation. There is no evidence that the charcoal is archeological. Collected 30 October 78 by JBB.

I-10,933

2820 ± 85 BP

Porcupine Peak site (5 ST 98). Wood charcoal from Feature 3, a hearth on the boundary between grid squares 19S/5W and 19S/6W. Charcoal was as thick as 6 cm, and contained burned granitic cobbles, but no artifacts or flakes. The sample was collected from 19- to 26-cm depth in the SE corner of 19S/6W. Flakes occurred in this grid square to a maximum depth of 19 cm. The hearth is shown in a profile of the W wall of grid square 19S/5W. It is entirely included in stratigraphic unit 3, a 7.5YR 5/3 (d) firm, compact sandy loam, free of stones, vesicular, with moderate platy structure, interpreted as reworked loess or overbank alluvium. Directly underlying unit 3 is a thick colluvial sequence (Early Neoglacial) and possible lake or outwash sediments. Collected 30 October 78 by JBB. Another date from Feature 3 is 2425 ± 85 BP (UGa-1866).

APPENDIX F: BURNED ARTFACTS PER LEVEL PER UNIT

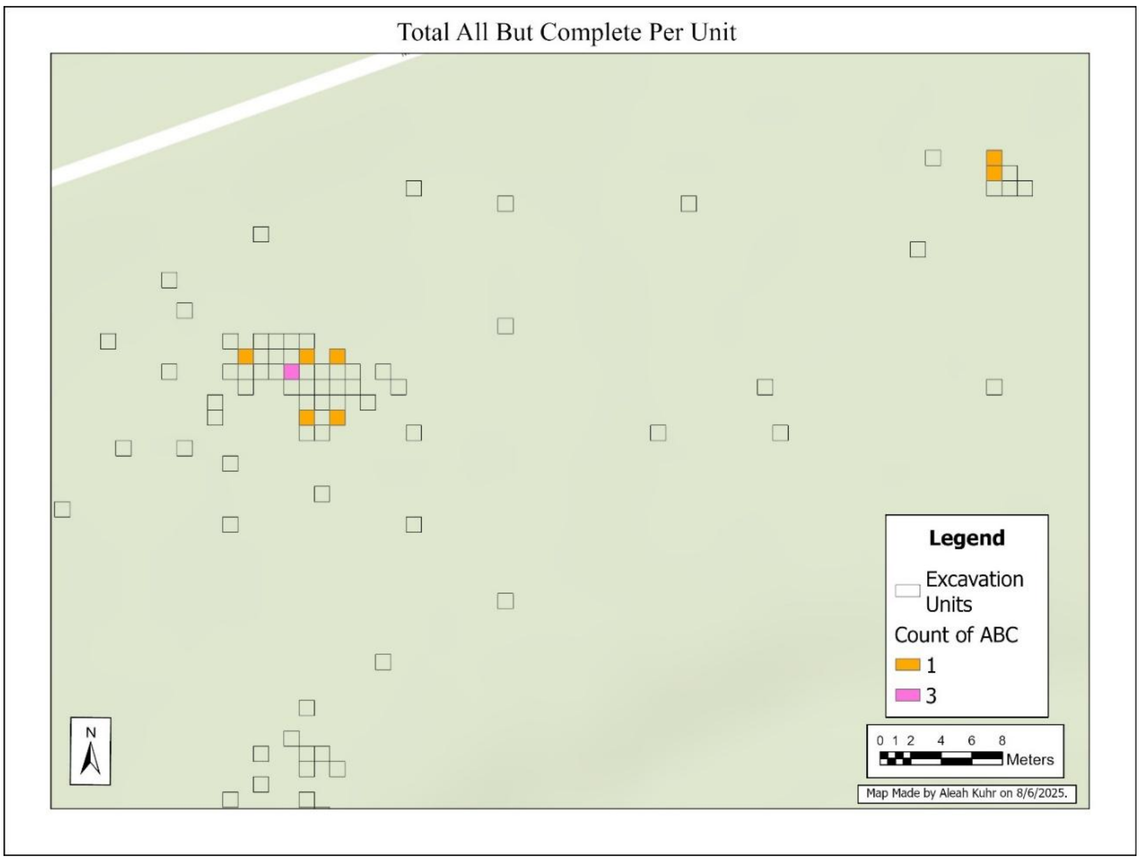
This appendix presents a table summarizing counts of burned artifacts by artifact type, stratigraphic level, and excavation unit. Artifact types were categorized using the following coding system: FK for flakes, BN for bone, PP for projectile points, ANG for angular debris, BF for bifaces, FCR for burnt fire-cracked rock, GS for ground stone, and SC for scrapers. Each artifact was recorded according to this classification to standardize identification and facilitate analysis of the assemblage. Although these data were not directly analyzed in the main body of the thesis, they are included here to provide an additional visual perspective on artifact distributions across the site and to serve as a reference for burned materials within the excavated units.

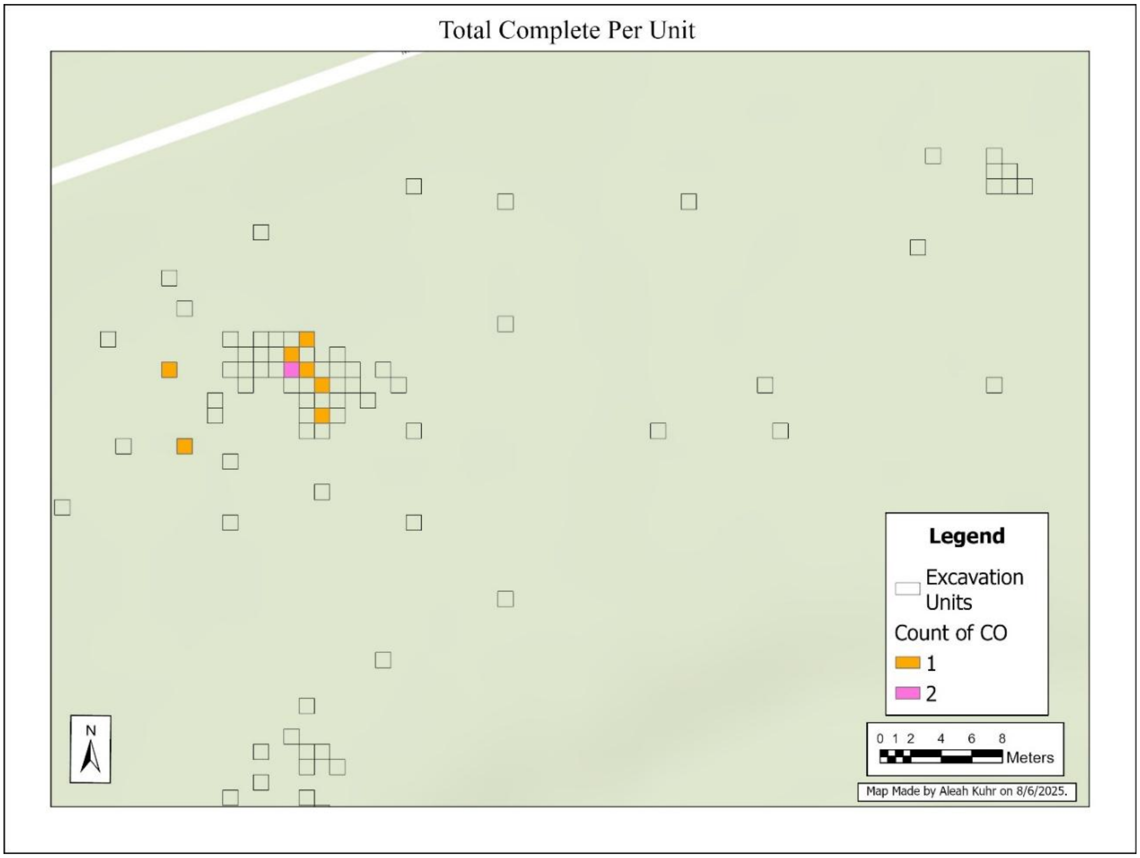
Cell Unit	Surface	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
1007_989	3(FK)	16(FK) 1(SC)	36(FK) 1(PP)				
1007_991		23(FK) 1(PP)	29(FK)	2(FK)	4(FK)		
1007_992		19(FK) 1(BF)	1(FK)				
1007_993	8(FK)	37(FK) 1(ANG) 1(PP)					
1007_994	8(FK)	29(FK) 2(PP)	33(FK)	5(FK)			
1006_990		9(FK)	7(FK) 1(PP)				
1006_991	1(FK)	37(FK) 6(BF) 1(SC)	11(FK) 1(PP)				
1006_992		11(FK) 2(BF)	1(FK)				
1006_993		20(FK) 2(PP)	13(FK) 1(BN) 1(PP)	19(FK)	11(FK) 1(PP)		
1006_994		13(FK) 1(PP)	11(FK) 1(PP)	5(FK) 2(BN)			
1006_996		30(FK) 1(PP)	17(FK) 2(PP)	17(FK)	8(FK)		
1005_985		1(FK)	2(FK)	2(FK)			
1005_989	1(FK)	25(FK) 1(PP)	21(FK)				
1005_991	2(GS)	28(FK) 2(PP)	23(FK)	3(FK)			
1005_992		27(FK)	16(FK)	19(FK) 1(PP)	5(FK) 1(ANG) 14(BN)		
1005_993		37(FK)	43(FK) 3(PP)	72(FK)	10(FK) 2(PP)		

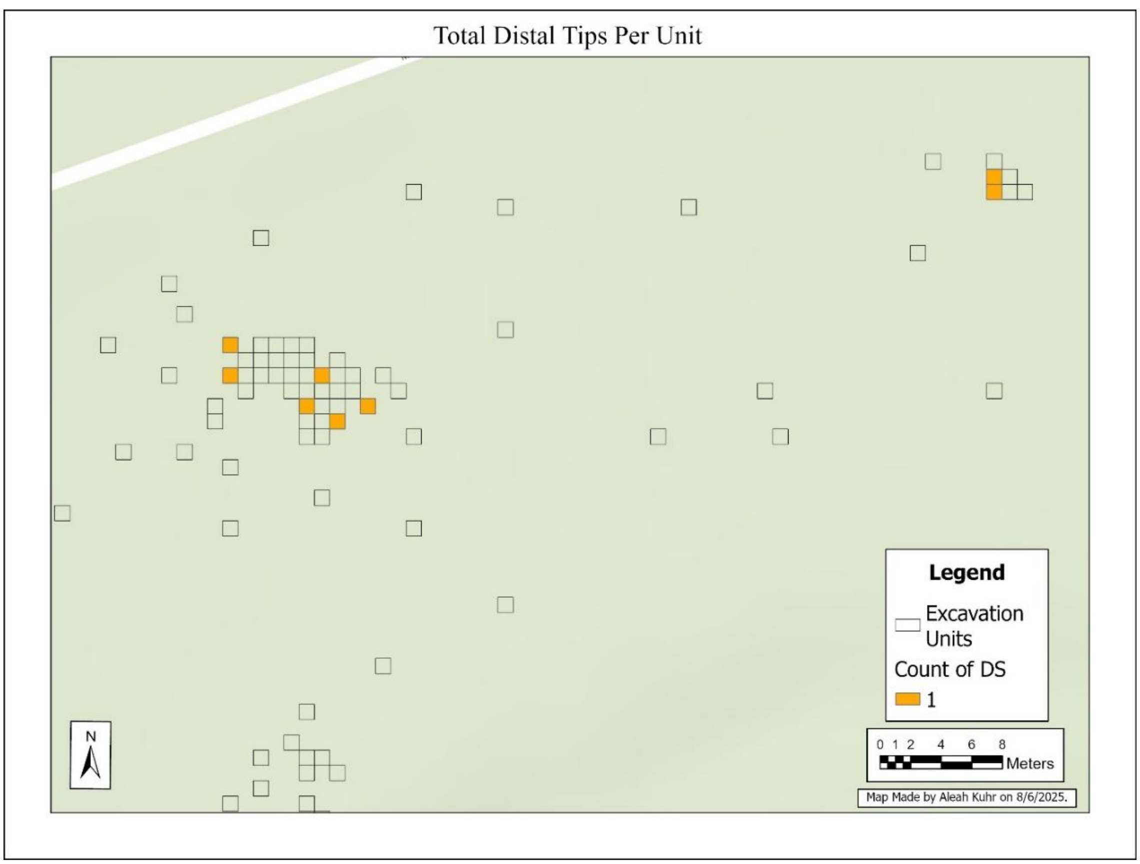
1005_994		39(FK) 4(BN)	41(FK) 1(BN) 2(PP)	19(FK) 2(PP)	8(FK) 1(BN)		
1005_995		74(FK) 3(BN) 1(PP)	8(FK) 2(BN)				
1005_997	5(FK)	19(FK)	29(FK)	3(FK)			
1005_999	14(FK) 1(GS)	91(FK)	24(FK) 2(BN)	14(FK) 1(BN)	16(FK)	5(FK)	2(FK)
1004_990	1(GS)	10(FK)	7(FK)	1(FK)			
1004_993		23(FK) 1(PP)	20(FK) 1(BN)	18(FK)	12(FK) 1(PP)		
1004_994	2(FK)	21(FK) 1(PP)	33(FK) 1(BN) 1(PP)				
1004_995	2(FK) 1(PP)	12(FK) 1(PP)	16(FK) 2(PP)				
1004_996		5(FK)	25(FK)				
1004_997	3(FK)	6(FK) 1(PP)	14(FK) 1(PP)	19(FK)	11(FK)	2(FK)	
1004_1000	1(GS)	15(FK)					
1003_988		3(FK)	8(FK)	5(FK)			
1003_994	5(FK)	24(FK) 2(BN)	18(FK) 1(PP)	3(FK)			
1003_995	2(FK)	27(FK) 2(PP) 1(ANG)	10(FK)	11(FK)			
1003_996	1(FK)	37(FK) 3(BN)	40(FK) 4(BN)				
1003_998	2(PP)	24(FK)					
1002_988		5(FK) 1(PP)	9(FK)	2(FK)			
1002_994		36(FK) 2(PP)	5(FK)				
1002_995		17(FK) 1(BN) 4(PP)	2(FK)	1(FK)			
1002_996	3(FK)	27(FK) 1(PP) 1(BF)	8(FK)	3(FK)			
1001_994		9(FK)	8(FK)				
1001_995		15(FK) 1(PP)	12(FK)				
1000_986		6(FK) 1(PP)	2(FK)	1(FK)			
Cell Unit							
1019_1039		1(PP)	7(FK) 1(PP)	9(FK) 1(PP)	83(FK)	4(FK)	
1018_1039		2(FK)	13(FK) 2(PP) 1(BF)	4(FK) 1(PP)			
1018_1040		21(FK) 1(PP)	12(FK)				
1017_1039		90(FK) 1(PP)	21(FK)				
1017_1040		20(FK)	14(FK)				
1017_1041		10(FK) 1(PP)	12(FK) 1(FCR)				
Cell Unit							
983_994		1(FK) 1(PP)	1 (FK)				

APPENDIX G: PROJECTILE POINTS PORTIONS MAPS (SINGULAR)

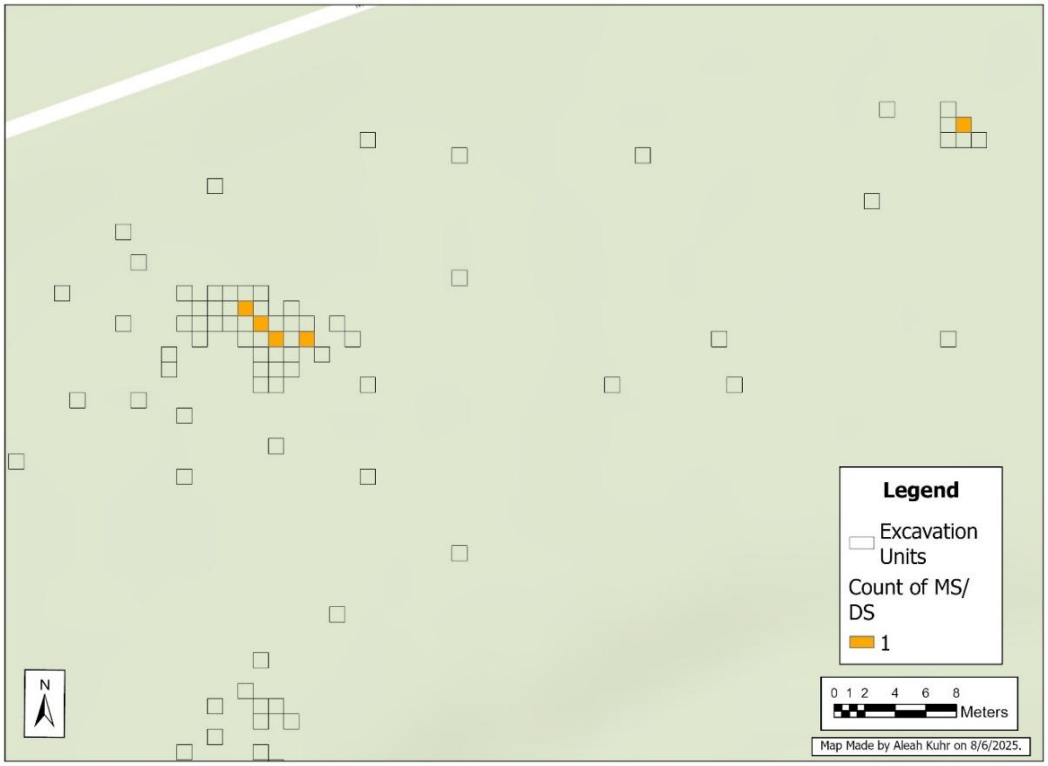
This appendix presents a series of maps illustrating the distribution of projectile point portions across the excavation units. Unlike the maps included in the main body of the thesis, which overlapped similar portion types, these maps display each portion type individually without overlap. The appendix provides a more detailed visualization of projectile point distributions, allowing for closer examination of spatial patterns within the assemblage.



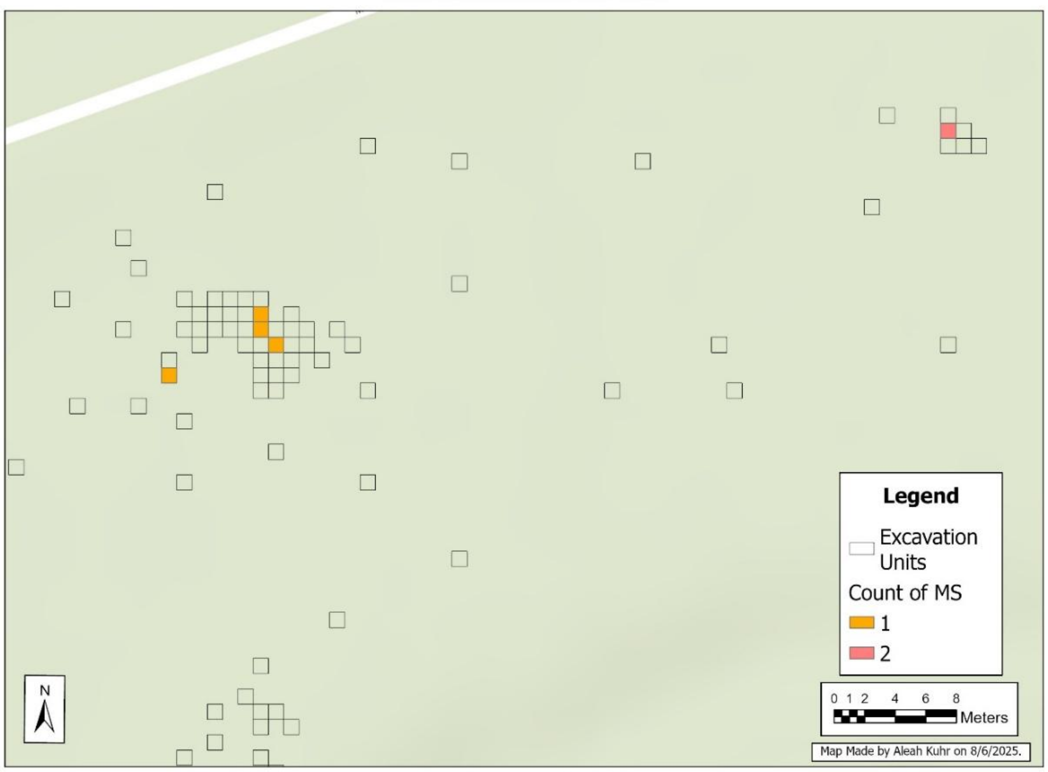

Total Complete Per Unit
Legend
Excavation Units
Count of CO
1
2
N
0 1 2 4 6 8
Meters
Map Made by Aleah Kuhr on 8/6/2025.

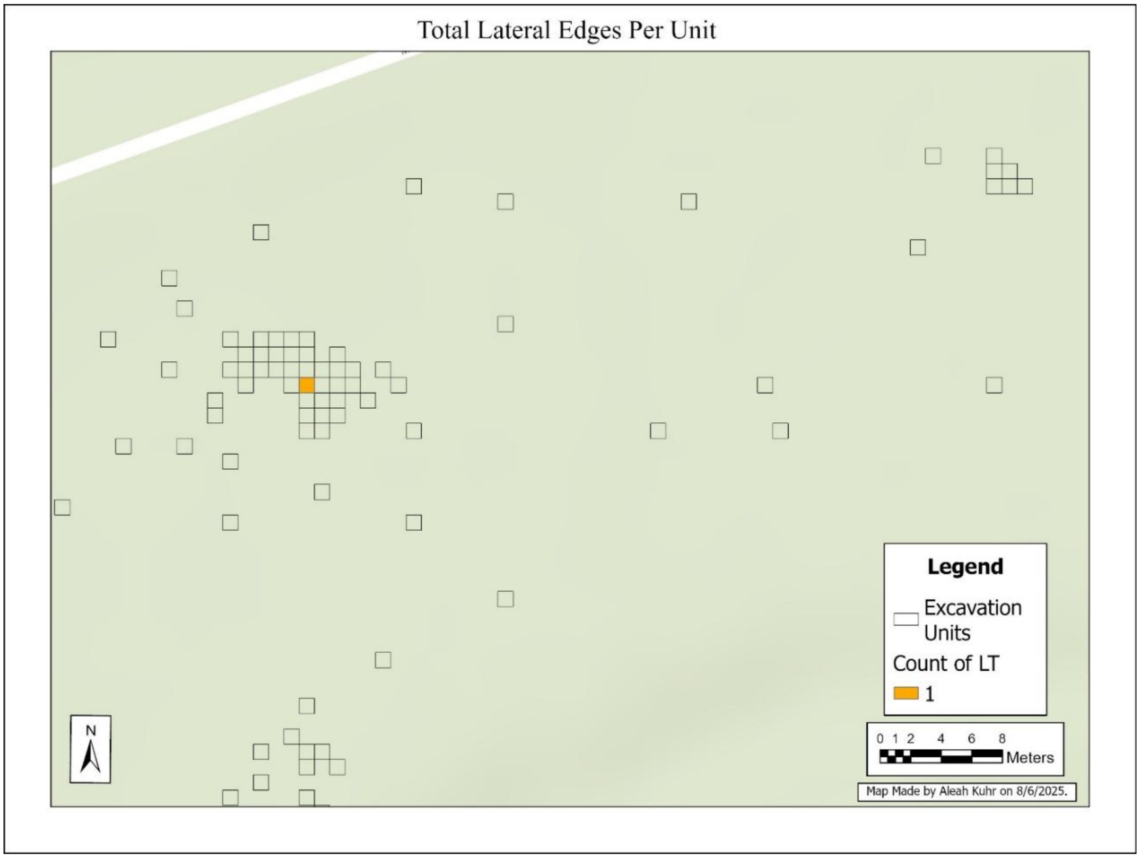

Total Distal Tips Per Unit
Legend
Excavation Units
Count of DS
1
N
0 1 2 4 6 8
Meters
Map Made by Aleah Kuhr on 8/6/2025.

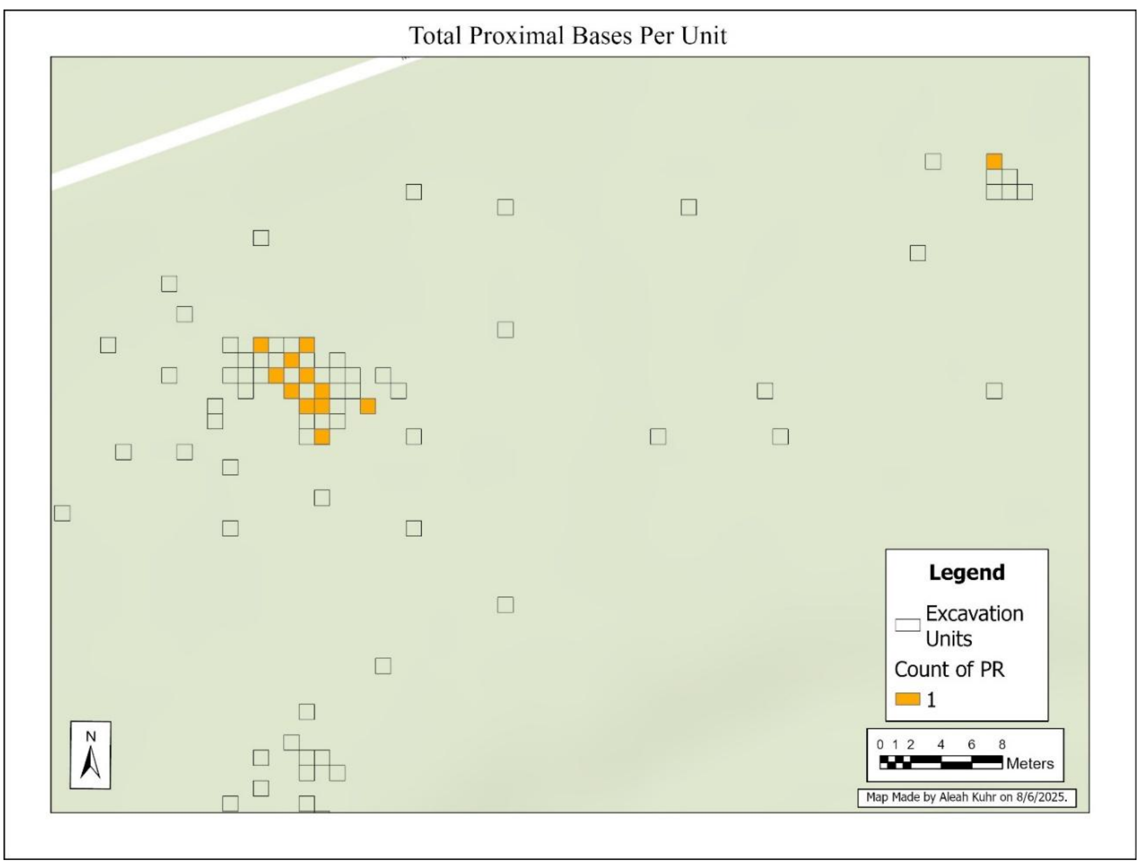
Total Midsections with Distal Tips Per Unit



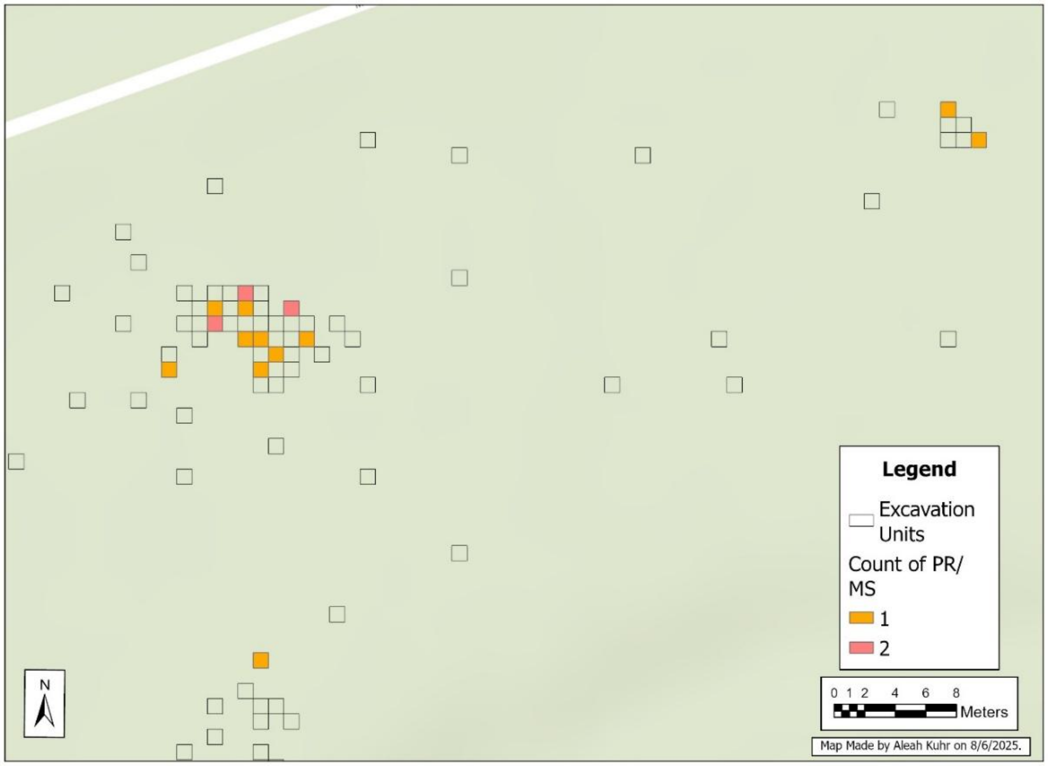
Total Midsections Per Unit




Total Lateral Edges Per Unit
Legend
Excavation Units
Count of LT
1
0 1 2 4 6 8
Meters
N
Map Made by Aleah Kuhr on 8/6/2025.


Total Proximal Bases Per Unit
Legend
Excavation Units
Count of PR
1
0 1 2 4 6 8
Meters
N
Map Made by Aleah Kuhr on 8/6/2025.

Total Proximal Bases with Midsections Per Unit



APPENDIX H: SITE COMPARISONS FOR BLADE ANGLE ANALYSIS

This appendix presents the dataset of sites used in the blade angle analysis, including all relevant projectile points, their item numbers, measured blade angles, and distances from the Kremmling chert quarry. The table is included to provide transparency regarding the sources of comparative data and to allow readers to clearly see the dataset used in the analysis presented in Chapter VII.

Site	Item Number	Blade angle (°)	Distance (Straight Line) (km)
Porcupine Peak	1	49.408	62.65
Porcupine Peak	2	50.978	62.65
Porcupine Peak	3	54.625	62.65
Porcupine Peak	17	30.564	62.65
Porcupine Peak	23	57.009	62.65
Porcupine Peak	26	27.162	62.65
Porcupine Peak	30	43.955	62.65
Porcupine Peak	32	34.175	62.65
Porcupine Peak	33	39.573	62.65
Porcupine Peak	38	53.987	62.65
Porcupine Peak	40	53.506	62.65
Porcupine Peak	42	47.518	62.65
Porcupine Peak	53	40.28	62.65
Porcupine Peak	54	50.629	62.65
Porcupine Peak	58	43.896	62.65
Porcupine Peak	59	44.392	62.65
Porcupine Peak	67	53.611	62.65
Porcupine Peak	70	33.355	62.65
Porcupine Peak	77	48.766	62.65
Porcupine Peak	79	50.201	62.65
Porcupine Peak	86	52.483	62.65
Porcupine Peak	93	43.698	62.65
Porcupine Peak	94	43.741	62.65

Porcupine Peak	95	37.272	62.65
Porcupine Peak	96	37.343	62.65
5ST303	5ST303.185	14.619	36.93
Flattop Mountain Game Drive	ROMO 108	57.824	62.25
Flattop Mountain Game Drive	ROMO 383	48.369	62.25
Coney Lake	I	23.005	62.95
Coney Lake	Q	23.071	62.95
Coney Lake	R	45.128	62.95
Coney Lake	U	25.236	62.95
Coney Lake	V	38.525	62.95
Devils Thumb	I	38.37	56.25
Fourth of July Mine Site	Q (5.5)	29.703	57.89
Fourth of July Mine Site	F	55.449	57.89
Fourth of July Mine Site	C	37.129	57.89
Horn Ranch Site	1015	47.576	31.35
Horn Ranch Site	1008	51.359	31.35

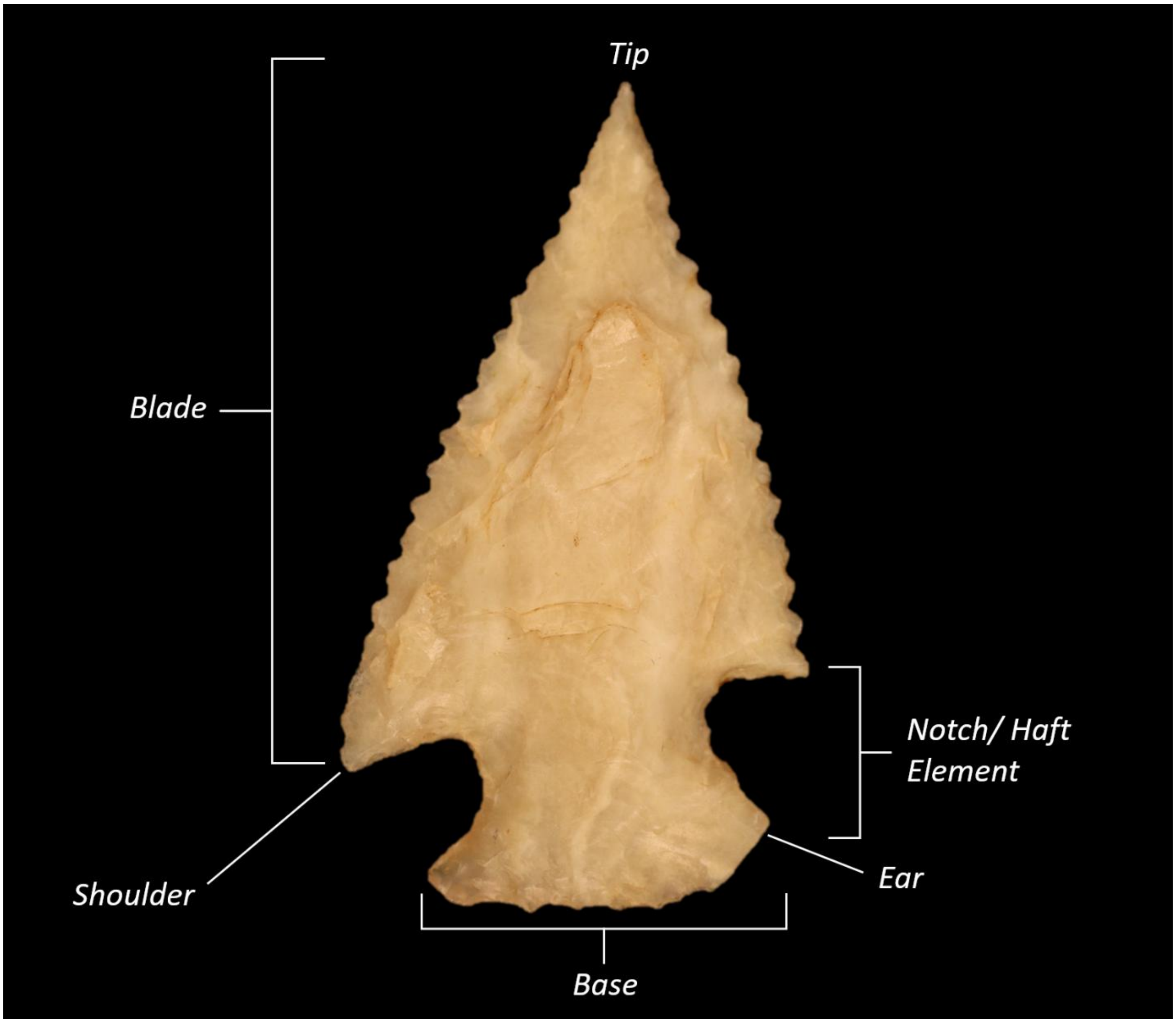
APPENDIX I: SAMPLE SITE DETAILS

This appendix presents the dataset used for the blade angle analysis, including site details, associated radiocarbon dates, distances from the Kremmling chert quarry, and average blade angles for the projectile points from their site. The table is included to provide full transparency regarding the data underlying the analysis presented in Chapter VII and to allow readers to examine the relationships between blade morphology, site context, and chronological information.

	Average Blade Angle	Distance (km)	Radiocarbon Dates
Porcupine Peak	44.88508	62.65	Feature 1: 3555 +/- 215 2845 +/- 75 2625 +/- 60 Feature 3: 2425 +/- 85 2820 +/- 85
5ST303	14.619	36.93	4500 - 2850
Flattop Mountain Game Drive	53.0965	62.25	2620 +/- 60
Coney Lake	30.993	62.95	3660 +/- 130 YR BP
Devils Thumb	38.37	56.25	1850 +/- 50 BP 2155 +/- 55 BP
Fourth of July Mine Site	40.76033333	57.89	2650 +/- 50 BP
Horn Ranch Site	49.4675	31.35	6500 +/- 50 BP 6910 +/- 60 BP 340 +/- 60 BP 790 +/- 40 BP 920 +/- 50 BP

APPENDIX J: PROJECTILE POINT TERMINOLOGY

This appendix presents a graphic illustrating the key elements of a projectile point used for typological analysis and artifact descriptions within the thesis. The diagram provides a visual reference for terminology and measurement conventions applied to the projectile point assemblage.



APPENDIX K: DATA

This appendix presents the full dataset collected from Porcupine Peak, organized into tables for reader access and potential further analysis. The tables include all recorded artifact types: angular debris, bifaces, bone, charcoal, cores, flakes, edge-modified flakes, fire-cracked rock, ground stone, historic artifacts, preforms, projectile points, rocks, and scrapers. Historical artifacts are included to document the complete assemblage, though they were not within the scope of this thesis. A separate table of rocks is also included to account for quartz pieces with reflective cleavage planes that were originally misidentified as artifacts during excavation. This appendix provides a comprehensive reference for the assemblage and ensures transparency of the data collected.

Angular Debris

Thousands Conversions	Unit (X,Y)	Catalogue Number	Level	Class	Element	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
1003, 995	4n5w	5ST98.351	1	CS	ANG	9.5	6.5	4.3	0.3	Troublesome	No	Yes
1004, 997	5n3w	5ST98.2563	unknown	CS	ANG	34.9	25.7	13.3	11.6	Troublesome	Yes	No
1005, 992	6n8w	5ST98.2561	4	CS	ANG	77.3	54.2	15.9	51.4	Troublesome	Yes	No
1007, 993	8n7w	5ST98.138	1	CS	ANG	20.7	20.6	9.4	3.5	Troublesome	Yes	No
1007, 994	8n6w	5ST98.2564	unknown	CS	ANG	37	28	9	7.6	Troublesome	No	Yes
1009, 1046	10n46e	5ST98.2562	1	CS	ANG	89.7	63.8	32.7	136.9	Unknown	Yes	No
n/a	No Prov. Surface	5ST98.2565	surface	CS	ANG	43.7	21.9	9.9	5.3	Troublesome	No	Yes
n/a	No Prov. Surface	5ST98.2568	surface	CS	ANG	32.5	26.3	9.9	6.2	Unknown	No	Yes
n/a	No Prov. Surface	5ST98.2566	surface	CS	ANG	54.8	21.7	11.8	15.3	Troublesome	Yes	Yes

Bifaces

Thousands Conversions	Unit (X,Y)	Catalogue Number	Level	Class	Element	Late or Early Stage	Portion	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
1001, 994	2n6w	5ST98.2548	n/a	CS	BF	Late	MS/DS	39.6	29.2	13	13.8	Troublesome	N	N
1002, 996	3n4w	5ST98.2544	1	CS	BF	Early	MS/DS	43.2	23	6.7	6.1	Unknown	N	N

1003, 995	4n5w	5ST98.2551	n/a	CS	BF	Mid-Stage	DS	33.7	24	7.7	7.5	Troublesome	N	N
1003, 996	4n4w	5ST98.2550	n/a	CS	BF	Early	MS/DS	42.5	28.6	12.7	12.2	Troublesome	N	N
1004, 995	5n5w	5ST98.2553	n/a	CS	BF	Mid-Stage	MS/DS	30	25.9	10.3	5.8	Troublesome	N	Y
1005, 993	6n7w	5ST98.2365	n/a	CS	BF	Mid-Stage	PR	36	19.9	9.4	5.1	Troublesome	N	N
1006, 991	7n9w	5ST98.2541	1	CS	BF	Mid-Stage	ABC	64.4	36.7	8.8	27.5	Troublesome	N	N
1006, 991	7n9w	5ST98.2536	1	CS	BF	Mid-Stage	CO	60.2	43.6	11.5	29.4	Troublesome	N	N
1006, 991	7n9w	5ST98.2539	1	CS	BF	Mid-Stage	CO	57.3	36.6	11.1	22	Troublesome	N	N
1006, 991	7n9w	5ST98.2535	1	CS	BF	Mid-Stage	CO	59.1	42.5	10.2	26.5	Troublesome	Y	N
1006, 991	7n9w	5ST98.2537	1	CS	BF	Mid-Stage	CO	63.5	39	9.9	27.8	Troublesome	Y	N
1006, 991	7n9w	5ST98.2540	1	CS	BF	Mid-Stage	MS/DS	38.6	35.8	8.7	13.3	Troublesome	N	Y
1006, 992	7n8w	5ST98.2542	1	CS	BF	Mid-Stage	CO	55.7	45.1	9.7	28.7	Troublesome	N	N
1006, 992	7n8w	5ST98.2543	1	CS	BF	Mid-Stage	CO	50.8	41.1	10.7	22.4	Troublesome	N	N
1006, 993	7n7w	5ST98.2545	n/a	CS	BF	Late	CO	34.1	30.9	7.3	7.3	Troublesome	N	N
1007, 991	8n9w	5ST98.2547	n/a	CS	BF	Mid-Stage	CO	50.2	36.3	10.7	20.3	Troublesome	Y	N
1007, 992	8n8w	5ST98.1146	1	CS	BF	Early	MS	36	22.4	9.6	6.9	Troublesome	Y	N
1007, 992	8n8w	5ST98.2549	n/a	CS	BF	Early	CO	47	42.8	13.2	17.8	Troublesome	N	N
1007, 994	8n6w	5ST98.2552	n/a	CS	BF	Late	ABC	44.2	32.3	7.9	10.4	Troublesome	N	Y
1009, 986	10n14w	5ST98.1041	1	CS	BF	Mid-Stage	MS/DS	25.7	28.7	8.2	6.7	Troublesome	N	N
1018, 1039	19n39e	5ST98.1785	2	CS	BF	Late	LT	21	13.7	6.1	1.6	Troublesome	N	Y
1019, 1039	20n39e	5ST98.2546	n/a	CS	BF	Mid-Stage	MS/DS	54.3	27	8.4	12.9	Troublesome	N	N
983, 994	16s6w	5ST98.2368	n/a	CS	BF	Late	DS	28.1	20.9	5.8	3.4	Table Mountain jasper	Y	N
No Prov.	No Prov.	5ST98.2567	surface	CS	BF	Late	LT	15.6	11.5	3.7	0.6	Unknown	N	N
No Prov.	No Prov.	5ST98.2555	n/a	CS	BF	Late	CO	35.2	27.3	7.8	6.6	Troublesome	N	N
No Prov.	No Prov.	5ST98.2559	un/a	CS	BF	Late	LT	26.5	16.7	6.9	3.4	Troublesome	N	N
No Prov.	No Prov.	5ST98.2558	n/a	CS	BF	Late	MS	40.9	29.3	7.9	8.3	Troublesome	N	N
No Prov.	No Prov.	5ST98.2557	n/a	CS	BF	Late	DS	30.3	22.5	9.8	5	Unknown	Y	N
No Prov.	No Prov.	5ST98.2554	n/a	CS	BF	Late	LT	25.5	15	3.9	1.9	Troublesome	N	Y
No Prov.	No Prov.	5ST98.2556	n/a	CS	BF	Late	LT	42.9	19.6	7.3	4.4	Troublesome	N	Y

Bone

Thousands Conversion	Catalogue Number	Unit (X/Y)	Unit Level	Maximum Length (mm)	Maximum width (mm)	Thickness (mm)	Mass (mm)	Milligrams	Burn (Y/N)
1002, 995	5ST98.277	3n5w	1	13.10	12.70	2.30	0.08	81.50	yes
1003, 994	5ST98.929	4n6w	2	11.60	8.70	3.40	0.06	59.50	no

1003, 994	5ST98.931	4n6w	2	9.60	4.00	2.50	0.23	230.00	yes
1003, 996	5ST98.2397	4n4w	1	10.70	7.50	3.40	0.30	300.00	yes
1003, 996	5ST98.2398	4n4w	1	11.50	7.80	3.00	0.20	200.00	yes
1003, 996	5ST98.2399	4n4w	1	9.30	6.90	2.50	0.10	100.00	yes
1003, 996	5ST98.2403	4n4w	2	11.20	8.50	1.60	0.20	200.00	no
1003, 996	5ST98.2400	4n4w	2	17.30	9.50	4.10	0.40	400.00	yes
1003, 996	5ST98.2401	4n4w	2	14.10	6.10	3.50	0.30	300.00	yes
1003, 996	5ST98.2402	4n4w	2	12.40	6.20	2.90	0.20	200.00	yes
1004, 993	5ST98.2120	5n7w	2	14.30	8.60	3.40	0.08	75.50	yes
1004, 994	5ST98.1097	5n6w	2	10.50	8.80	3.70	0.05	52.00	yes
1005, 992	5ST98.2406	6n8w	4	3.20	3.00	1.80	0.02	15.00	yes
1005, 992	5ST98.2407	6n8w	4	4.90	4.70	2.90	0.05	49.00	yes
1005, 992	5ST98.2408	6n8w	4	4.50	3.60	1.50	0.02	23.00	yes
1005, 992	5ST98.2409	6n8w	4	2.70	2.30	1.30	0.008	8.00	yes
1005, 992	5ST98.2410	6n8w	4	4.30	2.70	1.40	0.01	12.00	yes
1005, 992	5ST98.2411	6n8w	4	4.40	1.80	1.90	0.01	13.00	yes
1005, 992	5ST98.2412	6n8w	4	3.70	1.90	1.40	0.01	10.00	yes
1005, 992	5ST98.2413	6n8w	4	2.90	1.20	0.70	0.00	1.00	yes
1005, 992	5ST98.2414	6n8w	4	2.90	2.70	1.30	0.01	6.00	yes
1005, 992	5ST98.2415	6n8w	4	3.10	2.50	1.20	0.01	7.00	yes
1005, 992	5ST98.2416	6n8w	4	2.50	1.80	1.10	0.00	3.00	yes
1005, 992	5ST98.2417	6n8w	4	3.00	1.90	1.10	0.01	5.00	yes
1005, 992	5ST98.2418	6n8w	4	2.40	1.30	1.50	0.00	1.00	yes
1005, 992	5ST98.2419	6n8w	4	2.90	1.30	1.50	0.01	5.00	yes
1005, 993	5ST98.2425	6n7w	level unknown	7.30	5.70	2.30	0.01	14.50	yes
1005, 994	5ST98.2392	6n6w	1	14.10	12.50	3.20	0.40	400.00	no
1005, 994	5ST98.2395	6n6w	1	10.60	7.90	22.00	0.20	200.00	no
1005, 994	5ST98.1379	6n6w	1	3.20	2.80	1.30	0.02	17.50	no
1005, 994	5ST98.2394	6n6w	1	12.60	6.30	4.20	0.20	200.00	yes
1005, 994	5ST98.2393	6n6w	2	15.20	5.60	4.10	0.30	300.00	yes
1005, 994	5ST98.2396	6n6w	4	19.20	14.30	5.00	0.80	800.00	yes
1005, 995	5ST98.2602	6n5w	1	6.1	3.9	1.6	0.0105	10.5	no
1005, 995	5ST98.2603	6n5w	1	4.6	4.2	1.4	0.006	6	no
1005, 995	5ST98.2688	6n5w	1	9.8	4.5	2.7	0.0315	31.5	no
1005, 995	5ST98.2641	6n5w	2	13.4	10	2.5	0.066	66	no
1005, 995	5ST98.2642	6n5w	2	7.8	5.7	2.2	0.0265	26.5	no
1005, 999	5ST98.2420	6n1w	2	3.70	3.30	2.60	0.02	15.00	no
1005, 999	5ST98.2421	6n1w	2	3.20	2.30	2.40	0.01	14.00	no
1005, 999	5ST98.2422	6n1w	3	8.80	5.10	4.10	0.14	139.00	no

1006, 993	5ST98.1957	7n7w	2	10.10	7.10	2.40	0.03	32.50	yes
1006, 994	5ST98.2405	7n6w	3	12.90	6.40	3.90	0.20	200.00	no
1006, 994	5ST98.2404	7n6w	3	19.00	6.50	1.30	0.20	200.00	yes
1018, 1040	5ST98.2423	19n40e	level unknown	15.00	7.90	3.50	0.08	82.50	yes
1018, 1040	5ST98.2424	19n40e	level unknown	13.20	5.80	2.10	0.03	32.00	yes
No Prov.	5ST98.2426	no Prov.	0	20.20	7.00	1.70	0.04	40.00	no
No Prov.	5ST98.2427	no Prov.	0	11.50	10.00	2.80	0.02	20.50	no
No Prov.	5ST98.2428	no Prov.	0	10.80	3.60	1.40	0.02	15.00	no
No Prov.	5ST98.2429	no Prov.	0	8.00	4.50	2.20	0.01	11.00	no
No Prov.	5ST98.2430	no Prov.	0	8.00	5.00	1.30	0.01	12.50	no

Charcoal

Thousands Conversions	Unit (X,Y)	Catalogue Number	Level	Average Mass (g)	Comments
997, 995	2s5w	5ST98.2573	3	~8.7	This was weighed with the plastic bag.

Core

Thousands Conversions	Unit (X,Y)	Catalogue Number	Level	Class	Element	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Average Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
978_991	21s9w	5ST98.2572	1	CS	Core	54.2	31.9	17.8	30	Troublesome	Yes	Yes

Flakes

Thousands Conversions	Unit (X,Y)	Catalogue Number	Level	Class	Element	Maximum Length (mm)	Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
1000_982	1n18w	5ST98.457	1	CS	FK	21.8	1.5	unknown	N	N
1000_982	1n18w	5ST98.458	1	CS	FK	10.5	0.2	unknown	N	N
1000_986	1n14w	5ST98.398	1	CS	FK	7.9	0.1	Troublesome	N	N
1000_986	1n14w	5ST98.399	1	CS	FK	10.7	0.1	Troublesome	N	Y
1000_986	1n14w	5ST98.400	1	CS	FK	12.8	0.2	Troublesome	N	N
1000_986	1n14w	5ST98.401	1	CS	FK	16	0.7	Troublesome	N	Y
1000_986	1n14w	5ST98.402	1	CS	FK	27.8	2.4	Troublesome	N	N
1000_986	1n14w	5ST98.403	1	CS	FK	27.5	1.7	Troublesome	N	N
1000_986	1n14w	5ST98.404	2	CS	FK	23.3	1.2	Windy Ridge Quartzite	N	N
1000_986	1n14w	5ST98.405	2	CS	FK	12.1	0.1	Windy Ridge Quartzite	N	N
1000_986	1n14w	5ST98.406	3	CS	FK	9.1	0.1	Troublesome	N	N
1001_994	2n6w	5ST98.716	1	CS	FK	22.1	1.2	Troublesome	Y	N
1001_994	2n6w	5ST98.717	1	CS	FK	13	0.3	Troublesome	N	Y
1001_994	2n6w	5ST98.718	1	CS	FK	12.8	0.2	Troublesome	N	N
1001_994	2n6w	5ST98.719	1	CS	FK	12.6	0.2	unknown	N	N
1001_994	2n6w	5ST98.720	1	CS	FK	11.4	0.2	Troublesome	N	N
1001_994	2n6w	5ST98.721	1	CS	FK	11.6	0.1	Troublesome	N	N
1001_994	2n6w	5ST98.722	1	CS	FK	11.5	0.1	Troublesome	N	N
1001_994	2n6w	5ST98.723	1	CS	FK	8.5	0.07	Troublesome	N	N
1001_994	2n6w	5ST98.724	1	CS	FK	8.1	0.1	Troublesome	N	N
1001_994	2n6w	5ST98.725	2	CS	FK	50.1	14.8	Troublesome	Y	N
1001_994	2n6w	5ST98.726	2	CS	FK	29.7	3.3	Troublesome	N	N
1001_994	2n6w	5ST98.727	2	CS	FK	26.3	0.6	Troublesome	N	N
1001_994	2n6w	5ST98.728	2	CS	FK	16	0.4	Troublesome	Y	N
1001_994	2n6w	5ST98.729	2	CS	FK	17	0.5	Troublesome	N	Y
1001_994	2n6w	5ST98.730	2	CS	FK	13.3	0.4	Troublesome	N	N
1001_994	2n6w	5ST98.731	2	CS	FK	8.8	0.1	Troublesome	N	N
1001_994	2n6w	5ST98.732	2	CS	FK	11.6	0.2	Troublesome	N	N
1001_995	2n5w	5ST98.504	1	CS	FK	36	3.6	Troublesome	N	N
1001_995	2n5w	5ST98.505	1	CS	FK	27.8	4.7	Troublesome	N	N
1001_995	2n5w	5ST98.506	1	CS	FK	19.8	0.1	Troublesome	N	N
1001_995	2n5w	5ST98.507	1	CS	FK	14.6	0.3	Troublesome	N	N
1001_995	2n5w	5ST98.508	1	CS	FK	16.3	0.4	Troublesome	N	N
1001_995	2n5w	5ST98.509	1	CS	FK	14.3	0.2	Troublesome	N	N
1001_995	2n5w	5ST98.510	1	CS	FK	11.8	0.2	Troublesome	N	N
1001_995	2n5w	5ST98.511	1	CS	FK	12	0.2	Troublesome	N	N
1001_995	2n5w	5ST98.512	1	CS	FK	12.4	0.2	Troublesome	N	N
1001_995	2n5w	5ST98.513	1	CS	FK	10	0.1	Troublesome	N	N
1001_995	2n5w	5ST98.514	1	CS	FK	12.3	0.1	Troublesome	N	N

1001_995	2n5w	5ST98.515	1	CS	FK	8.4	0.1	Troublesome	N	N
1001_995	2n5w	5ST98.516	1	CS	FK	8.6	0.054	Troublesome	N	N
1001_995	2n5w	5ST98.517	1	CS	FK	9.8	0.1	Troublesome	N	N
1001_995	2n5w	5ST98.518	1	CS	FK	8.6	0.1	Troublesome	Y	N
1001_995	2n5w	5ST98.519	2	CS	FK	21.7	3.1	Troublesome	Y	N
1001_995	2n5w	5ST98.520	2	CS	FK	19.7	0.6	Troublesome	N	N
1001_995	2n5w	5ST98.521	2	CS	FK	12.8	0.4	TMJ	N	N
1001_995	2n5w	5ST98.522	2	CS	FK	17	0.4	Troublesome	N	N
1001_995	2n5w	5ST98.523	2	CS	FK	13.1	0.4	Troublesome	N	N
1001_995	2n5w	5ST98.524	2	CS	FK	15.4	0.4	Troublesome	N	N
1001_995	2n5w	5ST98.525	2	CS	FK	10.2	0.1	Troublesome	N	N
1001_995	2n5w	5ST98.526	2	CS	FK	18.7	0.2	Troublesome	N	N
1001_995	2n5w	5ST98.527	2	CS	FK	13.3	0.1	Troublesome	N	N
1001_995	2n5w	5ST98.528	2	CS	FK	8.7	0.1	Troublesome	N	N
1001_995	2n5w	5ST98.529	2	CS	FK	10.6	0.1	Troublesome	N	N
1001_995	2n5w	5ST98.530	2	CS	FK	10.9	0.1	Troublesome	N	N
1002_988	3n12w	5ST98.300	1	CS	FK	11.1	0.1	Troublesome	N	N
1002_988	3n12w	5ST98.301	1	CS	FK	10.1	0.1	Troublesome	N	N
1002_988	3n12w	5ST98.302	1	CS	FK	8.8	0.1	Troublesome	N	Y
1002_988	3n12w	5ST98.303	1	CS	FK	11.1	0.1	Troublesome	N	N
1002_988	3n12w	5ST98.304	1	CS	FK	11	0.1	Troublesome	N	N
1002_988	3n12w	5ST98.305	2	CS	FK	54.5	15	Troublesome	Y	N
1002_988	3n12w	5ST98.306	2	CS	FK	33.4	2.8	Troublesome	N	N
1002_988	3n12w	5ST98.307	2	CS	FK	19.2	0.8	Troublesome	N	N
1002_988	3n12w	5ST98.308	2	CS	FK	18.7	0.2	Troublesome	N	N
1002_988	3n12w	5ST98.309	2	CS	FK	19	0.4	Troublesome	N	N
1002_988	3n12w	5ST98.310	2	CS	FK	9.2	0.1	Troublesome	N	N
1002_988	3n12w	5ST98.311	2	CS	FK	11.3	0.1	Troublesome	N	N
1002_988	3n12w	5ST98.312	2	CS	FK	10.3	0.1	Troublesome	N	N
1002_988	3n12w	5ST98.313	2	CS	FK	9.2	0.1	Troublesome	N	N
1002_988	3n12w	5ST98.314	3	CS	FK	15.1	0.3	Troublesome	N	N
1002_988	3n12w	5ST98.315	3	CS	FK	12	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.461	1	CS	FK	22.5	1	Troublesome	N	N
1002_994	3n6w	5ST98.462	1	CS	FK	18.6	0.7	Troublesome	N	Y
1002_994	3n6w	5ST98.463	1	CS	FK	23.9	1.1	Troublesome	N	N
1002_994	3n6w	5ST98.464	1	CS	FK	17.8	0.2	Troublesome	N	Y
1002_994	3n6w	5ST98.465	1	CS	FK	17.6	0.8	Troublesome	N	N
1002_994	3n6w	5ST98.467	1	CS	FK	14.3	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.468	1	CS	FK	19.5	0.7	Troublesome	N	N
1002_994	3n6w	5ST98.469	1	CS	FK	13.8	0.2	Troublesome	N	N
1002_994	3n6w	5ST98.470	1	CS	FK	12.2	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.471	1	CS	FK	16	0.2	Troublesome	N	N
1002_994	3n6w	5ST98.472	1	CS	FK	11.7	0.2	Troublesome	N	N
1002_994	3n6w	5ST98.473	1	CS	FK	11.9	0.2	Troublesome	N	N
1002_994	3n6w	5ST98.474	1	CS	FK	10.7	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.475	1	CS	FK	11.7	0.2	Troublesome	N	N
1002_994	3n6w	5ST98.476	1	CS	FK	12.6	0.2	Troublesome	N	N
1002_994	3n6w	5ST98.477	1	CS	FK	16	0.4	Troublesome	N	N
1002_994	3n6w	5ST98.478	1	CS	FK	10.7	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.479	1	CS	FK	11	0.2	Troublesome	N	N
1002_994	3n6w	5ST98.480	1	CS	FK	13.7	0.2	Troublesome	N	N
1002_994	3n6w	5ST98.481	1	CS	FK	9.3	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.482	1	CS	FK	10.5	0.1	Troublesome	N	Y

1002_994	3n6w	5ST98.483	1	CS	FK	7.7	0.024	Troublesome	N	N
1002_994	3n6w	5ST98.484	1	CS	FK	10.6	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.485	1	CS	FK	11.4	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.486	1	CS	FK	8.9	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.487	1	CS	FK	10	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.488	1	CS	FK	9.1	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.489	1	CS	FK	8.3	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.490	1	CS	FK	10.6	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.491	1	CS	FK	8	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.492	1	CS	FK	9.3	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.493	1	CS	FK	8.7	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.494	1	CS	FK	9.5	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.495	1	CS	FK	9	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.496	1	CS	FK	8.4	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.497	1	CS	FK	7.6	0.1	Troublesome	N	N
1002_994	3n6w	5ST98.498	2	CS	FK	41.9	6.8	Troublesome	N	N
1002_994	3n6w	5ST98.499	2	CS	FK	26.1	1.2	Troublesome	N	N
1002_994	3n6w	5ST98.501	2	CS	FK	12	0.2	Troublesome	N	N
1002_994	3n6w	5ST98.502	2	CS	FK	24.6	0.9	Troublesome	N	N
1002_994	3n6w	5ST98.503	2	CS	FK	21.4	1.1	Troublesome	N	N
1002_995	3n5w	5ST98.266	1	CS	FK	14.5	0.1	Troublesome	N	N
1002_995	3n5w	5ST98.267	1	CS	FK	23.7	1.4	Troublesome	N	N
1002_995	3n5w	5ST98.268	1	CS	FK	28.1	2.5	unknown	N	Y
1002_995	3n5w	5ST98.269	1	CS	FK	30.3	0.9	Troublesome	Y	N
1002_995	3n5w	5ST98.270	1	CS	FK	21.4	0.9	Troublesome	N	Y
1002_995	3n5w	5ST98.271	1	CS	FK	29.3	1.8	TMJ	N	Y
1002_995	3n5w	5ST98.272	1	CS	FK	23.3	0.7	Troublesome	N	N
1002_995	3n5w	5ST98.273	1	CS	FK	26.4	1	Troublesome	N	N
1002_995	3n5w	5ST98.274	1	CS	FK	17	0.6	Troublesome	N	N
1002_995	3n5w	5ST98.275	1	CS	FK	18.3	0.6	Troublesome	N	N
1002_995	3n5w	5ST98.276	1	CS	FK	14.1	0.3	Troublesome	N	N
1002_995	3n5w	5ST98.278	1	CS	FK	11.8	0.2	Troublesome	N	Y
1002_995	3n5w	5ST98.279	1	CS	FK	12.4	0.2	Troublesome	Y	N
1002_995	3n5w	5ST98.280	1	CS	FK	11.9	0.1	Troublesome	N	N
1002_995	3n5w	5ST98.281	1	CS	FK	10.4	0.1	Troublesome	N	N
1002_995	3n5w	5ST98.282	1	CS	FK	11	0.2	Troublesome	N	N
1002_995	3n5w	5ST98.283	1	CS	FK	9.5	0.1	Troublesome	N	N
1002_995	3n5w	5ST98.284	2	CS	FK	14.6	0.4	Troublesome	N	N
1002_995	3n5w	5ST98.285	2	CS	FK	13.7	0.2	Troublesome	N	N
1002_995	3n5w	5ST98.286	3	CS	FK	23.7	2.4	unknown	N	N
1002_996	3n4w	5ST98.675	surface	CS	FK	5.4	0.01	Troublesome	N	N
1002_996	3n4w	5ST98.676	surface	CS	FK	12.6	0.2	Troublesome	N	N
1002_996	3n4w	5ST98.677	surface	CS	FK	11.6	0.1	Troublesome	N	N
1002_996	3n4w	5ST98.678	1	CS	FK	23.7	1.1	Troublesome	Y	N
1002_996	3n4w	5ST98.679	1	CS	FK	14.7	0.2	unknown	N	N
1002_996	3n4w	5ST98.680	1	CS	FK	28.8	1.1	Troublesome	N	N
1002_996	3n4w	5ST98.681	1	CS	FK	17.1	0.6	unknown	N	N
1002_996	3n4w	5ST98.682	1	CS	FK	23.5	1.4	Troublesome	N	N
1002_996	3n4w	5ST98.683	1	CS	FK	11	0.2	unknown	N	N
1002_996	3n4w	5ST98.684	1	CS	FK	17.5	0.6	Troublesome	N	N
1002_996	3n4w	5ST98.685	1	CS	FK	11.4	0.2	TMJ	N	N
1002_996	3n4w	5ST98.686	1	CS	FK	14.4	0.5	Troublesome	N	Y
1002_996	3n4w	5ST98.687	1	CS	FK	15.1	0.4	Troublesome	N	N
1002_996	3n4w	5ST98.688	1	CS	FK	17.6	0.5	Troublesome	N	N
1002_996	3n4w	5ST98.689	1	CS	FK	15.8	0.6	Troublesome	Y	N
1002_996	3n4w	5ST98.690	1	CS	FK	8.4	0.1	Troublesome	N	N
1002_996	3n4w	5ST98.691	1	CS	FK	11.1	0.1	Troublesome	N	N

1002_996	3n4w	5ST98.692	1	CS	FK	13.2	0.3	Troublesome	N	N
1002_996	3n4w	5ST98.693	1	CS	FK	12.7	0.1	Troublesome	N	N
1002_996	3n4w	5ST98.694	1	CS	FK	16.4	0.2	Troublesome	N	N
1002_996	3n4w	5ST98.695	1	CS	FK	8.7	0.1	Troublesome	N	N
1002_996	3n4w	5ST98.696	1	CS	FK	9.6	0.1	Troublesome	N	N
1002_996	3n4w	5ST98.697	1	CS	FK	10	0.1	Troublesome	N	N
1002_996	3n4w	5ST98.698	1	CS	FK	11.9	0.3	Troublesome	N	N
1002_996	3n4w	5ST98.699	1	CS	FK	11.5	0.1	Troublesome	N	N
1002_996	3n4w	5ST98.700	1	CS	FK	10.8	0.1	Troublesome	N	N
1002_996	3n4w	5ST98.701	1	CS	FK	11.1	0.1	Troublesome	N	N
1002_996	3n4w	5ST98.702	1	CS	FK	8.9	0.1	Troublesome	N	N
1002_996	3n4w	5ST98.703	1	CS	FK	12	0.1	Troublesome	N	N
1002_996	3n4w	5ST98.704	1	CS	FK	8.1	0.023	Troublesome	N	N
1002_996	3n4w	5ST98.705	2	CS	FK	29.3	1.4	Troublesome	Y	N
1002_996	3n4w	5ST98.706	2	CS	FK	18.9	0.7	Troublesome	N	N
1002_996	3n4w	5ST98.707	2	CS	FK	13.1	0.1	Troublesome	N	N
1002_996	3n4w	5ST98.708	2	CS	FK	16.5	0.3	Troublesome	N	N
1002_996	3n4w	5ST98.709	2	CS	FK	13.9	0.3	Troublesome	N	N
1002_996	3n4w	5ST98.710	2	CS	FK	13.1	0.2	Troublesome	N	N
1002_996	3n4w	5ST98.711	2	CS	FK	13.4	0.2	Troublesome	N	N
1002_996	3n4w	5ST98.712	2	CS	FK	10.8	0.1	Troublesome	N	N
1002_996	3n4w	5ST98.713	3	CS	FK	20	0.7	Windy Ridge Quartzite	N	N
1002_996	3n4w	5ST98.714	3	CS	FK	16.4	0.3	Troublesome	N	N
1002_996	3n4w	5ST98.715	3	CS	FK	14.7	0.3	Troublesome	N	N
1003_988	4n12w	5ST98.407	1	CS	FK	24.1	1.1	unknown	N	N
1003_988	4n12w	5ST98.408	1	CS	FK	23.1	0.9	Troublesome	N	N
1003_988	4n12w	5ST98.409	1	CS	FK	7.9	0.85	Troublesome	N	N
1003_988	4n12w	5ST98.410	2	CS	FK	31.4	2.5	Troublesome	Y	N
1003_988	4n12w	5ST98.411	2	CS	FK	20	1.1	Troublesome	N	Y
1003_988	4n12w	5ST98.412	2	CS	FK	13	0.1	Troublesome	N	N
1003_988	4n12w	5ST98.413	2	CS	FK	13.7	0.1	Troublesome	N	N
1003_988	4n12w	5ST98.414	2	CS	FK	13.6	0.1	Troublesome	N	N
1003_988	4n12w	5ST98.415	2	CS	FK	10.1	0.1	Troublesome	N	N
1003_988	4n12w	5ST98.416	2	CS	FK	10.3	0.1	Troublesome	N	N
1003_988	4n12w	5ST98.417	2	CS	FK	12.6	0.1	Troublesome	N	N
1003_988	4n12w	5ST98.418	3	CS	FK	15.6	0.4	Troublesome	Y	Y
1003_988	4n12w	5ST98.419	3	CS	FK	9.8	0.1	Troublesome	N	N
1003_988	4n12w	5ST98.420	3	CS	FK	9	0.1	Troublesome	N	N
1003_988	4n12w	5ST98.421	3	CS	FK	9.5	0.1	Troublesome	N	N
1003_988	4n12w	5ST98.422	3	CS	FK	8.3	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.898	surface	CS	FK	9.6	0.2	Troublesome	N	N
1003_994	4n6w	5ST98.899	surface	CS	FK	7	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.900	surface	CS	FK	6.1	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.901	surface	CS	FK	5	0.013	Troublesome	N	N
1003_994	4n6w	5ST98.902	surface	CS	FK	6.4	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.903	1	CS	FK	16.1	0.4	unknown	N	Y
1003_994	4n6w	5ST98.904	1	CS	FK	11	0.1	unknown	N	Y
1003_994	4n6w	5ST98.905	1	CS	FK	11.9	0.2	unknown	N	Y
1003_994	4n6w	5ST98.906	1	CS	FK	14.3	0.3	Troublesome	N	Y
1003_994	4n6w	5ST98.907	1	CS	FK	14.5	0.3	Troublesome	N	N
1003_994	4n6w	5ST98.908	1	CS	FK	11.3	0.1	Troublesome	N	Y
1003_994	4n6w	5ST98.909	1	CS	FK	11.8	0.2	Troublesome	N	Y
1003_994	4n6w	5ST98.910	1	CS	FK	10.5	0.2	Troublesome	N	Y
1003_994	4n6w	5ST98.911	1	CS	FK	13	0.2	Troublesome	N	Y
1003_994	4n6w	5ST98.912	1	CS	FK	10	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.913	1	CS	FK	15.1	0.3	Troublesome	Y	N

1003_994	4n6w	5ST98.914	1	CS	FK	10.1	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.917	1	CS	FK	12.6	0.2	Troublesome	N	N
1003_994	4n6w	5ST98.918	1	CS	FK	11.5	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.919	1	CS	FK	10.7	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.920	1	CS	FK	11.1	0.1	Troublesome	N	Y
1003_994	4n6w	5ST98.921	1	CS	FK	9.7	0.1	Troublesome	N	Y
1003_994	4n6w	5ST98.922	1	CS	FK	12.1	0.2	Troublesome	N	N
1003_994	4n6w	5ST98.923	1	CS	FK	9.7	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.924	1	CS	FK	10.1	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.925	1	CS	FK	9.1	0.1	Troublesome	N	Y
1003_994	4n6w	5ST98.926	1	CS	FK	8.1	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.927	1	CS	FK	9.8	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.928	1	CS	FK	7.2	0.091	Troublesome	N	N
1003_994	4n6w	5ST98.930	2	CS	FK	28.4	1.5	Windy Ridge Quartzite	N	N
1003_994	4n6w	5ST98.932	2	CS	FK	16.9	0.4	Troublesome	N	Y
1003_994	4n6w	5ST98.933	2	CS	FK	14.4	0.5	Troublesome	N	N
1003_994	4n6w	5ST98.934	2	CS	FK	19.8	0.4	Troublesome	N	N
1003_994	4n6w	5ST98.935	2	CS	FK	15.3	0.2	Troublesome	N	N
1003_994	4n6w	5ST98.936	2	CS	FK	10.9	0.2	Troublesome	N	N
1003_994	4n6w	5ST98.938	2	CS	FK	15.3	0.4	Troublesome	N	N
1003_994	4n6w	5ST98.939	2	CS	FK	14.8	0.4	Troublesome	N	n/a
1003_994	4n6w	5ST98.940	2	CS	FK	13.2	0.2	Troublesome	N	N
1003_994	4n6w	5ST98.942	2	CS	FK	9.4	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.943	2	CS	FK	8.5	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.944	2	CS	FK	11.6	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.945	2	CS	FK	16.4	0.4	Troublesome	N	N
1003_994	4n6w	5ST98.946	2	CS	FK	10.1	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.947	2	CS	FK	11.6	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.948	2	CS	FK	8.6	0.067	Troublesome	N	Y
1003_994	4n6w	5ST98.949	2	CS	FK	13.2	0.2	Troublesome	N	Y
1003_994	4n6w	5ST98.950	2	CS	FK	14.1	0.2	Troublesome	N	N
1003_994	4n6w	5ST98.951	3	CS	FK	21.8	0.3	Troublesome	N	Y
1003_994	4n6w	5ST98.952	3	CS	FK	7.9	0.1	Troublesome	N	N
1003_994	4n6w	5ST98.953	3	CS	FK	20.6	0.8	Troublesome	N	N
1003_995	4n5w	5ST98.347	surface	CS	FK	11.6	0.2	Troublesome	N	N
1003_995	4n5w	5ST98.348	surface	CS	FK	9.8	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.349	1	CS	FK	24.5	1.4	Troublesome	N	N
1003_995	4n5w	5ST98.350	1	CS	FK	17.9	0.6	Troublesome	N	N
1003_995	4n5w	5ST98.352	1	CS	FK	17.8	0.6	Troublesome	N	N
1003_995	4n5w	5ST98.353	1	CS	FK	14.3	0.3	Troublesome	N	N
1003_995	4n5w	5ST98.354	1	CS	FK	12.1	0.5	Troublesome	N	N
1003_995	4n5w	5ST98.355	1	CS	FK	16.6	0.5	Troublesome	N	N
1003_995	4n5w	5ST98.356	1	CS	FK	13.7	0.3	Troublesome	N	N
1003_995	4n5w	5ST98.357	1	CS	FK	9.8	0.1	Troublesome	N	Y
1003_995	4n5w	5ST98.358	1	CS	FK	13	0.4	Troublesome	N	N
1003_995	4n5w	5ST98.359	1	CS	FK	9.1	0.2	Troublesome	Y	N
1003_995	4n5w	5ST98.360	1	CS	FK	14.8	0.2	Troublesome	N	N
1003_995	4n5w	5ST98.361	1	CS	FK	9.8	0.2	Troublesome	N	N
1003_995	4n5w	5ST98.362	1	CS	FK	9.5	0.2	Troublesome	N	N
1003_995	4n5w	5ST98.363	1	CS	FK	9	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.364	1	CS	FK	8.4	0.024	Troublesome	N	N
1003_995	4n5w	5ST98.365	1	CS	FK	9.8	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.366	1	CS	FK	9.8	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.367	1	CS	FK	9.4	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.368	1	CS	FK	10.3	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.369	1	CS	FK	5.4	0.01	Troublesome	N	N
1003_995	4n5w	5ST98.370	1	CS	FK	10.2	0.2	Troublesome	N	N

1003_995	4n5w	5ST98.371	1	CS	FK	9.4	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.372	1	CS	FK	8.8	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.373	1	CS	FK	10.4	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.374	1	CS	FK	8.9	0.2	Troublesome	N	N
1003_995	4n5w	5ST98.375	1	CS	FK	8.4	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.376	1	CS	FK	8.4	0.022	Troublesome	N	N
1003_995	4n5w	5ST98.377	2	CS	FK	10.5	0.3	unknown	N	Y
1003_995	4n5w	5ST98.378	2	CS	FK	17.6	0.9	Troublesome	N	N
1003_995	4n5w	5ST98.379	2	CS	FK	11.5	0.2	Troublesome	N	N
1003_995	4n5w	5ST98.380	2	CS	FK	13.9	0.2	Troublesome	N	N
1003_995	4n5w	5ST98.381	2	CS	FK	10.2	0.3	Troublesome	N	Y
1003_995	4n5w	5ST98.382	2	CS	FK	10.9	0.3	Troublesome	N	N
1003_995	4n5w	5ST98.383	2	CS	FK	7.6	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.384	2	CS	FK	6.7	0.1	Troublesome	N	Y
1003_995	4n5w	5ST98.385	2	CS	FK	10.3	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.386	2	CS	FK	9	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.387	3	CS	FK	27.2	3.7	unknown	N	N
1003_995	4n5w	5ST98.388	3	CS	FK	22.3	2	Troublesome	N	N
1003_995	4n5w	5ST98.389	3	CS	FK	12	0.2	Troublesome	N	N
1003_995	4n5w	5ST98.390	3	CS	FK	13.5	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.391	3	CS	FK	12.5	0.3	Troublesome	N	N
1003_995	4n5w	5ST98.392	3	CS	FK	12.4	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.393	3	CS	FK	11.6	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.394	3	CS	FK	9.9	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.395	3	CS	FK	8.9	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.396	3	CS	FK	7.6	0.1	Troublesome	N	N
1003_995	4n5w	5ST98.397	3	CS	FK	7.1	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2232	surface	CS	FK	6.3	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2233	1	CS	FK	30	2.7	Troublesome	N	Y
1003_996	4n4w	5ST98.2234	1	CS	FK	8.8	1.4	unknown	N	N
1003_996	4n4w	5ST98.2235	1	CS	FK	22	0.9	Troublesome	Y	Y
1003_996	4n4w	5ST98.2236	1	CS	FK	24.2	1.5	Troublesome	N	N
1003_996	4n4w	5ST98.2237	1	CS	FK	13.1	0.2	Troublesome	N	Y
1003_996	4n4w	5ST98.2238	1	CS	FK	24.7	1.8	Troublesome	N	N
1003_996	4n4w	5ST98.2239	1	CS	FK	14.9	0.4	Troublesome	Y	N
1003_996	4n4w	5ST98.2240	1	CS	FK	13.5	0.5	Troublesome	Y	Y
1003_996	4n4w	5ST98.2241	1	CS	FK	18.1	1.2	Troublesome	N	N
1003_996	4n4w	5ST98.2242	1	CS	FK	13.3	0.3	Petrified Wood	N	N
1003_996	4n4w	5ST98.2243	1	CS	FK	18.3	0.8	Troublesome	N	N
1003_996	4n4w	5ST98.2244	1	CS	FK	16.1	0.4	Troublesome	N	Y
1003_996	4n4w	5ST98.2245	1	CS	FK	11.6	0.3	Troublesome	N	Y
1003_996	4n4w	5ST98.2246	1	CS	FK	8.7	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2247	1	CS	FK	11.4	0.2	Troublesome	Y	N
1003_996	4n4w	5ST98.2248	1	CS	FK	15	0.3	Troublesome	N	N
1003_996	4n4w	5ST98.2249	1	CS	FK	13.2	0.3	Troublesome	N	N
1003_996	4n4w	5ST98.2250	1	CS	FK	13.4	0.4	Troublesome	N	N
1003_996	4n4w	5ST98.2251	1	CS	FK	10.2	0.2	Troublesome	N	N
1003_996	4n4w	5ST98.2252	1	CS	FK	12.5	0.2	Troublesome	N	N
1003_996	4n4w	5ST98.2253	1	CS	FK	11.3	0.2	Troublesome	N	Y
1003_996	4n4w	5ST98.2254	1	CS	FK	11.9	0.2	Troublesome	N	Y
1003_996	4n4w	5ST98.2255	1	CS	FK	9.7	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2256	1	CS	FK	10.5	0.1	Troublesome	N	Y
1003_996	4n4w	5ST98.2257	1	CS	FK	11.3	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2258	1	CS	FK	11.4	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2259	1	CS	FK	12.2	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2260	1	CS	FK	10.8	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2261	1	CS	FK	11.4	0.1	Troublesome	N	N

1003_996	4n4w	5ST98.2262	1	CS	FK	11.9	0.2	Troublesome	N	N
1003_996	4n4w	5ST98.2263	1	CS	FK	9.2	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2264	1	CS	FK	8.5	0.078	Troublesome	N	N
1003_996	4n4w	5ST98.2265	1	CS	FK	9.6	0.1	Troublesome	N	Y
1003_996	4n4w	5ST98.2266	1	CS	FK	8.5	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2267	1	CS	FK	7.3	0.1	Troublesome	N	Y
1003_996	4n4w	5ST98.2268	1	CS	FK	8.6	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2269	1	CS	FK	9.3	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2270	2	CS	FK	30.2	5.1	unknown	N	N
1003_996	4n4w	5ST98.2271	2	CS	FK	33	3.1	Troublesome	N	N
1003_996	4n4w	5ST98.2272	2	CS	FK	23.8	0.9	Troublesome	N	N
1003_996	4n4w	5ST98.2273	2	CS	FK	24.9	1.4	Troublesome	N	N
1003_996	4n4w	5ST98.2274	2	CS	FK	17.8	1.1	Troublesome	N	N
1003_996	4n4w	5ST98.2275	2	CS	FK	21.6	1.1	Troublesome	N	Y
1003_996	4n4w	5ST98.2276	2	CS	FK	18.1	0.5	Troublesome	N	N
1003_996	4n4w	5ST98.2277	2	CS	FK	18	0.9	Troublesome	N	N
1003_996	4n4w	5ST98.2278	2	CS	FK	13	0.6	unknown	N	Y
1003_996	4n4w	5ST98.2279	2	CS	FK	18.1	0.3	Troublesome	N	N
1003_996	4n4w	5ST98.2280	2	CS	FK	17	0.7	Troublesome	N	N
1003_996	4n4w	5ST98.2281	2	CS	FK	13.4	0.1	TMJ	N	N
1003_996	4n4w	5ST98.2282	2	CS	FK	8.6	0.1	TMJ	N	N
1003_996	4n4w	5ST98.2283	2	CS	FK	15.9	0.5	Troublesome	N	Y
1003_996	4n4w	5ST98.2284	2	CS	FK	12.7	0.2	Troublesome	N	Y
1003_996	4n4w	5ST98.2285	2	CS	FK	14.1	0.4	Troublesome	Y	N
1003_996	4n4w	5ST98.2286	2	CS	FK	11.2	0.4	Troublesome	N	N
1003_996	4n4w	5ST98.2287	2	CS	FK	9.9	0.1	Hartville/Trout Creek	N	Y
1003_996	4n4w	5ST98.2288	2	CS	FK	13.4	0.4	Troublesome	N	Y
1003_996	4n4w	5ST98.2289	2	CS	FK	10.2	0.1	unknown	N	Y
1003_996	4n4w	5ST98.2290	2	CS	FK	10.6	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2291	2	CS	FK	13.7	0.2	Troublesome	N	N
1003_996	4n4w	5ST98.2292	2	CS	FK	11.9	0.1	unknown	N	N
1003_996	4n4w	5ST98.2293	2	CS	FK	13.9	0.4	Troublesome	N	Y
1003_996	4n4w	5ST98.2294	2	CS	FK	14.4	0.3	Troublesome	N	Y
1003_996	4n4w	5ST98.2295	2	CS	FK	14.2	0.2	Troublesome	N	N
1003_996	4n4w	5ST98.2296	2	CS	FK	14	0.2	Troublesome	N	N
1003_996	4n4w	5ST98.2297	2	CS	FK	14.7	0.2	Troublesome	N	N
1003_996	4n4w	5ST98.2298	2	CS	FK	12.7	0.3	Troublesome	N	Y
1003_996	4n4w	5ST98.2299	2	CS	FK	13.1	0.3	Troublesome	N	Y
1003_996	4n4w	5ST98.2300	2	CS	FK	10.9	0.2	Troublesome	N	N
1003_996	4n4w	5ST98.2301	2	CS	FK	10.7	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2302	2	CS	FK	11.5	0.2	Troublesome	N	Y
1003_996	4n4w	5ST98.2303	2	CS	FK	12.8	0.2	Troublesome	N	N
1003_996	4n4w	5ST98.2304	2	CS	FK	8.3	0.2	Troublesome	N	N
1003_996	4n4w	5ST98.2305	2	CS	FK	10.1	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2306	2	CS	FK	12.6	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2307	2	CS	FK	10.7	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2308	2	CS	FK	9.1	0.1	Troublesome	N	N
1003_996	4n4w	5ST98.2309	2	CS	FK	6.6	0.1	Windy Ridge Quartzite	N	N
1003_998	4n2w	5ST98.323	1	CS	FK	33.7	5.5	Troublesome	Y	Y
1003_998	4n2w	5ST98.324	1	CS	FK	25.2	1.1	unknown	Y	N
1003_998	4n2w	5ST98.325	1	CS	FK	21	1.2	Troublesome	N	N
1003_998	4n2w	5ST98.326	1	CS	FK	16.7	0.4	Troublesome	Y	N
1003_998	4n2w	5ST98.327	1	CS	FK	19.3	0.9	Troublesome	Y	N
1003_998	4n2w	5ST98.328	1	CS	FK	17	0.4	Troublesome	N	N
1003_998	4n2w	5ST98.329	1	CS	FK	15.7	0.5	Troublesome	Y	N
1003_998	4n2w	5ST98.330	1	CS	FK	17.7	0.5	Troublesome	N	N
1003_998	4n2w	5ST98.331	1	CS	FK	19.6	0.6	Troublesome	N	N

1003_998	4n2w	5ST98.332	1	CS	FK	16.3	0.2	Troublesome	N	N
1003_998	4n2w	5ST98.333	1	CS	FK	15.3	0.2	Troublesome	N	N
1003_998	4n2w	5ST98.334	1	CS	FK	12	0.2	Troublesome	N	N
1003_998	4n2w	5ST98.335	1	CS	FK	11.9	0.3	Troublesome	N	N
1003_998	4n2w	5ST98.336	1	CS	FK	10.2	0.1	Troublesome	N	N
1003_998	4n2w	5ST98.337	1	CS	FK	10.5	0.1	Troublesome	N	N
1003_998	4n2w	5ST98.338	1	CS	FK	12	0.1	Troublesome	N	N
1003_998	4n2w	5ST98.339	1	CS	FK	9.5	0.1	Troublesome	N	N
1003_998	4n2w	5ST98.340	1	CS	FK	9.3	0.1	Troublesome	N	N
1003_998	4n2w	5ST98.341	1	CS	FK	9.9	0.1	Troublesome	N	N
1003_998	4n2w	5ST98.342	1	CS	FK	10.9	0.1	Troublesome	N	N
1003_998	4n2w	5ST98.343	1	CS	FK	9.9	0.1	Troublesome	N	N
1003_998	4n2w	5ST98.344	1	CS	FK	9.1	0.1	Troublesome	N	Y
1003_998	4n2w	5ST98.345	1	CS	FK	10.9	0.1	Troublesome	N	N
1003_998	4n2w	5ST98.346	1	CS	FK	8.8	0.1	Troublesome	N	N
1004_1000	5n0w	5ST98.249	1	CS	FK	25.3	1.1	Rhyolite	N	N
1004_1000	5n0w	5ST98.250	1	CS	FK	18.8	0.4	Troublesome	N	N
1004_1000	5n0w	5ST98.251	1	CS	FK	11.1	0.2	Troublesome	N	N
1004_1000	5n0w	5ST98.252	1	CS	FK	13.1	0.2	Troublesome	N	N
1004_1000	5n0w	5ST98.253	1	CS	FK	16.4	0.4	Troublesome	N	N
1004_1000	5n0w	5ST98.254	1	CS	FK	15.6	0.2	Troublesome	N	N
1004_1000	5n0w	5ST98.255	1	CS	FK	13.7	0.2	Troublesome	N	N
1004_1000	5n0w	5ST98.256	1	CS	FK	17.1	0.2	Troublesome	N	N
1004_1000	5n0w	5ST98.257	1	CS	FK	15.7	0.3	Troublesome	N	N
1004_1000	5n0w	5ST98.258	1	CS	FK	13.3	0.1	Troublesome	N	N
1004_1000	5n0w	5ST98.259	1	CS	FK	11.1	0.1	Troublesome	N	N
1004_1000	5n0w	5ST98.260	1	CS	FK	10.5	0.2	Troublesome	N	N
1004_1000	5n0w	5ST98.261	1	CS	FK	9.5	0.1	unknown	N	N
1004_1000	5n0w	5ST98.262	1	CS	FK	8.9	0.1	Troublesome	N	N
1004_1000	5n0w	5ST98.263	1	CS	FK	8.7	0.1	Troublesome	N	N
1004_1024	5n24e	5ST98.1012	1	CS	FK	17	0.4	unknown	N	N
1004_1039	5n39e	5ST98.264	1	CS	FK	17.1	0.5	Troublesome	N	N
1004_1039	5n39e	5ST98.265	2	CS	FK	18.5	0.9	Troublesome	N	N
1004_990	5n10w	5ST98.2079	1	CS	FK	29.7	1.4	Troublesome	N	Y
1004_990	5n10w	5ST98.2080	1	CS	FK	15.3	0.3	Troublesome	N	N
1004_990	5n10w	5ST98.2081	1	CS	FK	10.8	0.2	Troublesome	N	Y
1004_990	5n10w	5ST98.2082	1	CS	FK	9.7	0.1	Troublesome	N	N
1004_990	5n10w	5ST98.2083	1	CS	FK	11	0.2	Troublesome	Y	N
1004_990	5n10w	5ST98.2084	1	CS	FK	14.6	0.3	Troublesome	N	N
1004_990	5n10w	5ST98.2085	1	CS	FK	12.4	0.1	Troublesome	N	N
1004_990	5n10w	5ST98.2086	1	CS	FK	7.8	0.1	Troublesome	N	N
1004_990	5n10w	5ST98.2087	1	CS	FK	7.4	0.1	Troublesome	N	N
1004_990	5n10w	5ST98.2088	1	CS	FK	6.5	0.1	Troublesome	N	N
1004_990	5n10w	5ST98.2089	2	CS	FK	27	3.5	Troublesome	N	Y
1004_990	5n10w	5ST98.2090	2	CS	FK	21	1.6	Troublesome	Y	Y
1004_990	5n10w	5ST98.2091	2	CS	FK	12.4	0.2	Troublesome	N	N
1004_990	5n10w	5ST98.2092	2	CS	FK	10.6	0.1	Troublesome	N	N
1004_990	5n10w	5ST98.2093	2	CS	FK	12.7	0.2	unknown	N	N
1004_990	5n10w	5ST98.2094	2	CS	FK	8.7	0.1	Troublesome	N	N
1004_990	5n10w	5ST98.2095	2	CS	FK	7.1	0.041	Troublesome	N	N
1004_990	5n10w	5ST98.2096	3	CS	FK	9.3	0.1	Windy Ridge Quartzite	N	N
1004_993	5n7w	5ST98.2097	1	CS	FK	14.3	0.5	Troublesome	N	N
1004_993	5n7w	5ST98.2098	1	CS	FK	14.4	0.3	Troublesome	N	N
1004_993	5n7w	5ST98.2099	1	CS	FK	14.8	0.3	Troublesome	N	N
1004_993	5n7w	5ST98.2100	1	CS	FK	13.6	0.3	Troublesome	N	N
1004_993	5n7w	5ST98.2101	1	CS	FK	15.1	0.4	Troublesome	N	N
1004_993	5n7w	5ST98.2102	1	CS	FK	13.4	0.2	Troublesome	Y	N

1004_993	5n7w	5ST98.2103	1	CS	FK	12.6	0.2	Troublesome	N	N
1004_993	5n7w	5ST98.2104	1	CS	FK	10.1	0.2	Troublesome	N	N
1004_993	5n7w	5ST98.2105	1	CS	FK	9.4	0.2	Troublesome	N	N
1004_993	5n7w	5ST98.2106	1	CS	FK	10.3	0.2	Troublesome	N	N
1004_993	5n7w	5ST98.2107	1	CS	FK	7.6	0.05	Troublesome	N	N
1004_993	5n7w	5ST98.2108	1	CS	FK	9.7	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2109	1	CS	FK	9.2	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2110	1	CS	FK	11.2	0.2	Troublesome	N	N
1004_993	5n7w	5ST98.2111	1	CS	FK	10.3	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2112	1	CS	FK	11.9	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2113	1	CS	FK	8.5	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2114	1	CS	FK	9.5	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2115	1	CS	FK	11	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2116	1	CS	FK	10.3	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2117	1	CS	FK	8.2	0.1	Troublesome	N	Y
1004_993	5n7w	5ST98.2118	1	CS	FK	8.4	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2119	1	CS	FK	8.5	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2121	2	CS	FK	18.7	0.9	Troublesome	N	N
1004_993	5n7w	5ST98.2122	2	CS	FK	18.4	0.7	Troublesome	N	N
1004_993	5n7w	5ST98.2123	2	CS	FK	22.2	0.9	Troublesome	N	N
1004_993	5n7w	5ST98.2124	2	CS	FK	13.1	0.4	Troublesome	N	Y
1004_993	5n7w	5ST98.2125	2	CS	FK	10.1	0.2	TMJ	N	N
1004_993	5n7w	5ST98.2126	2	CS	FK	15.2	0.4	Troublesome	N	N
1004_993	5n7w	5ST98.2127	2	CS	FK	11.2	0.3	Troublesome	N	N
1004_993	5n7w	5ST98.2128	2	CS	FK	9.9	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2129	2	CS	FK	13.2	0.2	Troublesome	N	N
1004_993	5n7w	5ST98.2130	2	CS	FK	10.1	0.2	Troublesome	N	N
1004_993	5n7w	5ST98.2131	2	CS	FK	20.9	0.2	Troublesome	N	N
1004_993	5n7w	5ST98.2132	2	CS	FK	8.4	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2133	2	CS	FK	7.3	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2134	2	CS	FK	8.2	0.052	Troublesome	N	N
1004_993	5n7w	5ST98.2135	2	CS	FK	12.5	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2136	2	CS	FK	13.9	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2137	2	CS	FK	10.9	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2138	2	CS	FK	10.4	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2139	2	CS	FK	8.8	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2140	2	CS	FK	7.8	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2141	3	CS	FK	14.3	0.5	Troublesome	N	Y
1004_993	5n7w	5ST98.2142	3	CS	FK	13.7	0.2	Troublesome	N	Y
1004_993	5n7w	5ST98.2143	3	CS	FK	15.5	0.3	Troublesome	N	N
1004_993	5n7w	5ST98.2144	3	CS	FK	17.2	0.3	Troublesome	N	N
1004_993	5n7w	5ST98.2145	3	CS	FK	21.1	0.5	Troublesome	N	N
1004_993	5n7w	5ST98.2146	3	CS	FK	17.1	0.2	Troublesome	N	N
1004_993	5n7w	5ST98.2147	3	CS	FK	10.3	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2148	3	CS	FK	15.5	0.3	Troublesome	Y	N
1004_993	5n7w	5ST98.2149	3	CS	FK	13	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2150	3	CS	FK	13.1	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2151	3	CS	FK	10.1	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2152	3	CS	FK	10.5	0.2	Troublesome	N	N
1004_993	5n7w	5ST98.2153	3	CS	FK	10.4	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2154	3	CS	FK	9.4	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2155	3	CS	FK	12.5	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2156	3	CS	FK	9.5	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2157	3	CS	FK	9.6	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2158	3	CS	FK	9.3	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2159	4	CS	FK	30.8	3.3	Troublesome	Y	N
1004_993	5n7w	5ST98.2160	4	CS	FK	21	1.3	Troublesome	N	Y

1004_993	5n7w	5ST98.2161	4	CS	FK	25.8	2.2	Troublesome	N	Y
1004_993	5n7w	5ST98.2162	4	CS	FK	14.4	0.3	Troublesome	N	N
1004_993	5n7w	5ST98.2163	4	CS	FK	15.2	0.6	Troublesome	N	Y
1004_993	5n7w	5ST98.2164	4	CS	FK	14.2	0.2	Troublesome	N	N
1004_993	5n7w	5ST98.2165	4	CS	FK	14.9	0.3	Troublesome	N	Y
1004_993	5n7w	5ST98.2166	4	CS	FK	14.1	0.3	Troublesome	N	N
1004_993	5n7w	5ST98.2167	4	CS	FK	9.1	0.1	Troublesome	N	Y
1004_993	5n7w	5ST98.2168	4	CS	FK	13.8	0.2	Troublesome	N	Y
1004_993	5n7w	5ST98.2169	4	CS	FK	10	0.1	Troublesome	N	N
1004_993	5n7w	5ST98.2170	4	CS	FK	6.9	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1061	surface	CS	FK	7.3	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1062	surface	CS	FK	7.4	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1063	1	CS	FK	28.7	2.4	Troublesome	N	N
1004_994	5n6w	5ST98.1064	1	CS	FK	24.9	1.5	Troublesome	Y	Y
1004_994	5n6w	5ST98.1065	1	CS	FK	21.5	0.7	Troublesome	Y	N
1004_994	5n6w	5ST98.1066	1	CS	FK	12.8	0.2	Troublesome	N	Y
1004_994	5n6w	5ST98.1067	1	CS	FK	12.3	0.3	Troublesome	N	N
1004_994	5n6w	5ST98.1068	1	CS	FK	9.4	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1069	1	CS	FK	14.4	0.4	Troublesome	N	N
1004_994	5n6w	5ST98.1070	1	CS	FK	10.1	0.2	Troublesome	N	Y
1004_994	5n6w	5ST98.1071	1	CS	FK	13	0.2	Troublesome	N	N
1004_994	5n6w	5ST98.1072	1	CS	FK	10.7	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1073	1	CS	FK	11.1	0.2	Troublesome	N	N
1004_994	5n6w	5ST98.1074	1	CS	FK	16.9	0.7	Troublesome	N	Y
1004_994	5n6w	5ST98.1075	1	CS	FK	16.3	0.6	Troublesome	Y	N
1004_994	5n6w	5ST98.1076	1	CS	FK	8.9	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1077	1	CS	FK	11.9	0.2	Troublesome	N	N
1004_994	5n6w	5ST98.1078	1	CS	FK	8.4	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1079	1	CS	FK	8.2	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1080	1	CS	FK	7.6	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1081	1	CS	FK	10.2	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1082	1	CS	FK	8.9	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1083	1	CS	FK	11.9	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1084	2	CS	FK	23.4	1.3	Troublesome	N	Y
1004_994	5n6w	5ST98.1085	2	CS	FK	36.4	2.2	Troublesome	N	N
1004_994	5n6w	5ST98.1086	2	CS	FK	33.5	2.8	Troublesome	Y	N
1004_994	5n6w	5ST98.1087	2	CS	FK	24.2	2.5	Troublesome	N	N
1004_994	5n6w	5ST98.1088	2	CS	FK	35.2	2.2	Troublesome	Y	N
1004_994	5n6w	5ST98.1089	2	CS	FK	25.6	2.7	Troublesome	N	N
1004_994	5n6w	5ST98.1090	2	CS	FK	12.5	0.2	Troublesome	N	Y
1004_994	5n6w	5ST98.1091	2	CS	FK	8.3	0.1	Troublesome	N	Y
1004_994	5n6w	5ST98.1092	2	CS	FK	16.7	0.5	Troublesome	N	N
1004_994	5n6w	5ST98.1093	2	CS	FK	21.9	0.7	Troublesome	N	N
1004_994	5n6w	5ST98.1094	2	CS	FK	19.2	0.3	Troublesome	N	N
1004_994	5n6w	5ST98.1095	2	CS	FK	12.8	0.2	unknown	N	N
1004_994	5n6w	5ST98.1096	2	CS	FK	13.3	0.2	Troublesome	N	Y
1004_994	5n6w	5ST98.1098	2	CS	FK	10.9	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1099	2	CS	FK	12.4	0.2	Troublesome	N	N
1004_994	5n6w	5ST98.1100	2	CS	FK	10.6	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1101	2	CS	FK	10	0.2	Troublesome	N	N
1004_994	5n6w	5ST98.1102	2	CS	FK	9.9	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1103	2	CS	FK	11.5	0.2	Troublesome	N	N
1004_994	5n6w	5ST98.1104	2	CS	FK	14.9	0.3	Troublesome	N	Y
1004_994	5n6w	5ST98.1105	2	CS	FK	16.8	0.2	Troublesome	N	N
1004_994	5n6w	5ST98.1106	2	CS	FK	13.1	0.2	Troublesome	N	N
1004_994	5n6w	5ST98.1107	2	CS	FK	10.9	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1108	2	CS	FK	8.9	0.2	Troublesome	N	N

1004_994	5n6w	5ST98.1109	2	CS	FK	9.7	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1110	2	CS	FK	8.6	0.03	Troublesome	N	Y
1004_994	5n6w	5ST98.1111	2	CS	FK	9	0.1	Troublesome	N	Y
1004_994	5n6w	5ST98.1112	2	CS	FK	8.3	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1113	2	CS	FK	9.4	0.1	Troublesome	N	N
1004_994	5n6w	5ST98.1114	2	CS	FK	10.3	0.2	Troublesome	N	N
1004_994	5n6w	5ST98.1115	2	CS	FK	11.4	0.2	Troublesome	N	N
1004_994	5n6w	5ST98.1116	2	CS	FK	9.9	0.2	Troublesome	N	N
1004_994	5n6w	5ST98.1117	2	CS	FK	9.7	0.1	Troublesome	N	N
1004_995	5n5w	5ST98.2171	surface	CS	FK	9.8	0.1	Troublesome	N	N
1004_995	5n5w	5ST98.2172	surface	CS	FK	7	0.094	Troublesome	N	N
1004_995	5n5w	5ST98.2173	1	CS	FK	22	1.2	Troublesome	N	Y
1004_995	5n5w	5ST98.2174	1	CS	FK	23.6	0.9	Troublesome	N	N
1004_995	5n5w	5ST98.2175	1	CS	FK	20.6	0.6	Troublesome	N	N
1004_995	5n5w	5ST98.2176	1	CS	FK	13.7	0.3	Troublesome	N	N
1004_995	5n5w	5ST98.2177	1	CS	FK	12.8	0.2	Troublesome	N	Y
1004_995	5n5w	5ST98.2178	1	CS	FK	13	0.3	Troublesome	Y	N
1004_995	5n5w	5ST98.2179	1	CS	FK	14.1	0.2	Troublesome	N	N
1004_995	5n5w	5ST98.2180	1	CS	FK	9.6	0.1	Troublesome	N	N
1004_995	5n5w	5ST98.2181	1	CS	FK	11.8	0.2	Troublesome	N	Y
1004_995	5n5w	5ST98.2182	1	CS	FK	13	0.1	Troublesome	N	N
1004_995	5n5w	5ST98.2183	1	CS	FK	10	0.1	Troublesome	N	N
1004_995	5n5w	5ST98.2184	1	CS	FK	9.4	0.1	Troublesome	N	N
1004_995	5n5w	5ST98.2185	2	CS	FK	23.8	2	Troublesome	Y	N
1004_995	5n5w	5ST98.2186	2	CS	FK	20.6	0.8	Troublesome	N	Y
1004_995	5n5w	5ST98.2187	2	CS	FK	19.9	0.4	Troublesome	N	Y
1004_995	5n5w	5ST98.2188	2	CS	FK	14.9	0.4	Troublesome	Y	N
1004_995	5n5w	5ST98.2189	2	CS	FK	19.8	0.6	Troublesome	N	N
1004_995	5n5w	5ST98.2190	2	CS	FK	13.4	0.2	Troublesome	N	N
1004_995	5n5w	5ST98.2191	2	CS	FK	13.1	0.3	Troublesome	N	N
1004_995	5n5w	5ST98.2192	2	CS	FK	13.6	0.3	Troublesome	N	N
1004_995	5n5w	5ST98.2193	2	CS	FK	9.9	0.1	Troublesome	N	N
1004_995	5n5w	5ST98.2194	2	CS	FK	10.6	0.1	Troublesome	N	N
1004_995	5n5w	5ST98.2195	2	CS	FK	9.8	0.1	Troublesome	N	N
1004_995	5n5w	5ST98.2196	2	CS	FK	10.7	0.1	Troublesome	N	N
1004_995	5n5w	5ST98.2197	2	CS	FK	9.4	0.1	Troublesome	N	N
1004_995	5n5w	5ST98.2198	2	CS	FK	11.4	0.1	Troublesome	N	Y
1004_995	5n5w	5ST98.2199	2	CS	FK	9.2	0.1	Troublesome	N	N
1004_995	5n5w	5ST98.2200	2	CS	FK	53.7	11.6	Troublesome	N	N
1004_996	5n4w	5ST98.2201	1	CS	FK	23.3	1.2	Troublesome	N	Y
1004_996	5n4w	5ST98.2202	1	CS	FK	16.6	0.6	Troublesome	N	Y
1004_996	5n4w	5ST98.2203	1	CS	FK	28.9	1.1	Troublesome	N	N
1004_996	5n4w	5ST98.2204	1	CS	FK	21.5	0.8	Troublesome	N	N
1004_996	5n4w	5ST98.2205	1	CS	FK	11.5	0.1	Troublesome	N	N
1004_996	5n4w	5ST98.2206	2	CS	FK	51.4	6.6	Troublesome	N	N
1004_996	5n4w	5ST98.2207	2	CS	FK	28.7	2	Troublesome	N	N
1004_996	5n4w	5ST98.2208	2	CS	FK	25.3	0.9	Troublesome	N	N
1004_996	5n4w	5ST98.2209	2	CS	FK	18.7	1	Troublesome	N	N
1004_996	5n4w	5ST98.2210	2	CS	FK	17.7	0.5	Troublesome	N	N
1004_996	5n4w	5ST98.2211	2	CS	FK	16.9	0.2	unknown	N	N
1004_996	5n4w	5ST98.2212	2	CS	FK	14.6	0.3	Troublesome	N	N
1004_996	5n4w	5ST98.2213	2	CS	FK	13.7	0.3	TMJ	N	N
1004_996	5n4w	5ST98.2214	2	CS	FK	10.2	0.2	TMJ	N	N
1004_996	5n4w	5ST98.2215	2	CS	FK	13.4	0.4	unknown	N	N
1004_996	5n4w	5ST98.2216	2	CS	FK	16.5	0.2	Troublesome	N	N
1004_996	5n4w	5ST98.2217	2	CS	FK	12.5	0.4	Troublesome	N	Y
1004_996	5n4w	5ST98.2218	2	CS	FK	16.1	0.2	Troublesome	N	N

1004_996	5n4w	5ST98.2219	2	CS	FK	12	0.1	Troublesome	N	N
1004_996	5n4w	5ST98.2220	2	CS	FK	14.1	0.3	Troublesome	N	N
1004_996	5n4w	5ST98.2221	2	CS	FK	13.7	0.3	Troublesome	N	Y
1004_996	5n4w	5ST98.2222	2	CS	FK	13.1	0.3	Troublesome	N	Y
1004_996	5n4w	5ST98.2223	2	CS	FK	10.2	0.1	Troublesome	N	N
1004_996	5n4w	5ST98.2224	2	CS	FK	10	0.1	Troublesome	N	N
1004_996	5n4w	5ST98.2225	2	CS	FK	8.2	0.1	Troublesome	N	Y
1004_996	5n4w	5ST98.2227	2	CS	FK	10.3	0.1	Troublesome	N	N
1004_996	5n4w	5ST98.2228	2	CS	FK	9.7	0.1	Troublesome	N	N
1004_996	5n4w	5ST98.2229	2	CS	FK	10.5	0.1	Troublesome	N	N
1004_996	5n4w	5ST98.2230	2	CS	FK	7.9	0.1	Troublesome	N	N
1004_996	5n4w	5ST98.2231	2	CS	FK	8.1	0.1	Troublesome	N	N
1004_997	5n3w	5ST98.2310	surface	CS	FK	14.6	0.5	Troublesome	Y	N
1004_997	5n3w	5ST98.2311	surface	CS	FK	10.6	0.1	Troublesome	N	Y
1004_997	5n3w	5ST98.2312	surface	CS	FK	14.3	0.3	Troublesome	N	N
1004_997	5n3w	5ST98.2313	1	CS	FK	15.3	0.7	Troublesome	N	Y
1004_997	5n3w	5ST98.2314	1	CS	FK	16.8	0.4	Troublesome	N	N
1004_997	5n3w	5ST98.2315	1	CS	FK	9.8	0.2	Troublesome	Y	N
1004_997	5n3w	5ST98.2316	1	CS	FK	15.2	0.3	Troublesome	N	Y
1004_997	5n3w	5ST98.2317	1	CS	FK	11.3	0.1	Troublesome	N	Y
1004_997	5n3w	5ST98.2318	1	CS	FK	11.7	0.2	Troublesome	N	N
1004_997	5n3w	5ST98.2319	2	CS	FK	21.8	1.3	Troublesome	N	N
1004_997	5n3w	5ST98.2320	2	CS	FK	15.8	0.7	Troublesome	Y	N
1004_997	5n3w	5ST98.2321	2	CS	FK	16.8	0.2	Petrified Wood	N	N
1004_997	5n3w	5ST98.2322	2	CS	FK	18.4	0.2	unknown	N	N
1004_997	5n3w	5ST98.2323	2	CS	FK	17.3	0.6	Troublesome	N	N
1004_997	5n3w	5ST98.2324	2	CS	FK	11.7	0.2	Troublesome	N	Y
1004_997	5n3w	5ST98.2325	2	CS	FK	14.9	0.2	Troublesome	N	N
1004_997	5n3w	5ST98.2326	2	CS	FK	16.5	0.4	Troublesome	N	N
1004_997	5n3w	5ST98.2327	2	CS	FK	14.5	0.3	Troublesome	N	N
1004_997	5n3w	5ST98.2328	2	CS	FK	10.7	0.2	Troublesome	N	N
1004_997	5n3w	5ST98.2329	2	CS	FK	10.7	0.1	Troublesome	N	N
1004_997	5n3w	5ST98.2330	2	CS	FK	8.4	0.1	Troublesome	N	N
1004_997	5n3w	5ST98.2331	2	CS	FK	9.8	0.1	Troublesome	N	N
1004_997	5n3w	5ST98.2332	2	CS	FK	6.4	0.1	Troublesome	N	N
1004_997	5n3w	5ST98.2333	3	CS	FK	26	0.7	Troublesome	N	N
1004_997	5n3w	5ST98.2334	3	CS	FK	21.3	0.4	Troublesome	N	N
1004_997	5n3w	5ST98.2335	3	CS	FK	18.8	0.3	Petrified Wood	N	N
1004_997	5n3w	5ST98.2336	3	CS	FK	19.8	0.3	unknown	N	N
1004_997	5n3w	5ST98.2337	3	CS	FK	17.9	0.4	Troublesome	N	N
1004_997	5n3w	5ST98.2338	3	CS	FK	11.6	0.2	Troublesome	N	N
1004_997	5n3w	5ST98.2339	3	CS	FK	14.3	0.3	unknown	Y	N
1004_997	5n3w	5ST98.2340	3	CS	FK	17.4	0.4	Troublesome	N	N
1004_997	5n3w	5ST98.2341	3	CS	FK	13.6	0.2	unknown	N	N
1004_997	5n3w	5ST98.2342	3	CS	FK	12.8	0.1	Troublesome	Y	Y
1004_997	5n3w	5ST98.2343	3	CS	FK	12.7	0.2	TMJ	N	N
1004_997	5n3w	5ST98.2344	3	CS	FK	0.2	18.2	unknown	N	N
1004_997	5n3w	5ST98.2345	3	CS	FK	13.9	0.2	Troublesome	N	N
1004_997	5n3w	5ST98.2346	3	CS	FK	9.6	0.1	unknown	N	N
1004_997	5n3w	5ST98.2347	3	CS	FK	13.6	0.1	unknown	N	Y
1004_997	5n3w	5ST98.2348	3	CS	FK	14.2	0.2	Troublesome	N	N
1004_997	5n3w	5ST98.2349	3	CS	FK	13.8	0.1	Troublesome	N	N
1004_997	5n3w	5ST98.2350	3	CS	FK	13.3	0.1	Troublesome	N	N
1004_997	5n3w	5ST98.2351	3	CS	FK	10.4	0.3	Troublesome	N	N
1004_997	5n3w	5ST98.2352	4	CS	FK	23.4	0.9	Troublesome	N	N
1004_997	5n3w	5ST98.2353	4	CS	FK	24	0.6	unknown	N	N
1004_997	5n3w	5ST98.2354	4	CS	FK	20.5	0.7	Troublesome	N	N

1004_997	5n3w	5ST98.2355	4	CS	FK	14.8	0.4	Troublesome	N	N
1004_997	5n3w	5ST98.2356	4	CS	FK	16.5	0.5	Troublesome	N	N
1004_997	5n3w	5ST98.2357	4	CS	FK	11	0.1	Troublesome	N	N
1004_997	5n3w	5ST98.2358	4	CS	FK	12	0.1	Troublesome	N	N
1004_997	5n3w	5ST98.2359	4	CS	FK	12.6	0.3	unknown	N	N
1004_997	5n3w	5ST98.2360	4	CS	FK	11.7	0.1	unknown	N	N
1004_997	5n3w	5ST98.2361	4	CS	FK	13	0.1	Troublesome	N	N
1004_997	5n3w	5ST98.2362	4	CS	FK	9.4	0.1	Troublesome	N	N
1004_997	5n3w	5ST98.2363	5	CS	FK	16.1	0.3	Troublesome	N	N
1004_997	5n3w	5ST98.2364	5	CS	FK	9.9	0.1	unknown	N	N
1005_985	6n15w	5ST98.1056	1	CS	FK	8.5	0.071	Troublesome	N	N
1005_985	6n15w	5ST98.1057	2	CS	FK	10.7	0.1	Troublesome	N	N
1005_985	6n15w	5ST98.1058	2	CS	FK	11.5	0.1	Troublesome	N	N
1005_985	6n15w	5ST98.1059	3	CS	FK	15.9	0.3	Troublesome	N	N
1005_985	6n15w	5ST98.1060	3	CS	FK	10.4	0.2	Troublesome	N	N
1005_989	6n11w	5ST98.22	surface	CS	FK	13	0.2	Troublesome	N	N
1005_989	6n11w	5ST98.23	1	CS	FK	31.4	1	Troublesome	N	N
1005_989	6n11w	5ST98.24	1	CS	FK	18.5	1.2	Troublesome	N	N
1005_989	6n11w	5ST98.25	1	CS	FK	17.6	0.5	Troublesome	N	N
1005_989	6n11w	5ST98.26	1	CS	FK	13.6	0.3	Troublesome	N	Y
1005_989	6n11w	5ST98.27	1	CS	FK	16.9	0.2	Troublesome	N	N
1005_989	6n11w	5ST98.28	1	CS	FK	15.3	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.29	1	CS	FK	10.5	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.30	1	CS	FK	14.5	0.2	Troublesome	N	N
1005_989	6n11w	5ST98.31	1	CS	FK	13.9	0.3	Troublesome	N	N
1005_989	6n11w	5ST98.32	1	CS	FK	11.5	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.33	1	CS	FK	11.9	0.2	Troublesome	N	N
1005_989	6n11w	5ST98.34	1	CS	FK	11.4	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.35	1	CS	FK	11.7	0.2	Troublesome	Y	N
1005_989	6n11w	5ST98.36	1	CS	FK	11.5	0.2	Troublesome	N	N
1005_989	6n11w	5ST98.37	1	CS	FK	10.3	0.2	Troublesome	N	N
1005_989	6n11w	5ST98.38	1	CS	FK	10.1	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.39	1	CS	FK	10	0.2	Troublesome	N	N
1005_989	6n11w	5ST98.40	1	CS	FK	11.5	0.2	Troublesome	N	N
1005_989	6n11w	5ST98.41	1	CS	FK	10	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.42	1	CS	FK	9.8	0.2	Troublesome	N	N
1005_989	6n11w	5ST98.43	1	CS	FK	10.1	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.44	1	CS	FK	7.9	0.091	Troublesome	N	N
1005_989	6n11w	5ST98.45	1	CS	FK	10.8	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.46	1	CS	FK	11.3	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.47	1	CS	FK	9.1	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.48	2	CS	FK	20.4	1.1	Troublesome	N	N
1005_989	6n11w	5ST98.49	2	CS	FK	24.9	1.4	Troublesome	N	N
1005_989	6n11w	5ST98.50	2	CS	FK	16	0.3	Troublesome	N	N
1005_989	6n11w	5ST98.51	2	CS	FK	24.6	1.3	Troublesome	N	N
1005_989	6n11w	5ST98.52	2	CS	FK	15.3	0.3	Troublesome	N	N
1005_989	6n11w	5ST98.53	2	CS	FK	15.9	0.6	Troublesome	N	N
1005_989	6n11w	5ST98.54	2	CS	FK	15.7	0.4	Troublesome	N	N
1005_989	6n11w	5ST98.55	2	CS	FK	16.9	0.2	Troublesome	N	N
1005_989	6n11w	5ST98.56	2	CS	FK	16	0.2	Troublesome	N	N
1005_989	6n11w	5ST98.58	2	CS	FK	15.3	0.2	Troublesome	N	N
1005_989	6n11w	5ST98.59	2	CS	FK	11	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.60	2	CS	FK	14.1	0.3	Troublesome	N	N
1005_989	6n11w	5ST98.61	2	CS	FK	10.9	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.62	2	CS	FK	10.9	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.63	2	CS	FK	11	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.64	2	CS	FK	11.3	0.2	Troublesome	N	N

1005_989	6n11w	5ST98.65	2	CS	FK	13	0.2	Troublesome	N	N
1005_989	6n11w	5ST98.66	2	CS	FK	9.3	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.67	2	CS	FK	10.1	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.68	2	CS	FK	9.7	0.1	Troublesome	N	N
1005_989	6n11w	5ST98.69	2	CS	FK	9.6	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.553	1	CS	FK	11.4	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.554	1	CS	FK	18.4	0.5	Troublesome	N	N
1005_991	6n9w	5ST98.555	1	CS	FK	16.9	0.5	Troublesome	N	N
1005_991	6n9w	5ST98.556	1	CS	FK	20.4	1.4	Troublesome	N	N
1005_991	6n9w	5ST98.557	1	CS	FK	19.6	0.9	Troublesome	N	N
1005_991	6n9w	5ST98.558	1	CS	FK	13.5	0.2	Troublesome	N	N
1005_991	6n9w	5ST98.559	1	CS	FK	13.8	0.2	Troublesome	N	N
1005_991	6n9w	5ST98.560	1	CS	FK	15.1	0.5	Troublesome	N	N
1005_991	6n9w	5ST98.561	1	CS	FK	13.2	0.3	unknown	N	N
1005_991	6n9w	5ST98.562	1	CS	FK	8	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.563	1	CS	FK	9.9	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.564	1	CS	FK	11.2	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.565	1	CS	FK	12	0.2	Troublesome	N	N
1005_991	6n9w	5ST98.566	1	CS	FK	11.3	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.567	1	CS	FK	15.3	0.2	Troublesome	N	N
1005_991	6n9w	5ST98.568	1	CS	FK	10.3	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.569	1	CS	FK	13.1	0.2	Troublesome	N	N
1005_991	6n9w	5ST98.570	1	CS	FK	10.8	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.571	1	CS	FK	11.9	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.572	1	CS	FK	10.9	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.573	1	CS	FK	12.4	0.2	Troublesome	N	N
1005_991	6n9w	5ST98.574	1	CS	FK	10.1	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.575	1	CS	FK	10.2	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.576	1	CS	FK	9.7	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.577	1	CS	FK	8.7	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.578	1	CS	FK	8.4	0.028	Troublesome	N	N
1005_991	6n9w	5ST98.579	1	CS	FK	7.6	0.039	Troublesome	N	N
1005_991	6n9w	5ST98.580	1	CS	FK	7.9	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.581	2	CS	FK	11.2	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.582	2	CS	FK	7.6	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.583	2	CS	FK	11.7	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.584	2	CS	FK	9.3	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.585	2	CS	FK	7.6	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.586	2	CS	FK	16.8	0.3	Troublesome	N	N
1005_991	6n9w	5ST98.587	2	CS	FK	19.5	0.6	Troublesome	N	N
1005_991	6n9w	5ST98.588	2	CS	FK	11	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.589	2	CS	FK	15.8	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.590	2	CS	FK	14.3	0.3	Troublesome	N	N
1005_991	6n9w	5ST98.591	2	CS	FK	13.5	0.2	Troublesome	N	N
1005_991	6n9w	5ST98.592	2	CS	FK	8.3	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.593	2	CS	FK	9	0.1	Troublesome	N	N
1005_991	6n9w	5ST98.594	2	CS	FK	8.9	0.2	Troublesome	N	N
1005_991	6n9w	5ST98.595	2	CS	FK	9.1	0.2	Troublesome	N	N
1005_991	6n9w	5ST98.596	2	CS	FK	13.1	0.2	Troublesome	N	N
1005_991	6n9w	5ST98.597	2	CS	FK	15	0.6	Troublesome	N	N
1005_991	6n9w	5ST98.598	2	CS	FK	13.3	0.6	Troublesome	N	N
1005_991	6n9w	5ST98.599	2	CS	FK	14.6	0.3	Troublesome	N	N
1005_991	6n9w	5ST98.600	2	CS	FK	11.2	0.2	Troublesome	N	N
1005_991	6n9w	5ST98.601	2	CS	FK	9.6	0.2	Troublesome	N	N
1005_991	6n9w	5ST98.602	2	CS	FK	12.3	0.2	Troublesome	N	N
1005_991	6n9w	5ST98.603	2	CS	FK	40.7	8.3	Troublesome	N	N
1005_991	6n9w	5ST98.604	3	CS	FK	9.3	0.1	Troublesome	N	N

1005_991	6n9w	5ST98.605	3	CS	FK	13.1	0.2	Troublesome	N	N
1005_991	6n9w	5ST98.606	3	CS	FK	18.5	0.4	Troublesome	N	N
1005_992	6n8w	5ST98.607	1	CS	FK	23.9	2.7	Troublesome	N	N
1005_992	6n8w	5ST98.608	1	CS	FK	27.6	1.5	unknown	N	N
1005_992	6n8w	5ST98.609	1	CS	FK	19.7	1	Troublesome	N	N
1005_992	6n8w	5ST98.610	1	CS	FK	25.7	2.1	Troublesome	N	N
1005_992	6n8w	5ST98.611	1	CS	FK	14.5	0.5	Troublesome	Y	N
1005_992	6n8w	5ST98.612	1	CS	FK	21.9	1.8	Troublesome	N	N
1005_992	6n8w	5ST98.614	1	CS	FK	8.7	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.615	1	CS	FK	16.4	0.4	Troublesome	Y	N
1005_992	6n8w	5ST98.616	1	CS	FK	8.1	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.617	1	CS	FK	9.4	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.618	1	CS	FK	21.8	0.6	Troublesome	N	N
1005_992	6n8w	5ST98.619	1	CS	FK	21.1	0.6	Troublesome	N	N
1005_992	6n8w	5ST98.620	1	CS	FK	21.7	0.6	Troublesome	N	N
1005_992	6n8w	5ST98.621	1	CS	FK	16.7	0.7	Troublesome	N	N
1005_992	6n8w	5ST98.622	1	CS	FK	10	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.623	1	CS	FK	16.5	0.4	Troublesome	N	N
1005_992	6n8w	5ST98.624	1	CS	FK	17	0.2	Troublesome	N	N
1005_992	6n8w	5ST98.625	1	CS	FK	13.7	0.2	Troublesome	N	N
1005_992	6n8w	5ST98.626	1	CS	FK	12.8	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.627	1	CS	FK	7.8	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.628	1	CS	FK	12	0.2	Troublesome	N	N
1005_992	6n8w	5ST98.629	1	CS	FK	13.7	0.3	Troublesome	N	N
1005_992	6n8w	5ST98.630	1	CS	FK	15.9	0.4	Troublesome	N	Y
1005_992	6n8w	5ST98.631	1	CS	FK	14.5	0.3	Troublesome	N	N
1005_992	6n8w	5ST98.632	1	CS	FK	14	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.633	1	CS	FK	11.8	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.634	1	CS	FK	10.1	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.635	2	CS	FK	21.8	1.1	Troublesome	N	N
1005_992	6n8w	5ST98.636	2	CS	FK	28.3	0.8	Troublesome	N	N
1005_992	6n8w	5ST98.637	2	CS	FK	19.2	0.7	Troublesome	N	N
1005_992	6n8w	5ST98.638	2	CS	FK	11.1	0.1	Troublesome	N	Y
1005_992	6n8w	5ST98.639	2	CS	FK	15.2	0.2	Troublesome	N	N
1005_992	6n8w	5ST98.640	2	CS	FK	17.6	0.6	Troublesome	N	N
1005_992	6n8w	5ST98.641	2	CS	FK	16	0.3	Troublesome	N	N
1005_992	6n8w	5ST98.642	2	CS	FK	15.4	0.3	Troublesome	N	N
1005_992	6n8w	5ST98.643	2	CS	FK	8.1	0.041	Troublesome	N	Y
1005_992	6n8w	5ST98.644	2	CS	FK	11.7	0.3	Troublesome	N	N
1005_992	6n8w	5ST98.645	2	CS	FK	12.8	0.2	Troublesome	N	N
1005_992	6n8w	5ST98.646	2	CS	FK	14.2	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.647	2	CS	FK	10.5	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.648	2	CS	FK	10.5	0.2	Troublesome	N	Y
1005_992	6n8w	5ST98.649	2	CS	FK	10.2	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.650	2	CS	FK	9.4	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.651	3	CS	FK	28.6	1.9	Troublesome	N	N
1005_992	6n8w	5ST98.652	3	CS	FK	22.3	0.9	Troublesome	N	N
1005_992	6n8w	5ST98.653	3	CS	FK	19.2	0.5	Troublesome	N	N
1005_992	6n8w	5ST98.654	3	CS	FK	27	1.7	Troublesome	N	N
1005_992	6n8w	5ST98.655	3	CS	FK	16.8	0.5	Troublesome	N	N
1005_992	6n8w	5ST98.656	3	CS	FK	13.8	0.3	Troublesome	N	Y
1005_992	6n8w	5ST98.657	3	CS	FK	15	0.6	Troublesome	N	N
1005_992	6n8w	5ST98.658	3	CS	FK	17.2	0.7	Troublesome	N	N
1005_992	6n8w	5ST98.659	3	CS	FK	12.5	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.660	3	CS	FK	13.4	0.2	Troublesome	N	N
1005_992	6n8w	5ST98.661	3	CS	FK	10.9	0.2	Troublesome	Y	N
1005_992	6n8w	5ST98.662	3	CS	FK	11.7	0.1	Troublesome	N	N

1005_992	6n8w	5ST98.663	3	CS	FK	14.4	0.2	Troublesome	N	N
1005_992	6n8w	5ST98.664	3	CS	FK	9.2	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.665	3	CS	FK	11.3	0.2	Troublesome	N	N
1005_992	6n8w	5ST98.666	3	CS	FK	10.4	0.1	Troublesome	N	Y
1005_992	6n8w	5ST98.667	3	CS	FK	9.6	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.668	3	CS	FK	9.2	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.669	3	CS	FK	8.8	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.670	4	CS	FK	46.1	9.4	Troublesome	Y	N
1005_992	6n8w	5ST98.671	4	CS	FK	15.6	0.2	Troublesome	N	N
1005_992	6n8w	5ST98.672	4	CS	FK	13	0.4	Troublesome	N	Y
1005_992	6n8w	5ST98.673	4	CS	FK	11.8	0.1	Troublesome	N	N
1005_992	6n8w	5ST98.674	4	CS	FK	10.1	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.733	unknown	CS	FK	9	0.1	Troublesome	Y	N
1005_993	6n7w	5ST98.734	unknown	CS	FK	8.7	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.735	1	CS	FK	25.2	1.1	Troublesome	N	N
1005_993	6n7w	5ST98.736	1	CS	FK	29.9	3.4	Troublesome	N	N
1005_993	6n7w	5ST98.737	1	CS	FK	17.4	0.9	Troublesome	N	N
1005_993	6n7w	5ST98.738	1	CS	FK	16.7	0.6	Troublesome	Y	Y
1005_993	6n7w	5ST98.739	1	CS	FK	7.3	0.1	Troublesome	N	Y
1005_993	6n7w	5ST98.740	1	CS	FK	17.4	0.6	Troublesome	N	Y
1005_993	6n7w	5ST98.741	1	CS	FK	22.5	0.3	Troublesome	N	N
1005_993	6n7w	5ST98.742	1	CS	FK	13	0.4	Troublesome	N	N
1005_993	6n7w	5ST98.743	1	CS	FK	9.7	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.744	1	CS	FK	26.6	0.6	Troublesome	N	N
1005_993	6n7w	5ST98.745	1	CS	FK	16	0.4	Troublesome	N	N
1005_993	6n7w	5ST98.746	1	CS	FK	13.7	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.747	1	CS	FK	13.4	0.3	Troublesome	N	N
1005_993	6n7w	5ST98.748	1	CS	FK	14	0.3	Troublesome	N	N
1005_993	6n7w	5ST98.749	1	CS	FK	12	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.750	1	CS	FK	14.6	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.751	1	CS	FK	12.3	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.752	1	CS	FK	13.8	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.753	1	CS	FK	13.6	0.1	Troublesome	Y	N
1005_993	6n7w	5ST98.754	1	CS	FK	11.2	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.755	1	CS	FK	11.6	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.756	1	CS	FK	11	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.757	1	CS	FK	10	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.758	1	CS	FK	10.6	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.759	1	CS	FK	9.2	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.760	1	CS	FK	7.7	0.039	Troublesome	N	N
1005_993	6n7w	5ST98.761	1	CS	FK	13	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.762	1	CS	FK	11	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.763	1	CS	FK	9.4	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.764	1	CS	FK	10	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.765	1	CS	FK	7.7	0.032	Troublesome	N	N
1005_993	6n7w	5ST98.766	1	CS	FK	7.8	0.045	Troublesome	N	N
1005_993	6n7w	5ST98.767	1	CS	FK	7.7	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.768	1	CS	FK	12.2	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.769	1	CS	FK	7.3	0.03	Troublesome	N	N
1005_993	6n7w	5ST98.770	1	CS	FK	7.7	0.039	Troublesome	N	N
1005_993	6n7w	5ST98.771	1	CS	FK	8.1	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.772	2	CS	FK	8.9	6.6	Troublesome	Y	N
1005_993	6n7w	5ST98.773	2	CS	FK	28.8	5.6	Troublesome	N	Y
1005_993	6n7w	5ST98.774	2	CS	FK	23.6	1.9	Troublesome	N	Y
1005_993	6n7w	5ST98.775	2	CS	FK	22.2	2.4	Troublesome	N	N
1005_993	6n7w	5ST98.776	2	CS	FK	26.1	1	Troublesome	N	N
1005_993	6n7w	5ST98.777	2	CS	FK	24.4	2	Troublesome	N	N

1005_993	6n7w	5ST98.778	2	CS	FK	22.2	1.5	Troublesome	Y	N
1005_993	6n7w	5ST98.779	2	CS	FK	24.5	1	Troublesome	N	N
1005_993	6n7w	5ST98.780	2	CS	FK	17.6	0.4	Troublesome	N	N
1005_993	6n7w	5ST98.781	2	CS	FK	24.2	1.2	Troublesome	Y	N
1005_993	6n7w	5ST98.782	2	CS	FK	14.8	0.3	Troublesome	Y	N
1005_993	6n7w	5ST98.783	2	CS	FK	20	1	Troublesome	Y	Y
1005_993	6n7w	5ST98.784	2	CS	FK	22.1	0.9	Troublesome	N	N
1005_993	6n7w	5ST98.785	2	CS	FK	15.9	0.4	Troublesome	N	N
1005_993	6n7w	5ST98.786	2	CS	FK	21.3	0.3	Troublesome	N	N
1005_993	6n7w	5ST98.787	2	CS	FK	17.2	0.3	Troublesome	N	N
1005_993	6n7w	5ST98.788	2	CS	FK	15.1	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.789	2	CS	FK	15.6	0.5	Troublesome	N	N
1005_993	6n7w	5ST98.790	2	CS	FK	15.6	0.3	Troublesome	N	N
1005_993	6n7w	5ST98.791	2	CS	FK	13.7	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.792	2	CS	FK	16.6	0.3	Troublesome	N	N
1005_993	6n7w	5ST98.793	2	CS	FK	16.3	0.3	Troublesome	N	N
1005_993	6n7w	5ST98.794	2	CS	FK	13.2	0.3	Troublesome	N	N
1005_993	6n7w	5ST98.795	2	CS	FK	14.6	0.2	unknown	N	N
1005_993	6n7w	5ST98.796	2	CS	FK	13.2	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.797	2	CS	FK	8.6	0.1	Troublesome	N	Y
1005_993	6n7w	5ST98.798	2	CS	FK	11.5	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.799	2	CS	FK	13.7	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.800	2	CS	FK	12.9	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.801	2	CS	FK	11.3	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.802	2	CS	FK	13.6	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.803	2	CS	FK	10.4	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.804	2	CS	FK	11.8	0.3	unknown	N	Y
1005_993	6n7w	5ST98.805	2	CS	FK	13.4	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.806	2	CS	FK	11.4	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.807	2	CS	FK	12.1	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.808	2	CS	FK	12.3	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.809	2	CS	FK	10.6	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.810	2	CS	FK	10.5	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.811	2	CS	FK	13.8	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.812	2	CS	FK	9.2	0.1	Troublesome	N	Y
1005_993	6n7w	5ST98.813	2	CS	FK	10.1	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.814	2	CS	FK	9.8	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.815	3	CS	FK	30.6	0.8	Troublesome	N	N
1005_993	6n7w	5ST98.816	3	CS	FK	32.5	2.4	Troublesome	N	N
1005_993	6n7w	5ST98.817	3	CS	FK	17.7	0.5	Troublesome	Y	N
1005_993	6n7w	5ST98.818	3	CS	FK	15.1	0.3	Troublesome	N	N
1005_993	6n7w	5ST98.819	3	CS	FK	22.6	0.7	Troublesome	N	N
1005_993	6n7w	5ST98.820	3	CS	FK	17.4	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.821	3	CS	FK	12.8	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.822	3	CS	FK	18.3	0.5	Troublesome	N	N
1005_993	6n7w	5ST98.823	3	CS	FK	9.1	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.824	3	CS	FK	15.4	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.825	3	CS	FK	10.7	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.826	3	CS	FK	10.5	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.827	3	CS	FK	13.1	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.828	3	CS	FK	8.6	0.07	Troublesome	N	N
1005_993	6n7w	5ST98.829	3	CS	FK	13.7	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.830	3	CS	FK	11.7	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.831	3	CS	FK	16.9	0.5	Troublesome	N	N
1005_993	6n7w	5ST98.832	3	CS	FK	10.9	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.833	3	CS	FK	13.6	0.2	Troublesome	Y	N
1005_993	6n7w	5ST98.834	3	CS	FK	15.1	0.2	Troublesome	N	N

1005_993	6n7w	5ST98.836	3	CS	FK	11.4	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.837	3	CS	FK	9	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.838	3	CS	FK	13	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.839	3	CS	FK	11	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.840	3	CS	FK	12.9	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.841	3	CS	FK	13.1	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.842	3	CS	FK	11.2	0.1	Troublesome	Y	N
1005_993	6n7w	5ST98.843	3	CS	FK	11.3	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.844	3	CS	FK	14.3	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.845	3	CS	FK	9.1	0.1	Troublesome	Y	N
1005_993	6n7w	5ST98.846	3	CS	FK	12.6	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.847	3	CS	FK	14.8	0.2	Troublesome	Y	N
1005_993	6n7w	5ST98.848	3	CS	FK	9.9	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.849	3	CS	FK	10.6	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.850	3	CS	FK	11.6	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.851	3	CS	FK	10.5	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.852	3	CS	FK	9.5	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.853	3	CS	FK	10.5	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.854	3	CS	FK	11.3	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.855	3	CS	FK	13.8	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.856	3	CS	FK	10.2	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.857	3	CS	FK	13.8	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.858	3	CS	FK	11.4	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.859	3	CS	FK	9.1	0.1	Troublesome	N	Y
1005_993	6n7w	5ST98.860	3	CS	FK	11.7	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.861	3	CS	FK	8.6	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.862	3	CS	FK	11.1	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.863	3	CS	FK	11.2	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.864	3	CS	FK	11	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.865	3	CS	FK	9.2	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.866	3	CS	FK	9.1	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.867	3	CS	FK	12.3	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.868	3	CS	FK	9.8	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.869	3	CS	FK	12	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.870	3	CS	FK	8.4	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.871	3	CS	FK	11.2	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.872	3	CS	FK	11.3	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.873	3	CS	FK	10.3	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.874	3	CS	FK	11	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.875	3	CS	FK	8.6	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.876	3	CS	FK	10.6	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.877	3	CS	FK	10.8	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.878	3	CS	FK	11	0.2	Troublesome	N	N
1005_993	6n7w	5ST98.879	3	CS	FK	10.7	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.880	3	CS	FK	11.4	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.881	3	CS	FK	10.6	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.882	3	CS	FK	15.8	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.883	3	CS	FK	8.7	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.884	3	CS	FK	11.7	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.885	3	CS	FK	12.6	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.886	3	CS	FK	9.2	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.887	3	CS	FK	8.6	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.888	4	CS	FK	36.1	6.1	Troublesome	N	N
1005_993	6n7w	5ST98.889	4	CS	FK	35.3	1.3	Troublesome	N	N
1005_993	6n7w	5ST98.890	4	CS	FK	32.2	2.3	Troublesome	Y	N
1005_993	6n7w	5ST98.891	4	CS	FK	28.3	1.2	Troublesome	N	N
1005_993	6n7w	5ST98.892	4	CS	FK	37.4	1.5	Troublesome	Y	N

1005_993	6n7w	5ST98.893	4	CS	FK	22.2	0.5	Troublesome	N	N
1005_993	6n7w	5ST98.894	4	CS	FK	13.5	0.3	unknown	N	N
1005_993	6n7w	5ST98.895	4	CS	FK	8.3	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.896	4	CS	FK	9	0.1	Troublesome	N	N
1005_993	6n7w	5ST98.897	4	CS	FK	9	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1339	1	CS	FK	27.3	4.2	TMJ	N	Y
1005_994	6n6w	5ST98.1340	1	CS	FK	26.3	1.6	unknown	N	Y
1005_994	6n6w	5ST98.1341	1	CS	FK	33.4	5.6	Troublesome	N	Y
1005_994	6n6w	5ST98.1342	1	CS	FK	27.1	1.6	Troublesome	N	N
1005_994	6n6w	5ST98.1343	1	CS	FK	14.2	0.4	unknown	N	N
1005_994	6n6w	5ST98.1344	1	CS	FK	28.7	0.9	Troublesome	N	N
1005_994	6n6w	5ST98.1345	1	CS	FK	24.5	0.8	Troublesome	N	N
1005_994	6n6w	5ST98.1346	1	CS	FK	16	0.8	Troublesome	N	Y
1005_994	6n6w	5ST98.1347	1	CS	FK	21.4	1.6	Troublesome	N	N
1005_994	6n6w	5ST98.1348	1	CS	FK	23	1.5	Troublesome	N	N
1005_994	6n6w	5ST98.1349	1	CS	FK	10.6	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1350	1	CS	FK	15.7	0.2	Troublesome	N	N
1005_994	6n6w	5ST98.1351	1	CS	FK	14.1	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1352	1	CS	FK	11.9	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1353	1	CS	FK	14.6	0.1	Troublesome	N	Y
1005_994	6n6w	5ST98.1354	1	CS	FK	13.1	0.3	Troublesome	N	N
1005_994	6n6w	5ST98.1355	1	CS	FK	13	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1356	1	CS	FK	14	0.2	Troublesome	N	N
1005_994	6n6w	5ST98.1357	1	CS	FK	14.8	0.3	Troublesome	N	N
1005_994	6n6w	5ST98.1358	1	CS	FK	13.2	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1359	1	CS	FK	5	0.013	Troublesome	N	N
1005_994	6n6w	5ST98.1360	1	CS	FK	8.8	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1361	1	CS	FK	10.5	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1362	1	CS	FK	10.5	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1364	1	CS	FK	13.9	0.2	Troublesome	N	N
1005_994	6n6w	5ST98.1365	1	CS	FK	11.2	0.2	Troublesome	N	N
1005_994	6n6w	5ST98.1366	1	CS	FK	10.4	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1367	1	CS	FK	10.3	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1368	1	CS	FK	9.3	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1369	1	CS	FK	9.2	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1370	1	CS	FK	13.9	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1371	1	CS	FK	10.6	0.2	Troublesome	N	N
1005_994	6n6w	5ST98.1372	1	CS	FK	8.9	0.1	Troublesome	N	Y
1005_994	6n6w	5ST98.1373	1	CS	FK	8.7	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1374	1	CS	FK	10.2	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1375	1	CS	FK	9.6	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1376	1	CS	FK	10.3	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1377	1	CS	FK	9.1	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1378	1	CS	FK	9	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1380	2	CS	FK	29	2.5	Troublesome	N	N
1005_994	6n6w	5ST98.1381	2	CS	FK	33.2	0.8	Troublesome	N	N
1005_994	6n6w	5ST98.1382	2	CS	FK	21.8	0.6	Troublesome	Y	N
1005_994	6n6w	5ST98.1383	2	CS	FK	33.4	2.2	Troublesome	N	N
1005_994	6n6w	5ST98.1384	2	CS	FK	26.6	1.2	Troublesome	N	N
1005_994	6n6w	5ST98.1385	2	CS	FK	23	1	Troublesome	N	Y
1005_994	6n6w	5ST98.1386	2	CS	FK	19.8	0.7	Troublesome	N	Y
1005_994	6n6w	5ST98.1387	2	CS	FK	19.8	0.5	Troublesome	Y	Y
1005_994	6n6w	5ST98.1388	2	CS	FK	27.5	1.1	Troublesome	N	N
1005_994	6n6w	5ST98.1389	2	CS	FK	25.4	1.2	Troublesome	Y	N
1005_994	6n6w	5ST98.1390	2	CS	FK	14.9	0.3	Troublesome	N	Y
1005_994	6n6w	5ST98.1391	2	CS	FK	14.2	0.2	Troublesome	N	N
1005_994	6n6w	5ST98.1392	2	CS	FK	14.6	0.4	Troublesome	Y	N

1005_994	6n6w	5ST98.1393	2	CS	FK	10.2	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1394	2	CS	FK	11.2	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1395	2	CS	FK	11.2	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1396	2	CS	FK	10.7	0.1	unknown	N	N
1005_994	6n6w	5ST98.1397	2	CS	FK	16.7	0.2	Troublesome	N	N
1005_994	6n6w	5ST98.1398	2	CS	FK	13.7	0.3	Troublesome	N	N
1005_994	6n6w	5ST98.1399	2	CS	FK	14.3	0.2	Troublesome	Y	N
1005_994	6n6w	5ST98.1400	2	CS	FK	12.9	0.4	Troublesome	N	Y
1005_994	6n6w	5ST98.1401	2	CS	FK	16.6	0.3	Troublesome	N	N
1005_994	6n6w	5ST98.1402	2	CS	FK	10.7	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1403	2	CS	FK	11.2	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1404	2	CS	FK	9.3	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1405	2	CS	FK	9.2	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1406	2	CS	FK	10.1	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1407	2	CS	FK	10.4	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1408	2	CS	FK	9.9	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1409	2	CS	FK	10.7	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1410	2	CS	FK	9.8	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1411	2	CS	FK	9.5	0.2	Troublesome	Y	N
1005_994	6n6w	5ST98.1412	2	CS	FK	17.4	0.3	Troublesome	N	N
1005_994	6n6w	5ST98.1413	2	CS	FK	12.5	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1414	2	CS	FK	12.5	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1415	2	CS	FK	7.8	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1416	2	CS	FK	7.9	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1417	2	CS	FK	9.8	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1418	2	CS	FK	9.2	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1419	2	CS	FK	7.9	0.088	Troublesome	N	N
1005_994	6n6w	5ST98.1420	2	CS	FK	8.2	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1421	3	CS	FK	43.3	7.5	Troublesome	N	N
1005_994	6n6w	5ST98.1422	3	CS	FK	15.9	0.6	Troublesome	N	Y
1005_994	6n6w	5ST98.1424	3	CS	FK	21.2	0.5	Troublesome	N	Y
1005_994	6n6w	5ST98.1425	3	CS	FK	21.6	1	Troublesome	N	N
1005_994	6n6w	5ST98.1426	3	CS	FK	17.5	0.2	Troublesome	N	Y
1005_994	6n6w	5ST98.1427	3	CS	FK	9.1	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1428	3	CS	FK	27.4	1.9	Troublesome	N	N
1005_994	6n6w	5ST98.1429	3	CS	FK	19.8	0.4	Troublesome	N	N
1005_994	6n6w	5ST98.1430	3	CS	FK	11.4	0.1	unknown	Y	N
1005_994	6n6w	5ST98.1431	3	CS	FK	16.6	0.3	Troublesome	N	N
1005_994	6n6w	5ST98.1432	3	CS	FK	10.6	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1433	3	CS	FK	11.3	0.1	unknown	N	Y
1005_994	6n6w	5ST98.1434	3	CS	FK	8.6	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1435	3	CS	FK	11.7	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1436	3	CS	FK	14.3	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1437	3	CS	FK	10.6	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1438	3	CS	FK	10.6	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1439	3	CS	FK	10.4	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1440	3	CS	FK	9.9	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1442	4	CS	FK	29.6	3.4	Troublesome	N	N
1005_994	6n6w	5ST98.1443	4	CS	FK	25.6	1.5	Troublesome	N	N
1005_994	6n6w	5ST98.1444	4	CS	FK	27.3	0.9	Troublesome	N	N
1005_994	6n6w	5ST98.1445	4	CS	FK	16.3	0.5	Troublesome	N	N
1005_994	6n6w	5ST98.1446	4	CS	FK	19	0.2	Troublesome	N	N
1005_994	6n6w	5ST98.1447	4	CS	FK	10.8	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1448	4	CS	FK	10.3	0.1	Troublesome	N	N
1005_994	6n6w	5ST98.1449	4	CS	FK	12.1	0.2	Troublesome	N	N
1005_995	6n5w	5ST98.2587	1	CS	FK	31.9	4.3	Troublesome	N	N
1005_995	6n5w	5ST98.2588	1	CS	FK	28.5	3.8	Troublesome	N	N

1005_995	6n5w	5ST98.2589	1	CS	FK	31.5	3.4	Troublesome	Y	N
1005_995	6n5w	5ST98.2590	1	CS	FK	24.8	1.9	Troublesome	Y	N
1005_995	6n5w	5ST98.2591	1	CS	FK	10.8	0.075	Troublesome	N	N
1005_995	6n5w	5ST98.2592	1	CS	FK	11	0.11	unknown	N	N
1005_995	6n5w	5ST98.2593	1	CS	FK	11.6	0.12	Troublesome	N	N
1005_995	6n5w	5ST98.2594	1	CS	FK	6.4	0.02	Troublesome	N	N
1005_995	6n5w	5ST98.2595	1	CS	FK	7.9	0.05	Troublesome	N	N
1005_995	6n5w	5ST98.2596	1	CS	FK	3.1	0.008	Troublesome	N	N
1005_995	6n5w	5ST98.2597	1	CS	FK	4.6	0.012	Troublesome	N	N
1005_995	6n5w	5ST98.2598	1	CS	FK	6.2	0.3	Troublesome	N	N
1005_995	6n5w	5ST98.2599	1	CS	FK	8.2	0.055	Troublesome	N	N
1005_995	6n5w	5ST98.2600	1	CS	FK	6.8	0.03	Troublesome	N	N
1005_995	6n5w	5ST98.2601	1	CS	FK	5.8	0.015	Troublesome	N	N
1005_995	6n5w	5ST98.2604	2	CS	FK	23.4	0.317	Troublesome	N	N
1005_995	6n5w	5ST98.2605	2	CS	FK	11.8	0.12	Troublesome	N	N
1005_995	6n5w	5ST98.2606	2	CS	FK	6.1	0.2	Troublesome	N	N
1005_995	6n5w	5ST98.2607	2	CS	FK	5.7	0.015	Troublesome	N	N
1005_995	6n5w	5ST98.2608	2	CS	FK	5.6	0.013	Troublesome	N	N
1005_995	6n5w	5ST98.2609	1	CS	FK	12.9	0.31	Troublesome	N	N
1005_995	6n5w	5ST98.2610	1	CS	FK	10.3	0.1	Troublesome	N	N
1005_995	6n5w	5ST98.2611	1	CS	FK	6.2	0.035	Troublesome	N	N
1005_995	6n5w	5ST98.2612	1	CS	FK	6.9	0.042	Troublesome	N	N
1005_995	6n5w	5ST98.2613	1	CS	FK	6	0.02	Troublesome	N	N
1005_995	6n5w	5ST98.2614	1	CS	FK	5.9	0.03	Troublesome	N	N
1005_995	6n5w	5ST98.2615	unknown	CS	FK	11.9	0.22	Troublesome	N	N
1005_995	6n5w	5ST98.2616	1	CS	FK	7.1	0.034	Troublesome	N	N
1005_995	6n5w	5ST98.2618	unknown	CS	FK	9.8	0.104	Troublesome	N	N
1005_995	6n5w	5ST98.2619	1	CS	FK	20.3	1.32	Troublesome	N	Y
1005_995	6n5w	5ST98.2620	1	CS	FK	6.1	0.038	Troublesome	N	N
1005_995	6n5w	5ST98.2621	1	CS	FK	5.1	0.029	Troublesome	N	N
1005_995	6n5w	5ST98.2622	1	CS	FK	5.6	0.025	Troublesome	N	N
1005_995	6n5w	5ST98.2623	1	CS	FK	7.4	0.047	Troublesome	N	N
1005_995	6n5w	5ST98.2624	1	CS	FK	8.6	0.06	Troublesome	N	Y
1005_995	6n5w	5ST98.2625	1	CS	FK	7.9	0.092	Troublesome	N	N
1005_995	6n5w	5ST98.2626	1	CS	FK	6.3	0.021	Troublesome	N	N
1005_995	6n5w	5ST98.2627	1	CS	FK	5.9	0.032	Troublesome	N	N
1005_995	6n5w	5ST98.2628	1	CS	FK	12.2	0.15	Troublesome	N	N
1005_995	6n5w	5ST98.2629	1	CS	FK	6.9	0.034	Troublesome	N	N
1005_995	6n5w	5ST98.2630	1	CS	FK	7.7	0.062	Troublesome	N	N
1005_995	6n5w	5ST98.2631	1	CS	FK	6.8	0.034	Troublesome	N	N
1005_995	6n5w	5ST98.2632	1	CS	FK	8.5	0.082	Troublesome	N	N
1005_995	6n5w	5ST98.2633	1	CS	FK	4.9	0.012	Troublesome	N	N
1005_995	6n5w	5ST98.2634	unknown	CS	FK	5.8	0.031	Troublesome	N	N
1005_995	6n5w	5ST98.2635	unknown	CS	FK	6	0.066	Troublesome	N	N
1005_995	6n5w	5ST98.2636	unknown	CS	FK	5.3	0.015	Troublesome	N	N
1005_995	6n5w	5ST98.2637	unknown	CS	FK	4.2	0.003	Troublesome	N	N
1005_995	6n5w	5ST98.2638	2	CS	FK	42.3	2.402	Troublesome	N	N
1005_995	6n5w	5ST98.2639	2	CS	FK	11.8	0.167	Troublesome	N	N
1005_995	6n5w	5ST98.2640	2	CS	FK	14.4	0.148	Troublesome	N	N
1005_995	6n5w	5ST98.2643	1	CS	FK	7.2	0.045	Troublesome	N	N
1005_995	6n5w	5ST98.2644	1	CS	FK	7.6	0.049	Troublesome	N	N
1005_995	6n5w	5ST98.2645	1	CS	FK	6.5	0.053	Troublesome	N	N
1005_995	6n5w	5ST98.2646	1	CS	FK	6.8	0.042	Troublesome	N	N
1005_995	6n5w	5ST98.2647	1	CS	FK	7.3	0.03	Troublesome	N	N
1005_995	6n5w	5ST98.2648	1	CS	FK	6.4	0.03	Troublesome	N	N
1005_995	6n5w	5ST98.2649	unknown	CS	FK	9.2	0.079	Troublesome	N	N
1005_995	6n5w	5ST98.2650	unknown	CS	FK	10.3	0.112	Troublesome	N	N

1005_995	6n5w	5ST98.2651	unknown	CS	FK	7.4	0.048	Troublesome	N	N
1005_995	6n5w	5ST98.2652	unknown	CS	FK	7.2	0.038	Troublesome	N	N
1005_995	6n5w	5ST98.2653	unknown	CS	FK	6.1	0.019	Troublesome	N	N
1005_995	6n5w	5ST98.2654	unknown	CS	FK	4.6	0.012	Troublesome	N	N
1005_995	6n5w	5ST98.2655	unknown	CS	FK	6	0.019	Troublesome	N	N
1005_995	6n5w	5ST98.2656	unknown	CS	FK	6.4	0.027	Troublesome	N	N
1005_995	6n5w	5ST98.2657	1	CS	FK	13.3	0.248	Troublesome	N	N
1005_995	6n5w	5ST98.2658	1	CS	FK	9.5	0.111	Troublesome	N	N
1005_995	6n5w	5ST98.2659	1	CS	FK	10.4	0.093	Troublesome	N	N
1005_995	6n5w	5ST98.2660	1	CS	FK	7.6	0.054	Troublesome	N	Y
1005_995	6n5w	5ST98.2661	1	CS	FK	7.4	0.031	unknown	N	N
1005_995	6n5w	5ST98.2662	1	CS	FK	7.2	0.02	Troublesome	N	N
1005_995	6n5w	5ST98.2663	1	CS	FK	6.5	0.049	Troublesome	N	N
1005_995	6n5w	5ST98.2664	1	CS	FK	6.3	0.21	Troublesome	N	N
1005_995	6n5w	5ST98.2665	1	CS	FK	6	0.018	unknown	N	N
1005_995	6n5w	5ST98.2666	1	CS	FK	7.1	0.043	Troublesome	N	N
1005_995	6n5w	5ST98.2667	1	CS	FK	7	0.23	Troublesome	N	N
1005_995	6n5w	5ST98.2668	1	CS	FK	12.3	0.276	Troublesome	N	N
1005_995	6n5w	5ST98.2669	1	CS	FK	9	0.161	Troublesome	N	N
1005_995	6n5w	5ST98.2670	1	CS	FK	9	0.077	Troublesome	N	N
1005_995	6n5w	5ST98.2671	1	CS	FK	6.5	0.069	Troublesome	N	N
1005_995	6n5w	5ST98.2672	1	CS	FK	6.2	0.031	Troublesome	N	N
1005_995	6n5w	5ST98.2673	1	CS	FK	7.5	0.047	Troublesome	N	N
1005_995	6n5w	5ST98.2674	1	CS	FK	6.1	0.034	Troublesome	N	N
1005_995	6n5w	5ST98.2675	1	CS	FK	5.8	0.02	Troublesome	N	N
1005_995	6n5w	5ST98.2676	1	CS	FK	6.1	0.015	Troublesome	N	N
1005_995	6n5w	5ST98.2677	1	CS	FK	20.1	0.222	Troublesome	N	N
1005_995	6n5w	5ST98.2678	1	CS	FK	8.5	0.127	Troublesome	N	N
1005_995	6n5w	5ST98.2679	1	CS	FK	8.5	0.078	Troublesome	N	N
1005_995	6n5w	5ST98.2680	1	CS	FK	6.1	0.024	Troublesome	N	N
1005_995	6n5w	5ST98.2681	1	CS	FK	6.6	0.036	Troublesome	N	N
1005_995	6n5w	5ST98.2682	1	CS	FK	7.6	0.045	Troublesome	N	N
1005_995	6n5w	5ST98.2683	1	CS	FK	12.3	0.225	Troublesome	N	N
1005_995	6n5w	5ST98.2684	1	CS	FK	11.3	0.11	Troublesome	N	N
1005_995	6n5w	5ST98.2685	1	CS	FK	8.3	0.023	Troublesome	N	N
1005_995	6n5w	5ST98.2686	1	CS	FK	6.4	0.023	Troublesome	N	N
1005_995	6n5w	5ST98.2687	1	CS	FK	7.5	0.036	Troublesome	N	N
1005_997	6n3w	5ST98.2019	unknown	CS	FK	11.6	0.1	Troublesome	N	N
1005_997	6n3w	5ST98.2020	unknown	CS	FK	9.4	0.1	Troublesome	N	N
1005_997	6n3w	5ST98.2021	unknown	CS	FK	8.5	0.2	Troublesome	N	N
1005_997	6n3w	5ST98.2022	unknown	CS	FK	8.5	0.1	Troublesome	N	N
1005_997	6n3w	5ST98.2023	surface	CS	FK	9.7	0.1	Troublesome	N	N
1005_997	6n3w	5ST98.2024	surface	CS	FK	9.7	0.1	Troublesome	N	N
1005_997	6n3w	5ST98.2025	surface	CS	FK	11.1	0.1	Troublesome	N	Y
1005_997	6n3w	5ST98.2026	surface	CS	FK	9.9	0.2	Troublesome	N	N
1005_997	6n3w	5ST98.2027	surface	CS	FK	10	0.1	Troublesome	N	N
1005_997	6n3w	5ST98.2028	1	CS	FK	22.3	1.2	Troublesome	N	Y
1005_997	6n3w	5ST98.2029	1	CS	FK	27.6	2.1	Troublesome	N	N
1005_997	6n3w	5ST98.2030	1	CS	FK	27.6	2.4	Troublesome	N	N
1005_997	6n3w	5ST98.2031	1	CS	FK	26.6	1.6	Troublesome	N	Y
1005_997	6n3w	5ST98.2032	1	CS	FK	14.5	0.4	unknown	N	N
1005_997	6n3w	5ST98.2033	1	CS	FK	23.3	2	Troublesome	N	N
1005_997	6n3w	5ST98.2034	1	CS	FK	18.1	0.8	Troublesome	N	Y
1005_997	6n3w	5ST98.2035	1	CS	FK	13.6	0.5	Troublesome	Y	N
1005_997	6n3w	5ST98.2036	1	CS	FK	18	0.2	TMJ	N	N
1005_997	6n3w	5ST98.2037	1	CS	FK	17.8	0.4	Hartville/Trout Creek	N	N
1005_997	6n3w	5ST98.2038	1	CS	FK	11.8	0.2	Petrified Wood	N	N

1005_997	6n3w	5ST98.2039	1	CS	FK	20.1	1	Troublesome	N	N
1005_997	6n3w	5ST98.2040	1	CS	FK	15.2	0.4	Troublesome	N	N
1005_997	6n3w	5ST98.2041	1	CS	FK	15.1	0.4	Troublesome	N	Y
1005_997	6n3w	5ST98.2042	1	CS	FK	14.2	0.2	Troublesome	N	Y
1005_997	6n3w	5ST98.2043	1	CS	FK	11.8	0.2	Troublesome	N	Y
1005_997	6n3w	5ST98.2044	1	CS	FK	11.8	0.2	Troublesome	N	N
1005_997	6n3w	5ST98.2045	1	CS	FK	11.7	0.1	Troublesome	N	N
1005_997	6n3w	5ST98.2046	1	CS	FK	12.1	0.2	Troublesome	N	N
1005_997	6n3w	5ST98.2047	2	CS	FK	41.2	5	Hartville/Trout Creek	Y	Y
1005_997	6n3w	5ST98.2048	2	CS	FK	24.5	1	Troublesome	N	N
1005_997	6n3w	5ST98.2049	2	CS	FK	31.2	2.3	Troublesome	N	N
1005_997	6n3w	5ST98.2050	2	CS	FK	20.3	0.8	Troublesome	N	Y
1005_997	6n3w	5ST98.2051	2	CS	FK	19.8	0.4	unknown	N	N
1005_997	6n3w	5ST98.2052	2	CS	FK	13.1	0.4	unknown	N	N
1005_997	6n3w	5ST98.2053	2	CS	FK	19	0.5	Hartville/Trout Creek	N	N
1005_997	6n3w	5ST98.2054	2	CS	FK	17.4	0.3	Hartville/Trout Creek	N	N
1005_997	6n3w	5ST98.2055	2	CS	FK	16.2	0.4	Hartville/Trout Creek	N	N
1005_997	6n3w	5ST98.2056	2	CS	FK	13.6	0.2	Hartville/Trout Creek	N	N
1005_997	6n3w	5ST98.2057	2	CS	FK	13.7	0.2	Hartville/Trout Creek	N	N
1005_997	6n3w	5ST98.2058	2	CS	FK	11.2	0.1	Hartville/Trout Creek	N	N
1005_997	6n3w	5ST98.2059	2	CS	FK	20.2	0.7	Troublesome	N	Y
1005_997	6n3w	5ST98.2060	2	CS	FK	13.3	0.3	Troublesome	N	Y
1005_997	6n3w	5ST98.2061	2	CS	FK	17.3	0.3	Troublesome	N	N
1005_997	6n3w	5ST98.2062	2	CS	FK	14.9	0.3	unknown	N	N
1005_997	6n3w	5ST98.2063	2	CS	FK	13.8	0.2	Troublesome	N	N
1005_997	6n3w	5ST98.2064	2	CS	FK	15.2	0.2	Troublesome	N	N
1005_997	6n3w	5ST98.2065	2	CS	FK	15	0.1	Troublesome	N	N
1005_997	6n3w	5ST98.2066	2	CS	FK	11.4	0.2	Troublesome	N	N
1005_997	6n3w	5ST98.2067	2	CS	FK	10.8	0.1	Troublesome	N	N
1005_997	6n3w	5ST98.2068	2	CS	FK	12.8	0.1	Troublesome	N	N
1005_997	6n3w	5ST98.2069	2	CS	FK	12.5	0.1	Troublesome	N	N
1005_997	6n3w	5ST98.2070	2	CS	FK	9.8	0.2	Troublesome	N	N
1005_997	6n3w	5ST98.2071	2	CS	FK	9	0.1	Troublesome	N	N
1005_997	6n3w	5ST98.2072	2	CS	FK	11.6	0.2	Troublesome	N	N
1005_997	6n3w	5ST98.2073	2	CS	FK	11.3	0.1	Troublesome	N	N
1005_997	6n3w	5ST98.2074	2	CS	FK	10.7	0.1	Troublesome	N	N
1005_997	6n3w	5ST98.2075	2	CS	FK	12	0.1	Troublesome	N	N
1005_997	6n3w	5ST98.2076	3	CS	FK	32.6	3.8	Troublesome	N	Y
1005_997	6n3w	5ST98.2077	3	CS	FK	18.3	0.2	Troublesome	N	N
1005_997	6n3w	5ST98.2078	3	CS	FK	10.5	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1450	surface	CS	FK	13	0.6	Troublesome	Y	N
1005_999	6n1w	5ST98.1451	surface	CS	FK	18.1	0.7	unknown	N	N
1005_999	6n1w	5ST98.1452	surface	CS	FK	18.6	0.6	Troublesome	N	N
1005_999	6n1w	5ST98.1453	surface	CS	FK	12.1	0.2	Troublesome	N	N
1005_999	6n1w	5ST98.1454	surface	CS	FK	10.8	0.2	Troublesome	N	N
1005_999	6n1w	5ST98.1455	surface	CS	FK	5.9	0.03	unknown	N	N
1005_999	6n1w	5ST98.1456	surface	CS	FK	12.9	0.2	Troublesome	N	Y
1005_999	6n1w	5ST98.1457	surface	CS	FK	10	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1458	surface	CS	FK	9.9	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1459	surface	CS	FK	9.9	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1460	surface	CS	FK	7.5	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1461	surface	CS	FK	5.1	0.029	Troublesome	N	N
1005_999	6n1w	5ST98.1462	surface	CS	FK	5.8	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1463	surface	CS	FK	6.1	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1464	1	CS	FK	25.5	1.7	Troublesome	N	Y
1005_999	6n1w	5ST98.1465	1	CS	FK	16.5	0.5	unknown	Y	Y
1005_999	6n1w	5ST98.1466	1	CS	FK	14.1	0.3	Troublesome	N	Y

1005_999	6n1w	5ST98.1467	1	CS	FK	18	0.7	Troublesome	Y	N
1005_999	6n1w	5ST98.1468	1	CS	FK	14.1	0.4	Troublesome	Y	N
1005_999	6n1w	5ST98.1469	1	CS	FK	19.3	0.6	Troublesome	N	N
1005_999	6n1w	5ST98.1470	1	CS	FK	16.7	0.5	Troublesome	N	N
1005_999	6n1w	5ST98.1471	1	CS	FK	12.4	0.5	Troublesome	N	N
1005_999	6n1w	5ST98.1472	1	CS	FK	14.5	0.4	Troublesome	N	N
1005_999	6n1w	5ST98.1473	1	CS	FK	12.8	0.4	Troublesome	N	N
1005_999	6n1w	5ST98.1474	1	CS	FK	14.2	0.1	Troublesome	N	Y
1005_999	6n1w	5ST98.1475	1	CS	FK	13.7	0.3	Troublesome	N	N
1005_999	6n1w	5ST98.1476	1	CS	FK	10.4	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1477	1	CS	FK	13.1	0.4	Troublesome	N	N
1005_999	6n1w	5ST98.1478	1	CS	FK	13.2	0.2	Troublesome	N	N
1005_999	6n1w	5ST98.1479	1	CS	FK	12.6	0.2	Troublesome	N	Y
1005_999	6n1w	5ST98.1480	1	CS	FK	7.8	0.1	TMJ	N	N
1005_999	6n1w	5ST98.1481	1	CS	FK	10.9	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1482	1	CS	FK	9.8	0.2	Troublesome	N	N
1005_999	6n1w	5ST98.1483	1	CS	FK	7.2	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1484	1	CS	FK	10.6	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1485	1	CS	FK	7.8	0.1	unknown	N	N
1005_999	6n1w	5ST98.1486	1	CS	FK	14.4	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1488	1	CS	FK	11.5	0.1	Windy Ridge Quartzite	N	N
1005_999	6n1w	5ST98.1489	1	CS	FK	9.3	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1490	1	CS	FK	7.5	0.1	Troublesome	Y	Y
1005_999	6n1w	5ST98.1491	1	CS	FK	6.4	0.1	unknown	N	N
1005_999	6n1w	5ST98.1492	1	CS	FK	10.4	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1493	1	CS	FK	11.5	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1494	1	CS	FK	7.9	0.097	Troublesome	Y	N
1005_999	6n1w	5ST98.1496	1	CS	FK	10.9	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1497	1	CS	FK	10.8	0.2	Troublesome	N	N
1005_999	6n1w	5ST98.1498	1	CS	FK	6.8	0.03	Troublesome	N	Y
1005_999	6n1w	5ST98.1499	1	CS	FK	8.4	0.032	Troublesome	N	Y
1005_999	6n1w	5ST98.1500	1	CS	FK	7.8	0.05	Troublesome	N	N
1005_999	6n1w	5ST98.1501	1	CS	FK	9.3	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1502	1	CS	FK	10.8	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1503	1	CS	FK	9.7	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1505	1	CS	FK	10.1	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1506	1	CS	FK	8.3	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1507	1	CS	FK	10.9	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1508	1	CS	FK	7.3	0.02	Troublesome	N	N
1005_999	6n1w	5ST98.1509	1	CS	FK	7.2	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1510	1	CS	FK	6.9	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1511	1	CS	FK	6.8	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1512	1	CS	FK	8.9	0.1	Troublesome	N	Y
1005_999	6n1w	5ST98.1513	1	CS	FK	7.7	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1515	1	CS	FK	8.2	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1516	1	CS	FK	8.2	0.032	Troublesome	N	N
1005_999	6n1w	5ST98.1517	1	CS	FK	9	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1518	1	CS	FK	6.5	0.1	Troublesome	N	Y
1005_999	6n1w	5ST98.1519	1	CS	FK	6.6	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1520	1	CS	FK	8.3	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1521	1	CS	FK	8	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1522	1	CS	FK	7.1	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1523	1	CS	FK	5	0.013	Troublesome	N	N
1005_999	6n1w	5ST98.1524	1	CS	FK	9.5	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1525	1	CS	FK	6	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1527	1	CS	FK	8.1	0.025	Troublesome	N	N
1005_999	6n1w	5ST98.1528	1	CS	FK	7.4	0.1	Troublesome	N	N

1005_999	6n1w	5ST98.1529	1	CS	FK	7.6	0.041	Troublesome	N	N
1005_999	6n1w	5ST98.1530	1	CS	FK	7.5	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1531	1	CS	FK	8.8	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1532	1	CS	FK	7	0.093	Troublesome	N	N
1005_999	6n1w	5ST98.1533	1	CS	FK	6.5	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1534	1	CS	FK	5.5	0.01	Troublesome	N	N
1005_999	6n1w	5ST98.1535	1	CS	FK	5.5	0.01	Troublesome	N	N
1005_999	6n1w	5ST98.1537	1	CS	FK	8.1	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1538	1	CS	FK	7.2	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1539	1	CS	FK	7.5	0.036	Troublesome	N	N
1005_999	6n1w	5ST98.1540	1	CS	FK	6.7	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1541	1	CS	FK	7.3	0.1	Troublesome	N	Y
1005_999	6n1w	5ST98.1542	1	CS	FK	6.6	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1543	1	CS	FK	5.1	0.029	Troublesome	N	N
1005_999	6n1w	5ST98.1544	1	CS	FK	4.9	0.012	Troublesome	N	N
1005_999	6n1w	5ST98.1545	1	CS	FK	6.9	0.042	Troublesome	N	N
1005_999	6n1w	5ST98.1546	1	CS	FK	6.4	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1547	1	CS	FK	5.7	0.026	Troublesome	N	N
1005_999	6n1w	5ST98.1548	1	CS	FK	5.9	0.03	Troublesome	N	N
1005_999	6n1w	5ST98.1549	1	CS	FK	6.6	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1550	1	CS	FK	7.6	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1551	1	CS	FK	5.7	0.026	Troublesome	N	N
1005_999	6n1w	5ST98.1552	1	CS	FK	5.9	0.03	Troublesome	N	N
1005_999	6n1w	5ST98.1553	1	CS	FK	6.4	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1554	1	CS	FK	6	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1555	1	CS	FK	5.4	0.01	Troublesome	N	N
1005_999	6n1w	5ST98.1556	1	CS	FK	6.2	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1557	1	CS	FK	5.2	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1558	1	CS	FK	5	0.014	Troublesome	N	N
1005_999	6n1w	5ST98.1559	1	CS	FK	6.2	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1560	1	CS	FK	4.9	0.012	Troublesome	N	N
1005_999	6n1w	5ST98.1561	2	CS	FK	13.4	0.4	Troublesome	N	N
1005_999	6n1w	5ST98.1562	2	CS	FK	13.5	0.3	Troublesome	N	N
1005_999	6n1w	5ST98.1563	2	CS	FK	16.5	0.2	TMJ	N	N
1005_999	6n1w	5ST98.1564	2	CS	FK	14.5	0.2	TMJ	N	N
1005_999	6n1w	5ST98.1565	2	CS	FK	14.5	0.2	unknown	N	N
1005_999	6n1w	5ST98.1566	2	CS	FK	12.4	0.2	Troublesome	N	N
1005_999	6n1w	5ST98.1567	2	CS	FK	10.5	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1568	2	CS	FK	10.5	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1569	2	CS	FK	10.3	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1570	2	CS	FK	10	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1571	2	CS	FK	8.2	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1572	2	CS	FK	13.1	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1574	2	CS	FK	8.7	0.1	Troublesome	Y	N
1005_999	6n1w	5ST98.1575	2	CS	FK	9.7	0.1	Troublesome	N	Y
1005_999	6n1w	5ST98.1576	2	CS	FK	5.9	0.04	Troublesome	N	N
1005_999	6n1w	5ST98.1580	2	CS	FK	7.5	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1581	2	CS	FK	8.5	0.07	Troublesome	N	N
1005_999	6n1w	5ST98.1582	2	CS	FK	6.7	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1584	2	CS	FK	7.6	0.05	Troublesome	N	N
1005_999	6n1w	5ST98.1585	2	CS	FK	6.7	0.03	Troublesome	N	N
1005_999	6n1w	5ST98.1586	2	CS	FK	9.1	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1587	2	CS	FK	5.8	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1588	2	CS	FK	5.5	0.01	Troublesome	N	N
1005_999	6n1w	5ST98.1589	2	CS	FK	3.7	0.009	Troublesome	N	N
1005_999	6n1w	5ST98.1590	3	CS	FK	11.3	0.1	Troublesome	N	Y
1005_999	6n1w	5ST98.1591	3	CS	FK	16.3	0.6	Troublesome	N	N

1005_999	6n1w	5ST98.1592	3	CS	FK	11.9	0.2	TMJ	N	N
1005_999	6n1w	5ST98.1593	3	CS	FK	15	0.2	Hartville/Trout Creek	N	N
1005_999	6n1w	5ST98.1594	3	CS	FK	8.4	0.1	TMJ	N	N
1005_999	6n1w	5ST98.1595	3	CS	FK	10.1	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1596	3	CS	FK	8.5	0.072	Troublesome	N	N
1005_999	6n1w	5ST98.1597	3	CS	FK	5.7	0.025	Troublesome	N	N
1005_999	6n1w	5ST98.1598	3	CS	FK	9.9	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1599	3	CS	FK	9.6	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1600	3	CS	FK	11.1	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1601	3	CS	FK	9.2	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1602	3	CS	FK	7.5	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1603	3	CS	FK	10	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1605	4	CS	FK	16.8	0.3	TMJ	N	Y
1005_999	6n1w	5ST98.1606	4	CS	FK	16.9	0.6	Troublesome	N	N
1005_999	6n1w	5ST98.1607	4	CS	FK	14.5	0.2	unknown	N	N
1005_999	6n1w	5ST98.1608	4	CS	FK	9.7	0.2	unknown	N	N
1005_999	6n1w	5ST98.1609	4	CS	FK	14.5	0.2	Troublesome	N	N
1005_999	6n1w	5ST98.1610	4	CS	FK	7.6	0.047	Troublesome	N	N
1005_999	6n1w	5ST98.1611	4	CS	FK	7.9	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1612	4	CS	FK	8.3	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1613	4	CS	FK	9.8	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1614	4	CS	FK	8.6	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1615	4	CS	FK	11.6	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1616	4	CS	FK	8.8	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1617	4	CS	FK	8	0.046	Troublesome	N	N
1005_999	6n1w	5ST98.1618	4	CS	FK	9.3	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1619	4	CS	FK	7.7	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1620	4	CS	FK	4.2	0.1	Windy Ridge Quartzite	N	N
1005_999	6n1w	5ST98.1621	5	CS	FK	8.4	0.1	TMJ	N	N
1005_999	6n1w	5ST98.1622	5	CS	FK	7.8	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1623	5	CS	FK	7.4	0.02	Troublesome	N	N
1005_999	6n1w	5ST98.1624	5	CS	FK	6.9	0.042	Troublesome	N	N
1005_999	6n1w	5ST98.1625	5	CS	FK	6.1	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1626	6	CS	FK	10.5	0.1	Troublesome	N	N
1005_999	6n1w	5ST98.1627	6	CS	FK	4.5	0.012	Windy Ridge Quartzite	N	N
1005_999	6n1w	5ST98.2366	unknown	CS	FK	11.6	0.4	Troublesome	N	Y
1006_990	7n10w	5ST98.1130	1	CS	FK	13.9	0.4	Troublesome	Y	N
1006_990	7n10w	5ST98.1131	1	CS	FK	13.4	0.1	Troublesome	N	N
1006_990	7n10w	5ST98.1132	1	CS	FK	13.1	0.2	unknown	N	N
1006_990	7n10w	5ST98.1133	1	CS	FK	10	0.1	Troublesome	N	N
1006_990	7n10w	5ST98.1134	1	CS	FK	11.7	0.1	Troublesome	N	N
1006_990	7n10w	5ST98.1135	1	CS	FK	10.5	0.2	Troublesome	N	N
1006_990	7n10w	5ST98.1136	1	CS	FK	9.5	0.1	Troublesome	N	N
1006_990	7n10w	5ST98.1137	1	CS	FK	8.9	0.1	Troublesome	N	N
1006_990	7n10w	5ST98.1138	1	CS	FK	11.2	0.1	Troublesome	N	N
1006_990	7n10w	5ST98.1139	2	CS	FK	39.5	1.5	Troublesome	N	N
1006_990	7n10w	5ST98.1140	2	CS	FK	26.8	1.5	Troublesome	N	N
1006_990	7n10w	5ST98.1141	2	CS	FK	16.3	0.3	Troublesome	Y	N
1006_990	7n10w	5ST98.1142	2	CS	FK	14.1	0.2	Troublesome	N	N
1006_990	7n10w	5ST98.1143	2	CS	FK	9.2	0.1	Troublesome	N	N
1006_990	7n10w	5ST98.1144	2	CS	FK	9.9	0.1	Troublesome	N	N
1006_990	7n10w	5ST98.1145	2	CS	FK	9.9	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1628	surface	CS	FK	27.7	2	Troublesome	N	Y
1006_991	7n9w	5ST98.1629	1	CS	FK	12.7	0.3	unknown	N	Y
1006_991	7n9w	5ST98.1630	1	CS	FK	21.9	1.1	Troublesome	N	N
1006_991	7n9w	5ST98.1631	1	CS	FK	18.1	0.5	Troublesome	N	Y
1006_991	7n9w	5ST98.1632	1	CS	FK	23.1	0.8	Troublesome	N	N

1006_991	7n9w	5ST98.1633	1	CS	FK	17.9	0.4	Troublesome	N	Y
1006_991	7n9w	5ST98.1634	1	CS	FK	13.9	0.4	Troublesome	N	Y
1006_991	7n9w	5ST98.1635	1	CS	FK	16.9	0.4	Troublesome	Y	Y
1006_991	7n9w	5ST98.1636	1	CS	FK	16.8	0.3	Troublesome	Y	N
1006_991	7n9w	5ST98.1637	1	CS	FK	16.1	0.4	Troublesome	N	N
1006_991	7n9w	5ST98.1638	1	CS	FK	19.6	0.7	Troublesome	N	N
1006_991	7n9w	5ST98.1639	1	CS	FK	17.2	0.4	Troublesome	N	N
1006_991	7n9w	5ST98.1640	1	CS	FK	13.1	0.2	Troublesome	N	N
1006_991	7n9w	5ST98.1641	1	CS	FK	14	0.3	Troublesome	N	N
1006_991	7n9w	5ST98.1642	1	CS	FK	10.8	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1643	1	CS	FK	11.1	0.2	Troublesome	Y	N
1006_991	7n9w	5ST98.1644	1	CS	FK	11.2	0.2	Troublesome	N	N
1006_991	7n9w	5ST98.1645	1	CS	FK	11.9	0.2	Troublesome	N	N
1006_991	7n9w	5ST98.1646	1	CS	FK	11	0.2	unknown	N	Y
1006_991	7n9w	5ST98.1647	1	CS	FK	12.7	0.2	Troublesome	N	N
1006_991	7n9w	5ST98.1648	1	CS	FK	16.4	0.2	Troublesome	N	N
1006_991	7n9w	5ST98.1649	1	CS	FK	13.6	0.2	Troublesome	N	N
1006_991	7n9w	5ST98.1650	1	CS	FK	11.3	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1651	1	CS	FK	11.2	0.2	Troublesome	N	N
1006_991	7n9w	5ST98.1652	1	CS	FK	8.5	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1653	1	CS	FK	10.8	0.2	Troublesome	N	N
1006_991	7n9w	5ST98.1654	1	CS	FK	10.5	0.2	Troublesome	N	N
1006_991	7n9w	5ST98.1655	1	CS	FK	11.5	0.2	Troublesome	N	N
1006_991	7n9w	5ST98.1656	1	CS	FK	9.9	0.1	Troublesome	N	Y
1006_991	7n9w	5ST98.1657	1	CS	FK	9.6	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1658	1	CS	FK	11	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1659	1	CS	FK	11.7	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1660	1	CS	FK	8.2	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1661	1	CS	FK	8	0.082	Troublesome	N	N
1006_991	7n9w	5ST98.1662	1	CS	FK	8.3	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1663	1	CS	FK	11.6	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1664	1	CS	FK	10	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1665	1	CS	FK	10.1	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1666	2	CS	FK	24.1	4.1	Troublesome	Y	Y
1006_991	7n9w	5ST98.1667	2	CS	FK	19.4	0.8	Troublesome	N	Y
1006_991	7n9w	5ST98.1668	2	CS	FK	20	0.9	Troublesome	N	Y
1006_991	7n9w	5ST98.1669	2	CS	FK	18.3	0.5	Troublesome	N	N
1006_991	7n9w	5ST98.1670	2	CS	FK	18.8	0.5	Troublesome	N	N
1006_991	7n9w	5ST98.1671	2	CS	FK	10.2	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1672	2	CS	FK	9.7	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1673	2	CS	FK	10.5	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1674	2	CS	FK	13.9	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1675	2	CS	FK	10.4	0.1	Troublesome	N	N
1006_991	7n9w	5ST98.1676	2	CS	FK	11.1	0.2	Troublesome	N	N
1006_992	7n8w	5ST98.1118	1	CS	FK	23.3	2.5	unknown	Y	Y
1006_992	7n8w	5ST98.1119	1	CS	FK	47.7	10.6	Troublesome	Y	N
1006_992	7n8w	5ST98.1120	1	CS	FK	29.3	2.1	Troublesome	Y	Y
1006_992	7n8w	5ST98.1121	1	CS	FK	19.6	1	Troublesome	N	N
1006_992	7n8w	5ST98.1122	1	CS	FK	14.1	0.3	Troublesome	N	N
1006_992	7n8w	5ST98.1123	1	CS	FK	10.6	0.1	Troublesome	N	N
1006_992	7n8w	5ST98.1124	1	CS	FK	13.5	0.3	Troublesome	N	N
1006_992	7n8w	5ST98.1125	1	CS	FK	12.5	0.4	Troublesome	N	Y
1006_992	7n8w	5ST98.1126	1	CS	FK	12.7	0.2	Troublesome	N	Y
1006_992	7n8w	5ST98.1127	1	CS	FK	14.7	0.5	Troublesome	N	N
1006_992	7n8w	5ST98.1128	1	CS	FK	9.6	0.1	Troublesome	N	N
1006_992	7n8w	5ST98.1129	2	CS	FK	43.3	2.4	Troublesome	N	N
1006_993	7n7w	5ST98.1918	1	CS	FK	22	1.1	Troublesome	N	N

1006_993	7n7w	5ST98.1919	1	CS	FK	20.2	0.5	Troublesome	N	N
1006_993	7n7w	5ST98.1920	1	CS	FK	14.2	0.5	Troublesome	N	Y
1006_993	7n7w	5ST98.1921	1	CS	FK	13.9	0.3	Troublesome	N	N
1006_993	7n7w	5ST98.1922	1	CS	FK	14.9	0.2	Troublesome	N	Y
1006_993	7n7w	5ST98.1923	1	CS	FK	13.2	0.2	Troublesome	N	N
1006_993	7n7w	5ST98.1924	1	CS	FK	11.8	0.2	Troublesome	N	N
1006_993	7n7w	5ST98.1925	1	CS	FK	8.9	0.1	unknown	N	N
1006_993	7n7w	5ST98.1926	1	CS	FK	10.6	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1927	1	CS	FK	8.7	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1928	1	CS	FK	10.2	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1929	1	CS	FK	10.4	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1930	1	CS	FK	8.7	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1931	1	CS	FK	9.3	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1932	1	CS	FK	8	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1933	1	CS	FK	10.7	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1934	1	CS	FK	10.3	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1935	1	CS	FK	9	0.1	Troublesome	N	Y
1006_993	7n7w	5ST98.1936	1	CS	FK	8	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1937	1	CS	FK	6.7	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1938	2	CS	FK	41.4	1.7	Troublesome	N	N
1006_993	7n7w	5ST98.1939	2	CS	FK	22.1	0.8	Troublesome	N	N
1006_993	7n7w	5ST98.1940	2	CS	FK	17.3	0.9	Troublesome	N	N
1006_993	7n7w	5ST98.1941	2	CS	FK	24.9	0.9	Troublesome	N	N
1006_993	7n7w	5ST98.1942	2	CS	FK	14.9	0.5	Troublesome	N	N
1006_993	7n7w	5ST98.1943	2	CS	FK	15.9	0.4	Troublesome	N	N
1006_993	7n7w	5ST98.1944	2	CS	FK	12.3	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1945	2	CS	FK	10.7	0.3	Troublesome	N	N
1006_993	7n7w	5ST98.1946	2	CS	FK	15.7	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1947	2	CS	FK	11.7	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1948	2	CS	FK	13.9	0.2	Troublesome	N	N
1006_993	7n7w	5ST98.1949	2	CS	FK	9.7	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1950	2	CS	FK	9.9	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1951	3	CS	FK	15.2	0.6	unknown	N	N
1006_993	7n7w	5ST98.1952	3	CS	FK	24.4	0.8	Troublesome	N	N
1006_993	7n7w	5ST98.1953	3	CS	FK	23.6	1	Troublesome	N	N
1006_993	7n7w	5ST98.1954	3	CS	FK	20.4	1.1	Troublesome	N	Y
1006_993	7n7w	5ST98.1955	3	CS	FK	26.7	1.3	Troublesome	N	N
1006_993	7n7w	5ST98.1956	3	CS	FK	15.2	0.7	Troublesome	N	Y
1006_993	7n7w	5ST98.1958	3	CS	FK	14.9	0.4	Troublesome	N	N
1006_993	7n7w	5ST98.1959	3	CS	FK	11.6	0.2	Troublesome	N	Y
1006_993	7n7w	5ST98.1960	3	CS	FK	11.8	0.3	unknown	N	N
1006_993	7n7w	5ST98.1961	3	CS	FK	15.8	0.3	Troublesome	N	N
1006_993	7n7w	5ST98.1962	3	CS	FK	14.5	0.2	Troublesome	N	N
1006_993	7n7w	5ST98.1963	3	CS	FK	10	0.2	unknown	N	N
1006_993	7n7w	5ST98.1964	3	CS	FK	10.7	0.2	Troublesome	N	Y
1006_993	7n7w	5ST98.1965	3	CS	FK	10.1	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1966	3	CS	FK	14.1	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1967	3	CS	FK	8.9	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1968	3	CS	FK	14.7	0.2	Troublesome	N	Y
1006_993	7n7w	5ST98.1969	3	CS	FK	9.4	0.1	Troublesome	N	Y
1006_993	7n7w	5ST98.1970	3	CS	FK	12.2	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1971	4	CS	FK	27.1	1.4	unknown	N	N
1006_993	7n7w	5ST98.1972	4	CS	FK	31.6	1.1	Troublesome	N	N
1006_993	7n7w	5ST98.1973	4	CS	FK	18.1	0.8	Troublesome	N	N
1006_993	7n7w	5ST98.1974	4	CS	FK	17	1	Troublesome	N	N
1006_993	7n7w	5ST98.1975	4	CS	FK	9.8	0.1	Troublesome	N	N
1006_993	7n7w	5ST98.1976	4	CS	FK	13.7	0.3	Troublesome	N	Y

1006_993	7n7w	5ST98.1977	4	CS	FK	14.6	0.2	Troublesome	N	N
1006_993	7n7w	5ST98.1978	4	CS	FK	16.8	0.3	Troublesome	N	N
1006_993	7n7w	5ST98.1979	4	CS	FK	14.4	0.2	Troublesome	N	N
1006_993	7n7w	5ST98.1980	4	CS	FK	8.5	0.075	Troublesome	N	N
1006_993	7n7w	5ST98.1981	4	CS	FK	20.5	0.5	Troublesome	N	N
1006_994	7n6w	5ST98.1989	1	CS	FK	28.6	2.7	Troublesome	N	N
1006_994	7n6w	5ST98.1990	1	CS	FK	17.7	0.9	Troublesome	N	Y
1006_994	7n6w	5ST98.1991	1	CS	FK	16.1	0.5	Troublesome	N	Y
1006_994	7n6w	5ST98.1992	1	CS	FK	23.6	0.7	Troublesome	N	N
1006_994	7n6w	5ST98.1993	1	CS	FK	15.5	0.6	Troublesome	N	N
1006_994	7n6w	5ST98.1994	1	CS	FK	17.9	0.2	Troublesome	N	N
1006_994	7n6w	5ST98.1996	1	CS	FK	13	0.3	Troublesome	N	Y
1006_994	7n6w	5ST98.1997	1	CS	FK	12.3	0.3	Troublesome	Y	N
1006_994	7n6w	5ST98.1998	1	CS	FK	17	0.3	Troublesome	N	N
1006_994	7n6w	5ST98.1999	1	CS	FK	10.6	0.1	Troublesome	N	N
1006_994	7n6w	5ST98.2000	1	CS	FK	8.4	0.1	Troublesome	N	N
1006_994	7n6w	5ST98.2001	1	CS	FK	9.6	0.1	Troublesome	N	N
1006_994	7n6w	5ST98.2002	1	CS	FK	11.3	0.1	Troublesome	N	N
1006_994	7n6w	5ST98.2003	2	CS	FK	20	1	Troublesome	N	Y
1006_994	7n6w	5ST98.2004	2	CS	FK	12.5	0.2	Troublesome	N	N
1006_994	7n6w	5ST98.2005	2	CS	FK	16.4	0.2	Troublesome	Y	N
1006_994	7n6w	5ST98.2006	2	CS	FK	16.2	0.2	Troublesome	N	N
1006_994	7n6w	5ST98.2007	2	CS	FK	15	0.1	Troublesome	N	Y
1006_994	7n6w	5ST98.2008	2	CS	FK	15.4	0.2	Troublesome	N	Y
1006_994	7n6w	5ST98.2009	2	CS	FK	11.7	0.1	Troublesome	N	N
1006_994	7n6w	5ST98.2010	2	CS	FK	11.7	0.3	Troublesome	N	N
1006_994	7n6w	5ST98.2011	2	CS	FK	9.8	0.1	Troublesome	N	N
1006_994	7n6w	5ST98.2012	2	CS	FK	11.5	0.2	Troublesome	N	N
1006_994	7n6w	5ST98.2013	2	CS	FK	7.9	0.1	Troublesome	N	N
1006_994	7n6w	5ST98.2014	3	CS	FK	22.5	0.7	Troublesome	N	N
1006_994	7n6w	5ST98.2015	3	CS	FK	14.7	0.3	Troublesome	N	Y
1006_994	7n6w	5ST98.2016	3	CS	FK	17.8	0.3	Troublesome	N	N
1006_994	7n6w	5ST98.2017	3	CS	FK	14.1	0.2	Troublesome	N	N
1006_994	7n6w	5ST98.2018	3	CS	FK	9.8	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1187	1	CS	FK	42.6	5.8	Troublesome	Y	N
1006_996	7n4w	5ST98.1188	1	CS	FK	17.2	0.4	Troublesome	N	Y
1006_996	7n4w	5ST98.1189	1	CS	FK	20.2	0.7	Troublesome	N	N
1006_996	7n4w	5ST98.1190	1	CS	FK	13.7	0.7	Troublesome	Y	N
1006_996	7n4w	5ST98.1191	1	CS	FK	16.7	0.6	Troublesome	Y	N
1006_996	7n4w	5ST98.1192	1	CS	FK	15.9	0.4	Troublesome	N	N
1006_996	7n4w	5ST98.1193	1	CS	FK	17.1	0.4	Troublesome	Y	N
1006_996	7n4w	5ST98.1194	1	CS	FK	12.5	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1195	1	CS	FK	11.3	0.2	unknown	N	Y
1006_996	7n4w	5ST98.1196	1	CS	FK	16.8	0.5	Troublesome	N	N
1006_996	7n4w	5ST98.1197	1	CS	FK	13.1	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1198	1	CS	FK	14.8	0.3	Troublesome	N	N
1006_996	7n4w	5ST98.1199	1	CS	FK	14.3	0.3	Troublesome	N	N
1006_996	7n4w	5ST98.1200	1	CS	FK	12.8	0.4	Troublesome	N	Y
1006_996	7n4w	5ST98.1201	1	CS	FK	14.8	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1202	1	CS	FK	11.7	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1203	1	CS	FK	10.2	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1204	1	CS	FK	13.9	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1205	1	CS	FK	10.8	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1206	1	CS	FK	11.7	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1207	1	CS	FK	10.2	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1208	1	CS	FK	9.1	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1209	1	CS	FK	12.8	0.2	Troublesome	N	N

1006_996	7n4w	5ST98.1210	1	CS	FK	11.1	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1211	1	CS	FK	8.6	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1212	1	CS	FK	11	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1213	1	CS	FK	5.4	0.01	Troublesome	N	N
1006_996	7n4w	5ST98.1214	1	CS	FK	8.9	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1215	1	CS	FK	9.3	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1216	1	CS	FK	11	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1217	2	CS	FK	17.2	1.4	Troublesome	Y	Y
1006_996	7n4w	5ST98.1218	2	CS	FK	19.7	0.7	Troublesome	N	Y
1006_996	7n4w	5ST98.1219	2	CS	FK	16.5	0.6	Troublesome	N	N
1006_996	7n4w	5ST98.1220	2	CS	FK	14.9	0.7	Troublesome	N	N
1006_996	7n4w	5ST98.1221	2	CS	FK	13.5	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1222	2	CS	FK	11.5	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1223	2	CS	FK	11	0.3	Troublesome	N	N
1006_996	7n4w	5ST98.1224	2	CS	FK	5.2	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1225	2	CS	FK	9.3	0.1	Troublesome	N	Y
1006_996	7n4w	5ST98.1226	2	CS	FK	14.8	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1227	2	CS	FK	12.5	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1228	2	CS	FK	10.5	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1229	2	CS	FK	10.3	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1230	2	CS	FK	12.5	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1231	2	CS	FK	8.2	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1233	2	CS	FK	9.4	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1234	2	CS	FK	10.7	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1235	3	CS	FK	35.5	1.6	Troublesome	N	N
1006_996	7n4w	5ST98.1236	3	CS	FK	15.1	0.3	unknown	N	N
1006_996	7n4w	5ST98.1237	3	CS	FK	19.5	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1238	3	CS	FK	11.1	0.2	Troublesome	N	Y
1006_996	7n4w	5ST98.1239	3	CS	FK	16.2	0.7	Troublesome	Y	N
1006_996	7n4w	5ST98.1240	3	CS	FK	15.8	0.4	Troublesome	N	N
1006_996	7n4w	5ST98.1241	3	CS	FK	12.9	0.3	Troublesome	N	N
1006_996	7n4w	5ST98.1242	3	CS	FK	14.9	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1243	3	CS	FK	12.3	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1244	3	CS	FK	9.8	0.1	Troublesome	N	Y
1006_996	7n4w	5ST98.1245	3	CS	FK	11.4	0.2	Troublesome	N	Y
1006_996	7n4w	5ST98.1246	3	CS	FK	10.7	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1247	3	CS	FK	11.7	0.2	Troublesome	Y	N
1006_996	7n4w	5ST98.1248	3	CS	FK	13.9	0.2	Troublesome	N	Y
1006_996	7n4w	5ST98.1249	3	CS	FK	11.2	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1250	3	CS	FK	11.6	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1251	3	CS	FK	11.1	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1252	4	CS	FK	20.4	0.9	Troublesome	Y	N
1006_996	7n4w	5ST98.1253	4	CS	FK	29.4	0.7	Troublesome	N	N
1006_996	7n4w	5ST98.1254	4	CS	FK	16.1	0.4	Troublesome	N	Y
1006_996	7n4w	5ST98.1256	4	CS	FK	12.9	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1257	4	CS	FK	12.3	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1258	4	CS	FK	11.4	0.2	Troublesome	N	N
1006_996	7n4w	5ST98.1259	4	CS	FK	11.7	0.1	Troublesome	N	N
1006_996	7n4w	5ST98.1260	4	CS	FK	13.1	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.100	2	CS	FK	13.8	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.101	2	CS	FK	9.3	0.1	Rhyolite	N	N
1007_989	8n11w	5ST98.102	2	CS	FK	10.9	0.2	Troublesome	Y	N
1007_989	8n11w	5ST98.103	2	CS	FK	12.2	0.2	Troublesome	N	N
1007_989	8n11w	5ST98.104	2	CS	FK	10.3	0.2	Troublesome	N	N
1007_989	8n11w	5ST98.105	2	CS	FK	11.7	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.106	2	CS	FK	11.8	0.3	Troublesome	N	N
1007_989	8n11w	5ST98.107	2	CS	FK	15	0.1	Troublesome	N	N

1007_989	8n11w	5ST98.108	2	CS	FK	15.1	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.109	2	CS	FK	9.3	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.110	2	CS	FK	11.2	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.111	2	CS	FK	14	0.2	Troublesome	N	N
1007_989	8n11w	5ST98.112	2	CS	FK	11.6	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.113	2	CS	FK	9.6	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.114	2	CS	FK	10.5	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.115	2	CS	FK	10.8	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.116	2	CS	FK	8.9	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.117	2	CS	FK	10	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.118	2	CS	FK	10.7	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.119	2	CS	FK	9	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.120	2	CS	FK	10.1	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.121	2	CS	FK	10.8	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.122	2	CS	FK	11	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.123	2	CS	FK	8.7	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.124	2	CS	FK	7.9	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.70	surface	CS	FK	17.5	1	Troublesome	N	N
1007_989	8n11w	5ST98.71	surface	CS	FK	15.5	0.4	Troublesome	N	N
1007_989	8n11w	5ST98.72	surface	CS	FK	8.7	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.73	1	CS	FK	35.8	7.4	Troublesome	Y	N
1007_989	8n11w	5ST98.74	1	CS	FK	14.7	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.75	1	CS	FK	13.8	0.5	Troublesome	N	N
1007_989	8n11w	5ST98.76	1	CS	FK	17.7	0.3	Troublesome	N	N
1007_989	8n11w	5ST98.77	1	CS	FK	12.3	0.3	Troublesome	N	N
1007_989	8n11w	5ST98.78	1	CS	FK	18.3	0.7	unknown	N	N
1007_989	8n11w	5ST98.79	1	CS	FK	14.8	0.4	Troublesome	N	Y
1007_989	8n11w	5ST98.80	1	CS	FK	12.8	0.2	Troublesome	N	N
1007_989	8n11w	5ST98.81	1	CS	FK	9.6	0.1	unknown	N	N
1007_989	8n11w	5ST98.82	1	CS	FK	11.6	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.83	1	CS	FK	14.5	0.2	Troublesome	N	N
1007_989	8n11w	5ST98.84	1	CS	FK	13.8	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.85	1	CS	FK	9.6	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.86	1	CS	FK	9.4	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.87	1	CS	FK	11.1	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.88	1	CS	FK	9.6	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.89	2	CS	FK	39.8	6.9	unknown	N	N
1007_989	8n11w	5ST98.90	2	CS	FK	25.2	0.9	Troublesome	N	N
1007_989	8n11w	5ST98.91	2	CS	FK	21.7	1.5	Troublesome	Y	N
1007_989	8n11w	5ST98.92	2	CS	FK	26.9	2.5	Troublesome	N	N
1007_989	8n11w	5ST98.93	2	CS	FK	16.8	0.6	Troublesome	N	N
1007_989	8n11w	5ST98.94	2	CS	FK	10.6	0.2	TMJ	N	N
1007_989	8n11w	5ST98.95	2	CS	FK	17	0.2	Troublesome	N	N
1007_989	8n11w	5ST98.96	2	CS	FK	7.6	0.1	Troublesome	N	N
1007_989	8n11w	5ST98.97	2	CS	FK	15.3	0.2	Troublesome	N	N
1007_989	8n11w	5ST98.98	2	CS	FK	11.9	0.2	Troublesome	N	N
1007_989	8n11w	5ST98.99	2	CS	FK	13.2	0.5	Troublesome	N	N
1007_991	8n9w	5ST98.190	surface	CS	FK	17.1	1.4	Troublesome	N	Y
1007_991	8n9w	5ST98.191	surface	CS	FK	16	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.192	surface	CS	FK	16.5	0.4	Troublesome	N	N
1007_991	8n9w	5ST98.193	surface	CS	FK	11.6	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.194	1	CS	FK	46.8	8.4	unknown	Y	Y
1007_991	8n9w	5ST98.195	1	CS	FK	30.2	2.4	Troublesome	Y	N
1007_991	8n9w	5ST98.196	1	CS	FK	20.2	0.8	Troublesome	N	N
1007_991	8n9w	5ST98.197	1	CS	FK	18.9	0.3	Troublesome	N	N
1007_991	8n9w	5ST98.198	1	CS	FK	21.6	0.6	Troublesome	Y	N
1007_991	8n9w	5ST98.199	1	CS	FK	23.4	1	Troublesome	N	N

1007_991	8n9w	5ST98.200	1	CS	FK	16.3	0.4	Troublesome	Y	N
1007_991	8n9w	5ST98.201	1	CS	FK	17.3	0.2	Troublesome	N	Y
1007_991	8n9w	5ST98.202	1	CS	FK	16.2	0.3	Troublesome	N	N
1007_991	8n9w	5ST98.203	1	CS	FK	16.3	0.3	Troublesome	N	N
1007_991	8n9w	5ST98.204	1	CS	FK	19.9	0.6	Troublesome	N	N
1007_991	8n9w	5ST98.205	1	CS	FK	16.5	0.5	Troublesome	N	Y
1007_991	8n9w	5ST98.206	1	CS	FK	15.3	0.3	Troublesome	N	N
1007_991	8n9w	5ST98.207	1	CS	FK	14	0.4	Troublesome	N	N
1007_991	8n9w	5ST98.208	1	CS	FK	15.4	0.5	Troublesome	N	N
1007_991	8n9w	5ST98.209	1	CS	FK	17.7	0.2	Troublesome	N	N
1007_991	8n9w	5ST98.210	1	CS	FK	15.2	0.2	Troublesome	N	N
1007_991	8n9w	5ST98.211	1	CS	FK	14	0.3	Troublesome	N	N
1007_991	8n9w	5ST98.212	1	CS	FK	15.1	0.5	Troublesome	N	N
1007_991	8n9w	5ST98.213	1	CS	FK	14.8	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.214	1	CS	FK	13.4	0.2	Troublesome	N	N
1007_991	8n9w	5ST98.215	1	CS	FK	12.8	0.2	Troublesome	N	N
1007_991	8n9w	5ST98.216	1	CS	FK	13	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.217	2	CS	FK	36.3	0.9	Troublesome	N	N
1007_991	8n9w	5ST98.218	2	CS	FK	26.5	1	Troublesome	N	N
1007_991	8n9w	5ST98.219	2	CS	FK	26.1	0.6	Troublesome	N	N
1007_991	8n9w	5ST98.220	2	CS	FK	20.9	0.8	Troublesome	N	Y
1007_991	8n9w	5ST98.221	2	CS	FK	18.6	0.6	Troublesome	N	N
1007_991	8n9w	5ST98.222	2	CS	FK	21.4	0.4	Troublesome	N	N
1007_991	8n9w	5ST98.223	2	CS	FK	17.2	0.3	Troublesome	N	N
1007_991	8n9w	5ST98.224	2	CS	FK	19.7	0.3	Troublesome	Y	N
1007_991	8n9w	5ST98.225	2	CS	FK	15	0.2	Troublesome	N	N
1007_991	8n9w	5ST98.226	2	CS	FK	16.1	0.4	Troublesome	N	Y
1007_991	8n9w	5ST98.227	2	CS	FK	13.2	0.2	Troublesome	N	N
1007_991	8n9w	5ST98.228	2	CS	FK	11.6	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.229	2	CS	FK	14.9	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.230	2	CS	FK	13.7	0.4	Troublesome	N	N
1007_991	8n9w	5ST98.231	2	CS	FK	15.6	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.232	2	CS	FK	15.4	0.2	Troublesome	N	N
1007_991	8n9w	5ST98.233	2	CS	FK	10.1	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.234	2	CS	FK	11.8	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.235	2	CS	FK	13.7	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.236	2	CS	FK	11.5	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.237	2	CS	FK	10.8	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.238	2	CS	FK	13.3	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.240	2	CS	FK	10.1	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.241	2	CS	FK	11.5	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.242	2	CS	FK	9.9	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.243	2	CS	FK	10.9	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.244	2	CS	FK	10.3	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.245	2	CS	FK	8.3	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.246	2	CS	FK	7.2	0.1	Troublesome	N	N
1007_991	8n9w	5ST98.247	3	CS	FK	19.7	1.4	Troublesome	N	N
1007_991	8n9w	5ST98.248	3	CS	FK	14.2	0.2	Troublesome	N	N
1007_992	8n8w	5ST98.1147	1	CS	FK	30.6	2.7	Troublesome	N	N
1007_992	8n8w	5ST98.1148	1	CS	FK	29.7	1.3	Troublesome	N	N
1007_992	8n8w	5ST98.1149	1	CS	FK	19.6	0.6	Troublesome	N	N
1007_992	8n8w	5ST98.1150	1	CS	FK	23.3	0.8	Troublesome	N	N
1007_992	8n8w	5ST98.1151	1	CS	FK	22.9	1.1	Troublesome	N	Y
1007_992	8n8w	5ST98.1152	1	CS	FK	21.5	0.6	Troublesome	N	N
1007_992	8n8w	5ST98.1153	1	CS	FK	8	0.1	Troublesome	N	Y
1007_992	8n8w	5ST98.1154	1	CS	FK	18.6	0.3	Troublesome	N	N
1007_992	8n8w	5ST98.1155	1	CS	FK	14.7	0.5	Troublesome	N	N

1007_992	8n8w	5ST98.1156	1	CS	FK	11.8	0.1	Troublesome	N	N
1007_992	8n8w	5ST98.1157	1	CS	FK	11.1	0.1	Troublesome	N	N
1007_992	8n8w	5ST98.1158	1	CS	FK	16.1	0.3	Troublesome	N	N
1007_992	8n8w	5ST98.1160	1	CS	FK	11	0.1	Troublesome	N	N
1007_992	8n8w	5ST98.1161	1	CS	FK	11.5	0.1	Troublesome	N	N
1007_992	8n8w	5ST98.1162	1	CS	FK	11.6	0.2	Troublesome	N	N
1007_992	8n8w	5ST98.1163	1	CS	FK	10.2	0.1	Troublesome	N	N
1007_992	8n8w	5ST98.1164	1	CS	FK	12.7	0.1	Troublesome	N	N
1007_992	8n8w	5ST98.1165	1	CS	FK	9.8	0.1	Troublesome	N	N
1007_992	8n8w	5ST98.1166	1	CS	FK	9.5	0.1	Troublesome	N	N
1007_992	8n8w	5ST98.1167	2	CS	FK	14.3	0.4	Troublesome	N	N
1007_993	8n7w	5ST98.130	surface	CS	FK	18.9	0.8	Troublesome	N	N
1007_993	8n7w	5ST98.131	surface	CS	FK	17.8	0.6	Troublesome	N	N
1007_993	8n7w	5ST98.132	surface	CS	FK	10.5	0.1	Troublesome	N	N
1007_993	8n7w	5ST98.133	surface	CS	FK	10	0.1	Troublesome	N	N
1007_993	8n7w	5ST98.134	surface	CS	FK	13.1	0.2	Troublesome	N	N
1007_993	8n7w	5ST98.135	surface	CS	FK	8.7	0.2	Troublesome	N	N
1007_993	8n7w	5ST98.136	surface	CS	FK	10.5	0.2	Troublesome	N	N
1007_993	8n7w	5ST98.137	surface	CS	FK	9.5	0.1	Troublesome	N	N
1007_993	8n7w	5ST98.139	1	CS	FK	27.3	3.9	Troublesome	N	N
1007_993	8n7w	5ST98.140	1	CS	FK	28.4	1.2	Troublesome	N	N
1007_993	8n7w	5ST98.141	1	CS	FK	25.7	1.5	Troublesome	N	N
1007_993	8n7w	5ST98.142	1	CS	FK	28.1	1.8	Rhyolite	N	N
1007_993	8n7w	5ST98.143	1	CS	FK	30.7	2.6	Troublesome	N	N
1007_993	8n7w	5ST98.144	1	CS	FK	20.6	0.9	Troublesome	N	N
1007_993	8n7w	5ST98.145	1	CS	FK	18.8	1	Hartville/Trout Creek	N	N
1007_993	8n7w	5ST98.146	1	CS	FK	15.2	0.4	unknown	N	N
1007_993	8n7w	5ST98.147	1	CS	FK	23.6	2	Troublesome	N	N
1007_993	8n7w	5ST98.148	1	CS	FK	16	0.4	Troublesome	Y	N
1007_993	8n7w	5ST98.149	1	CS	FK	25.3	0.8	Troublesome	Y	N
1007_993	8n7w	5ST98.150	1	CS	FK	22.7	22.7	Troublesome	N	N
1007_993	8n7w	5ST98.151	1	CS	FK	15.1	0.8	Troublesome	N	N
1007_993	8n7w	5ST98.152	1	CS	FK	17.3	0.1	Troublesome	N	N
1007_993	8n7w	5ST98.153	1	CS	FK	15.9	0.3	Troublesome	N	N
1007_993	8n7w	5ST98.154	1	CS	FK	21.8	0.6	Troublesome	N	N
1007_993	8n7w	5ST98.155	1	CS	FK	16.3	0.3	Troublesome	N	N
1007_993	8n7w	5ST98.156	1	CS	FK	19.3	0.2	Troublesome	N	N
1007_993	8n7w	5ST98.157	1	CS	FK	16.1	0.3	Troublesome	Y	N
1007_993	8n7w	5ST98.158	1	CS	FK	16.6	0.2	Troublesome	N	N
1007_993	8n7w	5ST98.159	1	CS	FK	13.2	0.4	Troublesome	N	N
1007_993	8n7w	5ST98.160	1	CS	FK	17.8	0.2	Troublesome	N	N
1007_993	8n7w	5ST98.161	1	CS	FK	12.3	0.3	Troublesome	N	N
1007_993	8n7w	5ST98.162	1	CS	FK	12.1	0.1	unknown	N	Y
1007_993	8n7w	5ST98.163	1	CS	FK	10.6	0.1	Troublesome	N	Y
1007_993	8n7w	5ST98.164	1	CS	FK	13.9	0.1	Troublesome	N	N
1007_993	8n7w	5ST98.165	1	CS	FK	9.5	0.3	Troublesome	N	Y
1007_993	8n7w	5ST98.166	1	CS	FK	11.4	0.1	Troublesome	N	N
1007_993	8n7w	5ST98.167	1	CS	FK	18.9	0.2	Troublesome	N	N
1007_993	8n7w	5ST98.168	1	CS	FK	12.5	0.2	Troublesome	N	N
1007_993	8n7w	5ST98.169	1	CS	FK	13	0.2	Troublesome	N	N
1007_993	8n7w	5ST98.170	1	CS	FK	11.3	0.1	Troublesome	N	N
1007_993	8n7w	5ST98.171	1	CS	FK	10.4	0.1	Troublesome	N	N
1007_993	8n7w	5ST98.172	1	CS	FK	9	0.1	Troublesome	N	N
1007_993	8n7w	5ST98.173	1	CS	FK	8.9	0.1	Troublesome	N	N
1007_993	8n7w	5ST98.174	1	CS	FK	10.9	0.1	Troublesome	N	N
1007_993	8n7w	5ST98.175	1	CS	FK	10.6	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1261	surface	CS	FK	14.6	0.6	unknown	N	N

1007_994	8n6w	5ST98.1262	surface	CS	FK	10	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1263	surface	CS	FK	15.9	0.4	Troublesome	N	N
1007_994	8n6w	5ST98.1264	surface	CS	FK	13.7	0.5	Troublesome	N	Y
1007_994	8n6w	5ST98.1265	surface	CS	FK	12.2	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1266	surface	CS	FK	10.9	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1267	surface	CS	FK	11.3	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1268	surface	CS	FK	10.3	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1269	1	CS	FK	25.5	3.5	Troublesome	Y	N
1007_994	8n6w	5ST98.1270	1	CS	FK	28.4	1.5	Troublesome	N	N
1007_994	8n6w	5ST98.1271	1	CS	FK	21.1	1.3	Troublesome	Y	Y
1007_994	8n6w	5ST98.1272	1	CS	FK	21.8	0.5	Troublesome	N	N
1007_994	8n6w	5ST98.1273	1	CS	FK	15.1	0.2	Troublesome	N	Y
1007_994	8n6w	5ST98.1274	1	CS	FK	17.3	0.8	Troublesome	N	N
1007_994	8n6w	5ST98.1275	1	CS	FK	17.1	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1276	1	CS	FK	13.9	0.4	Troublesome	N	N
1007_994	8n6w	5ST98.1277	1	CS	FK	15.2	0.3	Troublesome	N	N
1007_994	8n6w	5ST98.1278	1	CS	FK	16.9	0.4	Troublesome	N	N
1007_994	8n6w	5ST98.1279	1	CS	FK	18	0.5	Troublesome	N	N
1007_994	8n6w	5ST98.1280	1	CS	FK	11.9	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1281	1	CS	FK	10.8	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1282	1	CS	FK	11.3	0.2	unknown	N	N
1007_994	8n6w	5ST98.1283	1	CS	FK	11.9	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1284	1	CS	FK	13.2	0.4	Troublesome	N	N
1007_994	8n6w	5ST98.1285	1	CS	FK	12.3	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1286	1	CS	FK	12.5	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1287	1	CS	FK	12.4	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1288	1	CS	FK	11.3	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1289	1	CS	FK	11.8	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1290	1	CS	FK	9.6	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1291	1	CS	FK	11	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1292	1	CS	FK	11.7	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1293	1	CS	FK	11.2	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1294	1	CS	FK	10.1	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1295	1	CS	FK	11.3	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1296	1	CS	FK	7.7	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1297	1	CS	FK	7.7	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1298	2	CS	FK	25.4	2.1	Troublesome	Y	Y
1007_994	8n6w	5ST98.1299	2	CS	FK	12.7	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1300	2	CS	FK	16.3	0.5	Troublesome	N	N
1007_994	8n6w	5ST98.1301	2	CS	FK	19.4	0.5	Troublesome	N	N
1007_994	8n6w	5ST98.1303	2	CS	FK	16.1	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1304	2	CS	FK	16.3	0.4	Troublesome	N	N
1007_994	8n6w	5ST98.1305	2	CS	FK	16.3	0.3	Troublesome	N	N
1007_994	8n6w	5ST98.1306	2	CS	FK	12	0.3	Troublesome	N	N
1007_994	8n6w	5ST98.1307	2	CS	FK	14.3	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1309	2	CS	FK	11.2	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1310	2	CS	FK	14.9	0.5	Troublesome	N	N
1007_994	8n6w	5ST98.1311	2	CS	FK	8.7	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1312	2	CS	FK	13.6	0.3	Troublesome	N	N
1007_994	8n6w	5ST98.1313	2	CS	FK	16.6	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1314	2	CS	FK	11.8	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1315	2	CS	FK	13.7	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1316	2	CS	FK	16.7	0.3	Troublesome	N	N
1007_994	8n6w	5ST98.1317	2	CS	FK	14	0.3	Troublesome	N	N
1007_994	8n6w	5ST98.1318	2	CS	FK	10.5	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1319	2	CS	FK	13.7	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1320	2	CS	FK	13	0.2	Troublesome	N	N

1007_994	8n6w	5ST98.1321	2	CS	FK	11.5	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1323	2	CS	FK	12.5	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1324	2	CS	FK	11.2	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1325	2	CS	FK	10.8	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1326	2	CS	FK	10.3	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1327	2	CS	FK	9.7	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1328	2	CS	FK	11.5	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1329	2	CS	FK	10.9	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1330	2	CS	FK	6.9	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1331	2	CS	FK	7.7	0.046	Troublesome	N	N
1007_994	8n6w	5ST98.1332	2	CS	FK	7.3	0.1	Troublesome	N	N
1007_994	8n6w	5ST98.1333	2	CS	FK	5.7	0.025	Troublesome	N	N
1007_994	8n6w	5ST98.1334	3	CS	FK	15.7	1	unknown	Y	N
1007_994	8n6w	5ST98.1335	3	CS	FK	13.4	0.2	Troublesome	N	N
1007_994	8n6w	5ST98.1336	3	CS	FK	16	0.4	Troublesome	N	N
1007_994	8n6w	5ST98.1337	3	CS	FK	16.4	0.7	Troublesome	N	N
1007_994	8n6w	5ST98.1338	3	CS	FK	11.2	0.2	Troublesome	N	N
1009_1046	10n46e	5ST98.1169	1	CS	FK	12.6	0.2	Troublesome	Y	Y
1009_1046	10n46e	5ST98.1170	1	CS	FK	12.1	0.2	Troublesome	N	Y
1009_1046	10n46e	5ST98.1171	1	CS	FK	12.8	0.3	Troublesome	N	N
1009_1046	10n46e	5ST98.1172	1	CS	FK	11.6	0.1	Troublesome	N	N
1009_1046	10n46e	5ST98.1173	1	CS	FK	11.6	0.3	Troublesome	N	N
1009_1046	10n46e	5ST98.1174	1	CS	FK	11.1	0.1	Troublesome	N	N
1009_1046	10n46e	5ST98.1175	1	CS	FK	13.6	0.1	Troublesome	N	N
1009_1046	10n46e	5ST98.1176	1	CS	FK	13.6	0.2	Troublesome	N	N
1009_1046	10n46e	5ST98.1177	1	CS	FK	9.4	0.2	Troublesome	N	N
1009_1046	10n46e	5ST98.1178	1	CS	FK	11.5	0.2	Troublesome	N	Y
1009_1046	10n46e	5ST98.1179	1	CS	FK	11.6	0.3	Troublesome	N	Y
1009_1046	10n46e	5ST98.1180	1	CS	FK	8.3	0.1	Troublesome	N	N
1009_1046	10n46e	5ST98.1181	1	CS	FK	9.1	0.1	Troublesome	N	N
1009_1046	10n46e	5ST98.1182	1	CS	FK	12.1	0.1	Troublesome	N	N
1009_1046	10n46e	5ST98.1183	1	CS	FK	11.5	0.1	Troublesome	N	N
1009_1046	10n46e	5ST98.1184	1	CS	FK	10.5	0.1	Troublesome	N	N
1009_1046	10n46e	5ST98.1185	1	CS	FK	9.5	0.1	Troublesome	N	N
1009_1046	10n46e	5ST98.1186	2	CS	FK	20.4	0.7	Troublesome	N	N
1009_986	10n14w	5ST98.1040	1	CS	FK	34.1	5.4	Troublesome	N	N
1009_986	10n14w	5ST98.1042	1	CS	FK	31	1.2	Troublesome	N	N
1009_986	10n14w	5ST98.1043	1	CS	FK	29.6	1.9	Troublesome	N	N
1009_986	10n14w	5ST98.1044	1	CS	FK	21.7	1.3	Troublesome	N	N
1009_986	10n14w	5ST98.1045	1	CS	FK	21.3	0.4	Troublesome	N	N
1009_986	10n14w	5ST98.1046	1	CS	FK	10.4	0.1	Troublesome	N	N
1009_986	10n14w	5ST98.1047	1	CS	FK	8.8	0.1	Troublesome	N	N
1009_986	10n14w	5ST98.1048	1	CS	FK	11.8	0.1	Troublesome	N	N
1009_986	10n14w	5ST98.1049	1	CS	FK	13.4	0.1	Troublesome	N	N
1009_986	10n14w	5ST98.1050	1	CS	FK	11.4	0.1	Troublesome	N	N
1009_986	10n14w	5ST98.1051	1	CS	FK	9	0.1	Troublesome	N	N
1009_986	10n14w	5ST98.1052	1	CS	FK	10.1	0.1	Troublesome	N	N
1009_986	10n14w	5ST98.1053	1	CS	FK	12.6	0.1	Troublesome	N	N
1009_986	10n14w	5ST98.1054	1	CS	FK	11.3	0.1	Troublesome	N	N
1009_986	10n14w	5ST98.1055	2	CS	FK	29.3	1	Troublesome	N	N
1013_1034	14n49e	5ST98.316	1	CS	FK	12	0.1	Troublesome	N	N
1013_1034	14n34e	5ST98.459	1	CS	FK	13.2	0.1	Troublesome	N	N
1014_991	15n9w	5ST98.176	1	CS	FK	15	0.3	Troublesome	N	N
1014_991	15n9w	5ST98.177	1	CS	FK	12.4	0.2	Troublesome	N	N
1014_991	15n9w	5ST98.178	1	CS	FK	9.3	0.1	Troublesome	N	N
1014_991	15n9w	5ST98.179	2	CS	FK	26.2	1.6	Troublesome	N	N
1016_1007	17n7e	5ST98.187	1	CS	FK	17.8	0.7	Troublesome	N	Y

1016_1019	17n19e	5ST98.189	1	CS	FK	13.6	0.1	Troublesome	N	N
1016_1047	17n47e	5ST98.317	1	CS	FK	32.2	6.8	Troublesome	Y	N
1016_1047	17n47e	5ST98.318	1	CS	FK	20.4	1.2	Troublesome	N	Y
1016_1047	17n47e	5ST98.319	1	CS	FK	11	0.2	unknown	N	N
1016_1047	17n47e	5ST98.320	1	CS	FK	9.4	0.1	Troublesome	Y	N
1016_1047	17n47e	5ST98.321	2	CS	FK	9.1	0.1	TMJ	N	Y
1016_1047	17n47e	5ST98.322	2	CS	FK	12.6	0.2	Troublesome	N	N
1017_1001	18n1e	5ST98.180	1	CS	FK	25.8	2.4	Troublesome	Y	N
1017_1001	18n1e	5ST98.181	1	CS	FK	28	2.6	Troublesome	Y	N
1017_1001	18n1e	5ST98.182	1	CS	FK	15.9	0.5	Troublesome	N	N
1017_1001	18n1e	5ST98.183	1	CS	FK	20.8	0.7	Troublesome	N	N
1017_1001	18n1e	5ST98.184	1	CS	FK	12.9	0.2	Troublesome	N	N
1017_1001	18n1e	5ST98.185	1	CS	s	9.2	0.1	Troublesome	N	N
1017_1001	18n1e	5ST98.186	2	CS	FK	20.5	0.9	Troublesome	N	N
1017_1039	18n39e	5ST98.1805	1	CS	FK	31.2	1.6	Troublesome	N	Y
1017_1039	18n39e	5ST98.1806	1	CS	FK	26.2	1.6	Troublesome	Y	N
1017_1039	18n39e	5ST98.1807	1	CS	FK	35.9	1.8	Troublesome	N	Y
1017_1039	18n39e	5ST98.1808	1	CS	FK	14.3	0.2	Troublesome	N	Y
1017_1039	18n39e	5ST98.1809	1	CS	FK	22.8	0.6	Troublesome	N	Y
1017_1039	18n39e	5ST98.1810	1	CS	FK	19	0.4	Troublesome	N	Y
1017_1039	18n39e	5ST98.1811	1	CS	FK	26.8	0.9	Troublesome	N	N
1017_1039	18n39e	5ST98.1812	1	CS	FK	25.5	1	Troublesome	N	N
1017_1039	18n39e	5ST98.1813	1	CS	FK	25.7	1.4	Troublesome	N	N
1017_1039	18n39e	5ST98.1814	1	CS	FK	24.8	0.6	Troublesome	N	N
1017_1039	18n39e	5ST98.1815	1	CS	FK	19.3	0.6	Troublesome	N	Y
1017_1039	18n39e	5ST98.1816	1	CS	FK	19.5	1.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1817	1	CS	FK	21.9	1.6	Troublesome	N	Y
1017_1039	18n39e	5ST98.1818	1	CS	FK	25	0.7	Troublesome	N	N
1017_1039	18n39e	5ST98.1819	1	CS	FK	16.4	0.5	Troublesome	N	Y
1017_1039	18n39e	5ST98.1820	1	CS	FK	20.8	0.8	Troublesome	N	N
1017_1039	18n39e	5ST98.1821	1	CS	FK	19.5	0.6	Troublesome	N	Y
1017_1039	18n39e	5ST98.1822	1	CS	FK	20	0.5	Troublesome	N	Y
1017_1039	18n39e	5ST98.1823	1	CS	FK	14.8	0.6	Troublesome	N	Y
1017_1039	18n39e	5ST98.1824	1	CS	FK	22.3	0.6	Troublesome	N	N
1017_1039	18n39e	5ST98.1825	1	CS	FK	15.2	0.3	unknown	N	Y
1017_1039	18n39e	5ST98.1826	1	CS	FK	23.7	1	Troublesome	N	N
1017_1039	18n39e	5ST98.1827	1	CS	FK	19.1	0.5	Troublesome	N	Y
1017_1039	18n39e	5ST98.1828	1	CS	FK	17.4	0.3	Troublesome	N	N
1017_1039	18n39e	5ST98.1829	1	CS	FK	17.5	0.3	Windy Ridge Quartzite	N	N
1017_1039	18n39e	5ST98.1830	1	CS	FK	14.9	0.2	Troublesome	N	Y
1017_1039	18n39e	5ST98.1831	1	CS	FK	14.2	0.3	Troublesome	N	Y
1017_1039	18n39e	5ST98.1832	1	CS	FK	16.7	0.3	Troublesome	N	Y
1017_1039	18n39e	5ST98.1833	1	CS	FK	15	0.3	Troublesome	N	Y
1017_1039	18n39e	5ST98.1834	1	CS	FK	13	0.2	Troublesome	N	N
1017_1039	18n39e	5ST98.1835	1	CS	FK	19.9	0.3	Troublesome	N	Y
1017_1039	18n39e	5ST98.1836	1	CS	FK	16.4	0.3	Troublesome	N	N
1017_1039	18n39e	5ST98.1837	1	CS	FK	11.6	0.2	Troublesome	N	Y
1017_1039	18n39e	5ST98.1838	1	CS	FK	14.9	0.3	Troublesome	N	Y
1017_1039	18n39e	5ST98.1839	1	CS	FK	14.7	0.2	Troublesome	N	N
1017_1039	18n39e	5ST98.1840	1	CS	FK	15.4	0.2	Troublesome	N	Y
1017_1039	18n39e	5ST98.1841	1	CS	FK	16.9	0.5	Troublesome	N	N
1017_1039	18n39e	5ST98.1842	1	CS	FK	11.4	0.1	Troublesome	N	Y
1017_1039	18n39e	5ST98.1843	1	CS	FK	14	0.3	Troublesome	N	N
1017_1039	18n39e	5ST98.1844	1	CS	FK	13.7	0.2	Troublesome	N	N
1017_1039	18n39e	5ST98.1845	1	CS	FK	13.9	0.3	Troublesome	N	Y
1017_1039	18n39e	5ST98.1846	1	CS	FK	13.9	0.2	Troublesome	N	N
1017_1039	18n39e	5ST98.1847	1	CS	FK	16.1	0.2	Troublesome	N	N

1017_1039	18n39e	5ST98.1848	1	CS	FK	13.3	0.2	Troublesome	N	N
1017_1039	18n39e	5ST98.1849	1	CS	FK	16	0.3	Troublesome	N	Y
1017_1039	18n39e	5ST98.1850	1	CS	FK	8.5	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1851	1	CS	FK	12.7	0.2	Troublesome	N	Y
1017_1039	18n39e	5ST98.1852	1	CS	FK	15	0.2	Troublesome	N	Y
1017_1039	18n39e	5ST98.1853	1	CS	FK	15.7	0.2	Troublesome	N	Y
1017_1039	18n39e	5ST98.1854	1	CS	FK	15	0.2	Troublesome	N	Y
1017_1039	18n39e	5ST98.1855	1	CS	FK	14.4	0.2	Troublesome	N	N
1017_1039	18n39e	5ST98.1856	1	CS	FK	12.2	0.2	Troublesome	N	N
1017_1039	18n39e	5ST98.1857	1	CS	FK	14	0.4	Troublesome	N	Y
1017_1039	18n39e	5ST98.1858	1	CS	FK	17	0.2	Troublesome	N	N
1017_1039	18n39e	5ST98.1859	1	CS	FK	13.8	0.3	Troublesome	N	Y
1017_1039	18n39e	5ST98.1860	1	CS	FK	11.5	0.2	Troublesome	N	N
1017_1039	18n39e	5ST98.1861	1	CS	FK	12.4	0.1	Troublesome	N	Y
1017_1039	18n39e	5ST98.1862	1	CS	FK	12.7	0.2	Troublesome	N	N
1017_1039	18n39e	5ST98.1863	1	CS	FK	8.3	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1864	1	CS	FK	10.2	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1865	1	CS	FK	12.9	0.2	Troublesome	N	Y
1017_1039	18n39e	5ST98.1866	1	CS	FK	10.2	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1867	1	CS	FK	10.6	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1868	1	CS	FK	12.4	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1869	1	CS	FK	10.3	0.2	Troublesome	N	Y
1017_1039	18n39e	5ST98.1870	1	CS	FK	12.7	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1871	1	CS	FK	7.8	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1872	1	CS	FK	11.1	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1873	1	CS	FK	9	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1874	1	CS	FK	8.9	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1875	1	CS	FK	14.3	0.2	Troublesome	N	N
1017_1039	18n39e	5ST98.1876	1	CS	FK	13.6	0.2	Troublesome	N	N
1017_1039	18n39e	5ST98.1877	1	CS	FK	8.3	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1878	1	CS	FK	11.5	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1879	1	CS	FK	11.5	0.2	Troublesome	N	N
1017_1039	18n39e	5ST98.1880	1	CS	FK	13.5	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1881	1	CS	FK	10	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1882	1	CS	FK	11.5	0.1	Troublesome	N	Y
1017_1039	18n39e	5ST98.1883	1	CS	FK	11.2	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1884	1	CS	FK	12.2	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1885	1	CS	FK	11.9	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1886	1	CS	FK	8.9	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1887	1	CS	FK	9.9	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1888	1	CS	FK	10.1	0.1	Troublesome	Y	N
1017_1039	18n39e	5ST98.1889	1	CS	FK	11.7	0.1	Troublesome	N	Y
1017_1039	18n39e	5ST98.1890	1	CS	FK	7.2	0.047	Troublesome	N	N
1017_1039	18n39e	5ST98.1891	1	CS	FK	11.7	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1892	1	CS	FK	8.9	0.1	Troublesome	N	Y
1017_1039	18n39e	5ST98.1893	1	CS	FK	13.7	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1894	1	CS	FK	9.8	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1895	2	CS	FK	19.5	0.4	Troublesome	N	N
1017_1039	18n39e	5ST98.1896	2	CS	FK	18	0.6	Troublesome	N	N
1017_1039	18n39e	5ST98.1897	2	CS	FK	20.4	0.5	Troublesome	N	N
1017_1039	18n39e	5ST98.1898	2	CS	FK	17.7	0.5	Troublesome	N	Y
1017_1039	18n39e	5ST98.1899	2	CS	FK	16	0.3	Troublesome	N	Y
1017_1039	18n39e	5ST98.1900	2	CS	FK	16.3	0.8	Troublesome	N	Y
1017_1039	18n39e	5ST98.1901	2	CS	FK	20.8	0.2	Troublesome	N	Y
1017_1039	18n39e	5ST98.1902	2	CS	FK	11.1	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1903	2	CS	FK	14.4	0.2	Troublesome	N	Y
1017_1039	18n39e	5ST98.1904	2	CS	FK	13.3	0.1	Troublesome	N	N

1017_1039	18n39e	5ST98.1905	2	CS	FK	0.2	14.8	Troublesome	N	Y
1017_1039	18n39e	5ST98.1906	2	CS	FK	14	0.3	Troublesome	N	N
1017_1039	18n39e	5ST98.1907	2	CS	FK	16.2	0.2	Troublesome	N	N
1017_1039	18n39e	5ST98.1908	2	CS	FK	14.1	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1909	2	CS	FK	11	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1910	2	CS	FK	7	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1911	2	CS	FK	17.7	0.3	Troublesome	N	Y
1017_1039	18n39e	5ST98.1912	2	CS	FK	10.1	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1914	2	CS	FK	7.7	0.1	Troublesome	N	Y
1017_1039	18n39e	5ST98.1915	2	CS	FK	7.6	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.1916	2	CS	FK	7	0.1	Troublesome	N	N
1017_1039	18n39e	5ST98.2370	unknown	CS	FK	23.7	0.9	Troublesome	N	N
1017_1039	18n39e	5ST98.2373	unknown	CS	FK	27.9	4.3	Quartzite	N	N
1017_1040	18n40e	5ST98.423	1	CS	FK	36.3	1.8	Troublesome	N	N
1017_1040	18n40e	5ST98.424	1	CS	FK	26.2	0.6	Troublesome	N	Y
1017_1040	18n40e	5ST98.425	1	CS	FK	24.4	0.3	Troublesome	N	N
1017_1040	18n40e	5ST98.426	1	CS	FK	22.8	0.6	Troublesome	N	N
1017_1040	18n40e	5ST98.427	1	CS	FK	12	0.1	Troublesome	N	N
1017_1040	18n40e	5ST98.428	1	CS	FK	25.7	1.1	Troublesome	N	N
1017_1040	18n40e	5ST98.429	1	CS	FK	19	0.5	Troublesome	N	N
1017_1040	18n40e	5ST98.430	1	CS	FK	15.5	0.3	Troublesome	N	N
1017_1040	18n40e	5ST98.431	1	CS	FK	17.5	0.4	Troublesome	N	Y
1017_1040	18n40e	5ST98.432	1	CS	FK	13.6	0.5	Troublesome	N	N
1017_1040	18n40e	5ST98.433	1	CS	FK	14.2	0.2	Troublesome	N	N
1017_1040	18n40e	5ST98.434	1	CS	FK	12.1	0.1	Troublesome	N	N
1017_1040	18n40e	5ST98.435	1	CS	FK	12.7	0.1	Troublesome	N	N
1017_1040	18n40e	5ST98.436	1	CS	FK	10.8	0.1	Troublesome	N	N
1017_1040	18n40e	5ST98.437	1	CS	FK	13.2	0.2	Troublesome	N	N
1017_1040	18n40e	5ST98.438	1	CS	FK	10.4	0.1	Troublesome	N	N
1017_1040	18n40e	5ST98.439	1	CS	FK	10.4	0.1	Troublesome	N	N
1017_1040	18n40e	5ST98.440	1	CS	FK	10.6	0.1	Troublesome	N	N
1017_1040	18n40e	5ST98.441	1	CS	FK	12	0.1	Troublesome	N	N
1017_1040	18n40e	5ST98.442	1	CS	FK	10.3	0.1	Troublesome	N	N
1017_1040	18n40e	5ST98.443	2	CS	FK	32.7	1.2	Troublesome	N	N
1017_1040	18n40e	5ST98.444	2	CS	FK	24.8	0.9	unknown	N	N
1017_1040	18n40e	5ST98.445	2	CS	FK	28.1	1.2	Troublesome	N	N
1017_1040	18n40e	5ST98.446	2	CS	FK	12.4	0.3	Troublesome	N	N
1017_1040	18n40e	5ST98.447	2	CS	FK	24.6	0.6	Troublesome	N	N
1017_1040	18n40e	5ST98.448	2	CS	FK	20.3	0.5	Troublesome	N	Y
1017_1040	18n40e	5ST98.449	2	CS	FK	21.5	0.7	Troublesome	N	N
1017_1040	18n40e	5ST98.450	2	CS	FK	14.4	0.4	Troublesome	N	N
1017_1040	18n40e	5ST98.451	2	CS	FK	11.5	0.2	Troublesome	N	N
1017_1040	18n40e	5ST98.452	2	CS	FK	13.6	0.2	unknown	N	N
1017_1040	18n40e	5ST98.453	2	CS	FK	20.9	0.4	Troublesome	N	Y
1017_1040	18n40e	5ST98.454	2	CS	FK	10.1	0.1	Troublesome	N	N
1017_1040	18n40e	5ST98.455	2	CS	FK	11.9	0.2	Troublesome	N	N
1017_1040	18n40e	5ST98.456	2	CS	FK	9.3	0.1	Troublesome	N	N
1017_1041	18n41e	5ST98.2372	unknown	CS	FK	40	12.9	unknown	N	Y
1017_1041	18n41e	5ST98.531	1	CS	FK	32.1	2.3	Troublesome	N	N
1017_1041	18n41e	5ST98.532	1	CS	FK	15	0.7	TMJ	N	N
1017_1041	18n41e	5ST98.533	1	CS	FK	15.3	0.6	TMJ	N	N
1017_1041	18n41e	5ST98.534	1	CS	FK	14.2	0.4	TMJ	N	Y
1017_1041	18n41e	5ST98.535	1	CS	FK	13.9	0.5	unknown	N	N
1017_1041	18n41e	5ST98.536	1	CS	FK	8.8	0.1	Windy Ridge Quartzite	N	N
1017_1041	18n41e	5ST98.537	1	CS	FK	15.2	0.1	Troublesome	N	N
1017_1041	18n41e	5ST98.538	1	CS	FK	9.9	0.1	Troublesome	N	N
1017_1041	18n41e	5ST98.539	1	CS	FK	10.4	0.1	Troublesome	N	N

1017_1041	18n41e	5ST98.540	1	CS	FK	8.7	0.1	Troublesome	N	N
1017_1041	18n41e	5ST98.541	2	CS	FK	22.2	1.1	unknown	N	N
1017_1041	18n41e	5ST98.542	2	CS	FK	13.6	0.2	unknown	N	N
1017_1041	18n41e	5ST98.543	2	CS	FK	16.5	0.8	Troublesome	N	Y
1017_1041	18n41e	5ST98.544	2	CS	FK	18.3	0.5	Troublesome	N	N
1017_1041	18n41e	5ST98.545	2	CS	FK	17.7	0.4	Troublesome	N	N
1017_1041	18n41e	5ST98.546	2	CS	FK	16.1	0.5	Troublesome	N	N
1017_1041	18n41e	5ST98.547	2	CS	FK	15.4	0.4	Troublesome	N	N
1017_1041	18n41e	5ST98.548	2	CS	FK	15.4	0.2	Troublesome	N	N
1017_1041	18n41e	5ST98.549	2	CS	FK	14	0.2	Troublesome	N	N
1017_1041	18n41e	5ST98.550	2	CS	FK	13.4	0.1	Troublesome	N	N
1017_1041	18n41e	5ST98.551	2	CS	FK	12.1	0.1	Troublesome	N	N
1017_1041	18n41e	5ST98.552	2	CS	FK	10.5	0.1	Troublesome	N	N
1018_1039	19n39e	5ST98.1786	1	CS	FK	12.2	0.3	Troublesome	N	Y
1018_1039	19n39e	5ST98.1787	1	CS	FK	12.7	0.2	Troublesome	N	Y
1018_1039	19n39e	5ST98.1788	2	CS	FK	29.9	0.7	Troublesome	N	Y
1018_1039	19n39e	5ST98.1789	2	CS	FK	12.3	0.1	Troublesome	N	Y
1018_1039	19n39e	5ST98.1790	2	CS	FK	16.6	0.9	TMJ	N	Y
1018_1039	19n39e	5ST98.1791	2	CS	FK	15.3	0.4	Troublesome	N	Y
1018_1039	19n39e	5ST98.1792	2	CS	FK	20.5	0.6	Troublesome	N	Y
1018_1039	19n39e	5ST98.1793	2	CS	FK	14.2	0.3	Troublesome	N	Y
1018_1039	19n39e	5ST98.1794	2	CS	FK	11.5	0.2	Troublesome	N	N
1018_1039	19n39e	5ST98.1795	2	CS	FK	14.9	0.2	Troublesome	N	Y
1018_1039	19n39e	5ST98.1796	2	CS	FK	12.6	0.2	Troublesome	N	Y
1018_1039	19n39e	5ST98.1797	2	CS	FK	8.5	0.1	Troublesome	N	Y
1018_1039	19n39e	5ST98.1798	2	CS	FK	9.1	0.1	unknown	N	N
1018_1039	19n39e	5ST98.1799	2	CS	FK	9.6	0.1	Troublesome	N	Y
1018_1039	19n39e	5ST98.1800	2	CS	FK	9.9	0.1	Troublesome	N	N
1018_1039	19n39e	5ST98.1801	3	CS	FK	20.9	1	Troublesome	N	Y
1018_1039	19n39e	5ST98.1802	3	CS	FK	12.3	0.1	Troublesome	N	Y
1018_1039	19n39e	5ST98.1803	3	CS	FK	11.4	0.2	Windy Ridge Quartzite	N	N
1018_1039	19n39e	5ST98.1804	3	CS	FK	8.3	0.1	Troublesome	N	Y
1018_1039	19n39e	5ST98.2369	unknown	CS	FK	27.2	2.9	Troublesome	N	N
1018_1040	19n40e	5ST98.1001	2	CS	FK	14.4	0.2	Troublesome	N	N
1018_1040	19n40e	5ST98.1002	2	CS	FK	11.6	0.2	Troublesome	N	N
1018_1040	19n40e	5ST98.1003	2	CS	FK	9.3	0.1	Troublesome	N	N
1018_1040	19n40e	5ST98.1004	2	CS	FK	9.3	0.1	Troublesome	N	N
1018_1040	19n40e	5ST98.1005	2	CS	FK	10.1	0.1	Troublesome	N	N
1018_1040	19n40e	5ST98.1006	2	CS	FK	15.6	0.3	Troublesome	N	Y
1018_1040	19n40e	5ST98.1007	2	CS	FK	8	0.1	Troublesome	N	Y
1018_1040	19n40e	5ST98.1008	2	CS	FK	7.2	0.1	Troublesome	N	N
1018_1040	19n40e	5ST98.1009	2	CS	FK	6.5	0.1	Troublesome	N	N
1018_1040	19n40e	5ST98.1010	2	CS	FK	8.5	0.1	Troublesome	N	Y
1018_1040	19n40e	5ST98.1011	2	CS	FK	8.6	0.1	Troublesome	N	N
1018_1040	19n40e	5ST98.978	1	CS	FK	36.5	1.6	Troublesome	N	N
1018_1040	19n40e	5ST98.979	1	CS	FK	14.8	0.3	Troublesome	N	Y
1018_1040	19n40e	5ST98.980	1	CS	FK	25	1	Troublesome	N	Y
1018_1040	19n40e	5ST98.981	1	CS	FK	18.4	0.5	unknown	N	N
1018_1040	19n40e	5ST98.982	1	CS	FK	21.1	0.3	Troublesome	N	N
1018_1040	19n40e	5ST98.983	1	CS	FK	25.6	0.8	Troublesome	N	Y
1018_1040	19n40e	5ST98.984	1	CS	FK	16.6	0.7	Troublesome	N	Y
1018_1040	19n40e	5ST98.985	1	CS	FK	24.1	0.6	Troublesome	N	N
1018_1040	19n40e	5ST98.986	1	CS	FK	13	0.1	Troublesome	N	N
1018_1040	19n40e	5ST98.987	1	CS	FK	10.1	0.2	Troublesome	N	Y
1018_1040	19n40e	5ST98.988	1	CS	FK	16.4	0.4	Troublesome	N	N
1018_1040	19n40e	5ST98.989	1	CS	FK	20	0.4	Troublesome	N	N
1018_1040	19n40e	5ST98.990	1	CS	FK	14.6	0.3	Troublesome	N	Y

1018_1040	19n40e	5ST98.991	1	CS	FK	11.9	0.1	Troublesome	N	Y
1018_1040	19n40e	5ST98.992	1	CS	FK	14.2	0.3	Troublesome	N	Y
1018_1040	19n40e	5ST98.993	1	CS	FK	10.4	0.1	Troublesome	N	Y
1018_1040	19n40e	5ST98.994	1	CS	FK	6.8	0.03	Troublesome	N	Y
1018_1040	19n40e	5ST98.995	1	CS	FK	9.2	0.1	Troublesome	N	N
1018_1040	19n40e	5ST98.996	1	CS	FK	10.2	0.1	Troublesome	N	N
1018_1040	19n40e	5ST98.997	1	CS	FK	11.5	0.1	Troublesome	N	Y
1018_1040	19n40e	5ST98.998	1	CS	FK	11.5	0.2	Troublesome	N	Y
1018_1040	19n40e	5ST98.999	2	CS	FK	27.6	1.6	Troublesome	N	Y
1019_1035	20n35e	5ST98.460	1	CS	FK	14.1	0.2	Windy Ridge Quartzite	N	N
1019_1039	20n39e	5ST98.1682	2	CS	FK	21.2	1.6	Troublesome	N	Y
1019_1039	20n39e	5ST98.1683	2	CS	FK	16.2	0.3	unknown	N	N
1019_1039	20n39e	5ST98.1684	2	CS	FK	14.8	0.4	Troublesome	N	Y
1019_1039	20n39e	5ST98.1685	2	CS	FK	19.3	0.5	Troublesome	N	Y
1019_1039	20n39e	5ST98.1686	2	CS	FK	13.3	0.3	Troublesome	N	N
1019_1039	20n39e	5ST98.1687	2	CS	FK	17.8	0.7	Troublesome	N	Y
1019_1039	20n39e	5ST98.1688	2	CS	FK	16.9	0.9	Troublesome	N	Y
1019_1039	20n39e	5ST98.1689	3	CS	FK	32.4	6	Troublesome	Y	N
1019_1039	20n39e	5ST98.1690	3	CS	FK	27.8	1.8	Troublesome	N	N
1019_1039	20n39e	5ST98.1691	3	CS	FK	24.8	1.8	Troublesome	N	N
1019_1039	20n39e	5ST98.1692	3	CS	FK	18.4	1	Troublesome	N	N
1019_1039	20n39e	5ST98.1693	3	CS	FK	22.9	0.8	Troublesome	N	N
1019_1039	20n39e	5ST98.1694	3	CS	FK	17.9	0.3	Troublesome	N	N
1019_1039	20n39e	5ST98.1695	3	CS	FK	18.8	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1696	3	CS	FK	17.2	0.5	Troublesome	N	Y
1019_1039	20n39e	5ST98.1697	3	CS	FK	11.2	0.2	Troublesome	N	Y
1019_1039	20n39e	5ST98.1698	4	CS	FK	27.3	1.4	Troublesome	N	N
1019_1039	20n39e	5ST98.1699	4	CS	FK	34.4	1.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1700	4	CS	FK	35.5	2.9	Troublesome	Y	N
1019_1039	20n39e	5ST98.1701	4	CS	FK	25.5	1.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1702	4	CS	FK	25.9	0.8	Troublesome	N	N
1019_1039	20n39e	5ST98.1703	4	CS	FK	25	1.7	Troublesome	N	N
1019_1039	20n39e	5ST98.1704	4	CS	FK	22.9	0.7	Troublesome	N	N
1019_1039	20n39e	5ST98.1705	4	CS	FK	19.7	0.3	Troublesome	N	N
1019_1039	20n39e	5ST98.1706	4	CS	FK	19.6	1.4	Troublesome	N	N
1019_1039	20n39e	5ST98.1707	4	CS	FK	23.9	0.8	Troublesome	N	N
1019_1039	20n39e	5ST98.1708	4	CS	FK	28.5	0.9	Troublesome	N	N
1019_1039	20n39e	5ST98.1709	4	CS	FK	24.4	1.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1710	4	CS	FK	22.7	0.9	Troublesome	N	N
1019_1039	20n39e	5ST98.1711	4	CS	FK	24.3	0.8	Troublesome	N	N
1019_1039	20n39e	5ST98.1712	4	CS	FK	20.9	0.4	Troublesome	N	N
1019_1039	20n39e	5ST98.1713	4	CS	FK	19.4	0.5	Troublesome	N	N
1019_1039	20n39e	5ST98.1714	4	CS	FK	17	0.9	Troublesome	N	N
1019_1039	20n39e	5ST98.1715	4	CS	FK	22.3	0.9	Troublesome	N	N
1019_1039	20n39e	5ST98.1716	4	CS	FK	21.1	0.3	Troublesome	N	N
1019_1039	20n39e	5ST98.1717	4	CS	FK	20.2	0.3	Troublesome	N	N
1019_1039	20n39e	5ST98.1718	4	CS	FK	23.9	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1719	4	CS	FK	18	0.5	Troublesome	N	N
1019_1039	20n39e	5ST98.1720	4	CS	FK	20	0.7	Troublesome	N	N
1019_1039	20n39e	5ST98.1721	4	CS	FK	20.4	0.5	Troublesome	N	N
1019_1039	20n39e	5ST98.1722	4	CS	FK	20	0.6	Troublesome	N	N
1019_1039	20n39e	5ST98.1723	4	CS	FK	21	0.8	Troublesome	N	Y
1019_1039	20n39e	5ST98.1724	4	CS	FK	15.7	0.2	Troublesome	N	Y
1019_1039	20n39e	5ST98.1725	4	CS	FK	16.4	0.5	Troublesome	N	N
1019_1039	20n39e	5ST98.1726	4	CS	FK	17.9	0.5	Troublesome	N	N
1019_1039	20n39e	5ST98.1727	4	CS	FK	11.2	0.2	unknown	N	N
1019_1039	20n39e	5ST98.1728	4	CS	FK	17.7	0.4	Troublesome	N	N

1019_1039	20n39e	5ST98.1729	4	CS	FK	25.1	0.6	Troublesome	N	N
1019_1039	20n39e	5ST98.1730	4	CS	FK	18.8	0.5	Troublesome	N	N
1019_1039	20n39e	5ST98.1731	4	CS	FK	18.3	0.6	Troublesome	N	N
1019_1039	20n39e	5ST98.1732	4	CS	FK	21.9	0.5	Troublesome	Y	N
1019_1039	20n39e	5ST98.1733	4	CS	FK	20.9	0.6	Troublesome	Y	N
1019_1039	20n39e	5ST98.1734	4	CS	FK	18.4	0.7	Troublesome	Y	N
1019_1039	20n39e	5ST98.1735	4	CS	FK	21.1	0.4	Troublesome	N	N
1019_1039	20n39e	5ST98.1736	4	CS	FK	18.5	0.5	Troublesome	Y	N
1019_1039	20n39e	5ST98.1737	4	CS	FK	19.1	0.5	Troublesome	N	N
1019_1039	20n39e	5ST98.1738	4	CS	FK	19.2	0.5	Troublesome	N	N
1019_1039	20n39e	5ST98.1739	4	CS	FK	16.8	0.6	Troublesome	N	N
1019_1039	20n39e	5ST98.1740	4	CS	FK	17.1	0.5	Troublesome	N	N
1019_1039	20n39e	5ST98.1741	4	CS	FK	15.2	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1742	4	CS	FK	15.9	0.4	Troublesome	N	N
1019_1039	20n39e	5ST98.1743	4	CS	FK	18.6	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1744	4	CS	FK	15.1	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1745	4	CS	FK	14.3	0.3	Troublesome	N	N
1019_1039	20n39e	5ST98.1746	4	CS	FK	11.5	0.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1747	4	CS	FK	16	0.3	Troublesome	N	N
1019_1039	20n39e	5ST98.1748	4	CS	FK	17.5	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1749	4	CS	FK	16.7	0.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1750	4	CS	FK	13.2	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1751	4	CS	FK	12.9	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1752	4	CS	FK	15.7	0.3	Troublesome	N	N
1019_1039	20n39e	5ST98.1753	4	CS	FK	12.1	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1754	4	CS	FK	12.4	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1755	4	CS	FK	14.7	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1756	4	CS	FK	16.9	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1757	4	CS	FK	15.4	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1758	4	CS	FK	17.1	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1759	4	CS	FK	14.3	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1760	4	CS	FK	14.8	0.3	Troublesome	N	N
1019_1039	20n39e	5ST98.1761	4	CS	FK	13.2	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1762	4	CS	FK	13.8	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1763	4	CS	FK	11.3	0.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1764	4	CS	FK	9.8	0.1	Windy Ridge Quartzite	N	N
1019_1039	20n39e	5ST98.1765	4	CS	FK	16.4	0.3	Troublesome	N	N
1019_1039	20n39e	5ST98.1766	4	CS	FK	17.5	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1767	4	CS	FK	15.4	0.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1768	4	CS	FK	10.8	0.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1769	4	CS	FK	10.3	0.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1770	4	CS	FK	17.4	0.2	Troublesome	Y	N
1019_1039	20n39e	5ST98.1771	4	CS	FK	10.1	0.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1772	4	CS	FK	13.8	0.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1773	4	CS	FK	13.8	0.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1774	4	CS	FK	14.5	0.4	Troublesome	N	N
1019_1039	20n39e	5ST98.1775	4	CS	FK	10.6	0.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1776	4	CS	FK	10.4	0.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1777	4	CS	FK	13.8	0.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1778	4	CS	FK	9.9	0.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1779	4	CS	FK	13.7	0.1	Troublesome	N	N
1019_1039	20n39e	5ST98.1780	4	CS	FK	12.1	0.2	Troublesome	N	N
1019_1039	20n39e	5ST98.1781	5	CS	FK	35.8	1.5	Troublesome	Y	N
1019_1039	20n39e	5ST98.1782	5	CS	FK	29.4	1.7	Troublesome	Y	N
1019_1039	20n39e	5ST98.1783	5	CS	FK	25.1	0.8	Troublesome	N	N
1019_1039	20n39e	5ST98.1784	5	CS	FK	20.6	0.5	Troublesome	N	N
1019_1039	20n39e	5ST98.2367	unknown	CS	FK	23.8	1.5	Troublesome	N	Y

968_993	30s7w	5ST98.125	1	CS	FK	14.1	0.2	Troublesome	N	N
968_993	30s7w	5ST98.126	2	CS	FK	10.1	0.1	Troublesome	N	N
973_995	25s5w	5ST98.1	1	CS	FK	20.9	0.7	Troublesome	N	N
973_995	25s5w	5ST98.2	1	CS	FK	14.3	0.1	Troublesome	Y	N
973_995	25s5w	5ST98.3	1	CS	FK	11.1	0.1	Troublesome	N	N
974_993	24s7w	5ST98.4	1	CS	FK	15.6	0.4	TMJ	N	N
974_993	24s7w	5ST98.5	1	CS	FK	15.5	0.4	Troublesome	N	Y
978_991	21s9w	5ST98.10	3	CS	FK	25.5	1.3	unknown	N	N
978_991	21s9w	5ST98.2371	1	CS	FK	14.4	0.6	Troublesome	N	N
978_991	21s9w	5ST98.6	1	CS	FK	13.6	0.3	Troublesome	N	N
978_991	21s9w	5ST98.7	2	CS	FK	18.6	1.1	Troublesome	N	N
978_991	21s9w	5ST98.8	2	CS	FK	23.2	1.1	Troublesome	N	N
978_991	21s9w	5ST98.9	2	CS	FK	17.7	0.8	Troublesome	N	N
979_994	20s6w	5ST98.21	1	CS	FK	16.6	0.6	Windy Ridge Quartzite	N	N
979_996	20s4w	5ST98.1677	1	CS	FK	12.3	0.2	unknown	N	N
979_996	20s4w	5ST98.1678	1	CS	FK	10.1	0.1	Troublesome	N	N
979_996	20s4w	5ST98.1679	2	CS	FK	11.8	0.2	Troublesome	N	N
979_996	20s4w	5ST98.1680	2	CS	FK	6.6	0.1	unknown	N	N
980_991	19s9w	5ST98.12	2	CS	FK	15.7	0.3	Troublesome	N	N
980_994	19s6w	5ST98.2584	13cm	CS	FK	7	0.093	TMJ	N	N
980_994	19s6w	5ST98.2585	13 - 15 cm	CS	FK	11.8	0.158	Troublesome	N	Y
980_994	19s6w	5ST98.2586	19 cm	CS	FK	4.4	0.012	Troublesome	N	N
980_995	19s5w	5ST98.20	2	CS	FK	8.4	0.1	unknown	N	N
981_993	18s7w	5ST98.13	2	CS	FK	17.3	1.1	Troublesome	N	N
983_994	16s6w	5ST98.1036	1	CS	FK	9.9	0.1	Windy Ridge Quartzite	N	N
983_994	16s6w	5ST98.1037	2	CS	FK	10.6	0.1	Troublesome	Y	N
984_963	15s37w	5ST98.11	1	CS	FK	31.9	1.8	unknown	N	N
986_999	13s1w	5ST98.1013	1	CS	FK	23.5	1.6	Troublesome	Y	Y
986_999	13s1w	5ST98.1014	1	CS	FK	12.3	0.7	TMJ	N	N
986_999	13s1w	5ST98.1015	1	CS	FK	17.4	0.7	Troublesome	Y	N
986_999	13s1w	5ST98.1016	1	CS	FK	16.3	0.4	Windy Ridge Quartzite	N	N
986_999	13s1w	5ST98.1017	1	CS	FK	12.7	0.2	Troublesome	N	N
986_999	13s1w	5ST98.1018	1	CS	FK	18.8	0.3	Windy Ridge Quartzite	N	N
986_999	13s1w	5ST98.1019	1	CS	FK	12	0.2	Windy Ridge Quartzite	N	N
986_999	13s1w	5ST98.1020	1	CS	FK	12.6	0.2	Windy Ridge Quartzite	N	N
986_999	13s1w	5ST98.1021	1	CS	FK	14	0.2	Windy Ridge Quartzite	N	N
986_999	13s1w	5ST98.1022	1	CS	FK	12.8	0.1	Troublesome	N	N
986_999	13s1w	5ST98.1023	1	CS	FK	12.4	0.2	Troublesome	N	Y
986_999	13s1w	5ST98.1024	1	CS	FK	16.8	0.4	Troublesome	N	N
986_999	13s1w	5ST98.1025	1	CS	FK	11.5	0.2	Troublesome	N	N
986_999	13s1w	5ST98.1026	1	CS	FK	14.3	0.1	Troublesome	N	N
986_999	13s1w	5ST98.1027	1	CS	FK	10.8	0.2	Troublesome	N	N
986_999	13s1w	5ST98.1028	1	CS	FK	11.6	0.2	Troublesome	N	N
986_999	13s1w	5ST98.1029	1	CS	FK	11	0.2	Troublesome	N	N
986_999	13s1w	5ST98.1030	1	CS	FK	13.3	0.2	Troublesome	N	N
986_999	13s1w	5ST98.1031	2	CS	FK	18.6	1	Windy Ridge Quartzite	N	N
986_999	13s1w	5ST98.1032	2	CS	FK	20.9	1	Windy Ridge Quartzite	N	N
986_999	13s1w	5ST98.1033	2	CS	FK	15.1	0.7	Troublesome	Y	N
986_999	13s1w	5ST98.1034	2	CS	FK	13.5	0.2	Troublesome	N	N
986_999	13s1w	5ST98.1035	2	CS	FK	16.3	0.2	Troublesome	N	N
987_973	12s27w	5ST98.954	1	CS	FK	19.2	0.6	Troublesome	N	N
990_1007	9s7e	5ST98.188	1	CS	FK	9.3	0.2	Troublesome	N	N
995_1001	4s1e	5ST98.1982	1	CS	FK	12.6	0.2	Troublesome	N	Y
995_1001	4s1e	5ST98.1983	1	CS	FK	11.5	0.3	Troublesome	N	N
995_1001	4s1e	5ST98.1984	1	CS	FK	11.2	0.1	Troublesome	N	N
995_1001	4s1e	5ST98.1985	1	CS	FK	8	0.096	Windy Ridge Quartzite	N	N
995_1001	4s1e	5ST98.1986	2	CS	FK	15.2	0.4	unknown	N	Y

995_1001	4s1e	5ST98.1987	2	CS	FK	19.3	0.9	Troublesome	N	Y
995_1001	4s1e	5ST98.1988	2	CS	FK	15.6	0.6	Troublesome	N	Y
995_965	4s35w	5ST98.14	surface	CS	FK	13.8	0.3	Troublesome	N	N
995_965	4s35w	5ST98.15	surface	CS	FK	8.9	0.1	Troublesome	N	N
995_965	4s35w	5ST98.16	1	CS	FK	25.9	1.6	Troublesome	N	N
995_965	4s35w	5ST98.17	1	CS	FK	19	0.7	Troublesome	N	N
995_965	4s35w	5ST98.18	1	CS	FK	14.6	0.4	Troublesome	N	N
995_965	4s35w	5ST98.19	2	CS	FK	10.8	0.1	Troublesome	N	N
995_989	4s11w	5ST98.127	2	CS	FK	17.1	0.4	Troublesome	N	N
995_989	4s11w	5ST98.128	2	CS	FK	15.3	0.3	Troublesome	N	N
995_989	4s11w	5ST98.129	2	CS	FK	11.5	0.1	Troublesome	N	N
996_978	3s22w	5ST98.1038	1	CS	FK	12.9	0.2	unknown	N	N
996_978	3s22w	5ST98.1039	3	CS	FK	12.9	0.3	Troublesome	N	N
997_995	2s5w	5ST98.955	1	CS	FK	24.2	1.5	Troublesome	Y	Y
997_995	2s5w	5ST98.956	1	CS	FK	21.7	1.8	Troublesome	Y	Y
997_995	2s5w	5ST98.957	1	CS	FK	9.7	0.2	Troublesome	N	Y
997_995	2s5w	5ST98.958	1	CS	FK	13	0.3	Troublesome	N	Y
997_995	2s5w	5ST98.959	1	CS	FK	15.2	0.4	Troublesome	N	Y
997_995	2s5w	5ST98.960	1	CS	FK	14.9	0.7	Windy Ridge Quartzite	N	N
997_995	2s5w	5ST98.961	1	CS	FK	12.7	0.3	Troublesome	N	N
997_995	2s5w	5ST98.962	1	CS	FK	14.8	0.2	Troublesome	N	N
997_995	2s5w	5ST98.963	1	CS	FK	10.5	0.1	Troublesome	N	N
997_995	2s5w	5ST98.964	1	CS	FK	12.1	0.3	Troublesome	N	N
997_995	2s5w	5ST98.965	2	CS	FK	13.6	0.2	TMJ	N	N
997_995	2s5w	5ST98.966	2	CS	FK	16.5	0.6	unknown	N	N
997_995	2s5w	5ST98.967	2	CS	FK	15.3	0.7	Troublesome	Y	Y
997_995	2s5w	5ST98.968	2	CS	FK	19.9	0.6	Troublesome	Y	Y
997_995	2s5w	5ST98.969	2	CS	FK	18.1	0.6	Troublesome	N	N
997_995	2s5w	5ST98.970	2	CS	FK	18.6	0.4	Troublesome	N	N
997_995	2s5w	5ST98.971	2	CS	FK	11.9	0.2	Troublesome	N	N
997_995	2s5w	5ST98.972	2	CS	FK	9	0.1	Troublesome	N	N
997_995	2s5w	5ST98.973	2	CS	FK	12.1	0.2	Troublesome	N	N
997_995	2s5w	5ST98.974	2	CS	FK	11.9	0.1	Troublesome	N	N
997_995	2s5w	5ST98.975	2	CS	FK	6.8	0.1	Troublesome	N	N
997_995	2s5w	5ST98.976	3	CS	FK	19.8	0.5	Troublesome	N	N
997_995	2s5w	5ST98.977	3	CS	FK	16.3	0.5	Troublesome	N	N
999_989	0n11w	5ST98.287	1	CS	FK	21.5	1.1	Troublesome	N	N
999_989	0n11w	5ST98.288	1	CS	FK	13.6	0.5	Troublesome	N	N
999_989	0n11w	5ST98.289	1	CS	FK	19.9	0.8	Troublesome	N	N
999_989	0n11w	5ST98.290	1	CS	FK	13.2	0.4	Troublesome	N	N
999_989	0n11w	5ST98.291	1	CS	FK	10.4	0.1	Troublesome	N	N
999_989	0n11w	5ST98.292	1	CS	FK	10.3	0.1	Troublesome	N	Y
999_989	0n11w	5ST98.293	1	CS	FK	11	0.1	Troublesome	N	N
999_989	0n11w	5ST98.294	1	CS	FK	8.1	0.1	Troublesome	N	N
999_989	0n11w	5ST98.295	1	CS	FK	8	0.1	Troublesome	N	N
999_989	0n11w	5ST98.296	2	CS	FK	19.1	0.8	Troublesome	Y	N
999_989	0n11w	5ST98.297	2	CS	FK	10.2	0.1	Troublesome	N	N
999_989	0n11w	5ST98.298	2	CS	FK	10	0.1	Troublesome	N	N
999_989	0n11w	5ST98.299	2	CS	FK	10.2	0.1	Troublesome	N	Y

Edge Modified Flake

Thousands Conversions	Unit (X,Y)	Catalogue Number	Level	Class	Element	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Average Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
1016, 1047	17n47e	5ST98.2571	Unknown	CS	EMF	95.9	45.7	12.3	59.5	Unknown	yes	No
No Prov.	No Prov. Surface	5ST98.2569	surface	CS	FT	34.5	31.9	5.1	5.6	Unknown	No	No
1005, 997	6n3w	5ST98.2570	unknown	CS	FT	24.9	22	3.8	1.5	Troublesome	No	No

Fire-Cracked Rock

Unit (X,Y)	Catalogue Number	Level	Class	Element	Maximum Length (cm)	Maximum Width (cm)	Mass (g)	Maximum Thickness (cm)	Raw Material	Burn (Y/N)
18n41e	5ST98.2389	2	FCR	n/a	6.3	3	18.3	1	Schist	Y
No prov.	5ST98.2390	Surface	FCR	n/a	18	11.2	521.6	3.3	Schist	Y
No prov.	5ST98.2391	Surface	FCR	n/a	5.5	3.8	40.6	2	Schist	Y

Ground Stone

Thousands Convesions	Unit (X,Y)	Catalogue Number	Level	Class	Element	Maximum Length (cm)	Maximum Width (cm)	Mass (g)	Maximum Thickness (cm)	Raw Material	Burn (Y/N)	Notes
No prov.	No prov.	5ST98.2382	Surface	GS	Netherstone	5.2	3.9	56.5	2.8	Sandstone	N	This is a highly fragmented piece of Netherstone has one worked side intact.
1004, 990	5n10w	5ST98.2380	Surface	GS	Handstone	11.5	8.2	793.8	4.9	Sandstone	N	2 pieces glued together, both sides appear to be used.
1004, 1000	5n0w	5ST98.2377	Surface	GS	Netherstone	6.9	3.4	21	0.6	Sandstone	N	Four pieces glued together, micaceous
1005, 991	6n9w	5ST98.2374	Surface	GS	Netherstone	24.7	20.1	2041	4.2	Sandstone	N	This piece is made up of six fragments glued together
1005, 991	6n9w	5ST98.2375	Surface	GS	Netherstone	7.5	7.1	56.1	1.4	Sandstone	N	Singular piece of sandstone, micaceous.
1005, 999	6n1w	5ST98.2379	Surface	GS	Netherstone	18.3	11.4	952.5	5		N	three pieces glued together
1007, 981	8n19w	5ST98.2376	Surface	GS	Netherstone	5.8	5.1	18.3	0.7	Sandstone	N	Three pieces glued together, micaceous
1007, 981	8n19w	5ST98.2378	Surface	GS	Netherstone	3	3.6	12.7	3.6	Sandstone	N	Singular fragment of netherstone, micaceous.

No prov.	No prov.	5ST98.2381	Surface	GS	Hand stone	12	6	45.4	6	Sandstone	N	One ground stone fragment, looks like the butt end of one.
No prov.	No prov.	5ST98.2384	Surface	GS	Hand stone	5.7	3.8	1.8	39.5	Sandstone	N	This hand stone is heavily fragmented and circular in shape with polished edges all around the edge. Porous and micaceous rock.
No prov.	No prov.	5ST98.2385	Surface	GS	Hand stone	6.1	3	62.8	3	Sandstone	N	This hand-stone fragment has two clear faces and a polished edge between them. It is very rounded.
No prov.	No prov.	5ST98.2386	Surface	GS	Hand stone	4.1	4.1	29.7	1.6	Sandstone	N	This hand-stone fragment has three polished faces and smooth edges between them. Made up of a coarse grained sandstone.
No prov.	No prov.	5ST98.2387	Surface	GS	Netherstone	8.1	7.4	38.8	0.7	Sandstone	N	This netherstone is made up of six fragmented pieces.
No prov.	No prov.	5ST98.2388	Surface	GS	Netherstone	9	5.3	115.5	2.6	Sandstone	N	This fragment of netherstone is a singular piece with two clear faces and rough edges.
No prov.	No prov.	5ST98.2383	Surface	GS	Unknown	4.6	3.8	35.3	2.1	Sandstone	N	This piece comes from a bag of FCR and ground stone and is unspecified as to what it is. Looking at its characteristics the piece is heavily fragmented, with only one intact smooth side with mild curvature and a lip. There are not enough characteristics to categorize whether it is a

												hand stone or a netherstone.

Historic Artifacts

Unit (X, Y)	Catalogue Number	Level	Class	Element	Count	Comments
"5ST98 Lower"	5ST98.2574	Surface	HISTORIC	Ceramic	1	Porcelain
"5ST98 Lower"	5ST98.2575	Surface	HISTORIC	Amethyst Glass	1	Just a single fragment
"No prov. Or surface no prov."	5ST98.2576	Surface	HISTORIC	Penny	1	1968 Penny
"No prov. Or surface no prov."	5ST98.2577	Surface	HISTORIC	Button Half	1	Plastic
"5ST98 SW8"	5ST98.2578	Surface	HISTORIC	Insulator Glass	1	Likely from modern insulators in the area
"5ST98 SW8"	5ST98.2579	Surface	HISTORIC	Modern Bead	1	A circular white bead with the letter "R" printed on it in black on both sides.
"5ST98 Upper"	5ST98.2580	Surface	HISTORIC	Amethyst Glass	8	Several fragments of amethyst glass, some pieces are thick while others are fairly thin.
"No prov. Or surface no prov."	5ST98.2581	Surface	HISTORIC	Amethyst Glass	116	Potential Medicine Bottle, one base has the letter "T" for the manufacturer
"No prov. Or surface no prov."	5ST98.2582	Surface	HISTORIC	Track Spike	1	Mining Context?
"No prov. Or surface no prov."	5ST98.2583	Surface	HISTORIC	Forged Nail	2	Type B nails (1810s-1900s), fully tapered, machine-made heads. The most common nail in the 19th century.

Preforms

Thousands Conversions	Catalogue Number	Unit (X,Y)	Level	Element	Portion	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
1004, 995	5ST98.2496	5n5w	surface	Preform	CO	33.2	23.6	4.6	3.3	Kremmling Chert	N	N
1002, 988	5ST98.2497	3n12w	surface	Preform	PR/MS	30.8	27.5	3.6	2.9	Kremmling Chert	N	N
1005, 985	5ST98.2534	6n15w	n/a	Preform	CO	31.8	22.4	5.5	3.9	Kremmling Chert	N	N
No Prov.	5ST98.2512	n/a	surface	Preform	ABC	25.4	16.8	2.3	0.9	Kremmling Chert	N	N

Projectile Points

Thousands Conversions	Catalogue Number	Porcupine Peak Artifact Number (Madden)	Unit (X,Y)	Level	Element	Portion	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)	Comments
1000, 986	5ST98.2439	14	1n14w	1	PP	CO	17	10	2.24	0.3	Troublesome Chert	N	N	no comment
1001, 995	5ST98.2443	19	2n5w	1	PP	PR	10	18.3	4.4	0.5	Troublesome Chert	N	N	no comment
1002, 988	5ST98.2448	9	3n12w		PP	MS	14.4	20.5	4.3	1.3	Troublesome Chert	N	N	no comment
1002, 994	5ST98.2451	16	3n6w	1	PP	ABC	50.8	23.7	7.5	6.9	Troublesome Chert	N	N	no comment
1002, 994	5ST98.2452	17	3n6w	1	PP	PR/MS	33.7	23.1	5.2	3.6	Troublesome Chert	N	N	serrated
1002, 995	5ST98.2444	1	3n5w	1	PP	CO	25.4	18.1	4.9	1.9	Troublesome Chert	N	N	serrated
1002, 995	5ST98.2445	2	3n5w	1	PP	ABC	29.9	19.9	5.8	3.1	Troublesome Chert	N	N	no comment
1002, 995	5ST98.2446	3	3n5w	1	PP	CO	35	22.3	4.9	3.2	Troublesome Chert	N	N	serrated
1002, 995	5ST98.2447	4	3n5w	1	PP	PR	11.1	20.9	4.5	0.9	Troublesome	N	N	no comment
1002, 996	5ST98.2449	20	3n4w	1	PP	PR/MS	32.3	18.1	5.1	2.7	Troublesome Chert	N	N	no comment
1002, 996	5ST98.2450	21	3n4w	3	PP	PR	8.9	15.6	3.5	0.5	Troublesome Chert	N	N	no comment
1003, 994	5ST98.2455	38	4n6w	2	PP	CO	44.4	27.9	6.8	6.1	Troublesome Chert	N	N	serrated
1003, 995	5ST98.2453	11	4n5w	1	PP	ABC	31.1	20.5	5	2.4	unknown	N	N	no comment
1003, 995	5ST98.2454	90	4n5w	1	PP	DS	13.2	12.5	3	0.5	Windy Ridge Quartzite	N	N	no comment
1003, 998	5ST98.2498	n/a	4n2w	surface	PP	PR	27.2	17.6	3.7	1.6	unknown	N	N	no comment
1003, 998	5ST98.2499	n/a	4n12w	surface	PP	DS	15.3	13.6	4	0.9	Troublesome Chert	N	N	no comment
1004, 993	5ST98.2462	42	5n7w	1	PP	PR/MS	22.2	19.2	5.3	1.8	Troublesome Chert	N	N	no comment
1004, 993	5ST98.2463	47	5n7w	4	PP	PR	9.2	17.8	4	0.5	Troublesome Chert	N	N	no comment
1004, 994	5ST98.2461	66	5n6w	2	PP	PR/MS	24.2	24	5.1	3.2	Troublesome Chert	N	N	no comment

1004, 994	5ST98.2493	75	5n6w	1	PP	LT	18	17.6	3.7	0.8	Table Mountain Jasper	N	N	refits with 52, 71
1004, 995	5ST98.2458	58	5n5w	1	PP	PR/MS	33.5	21.5	5.1	3.5	Troublesome Chert	N	N	no comment
1004, 995	5ST98.2459	69	5n5w	2	PP	MS	17.7	20.4	5.4	2.2	Troublesome Chert	N	N	no comment
1004, 995	5ST98.2460	70	5n5w	2	PP	MS/DS	27.3	23.8	5.8	4.3	Troublesome Chert	N	N	no comment
1004, 997	5ST98.2456	82	5n3w	1	PP	MS/DS	18.7	17.8	3.9	1	Troublesome Chert	N	N	serrated
1004, 997	5ST98.2457	85	5n3w	2	PP	PR/MS	29.7	32.5	5.5	5.2	unknown	N	N	no comment
1005, 989	5ST98.2464	110	6n11w	1	PP	DS	15	12.5	4.5	0.8	Troublesome Chert	N	N	no comment
1005, 991	5ST98.2470	26	6n9w	1	PP	PR/MS	36.7	20.7	6.1	3.9	Troublesome Chert	N	N	no comment
1005, 991	5ST98.2476	74	6n9w	1	PP	PR/MS	16.3	19.6	3.3	1	Troublesome Chert	N	N	no comment
1005, 992	5ST98.2469	22	6n8w	3	PP	PR	9	14.8	3.9	0.4	Troublesome Chert	N	N	no comment
1005, 993	5ST98.2471	30	6n7w	2	PP	ABC	28.9	22.9	4.7	2.5	Troublesome Chert	N	N	serrated
1005, 993	5ST98.2472	32	6n7w	4	PP	ABC	36.8	24.8	4.2	3.3	Troublesome Chert	N	N	no comment
1005, 993	5ST98.2473	33	6n7w	4	PP	CO	35.7	20.2	5.2	2.6	Troublesome Chert	N	N	serrated
1005, 993	5ST98.2474	23	6n7w	2	PP	ABC	31.8	22.2	5.1	2.4	Troublesome Chert	N	N	serrated
1005, 993	5ST98.2475	29	6n7w	2	PP	CO	40	17	3.3	5.6	unknown	N	N	serrated
1005, 994	5ST98.2465	40	6n6w	two	PP	CO	35.2	20.6	4.7	3	Troublesome Chert	N	N	serrated
1005, 994	5ST98.2466	41	6n6w	3	PP	MS/DS	17.6	20.3	4.8	1.7	Troublesome Chert	N	N	no comment
1005, 994	5ST98.2467	91	6n6w	2	PP	MS	11.3	14.6	4	0.8	Troublesome Chert	N	N	no comment
1005, 994	5ST98.2468	92	6n6w	3	PP	PR	14.4	18.6	4.8	1.4	Troublesome Chert	N	N	no comment

1005, 995	5ST98.2617	n/a	6n5w	1	pp	DS	9.5	6	2.8	0.13	Troublesome Chert	N	N	Written on the original packaging is the following: "6n5w SW 0 - 2.5 cm" BURNED
1006, 990	5ST98.2477	94	7n10w	2	PP	ABC	38.6	25.8	5.7	4.8	Troublesome Chert	N	N	serrated
1006, 991	5ST98.2485	93	7n9w	2	PP	PR/MS	40.2	29.8	6.3	7.5	Troublesome Chert	N	N	serrated
1006, 993	5ST98.2478	51	7n7w	1	PP	PR	12.3	14.2	3.9	0.5	Troublesome Chert	N	N	no comment
1006, 993	5ST98.2479	54	7n7w	2	PP	CO	32.5	21.8	5.4	3.2	Troublesome Chert	N	N	serrated
1006, 993	5ST98.2480	57	7n7w	4	PP	MS/DS	32.4	26.2	7.6	5.7	Troublesome Chert	N	N	no comment
1006, 993	5ST98.2494	52	7n7w	1	PP	PR/MS	23.3	17.1	4.4	1.6	Table Mountain Jasper	N	N	same material as, and likely the tip of, 131
1006, 994	5ST98.2484	67	7n6w	1	PP	ABC	38.7	22.3	5.2	4.4	Troublesome Chert	N	N	serrated
1006, 994	5ST98.2492	71	7n6w	2	PP	MS	44.5	22.7	5.7	8.6	Table Mountain Jasper	N	N	same material as, and likely the medial portion of, 52
1006, 996	5ST98.2481	77	7n4w	1	PP	ABC	32.6	20.6	5	3	Troublesome Chert	N	N	no comment
1006, 996	5ST98.2482	79	7n4w	2	PP	PR/MS	24.4	17.6	3.7	2	Troublesome Chert	N	N	no comment
1006, 996	5ST98.2483	80	7n4w	2	PP	PR/MS	14.5	20.9	4.2	1.3	Troublesome Chert	N	N	no comment
1007, 989	5ST98.2486	112	8n11w	2	PP	DS	19.6	15.2	4.6	1.1	quartzite	N	N	no comment
1007, 991	5ST98.2491	97	8n9w	1	PP	PR	9.26	17.5	2.9	0.4	Troublesome Chert	N	N	no comment

1007, 993	5ST98.2489	95	8n7w	1	PP	PR/MS	22.3	18.1	5.6	2.5	Troublesome Chert	N	N	no comment
1007, 993	5ST98.2490	96	8n7w		PP	PR/MS	15.4	19.5	4.2	1.5	Troublesome Chert	N	N	no comment
1007, 994	5ST98.2487	83	8n6w	1	PP	PR	17.3	14.7	3.8	1.7	Troublesome Chert	N	N	no comment
1007, 994	5ST98.2488	86	8n6w	1	PP	CO	36.1	30.4	6.5	5.3	Troublesome Chert	N	N	no comment
1017, 1039	5ST98.2436	43	18n39e	1	PP	DS	15.2	13.3	2.75	0.4	Troublesome Chert	N	N	no comment
1017, 1041	5ST98.2437	25	18n41e	1	PP	PR/MS	34.2	15.9	3	1.6	Troublesome Chert	N	N	no comment
1018, 1039	5ST98.2431	37	19n39e	2	PP	MS	12	15.1	2	0.6	Troublesome Chert	N	N	no comment
1018, 1039	5ST98.2432	73	19n39e	n/a	PP	DS	11.7	16.4	3.4	0.5	Troublesome Chert	N	N	no comment
1018, 1039	5ST98.2433	36	19n39e	2	PP	ABC	27.3	18.6	3.1	1.2	unknown	N	Y	potlidded
1018, 1039	5ST98.2434	72	19n39e	3	PP	MS	10.4	12.4	3.5	0.4	Troublesome Chert	N	Y	heat spalled
1018, 1040	5ST98.2438	39	19n40e	10	pp	MS/DS	21.2	23.4	4	1.4	Troublesome Chert	N	Y	heat spalled
1019, 1039	5ST98.2440	53	20n39e	2-Jan	PP	PR/MS	25.7	15.3	3.1	1.1	Troublesome Chert	N	Y	potlidded; serrated
1019, 1039	5ST98.2441	59	20n39e	1	PP	ABC	27.5	17.3	3.5	1.2	Troublesome Chert	N	N	same material as #43
1019, 1039	5ST98.2442	64	20n39e	20 to 30	PP	PR	14.7	12.9	2.68	0.6	Troublesome Chert	N	N	no comment
959, 967	5ST98.2495	132	39s33w?	surface	PP	PR	16.7	23.9	5.1	1.8	Table Mountain Jasper	N	N	same material as 52 and 131
983, 994	5ST98.2435	49	16s6w	3 to 4	PP	PR	10.3	15.1	4.2	0.7	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2500	119	n/a	surface	PP	PR	18.6	16.6	5.2	3.2	quartzite	N	N	no comment
No Prov.	5ST98.2501	120	n/a	surface	PP	DS	12.9	13.1	2.6	0.4	Table Mountain Jasper	N	N	no comment
No Prov.	5ST98.2502	121	n/a	surface	PP	ABC	24.4	15	4.3	1.6	quartzite	N	N	no comment
No Prov.	5ST98.2503	122	n/a	surface	PP	ABC	31.5	19.9	5	2.6	quartzite	N	N	no comment

No Prov.	5ST98.2504	123	n/a	surface	PP	DS	14.6	11.3	3.3	0.5	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2505	124	n/a	surface	PP	PR/MS	24.1	15.5	4.3	2.2	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2506	125	n/a	surface	PP	MS/DS	13.5	9.2	2.5	0.3	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2507	126	n/a	surface	PP	DS	9.6	7.9	2.8	0.1	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2508	127	n/a	surface	PP	PR	11.9	13.9	2.3	0.4	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2509	128	n/a	surface	PP	MS	18.2	16.5	3.4	0.9	Windy Ridge Quartzite	N	N	no comment
No Prov.	5ST98.2510	129	n/a	surface	PP	MS/DS	37.5	4.2	6	6.8	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2511	130	n/a	surface	PP	PR/MS	23.2	25.5	4.3	2.8	Windy Ridge Quartzite	N	N	no comment
No Prov.	5ST98.2513	134	n/a	surface	PP	PR	17.5	30.1	4.2	1.8	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2514	135	n/a	surface	PP	PR/MS	35.3	20	19.3	3.8	Troublesome	N	N	no comment
No Prov.	5ST98.2515	136	n/a	surface	PP	PR/MS	21.2	25.3	5.6	3.2	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2516	137	n/a	surface	PP	PR	22.5	25	4	2.3	unknown	N	N	5800±125 to 5350±130 rcybp (Benedict 1978)
No Prov.	5ST98.2517	138	n/a	surface	PP	MS	26.7	16.2	4.9	2.7	Windy Ridge Quartzite	N	N	no comment
No Prov.	5ST98.2518	139	n/a	surface	PP	PR	16.5	20.1	4.3	1	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2519	140	n/a	surface	PP	PR	14.6	13.4	3.9	0.5	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2520	141	n/a	surface	PP	PR	8.3	13.3	3.6	0.3	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2521	142	n/a	surface	PP	PR	9.2	16.7	3.5	0.5	Table Mountain Jasper	N	N	no comment
No Prov.	5ST98.2522	143	n/a	surface	pp	PR	7.1	18.2	2.8	0.4	Table Mountain Jasper	N	N	no comment

No Prov.	5ST98.2523	144	n/a	surface	PP	PR	10.4	14.9	3.2	0.6	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2524	145	n/a	surface	PP	PR	12.9	15.7	4.68	0.8	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2525	146	n/a	surface	PP	DS	13.4	12.5	3.2	0.4	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2526	147	n/a	surface	PP	DS	10.1	10.1	2.5	0.3	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2527	148	n/a	surface	PP	DS	16.5	14.5	3	0.6	quartzite	N	N	no comment
No Prov.	5ST98.2528	149	n/a	surface	PP	DS	11.4	9.3	3.3	0.2	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2529	150	n/a	surface	PP	DS	11.1	10.7	2.5	0.3	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2530	151	n/a	surface	PP	DS	14.8	11	2.6	0.4	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2531	152	n/a	surface	PP	DS	11.4	8.9	2	0.1	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2532	153	n/a	surface	PP	PR/MS	13.2	26.8	4.2	1.2	Troublesome Chert	N	N	no comment
No Prov.	5ST98.2533	n/a	n/a	surface	PP	PR	24	21.2	5.9	1.9	Troublesome Chert	N	N	no comment

Rocks

Thousands Conversions	Unit (X,Y)	Catalogue Number	Level	Class	Element	Maximum Length (mm)	Average Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)	Flake Count
1005, 989	6n11w	5ST98.57	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	57
1007, 991	8n9w	5ST98.239	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	239
1002, 994	3n6w	5ST98.466	1	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	466
1002, 994	3n6w	5ST98.500	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	500
1005, 992	6n8w	5ST98.613	1	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	613
1005, 993	6n7w	5ST98.835	3	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	835
1003, 994	4n6w	5ST98.915	1	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	915
1003, 994	4n6w	5ST98.916	1	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	916
1003, 994	4n6w	5ST98.937	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	937
1003, 994	4n6w	5ST98.941	2	ROCK	ROCK	9.7	0.1	Quartz	n/a	n/a	941
1018, 1040	19n40e	5ST98.1000	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1000
1007, 992	8n8w	5ST98.1159	1	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1159
1009, 1046	10n46e	5ST98.1168	1	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1168
1006, 996	7n4w	5ST98.1232	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1232
1006, 996	7n4w	5ST98.1255	4	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1255
1007, 994	8n6w	5ST98.1302	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1302
1007, 994	8n6w	5ST98.1308	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1308
1007, 994	8n6w	5ST98.1322	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1322
1005, 994	6n6w	5ST98.1363	1	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1363
1005, 994	6n6w	5ST98.1423	3	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1423
1005, 994	6n6w	5ST98.1441	4	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1441
1005, 999	6n1w	5ST98.1487	1	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1487
1005, 999	6n1w	5ST98.1495	1	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1495
1005, 999	6n1w	5ST98.1504	1	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1504
1005, 999	6n1w	5ST98.1514	1	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1514
1005, 999	6n1w	5ST98.1526	1	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1526
1005, 999	6n1w	5ST98.1536	1	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1536
1005, 999	6n1w	5ST98.1573	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1573
1005, 999	6n1w	5ST98.1577	2	ROCK	ROCK	n/a	n/a	Unknown	n/a	n/a	1577
1005, 999	6n1w	5ST98.1578	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1578
1005, 999	6n1w	5ST98.1579	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1579
1005, 999	6n1w	5ST98.1583	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1583
1005, 999	6n1w	5ST98.1604	4	ROCK	ROCK	n/a	n/a	Unknown	n/a	n/a	1604

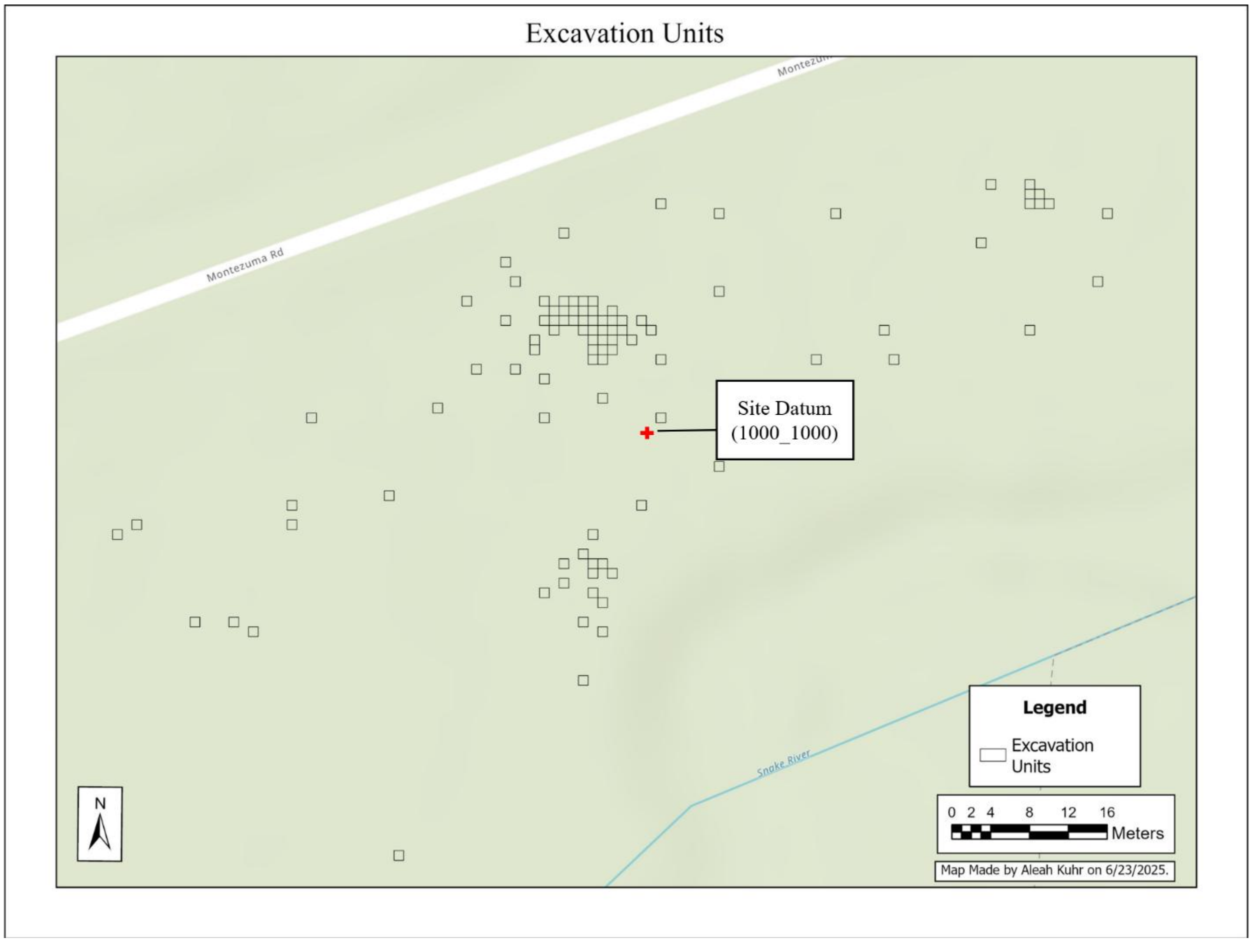
1019, 1039	20n39e	5ST98.1681	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1681
1017, 1039	18n39e	5ST98.1913	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1913
1006, 993	7n7w	5ST98.1917	1	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1917
1006, 994	7n6w	5ST98.1995	1	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	1995
1004, 996	5n4w	5ST98.2226	2	ROCK	ROCK	n/a	n/a	Quartz	n/a	n/a	2226

Scraper

Thousands Conversions	Unit (X,Y)	Catalogue Number	Level	Class	Element	Portion	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Mass (g)	Raw Material	Cortex (Y/N)	Burn (Y/N)
1006, 991	7n9w	5ST98.2538	1	CS	BF	CO	55.5	46.1	18.2	43.2	Unknown	N	N
1007, 989	8n11w	5ST98.2560	1	CS	ES	CO	72	56.1	19.3	104.8	Unknown	N	N

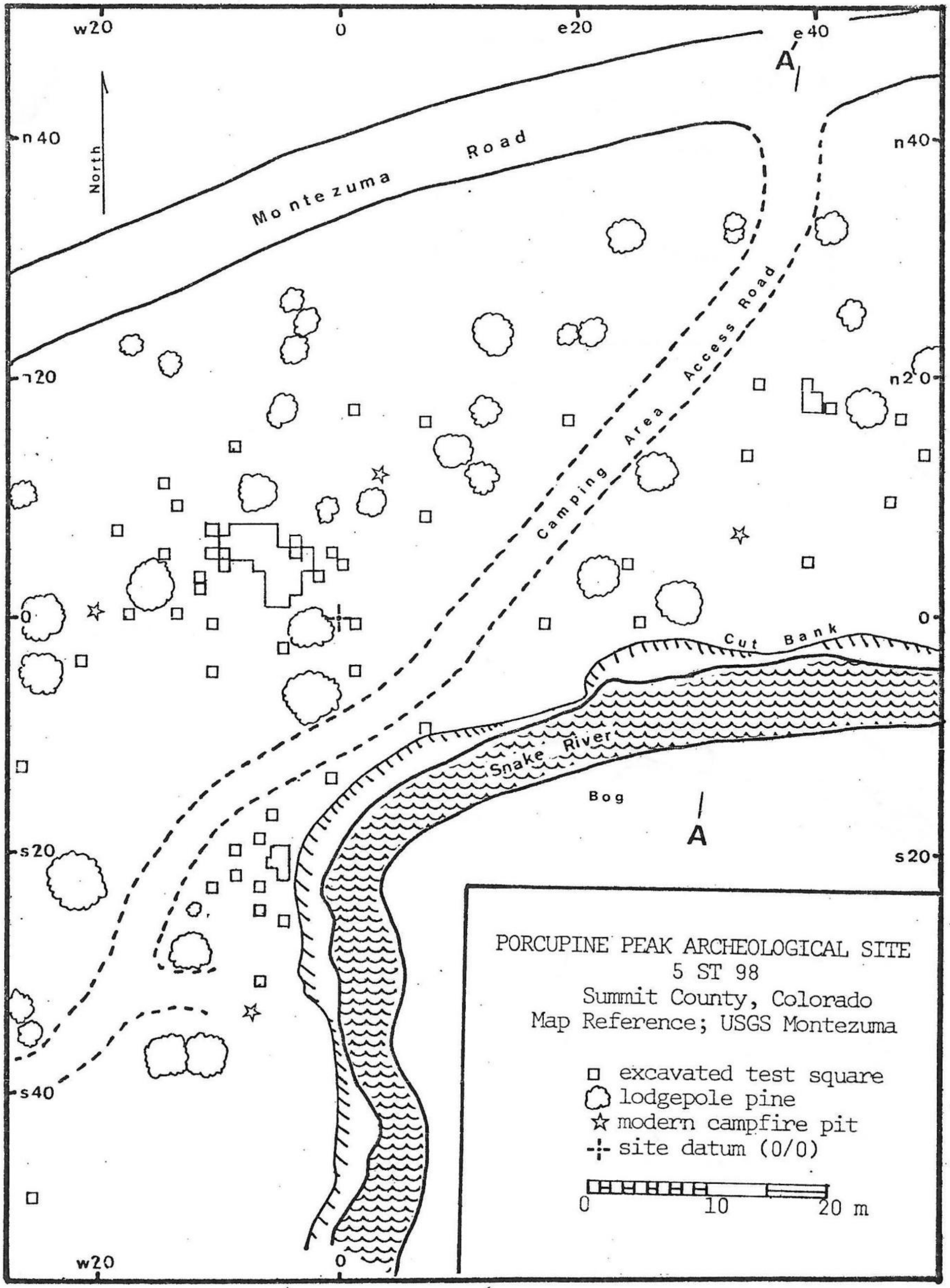
APPENDIX L: SITE DATUM MAP

This appendix presents a map showing the location of the site datum at Porcupine Peak, which is situated at excavation unit 1000_1000. Unlike the maps presented elsewhere in the thesis, this map explicitly displays the datum, providing readers with a point of reference to better understand the spatial orientation of the excavation grid and units.



APPENDIX M: ORIGINAL SITE MAP

This appendix presents the original site map created during the initial investigations at Porcupine Peak. Readers may notice that the excavation blocks shown here do not perfectly align with the maps used throughout the thesis. This discrepancy arises because the author reconstructed the units based on James Marcotte's notes and then verified each unit by correlating it with its associated artifacts. Consequently, the site datum appears in a different location on the original map compared to the corrected map shown in Appendix L.


w20
0
e20
e40
A
North
n40
n40
Montezuma Road
Camping Area Access Road
n20
n20
0
0
Cut Bank
Snake River
Bog
A
s20
s20
s40
w20
0
PORCUPINE PEAK ARCHEOLOGICAL SITE
5 ST 98
Summit County, Colorado
Map Reference; USGS Montezuma
excavated test square
lodgepole pine
modern campfire pit
site datum (0/0)
0
10
20 m

APPENDIX N: 1970S EXCAVATION PHOTOGRAPHY

This appendix presents a collection of photographs from the original excavations at Porcupine Peak. The images document the excavation process, illustrate the artifacts and features recovered, and provide visual context for the work conducted nearly 50 years ago. These photographs serve as a historical record and complement the written documentation of the site.

Figure 156. Porcupine Peak site and the Snake River, looking southwest. Note researcher working along cutbank of the river in the vicinity of the thermal feature exposed in the cut. Image dated ca. 1977-1978. Scanned slide from the Morris archive, Center for Mountain and Plains Archaeology, Colorado State University.

Figure 157. Similar image to above, but closer photo. Note well exposed cutbank and vertical deposits; these have slumped and become more vegetated between 1978 and 2024. Image dated ca. 1977-1978. Scanned slide from the Morris archive, Center for Mountain and Plains Archaeology, Colorado State University.

Figure 158. 5ST98 site datum, facing east. Past attempts to locate this datum (which appears to be rebar) have not been successful. Image dated ca. 1977-1978. Scanned slide from the Morris archive, Center for Mountain and Plains Archaeology, Colorado State University.

Figure 159. Excavation of test units just north of Snake River, photographer looking east. Image dated ca. 1977-1978. Scanned slide from the Morris archive, Center for Mountain and Plains Archaeology, Colorado State University.

Figure 160. Excavation of units just north of Snake River, looking east/southeast. Image dated ca. 1977-1978. Scanned slide from the Morris archive, Center for Mountain and Plains Archaeology, Colorado State University.

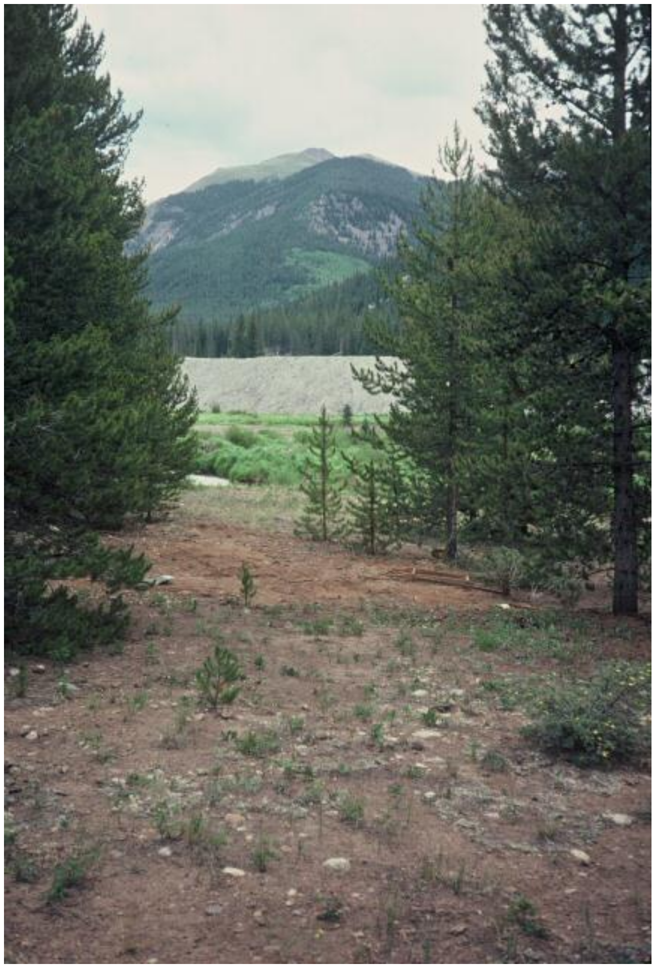


Figure 161. Backfilled units just north of Snake River. This appears to represent the location of units excavated in previous images, based on matching the tree sizes and background. Image dated ca. 1977-1978. Scanned slide from the Morris archive, Center for Mountain and Plains Archaeology, Colorado State University.

Figure 162. Excavation of unit 1006_991 (7n9w) within the main block. Six biface fragments exposed in the shallow excavation. Image dated ca. 1977-1978. Scanned slide from the Morris archive, Center for Mountain and Plains Archaeology, Colorado State University.

Figure 163. Closeup of the previous photo, showing biface fragments exposed in the excavation of unit 1006_991 (7n9w). Image dated ca. 1977-1978. Scanned slide from the Morris archive, Center for Mountain and Plains Archaeology, Colorado State University.

Figure 164. Work-in-progress, with crew examining the site surface of the Porcupine Peak site. Image dated ca. 1977-1978. Scanned slide from the Morris archive, Center for Mountain and Plains Archaeology, Colorado State University.

APPENDIX O: KREMMLING CHERT AND CORNER-NOTCHED DART POINTS

Appendix O provides a detailed overview of Kremmling Chert and its use in Late Archaic corner-notched dart points. The appendix describes the varieties of this chert, their flaking qualities, and their occurrence in regional sites, highlighting why certain materials were favored for tool production. It also situates corner-notched dart points within broader typological frameworks, emphasizing regional variability and the ongoing debates around classification. This background provides essential context for understanding the technological and mobility patterns discussed in the main analysis, linking raw material selection, tool design, and transport across the Colorado Mountains.

Kremmling Chert (Troublesome) and Corner-Notched Dart Points

Kremmling Chert is found in the Miocene-aged Troublesome Formation in Middle Park and its geologic equivalent, the Browns Park Formation, to the west along the Colorado River corridor (Metcalf et al. 1991). Kremmling Chert possesses a variety of characteristics with colors of white (opaque to a milky translucence with dendritic inclusions), pale brown, and dark greys. Three varieties are described by Metcalf et al. (1991): (i) a porcellanitic variety that is opaque and contains numerous tiny impurities, (ii) an opaline or vitreous variety which is glassier and less opaque to translucent, and (iii) an orange-colored variety (less common). At 5GA1172, researchers found that there may have been a deliberate selection of the porcellanitic variety of Kremmling Chert, as it was more common in tools than cores (Metcalf et al. 1991). Knapping experiments with this variety found that the flaking qualities were far more ideal than the others (Metcalf et al., 1991).

Kremmling Chert has been found in various spatial and temporal contexts within Colorado (Benedict 1990; Black 1995; Cassels 2000; Jepson et al. 2003; Metcalf et al. 1991;

Reust and Johnston 1998; Morris 1978). During the Heckendorf State Wildlife Area survey, it was noted that a noticeable amount of light-colored mottled chert was observed in the study area which appears to be Kremmling Chert from the northern mountains Grand, Routte, Jackson, and Eagle Counties (Black 1995). This observation suggests that Kremmling Chert was utilized extensively within the region. The extensive use of Kremmling Chert, particularly its use for tools such as projectile points, provides a valuable opportunity to examine mobility during the Late Archaic period. One of the key artifact types associated with this period is the corner-notched dart point.

The categorization of corner-notched dart points is a contentious issue, with these points often being placed into numerous typological categories based on subtle morphological differences. Specifically, corner-notched dart points are frequently grouped according to their resemblance to various regional types (i.e., Pelican Lake [Northern Plains], Elko Corner-Notched [Great Basin], Oshara [Southwest], etc.), a practice that tends to oversimplify regional variability. This approach forces points into typological categories that may not accurately reflect important dissimilarities across regions (Dinkel 2021). Pelican Lake points, one type of corner-notched dart point, share characteristics with Late Archaic examples dated between 3,500 and 1,800 BP (Peck 2011). These points are found throughout the Northwestern and Northern Plains, including regions such as Saskatchewan, Alberta, Montana, Wyoming, northern Colorado, and at game drive sites like Rollins Pass along the Continental Divide, which connects the Western Slope and the Colorado Front Range (Madden 2022). However, these points are often classified within the broadly defined Elko corner-notched category, a designation that spans a long chronological range in the eastern region. This practice may result from problematic dating of key sites and reliance on typological systems based on non-metric data (Reed and Metcalf 1999;

Hoskins 2016). Additionally, the Oshara Tradition, which has been in use for over 40 years, continues to influence the classification of corner-notched dart points and related archaeological findings, despite the absence of significant supporting published data (Irwin-Williams 1973; Chapin 2017).

For this thesis, dart points are larger, heavier points hafted onto longer shafts, typically darts used with a spear thrower (atlatl), and are characterized by notches at the corners of the base (refer to the methods section for how the point is specifically defined within this paper) (Boser 2022). Given the distinct flaking properties of the porcellanitic variety of Kremmling Chert, which was favored for tool production, the distribution of corner-notched dart points made from this material can serve as a proxy for understanding patterns of mobility during the Late Archaic period.