THESIS

PASSING THROUGH OR JOURNEY'S END?
A CHRONOLOGICAL ANALYSIS OF PROJECTILE POINT CURATION AND DISCARD AT ROLLINS PASS, NORTHERN COLORADO

Submitted by

Michelle A. Dinkel

Department of Anthropology and Geography

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Masters Committee:
Advisor: Jason M. LaBelle

Michelle M. Glantz
Tobi Jacobi

ABSTRACT

PASSING THROUGH OR JOURNEY'S END?
A CHRONOLOGICAL ANALYSIS OF PROJECTILE POINT CURATION AND DISCARD AT ROLLINS PASS, NORTHERN COLORADO

Rollins Pass is an intermountain travel corridor situated along the Continental Divide that connects the Western Slope and the Front Range of Colorado. This high-altitude pass is located at the intersection of Gilpin, Boulder, and Grand counties, and is notable because it contains the highest density of pre-contact Native American alpine game drives in North America. While the game-drive features represent one aspect of prehistoric use, 17 sites, four small sites, and five isolated finds provide an opportunity to explore a different facet of the prehistoric use of Rollins Pass. Investigations at these surface sites and isolates produced a total of 91 projectile points. Past research conducted at high altitudes in northern Colorado suggests prehistoric use spans from the Paleoindian to the Protohistoric period. However, chronological reconstruction is challenging in alpine settings due to poor preservation, shallow stratigraphy, and short occupation spans by hunter-gatherer groups. Due to this complication, researchers often rely on typology or index fossils, such as projectile points, to assign age to surface sites. While the analysis of other chipped stone data can provide information on-site use and occupation span, it is frequently complicated by the occurrence of multicomponent or palimpsest sites. This thesis aims to examine the prehistoric use of Rollins Pass through the analysis of projectile points -- a functional tool type -- to establish chronology, lithic raw material use, and curation intensity. The

results suggest an occupation beginning in the Late Paleoindian period and extending to at least the Middle Ceramic era (10,000 - 410 BP). Lithic raw materials identified suggest consistent acquisition of both local and non-local toolstone, across all periods represented. Curation patterns demonstrate a willingness to discard high utility portions of tools, with many projectile points discarded despite a potential to rejuvenate their forms and indicating a lack of raw material conservation. Projectile point analysis of Rollins Pass sites and isolates suggest that prehistoric hunter-gatherer populations interacted with the pass as a destination and to lesser extent as an intermountain travel corridor.

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CHAPTER ONE: INTRODUCTION, BACKGROUND, AND RESEARCH OBJECTIVES

Rollins Pass is an intermountain travel corridor located along the Continental Divide of northern Colorado, with Native American use which spans the Late Paleoindian through Protohistoric periods (12000 BP-90 BP). Rollins Pass is notable because it contains the highest density of alpine game drives within North America (LaBelle and Pelton 2013). While the game-drives represent one aspect of prehistoric use, 26 sites, small sites, and isolates provide the opportunity to explore aspects revolving around Rollins Pass use as a travel corridor or as a destination location. Archaeological research for the Pass has primarily focused on the numerous game-drive systems, examining large hunting sites such as the Olson Site (5BL147), the High Grade Site (5BL148), 5GA35, 5GA36, and 5GA37 (LaBelle and Pelton 2013; Meyer 2019; Meyer 2021; Whittenburg 2017). This game-drive driven research has largely been the focus of work conducted at the Pass; therefore, it is my intention in this thesis to examine the sites, small sites, and isolates in order to obtain a more complete picture of prehistoric use of Rollins Pass.

Investigations conducted during the last fifty years have produced a total of 91 projectile points from sites, small sites, and isolated finds in/around the pass. Beginning in the 1960s archaeological work completed at the Pass was principally led by the late James Benedict and Byron Olson (Olson and Benedict 1970; LaBelle and Pelton 2013). In 2009 the Center for Mountain and Plains Archaeology led by Dr. Jason LaBelle began work at Rollins Pass implementing high-resolution survey methods. Both sets of researchers have produced a plethora of data from this intermountain pass and the following investigation examines assemblages produced from the entirety of work conducted at the pass that occurred during the 1960s-2017.

Rollins Pass Location and Setting

Rollins Pass is a low intermountain pass located within the southern Rocky Mountains situated in north-central Colorado. The Pass is located at the intersection of Gilpin, Boulder, and Grand counties. The base elevation of the Pass is 11,660 feet (3554 m) above sea level but extends to approximately 12,000 feet (3658 m) in some locations. The variation in elevation provides an abundant ecotone areas with montane, subalpine, and alpine tundra environments. Vegetation in the area consists of lodgepole pine, ponderosa pine, Douglas fir, Engelmann spruce, short alpine grasses, and a plethora of wildflower species. Rollins Pass has high, bare ridges, intersected with several glacial cirque basins and moraine valleys. The Pass divides the drainage system of the Ranch Creek, a tributary of the Colorado River to the west and South Fork Middle Boulder Creek, a tributary of the South Platte River to the east (Meyer 2019). The western portion of the Pass, beginning in the alpine slopes downward transitioning into a montane ecosystem below treeline and eventually into the sagebrush steppe ecosystem of Middle Park. The topography drops steeply into Corona Lake and the Ranch Creek basin to the west. Rocky cirques sharply drop down toward King Lake and the subalpine basin containing the headwaters of the South Fork of Middle Boulder Creek to the east (Whittenburg 2017). Rollins Pass is one of many intermountain passes that provided opportunities to quickly access a mixture of environments from the Middle Park area, the Continental Divide, and the Colorado Front Range. The presence of numerous prehistoric and historic sites and isolates enforce the importance of this Pass through time. This significance is exemplified by the presence of numerous prehistoric game-drive sites, the historic Boulder Wagon Road, and Moffat Railroad via the Denver, Northwestern, and Pacific Railway (LaBelle and Pelton 2013; Meyer 2019; Meyer 2021; Whittenburg 2017).

Figure 1. View of Rollins Pass environment; photo taken at the northeastern portion of the pass, facing west.

Figure 2 View of Rollins Pass environment; photo taken at the southeastern portion of the pass, facing Mt. Epworth.

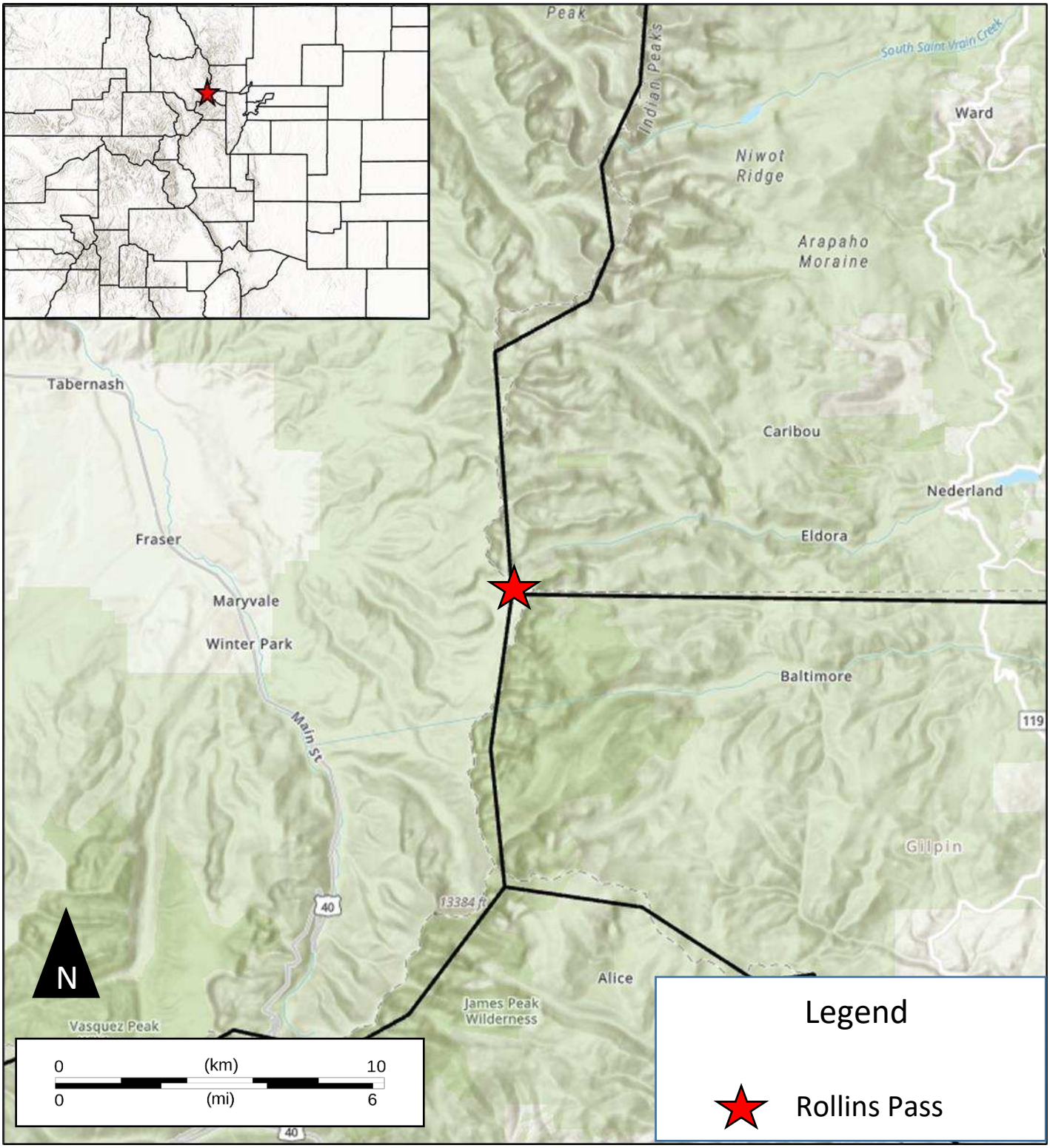

Figure 3. Map of the Rollins Pass area, within larger state of Colorado. The Pass sits at the intersection of Boulder, Gilpin, and Grand Counties.

History of Research

C.A. Deane, a government surveyor, first described stone features atop the Continental Divide near Rollins Pass in 1869 (Anonymous 1869; LaBelle and Pelton 2013). Later in 1873, John Q.A. Rollins provided additional descriptions of the Pass during the construction of a historic wagon road between the Town of Rollinsville and Middle Park, chronicled in the Rocky Mountain News (LaBelle and Pelton 2013; Meyer 2019; Rollins 1873; Whittenburg 2017). Traces of the historic wagon road are still visible on the ridges on the east side of the Pass.

Professional archaeological investigations were conducted here beginning in the late 1960s as one part of a comprehensive mountain survey project concerning high-altitude adaptations of hunter-gatherers in Northern Colorado. Byron L. Olson and James B. Benedict initiated this research, supported by the Arapaho and Roosevelt National Forests and funded by the National Science Foundation. As a part of this work, Jim Benedict and Byron Olson surveyed and recorded numerous sites located in Rollins Pass's cirque basins, moraine valleys, and bare ridges. This project focused on the systematic mapping of the many stone hunting complexes at the Pass. Additionally, work conducted included excavations in at least 27 hunting blinds at the four largest game drive complexes at the Pass (Meyer 2019; Whittenburg 2017). The results of the work conducted at the Pass were written up in brief reports for the National Forest Service and the Smithsonian Institution (Benedict 1969, 1971; Olson 1970, 1971; Olson and Benedict 1970) and mentioned in several articles by Benedict related to his work on game-drives and other alpine sites in the Indian Peaks Wilderness (Benedict 1992, 2005, 2009; Benedict and Olson 1978).

Beginning in 2009, Jason LaBelle and the Center for Mountain and Plains Archaeology (CMPA) at Colorado State University (CSU) reinvigorated investigations of Rollins Pass (Pelton 2012; LaBelle and Pelton 2013; Whittenburg 2017; Meyer 2019). It was during this time that the

CMPA enacted systematic recording procedures to revisit and rerecord previously known game-drives, campsites, and isolated finds situated throughout the Rollins Pass project area. The CMPA conducted work at Rollins Pass almost every field season from 2009-2017. Work that the CMPA directed at the pass used contemporary methodologies to estimate site structure, patterns in feature location and size, and inter-site visibility. Approaches also consisted of viewshed analysis, fine-grained pedestrian surveys, and new surveys in high-probability areas. A research article (LaBelle and Pelton 2013) and three Master's thesis projects (Meyer 2019; Whittenburg 2017; this thesis) have been produced, and numerous students and volunteers have received archaeological training due to the CMPA's work at Rollins Pass. A 2017 Master's thesis authored by Aaron Whittenburg addressed prehistoric use of the 5GA35, 5GA36, and 5GA37 game-drive sites with an emphasis on the use of space during different stages of hunting preparation, active hunting, and post-hunt activities (Whittenburg 2017). Kelton Meyer's Master's thesis studied the High Grade Site (5BL148), the largest and most complex game-drive located on Rollins Pass, by evaluating the time represented at the site through the examination of relative dating methods, absolute dating methods, and spatial analysis (Meyer 2019; Meyer 2021).

Site, Small Site, and Isolated Find Overview

Colorado OAHP's standard for defining prehistoric cultural resources is flexible and therefore the standards used to determine a site, a small site, and an isolate will reflect Wyoming cultural resource determinations. Within this thesis a (prehistoric) ***site*** will be defined as a cultural resource with more than 14 artifacts present within a 30 meter by 30 meter area. An ***isolate*** will be defined as a cultural resource in a 30 meter by 30 meter area consisting of less

than 14 artifacts with no more than one formal tool. Additional cultural resources with more than one formal tool within the assemblage but with an overall count less than 14 artifacts will be considered a ***small site*** (within a 30 meter by 30 meter area).

Table 1. Resource component type from the 26 sample campsites and isolated at Rollins Pass. The non-Smithsonian site names are temporary or field numbers (like RP12-3), and new Smithsonian will be assigned to them at the end of the CMPA's final report on Rollins Pass

Resource Number/Name	Resource Type	Single vs Multicomponent
5GA24	Site	Multicomponent
5GA26	Site	Single
5GA27	Site	Single
5GA29	Site	Multicomponent
5GA30	Site	Single
5GA32	Site	Multicomponent
Benedict 5GA51	Site	Multicomponent
Benedict 5GA53	Site	Multicomponent
Benedict 5GA56	Site	Multicomponent
5BL122	Site	Multicomponent
5BL124	Site	Single
5GL2	Site	Multicomponent
RADIOBEACON	Small Site	Multicomponent
RP12-3	IF	Single
RP12B-1	Site	Single
RP13-103	Small Site	Single
RP13-201	Small Site	Single
RP13-302	Site	Multicomponent
RP15-1	Site	Single
RP15-4	Site	Multicomponent
RP17-1	Site	Single
RP17-101	IF	Single
RP-Wright-18-2	IF	Single
RP-Wright-18-3	Small Site	Single
Crawford	IF	Single

Benedict and Olson recorded numerous sites at Rollins Pass during the 1960s and early 1970s. Twelve sites, small sites, and isolates documented during their research were incorporated into this thesis. An additional 14 sites, small sites, and isolates included within the sample were recorded during CMPA's 2009-2017 fieldwork, creating a total site sample size of 26 sites and isolates for this project (Table 1). The 26 sites, small sites, and isolates are found throughout the pass, mostly along the edges of alpine lakes and moraine valleys, and to a lesser extent, on

exposed ridgetops. Produced from these 26 resources, a total of 91 projectile points were incorporated into this study. Table 1 contains the breakdown of site name, resource size, as well as component or how many temporal occupations are present. Three sites make up the bulk of the sample (5GA32, Benedict 5GA51, and Benedict 5GA53); all of which are located on the western portion of the Pass near game-drives 5GA35, 5GA36, and 5GA37. Most other sites and isolates are situated near water sources or in sheltered areas with access to wood.

Thesis Objectives and Organization

This thesis aims to understand the prehistoric technological and behavioral organization of Rollins Pass by examining projectile points from sites, small sites, and isolates. Of the 25 total cultural resources included in this thesis, several sites are multicomponent surface sites (44%), meaning these sites have two or more chronological periods present. At Rollins Pass this is partially due to the nature of the alpine environment which promotes organic deterioration and has a slow deposition rate that often does not deposit enough sediment between occupations, essentially meaning that there is not enough sediment deposited between occupations to physically separate them, resulting in overlapping or time averaged occupations, also referred to as palimpsests (Bailey 2007; Davies et al. 2016; Wandsnider and Holdaway 2006). These multicomponent surface sites present a challenge when assessing richness/diversity and site function. Without spatial data, parsing out debitage and non-diagnostic tools and attributing them to a specific activity locale or to a chronological sequence is extremely difficult (Buckner 2020). In other words, the lack of spatial data for time averaged, overlapping surface sites can make creating a link between temporally non-diagnostic and diagnostic artifacts near impossible. Temporally non-diagnostic tools include both informal and formal types which have forms or

morphology that repeat throughout time. However, it should be noted that even though there are set typological units some variability in the expression of these typological form exists. Non-diagnostic formal lithic tools include artifacts such as scrapers, bifaces, cores, and drills. These tool types and their repeating forms, for the most part, cannot be bracketed to specific periods and therefore are considered temporally non-diagnostic. Diagnostic artifacts, like projectile points, demonstrate shifts in morphology that have been linked to dated context, usually from an excavated setting, and consequently can be used to establish a relative chronology to date surface sites (Andrefsky 2005). At Rollins Pass, a difference in site recording methods has produced differing scales of data, based on varying research objects, methods employed, or available technologies at the time of recording. Regardless, these variations in documentation can create limitations when comparing older data sets against more recently recorded data, specifically within palimpsest sites. Since a significant portion of the artifact assemblages available to be used for this thesis was obtained from palimpsest sites, only projectile points, a temporally and functionally diagnostic artifact, will be used to address questions about Rollins Pass use outside of game-drive sites.

Projectile points are the focus of this study and will be used to evaluate the time represented in the non-game drive sites, small sites, and isolates. Additionally, lithic raw material choices and discard patterns of these temporally diagnostic tools will be assessed in order better understand technological/behavioral strategies at Rollins Pass throughout time. Chronology is used as framework to investigate technological and behavioral organization through projectile point use strategy. Projectile point use strategy is based on toolkit design theory which addresses behavior through technological choices made by prehistoric hunter-gatherers. Toolkit design theory and projectile point use strategy are an ideal method to examine curation decisions on a

functionally and temporally diagnostic tool type since it addresses potential motivation for prehistoric population to have migrated and occupied Rollins Pass. By examining the curation of formal tool assemblages allows archaeologists to gauge how prehistoric people responded or plan to respond to their environment (Bleed 1986; Nelson 1991). Rollins Pass, an intermountain travel corridor and migratory route for game in prehistory, represented a predictable and reliable resource. A high concentration of game-drive features on the Pass confirms the significance of this reliability and predictability, and the numerous game-drives suggest that the Pass was a destination and represented a location prehistoric groups occupied and reoccupied through time. Therefore, it is hypothesized within this thesis that the sites, small sites, and isolates should also indicate that Rollins Pass in prehistory was a destination not just an intermountain travel corridor.

Research Questions

Five questions address prehistoric use related to the sites, small sites, and isolates located on Rollins Pass. These questions are divided into descriptive analysis and interrelated factors influencing projectile point use strategy through time. The following questions provide an outline for the organization of this thesis.

1. *What is the chronological sequence represented at Rollins Pass?*

This question aims to assess the prehistoric use of Rollins Pass through typological analysis. Projectile points are formal lithic tools and are most commonly used by archaeologists to establish a relative chronological sequence. Projectile points, a temporally diagnostic artifact, provide an avenue to assess when people occupied specific areas within a region and if

reoccupation was prevalent at these locations with occurrence of point types associated with different archaeological periods. Projectile points are largely the foundation for understanding and separating cultural sequences in regions throughout North America (Bacon 1977). This is accomplished by classifying the physical form or morphology of projectile points and tying them within a securely dated context. This classification methodology is correlated with the application of a culture historical framework that linked typological units as cultural groups. This is a lasting legacy within typology, still prolific in some realms of archaeology, such as studies about the Late Prehistoric period and tying established point types to historically known tribes. However, today many archaeologists value typology as a representation of chronology and do not directly tie morphology to specific Native American groups. This past work is the backbone that allows researchers to broadly correlate occupation and artifact trends through time.

Typology does not represent a clean chronological sequence and often there are overlaps in time or technologies which can have regionally varied dates that complicate how archaeologists interpret the archaeological record. Mitigating typological misidentification primarily pertains to the research method and can be remedied by using established local sequences before broader regional patterns. Local typologies are established by using artifacts from well-dated contexts, often from excavated sites within a bounded region and is best when assigning a relative chronology to a site or isolate through diagnostic artifacts. This allows for regional appearances and disappearances of morphological characteristics to be more accurately designated. Classifying projectile points usually studies characteristics such as the morphology of the blade margins, base, the size of the point, the cross-section, the presence and placement of notches, and flaking patterns. These above-aforementioned traits in certain combinations are diagnostic of bracketed time units which can be used to relatively date surface assemblages. This

typological classification will frame the exploration of technological and behavioral strategies at Rollins Pass. Chapter Two of this thesis explores projectile point typologies and the time represented at the Pass.

2. What raw materials are represented in the projectile point assemblage at Rollins Pass?

Chapter Three will focus on a comparative subjective lithic material analysis between raw material types from known sources in order to sort projectile point lithic raw materials into local or non-local categories. Rollins Pass itself has no known toolstone outcrops, however, the surrounding regions are known to produce high-quality knappable material including Troublesome Formation chert, Windy Ridge orthoquartzite, Table Mountain jasper, and Parker petrified wood (Bamforth 2006; Black 2000; Benedict 1981; Naze 2013). Local access to lithic raw materials is available from the Pass and is within a 75 km radius distance, while non-local lithic raw materials are sourced beyond this (75 km +). In order to assess procurement distance, the toolstone material of the Pass's projectile point collection was examined and compared to a lithic library housed in Colorado State University's Center for Mountain and Plains Archaeology Lab. The comparison established the ratio of local versus non-local toolstone materials within the projectile point sample. This ratio aims to address potential mobility patterns, resourcing mapping, local vs non-local toolstone preferences, and later is used to examine if and how lithic raw material procurement distance effected the curation and projectile point use strategies at the Pass. Chapter Three address this inquiry.

3. How are curation and projectile point use strategies represented at Rollins Pass?

Projectile points are commonly used to study technological strategy by the investigation of stone tool curation. Curation is defined as "a strategy of caring for tools and toolkits that can include advanced manufacture, transport, reshaping, and caching or storage" (Nelson 1991:62). Curated tools and expendable tools are considered to be opposite ends of the technological strategy spectrum and either approach can inform about choices regarding toolkit design and behavior. Curated tools are characterized as having time and energy investment, which can be manifested through raw material choice, advance or specialized manufacture, or extensive rejuvenation. Expendable tools typically are quickly produced tools created to address situational needs and usually demonstrate lower time and energy investment (Bamforth 1986; Nelson 1991; Bleed 1986). However, the technological spectrum is not an either-or categorization and curation can further be defined as having a toolkit design that favors conservative or expendable characteristics (Binford 1979; Bamforth 1986; Nelson 1991). Conservation versus expendability is thought to indicate choices that can be dependent on a variety of factors including quality of the raw material, access to raw materials, the complexity of the tool design, and intended use. This question aims to investigate curation by examining projectile point portion, fracture type, and presence/absence of rejuvenation within the projectile point assemblage. These analyses provide methods to understand projectile point use strategy by examining choices behind discard. Chapter Four evaluates curation trends in order to address possible motivations for prehistoric use, and whether Rollins Pass was used prehistorically as an intermountain travel corridor and/or as a destination location.

4. *Are there differences in curation strategies between archaeological periods at Rollins Pass?*

Curation is not a static technological strategy; how and the degree in which it is implemented in projectile points can differ throughout time. Fluctuations in conserving tools for creating expendable tools are reflected in archaeological periods, and the degree to which it is employed is often contingent on expanding or limiting influences that are thought to govern particular time frames (Bamforth 2009; Gilmore 1999; Gilmore 2008). Examining curation strategies outlined within archaeological periods may reveal time-dependent patterns in curation with projectile point use and discard strategies. An established relative chronological sequence contextualizes potential mobility patterns, technological organization, and behavioral organization. Research into toolkit design theory and projectile point use strategies suggests that curation intensity indicates different strategies of human-environmental interaction by implementing reliable (expendable) or maintainable (conservative) choices. Chapter Five addresses how curation intensity and typologies specify potential prehistoric motivations of Rollin Pass through time by examining behavioral and technological choices.

5. *Are there differences in curation strategies due to raw material availability and toolstone procurement distance at Rollins Pass?*

Analyzing curation through different lenses, such as lithic raw material accessibility, will help parse out how projectile point use and curation may have been affected at Rollins Pass. Projectile point curation intensity may vary depending on the quality and accessibility (or availability) of the lithic raw material. Lithic raw material accessibility/procurement distance at Rollins Pass sites/isolates may be a leading contributor in curation and projectile point use

strategies. Local lithic materials (within 75 km radius) are present near Rollins Pass therefore the expectation is that the degree of curation should be relatively low because toolstone accessibility is not a major stressor that would promote intensive curation. Similarly, non-local materials are expected to have a higher degree of rejuvenation and conservation. The analysis of projectile point assemblages by curation and raw material procurement distance (local vs non-local) will reveal if these assumptions are valid and how lithic raw material and curation are represented through time. This question builds on question four and expands on factors affecting technological and behavioral choices regarding toolstone conservation or expendability. Chapter Five analyzes how raw material and curation are related to projectile point use strategies at Rollins Pass.

Summary and Conclusion

Rollins Pass represents a landscape with a large accumulation of human activity, an expansive representation of time, and diversity of cultural material (LaBelle and Pelton 2013; Meyer 2019). While the Pass holds a high concentration of game-drives sites, numerous other sites, small sites, and isolates exist outside these impressive hunting complexes. These sites, small sites, and isolates located throughout the Pass represent cultural resources of varied size, density, age, and use. It is the objective of this thesis to explore one aspect of Pass use through the examination of 26 sites, small sites, and isolates not directly tied to game-drive systems in order to more holistically understand prehistoric hunter-gatherer use of Rollins Pass.

Previous research at Rollins Pass indicates the presence, reoccupation, and modification of the game-drive sites signify that these hunting complexes were viewed as destination-drives for prehistoric hunter-gatherers (Binford 1978; LaBelle and Pelton 2013; Meyer 2019:25). Each

methodology: typology, lithic raw material, and curation practices are employed to assess use of Rollins Pass through prehistory as a travel corridor and/or as a destination location. The following chapters detail the results of the projectile point analysis from 26 sites, small sites, and isolates and the implication of projectile point use strategies in association to prehistoric hunter-gatherer occupation at Rollins Pass.

CHAPTER TWO: CHRONOLOGICAL SEQUENCE OF ROLLINS PASS CAMPSITES AND ISOLATES

Rollins Pass is located within a harsh high-altitude environment that does not readily preserve dateable organics that are favored to obtain absolute ages such as bone and charcoal. The high-altitude intermountain pass sees little deposition of soil and poor organic preservation. These factors result in an accumulation of site assemblages on the ground surface due to conditions that do not produce an adequate amount of deposition to bury older occupations, which would create potential opportunities to separate relative sequences through stratigraphy. The continuation of artifact accumulation through time produces palimpsest sites (multicomponent) or overlapping occupations (Bailey 2007). Without excavation, assigning non-diagnostic tools and debitage within palimpsest sites to a particular period is problematic due to the vertical collapse of multiple occupations (Buckner 2020). The problem lies with the limited methods that can be used to date stone artifacts found on the ground surface. Due to the lack of organic material, time diagnostic artifacts provide the most appropriate method to achieve a chronological sequence.

The purpose of this chapter is to define and describe the chronological sequence at Rollins Pass in order to identify the time represented. Time will be classified based on relative dating methods derived from projectile points using typology. This chronological analysis will use data gathered in the 1960s-1970s as well as data collected from 2009-2017.

Methods

The method used, typology, in this thesis was employed to address prehistoric chronology at Rollins Pass. The projectile point assemblage was classified to nine temporal

categories (Table 2) 1) Early Paleoindian period, 2) Middle Paleoindian, 3) Late Paleoindian, 4) Early Archaic, 5) Middle Archaic, 6) Late Archaic, 7) Early Ceramic, 8) Middle Ceramic, and 9) Protohistoric.

Table 2. Prehistoric Chronology – Based on the CCPA Platte River Basin Chronology (Chenault 1999:3).

Stage (General Period)	Period	Date Range	Projectile Point Technology
Paleoindian	Early Paleoindian (Clovis)	12,000-11,000 BP	Spear
	Middle Paleoindian (Folsom)	11,000-10,000 BP	
	Late Paleoindian	10,000-7500 BP	
Archaic	Early Archaic	7500-5000 BP	Dart
	Middle Archaic	5000-3000 BP	
	Late Archaic	3000-1800 BP (3000 BP- AD 150)	
Late Prehistoric	Early Ceramic	1800-800 BP (AD 150-1150)	Arrow
	Middle Ceramic	800-410 BP (AD 1150-1540)	
Protohistoric		410-90 BP (AD 1540-1860)	

Typology is the classification of an object by function, style, and morphology (Odell 1998). In archaeology, is used to assess general patterns through time and is most often associated with projectile points, ceramics, and textiles. Typology is based on reproducible artifact groups or morphological types, manufactured by hunter-gatherers, which are formed from reoccurring sets of correlated attributes (Rosen 1997:25). Correlated attributes and associated dates, obtained by absolute dating techniques, are used to define archaeological groups within a particular moment in time and space (Hamza 2009:9). Typological analysis can be used to provide cultural and temporal information by examining patterns, such as the appearance and subsequent disappearance of fluting seen within the Paleoindian period. As a method, typology, was originally used to classify objects in order to identify prehistoric societies, essentially equating artifacts to specific cultural groups (Hamza 2009). However, this use of typology is no longer

considered acceptable (Knecht 1997:6). Today, typological classification is used as an index fossil, this relies on the assumption that diagnostic artifacts found on the ground surface roughly date to the same age as similar diagnostic artifacts recovered in a dated context (Andrefsky 1998). In the context of updated surface sites, the method is most often applied as a primary means to provide a chronological framework (Smith et al 2013). Due to these defined archaeological periods, typological analysis allows for the segmentation of time using diagnostics projectile points which encompasses many of the sites, small sites, and isolates located at Rollins Pass.

Excavation does not commonly occur at high altitude sites, therefore in alpine environments, typology is the most common method to assign relative age to surface sites. Projectile points at Rollins Pass were compared and evaluated against 1) the Northern Colorado archaeological typological record and 2) broader projectile point types from the surrounding regions including the High Plains and Northern Plains, to produce a cohesive and representative sample of chronology.

Typological analysis of projectile points within this thesis relies on morphological characteristics including size, blade shape, the presence of notches, placement of notches, shoulder shape, neck width, the presence of stem or base grinding, and base shape (Figure 4). It is correlated attributes such as those stated above that occur in a reproducible manner that are used to defined archaeological point types. Typology will only be assigned dependent on the preservation of diagnostic portions that allow a confident classification. The most reliably diagnostic portion of projectile points is the base or proximal portion. This area on a projectile point is where the tool was hafted and which over time was the most susceptible to change. General trends through time include the reduction of size with Paleoindian (spear) points being

the largest and Late Prehistoric (arrow) points being the smallest. Additionally, most points in the Paleoindian period were not notched but instead had a lanceolate outline. Projectile points from the Archaic are largely typified as large notched points, with a wide variety of forms. Notching carried over into the Late Prehistoric as well, but these point types can readily differentiated by the overall reduction in size. Known general trends, such as size and morphological traits were used to assign typology.

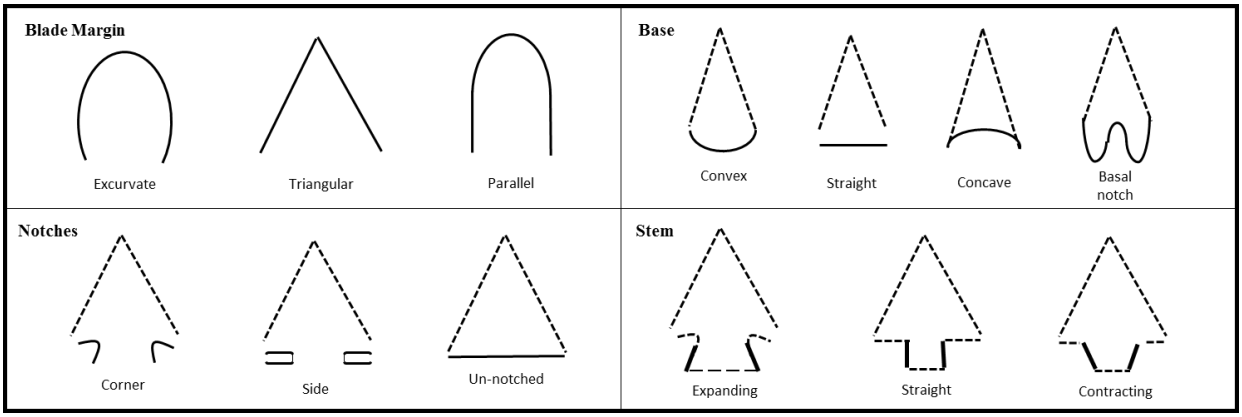

Figure 4 Diagram depicting the various morphological attributes assessed when assigning a projectile point typology based on Taylor (2006)

Projectile points that are considered not diagnostic will not be classified due to the lack of confidence that can be applied to these portions for temporal categorization. The projectile point assemblages employed for temporal analysis are strictly surface finds. Typology is used in this thesis to establish relative dating in an alpine environment and typological units based on morphological traits were used as chronological markers only and not as a cultural indicator of prehistoric peoples. Results of the typological analysis are discussed below.

Results

The non-game drive site assemblage at Rollins Pass consists of 91 projectile points of which 64 were complete enough to be assigned a specific typological units based on morphological characteristics (Table 3 and Table 4). Outside of defined typologies, 23 points are diagnostic enough to be assigned into General/Unknown Paleoindian, General/Unknown Archaic, and General/Unknown Late Prehistoric categories but could not be categorized into specific typologies. Only four projectile points were morphologically ambiguous to the extent that they remained within an unknown category. These points were diagnostic enough to be considered points based on morphological traits such as size and thinness. The following section will include a description of all classified points and associated ordinal chronological sequence.

Table 3. Table depicting the Rollins Pass assigned Projectile Point typologies

Typology	Frequency	Percentage
Cody Unspecified	1	1%
James Allen	4	4%
Angostura	2	2%
Unknown Late Paleoindian	1	1%
Mt. Albion	1	1%
Mallory	1	1%
Shouldered McKean/Duncan-Hanna	3	3%
'Park' Points	5	5%
Yonkee	2	2%
Besant	4	4%
Pelican Lake	7	8%
Late Archaic Corner-Notch	16	18%
Unknown/General Archaic	12	13%
Hogback Corner-Notch	12	13%
Plains Side-Notch	3	3%
Prairie Side Notch	2	2%
Plains Tri-Notch	2	2%
Unknown/General Late Prehistoric	9	10%
Unknown	4	4%
Total Projectile Points	91	

Table 4. Projectile point types and corresponding regional age-ranges.

		MORPHOLOGY							
Period	**Typology**	**Base**	**Notch Type**	**Shoulders /Ears**	**Blade Shape**	**Flaking Pattern**	**Specific Traits**	**Regional Age**	**References**
Late Paleoindian	Cody Unspecified	N/A	N/A	N/A	Parallel	Collateral	Affiliated with the Plains	9000 - 8800 BP	Taylor 2006;
	James Allen	Concave	N/A	N/A	Excurvate	Parallel Oblique	Affiliated with the Plains	8480 – 6980 BP	Benedict 1981; Taylor 2006; Kornfeld et al., 2010
	Angostura	Concave	N/A	N/A	Excurvate	Parallel Oblique	Largely affiliated with the Mountains	9700 BP – 7550 BP	Brunswig 2007; Kornfeld et al., 2010; Taylor 2006
Early Archaic	Mt. Albion	Convex	Corner-Notches	Sloping	Excurvate	Irregular	Usually quartzite	6600-6370 BP	Benedict, 1996, 1978a, 1978b, 2012; Olson, 1978; Taylor 2006; LaBelle and Pelton 2013; Whittenburg 2017
Middle Archaic	Mallory	Straight/flat	Side and basal notching	Abrupt	Excurvate	Irregular		4600-4100 BP	Taylor 2006;
	Shouldered McKean/Duncan-Hanna	Stemmed, concave	Corner-Notches	Abrupt or sloping	Excurvate	Irregular	High degree of variation	5420 – 3020 BP	Benedict 1981, 1990; Meyer 2019; Morris et al. 1985; Cassells 1995, 2000; Taylor 2006;
	Large Straight-to-Slightly Contracting Stemmed (Park Points)	Expanding stem, straight base	Side-Notches	Abrupt	Excurvate to Triangular	Irregular	Also referred to as a Gypsum point	5020 BP-4820 BP but possibly extend to 3020 BP	Anderson et al. 1989; Tate 1999
Late Archaic	Yonkee	Concave	Corner and basal notching	Abrupt	Excurvate	Irregular		3390 – 2970 BP	Husted, 1978; Greiser et al., 1985; Todd et al., 2001; Taylor 2006; Kornfeld et al., 2010; LaBelle and Pelton 2013
	Besant	Straight	Side-Notches	Abrupt	Excurvate	Irregular		2000-1500 BP	Hamza 2009
	Pelican Lake	Straight to slightly convex	Corner-notches	Barbed ears	Triangular	Irregular	Can be minimal serrated	3270 – 1720 BP	Todd et al. 2001; Taylor, 2006; LaBelle and Pelton 2013; Whittenburg 2017

	MORPHOLOGY								
Period	**Typology**	**Base**	**Notch Type**	**Shoulders /Ears**	**Blade Shape**	**Flaking Pattern**	**Specific Traits**	**Regional Age**	**References**
	Late Archaic Corner-Notch	Expanding stem, straight to convex	Corner-Notches	Abrupt to weak	Triangular to slightly excurvate	Irregular	High degree of variation	3000 – 1800 BP	Tate 1999
Early Ceramic	Hogback Corner-Notch	Straight, convex, rounded	Corner-Notches	Barbed ears	Excurvate	Irregular	Serrated	1720 - 950 BP	Nelson 1971; Benedict, 1975a, 1975b; Husted, 1978 Benedict 1996; Taylor 2006; LaBelle and Pelton 2013; Whittenburg 2017
Middle Ceramic	Plains Side-Notch	Concave to straight	Side-Notches	Abrupt	Excurvate	Irregular		850 – 150 BP	Gilmore, 1999; Kornfeld et al., 2010; Taylor 2006; LaBelle and Pelton 2013
	Prairie Side-Notch	Concave	Side-Notches	Abrupt or sloping	Excurvate	Irregular		1220 – 750 BP	Kehoe, 1966; Husted, 1978; LaBelle and Pelton
Middle Ceramic - Protohistoric	Plains Tri-Notch	Straight	Side and basal notching	Abrupt	Triangular	Irregular		350 – 150 BP	Reher and Frison 1980; Taylor 2006; LaBelle and Pelton 2013

Late Paleoindian Period

There is no representation of Early or Middle Paleoindian periods within the sites, small sites, and isolate assemblages at Rollins Pass. Clovis and Folsom presence within Colorado is primarily associated with lower altitude sites and many researchers tie these complexes to the Plains or Foothills where large game, such as bison, were considered abundant (Kornfeld et al. 2010). Overall, the presence for Clovis and Folsom in the mountains was once considered meager and the low occurrence of earlier Paleoindian use of high altitude in the Colorado Mountains has been largely attributed to the lack of access to alpine regions due to snowpack or seemingly lower resource abundance. However, an article by Pitblado (2017) challenges this

assumption stating there is evidence for Clovis throughout the Rocky Mountains suggesting Paleoindian use of the mountains was not as scarce as previously believed. While Rollins Pass does not have any examples of Early or Middle Paleoindian periods, Middle Park, an intermountain basin to the west has several examples, most notably the Barger Gulch Site (Mayer et al 2005). Therefore Paleoindian use of the nearby intermountain park regions are known. However, in terms of Rollins Pass, there is only a clear representation of the Late Paleoindian period (10000-7500 BP). Eight Late Paleoindian projectile points from five different sites are present at the pass's sites, small sites, and isolates.

Unspecified Cody (Figure 5)

The Cody complex is defined by variability in all aspects and largely represents an increase of technology, subsistence strategies, and land-use patterns not previously seen in the Paleoindian period (Kornfeld et al 2010). It is accepted that Cody in the Great Plains relied heavily on bison, likely Bison was the preferred prey and/or because other resources were not as abundant. While the Cody presence in the foothills-mountains had a wider diet which was linked to a more variable and diverse environment which harbored more varied resources. One projectile point midsection, from RP-Wright-18-2, can be assigned to the Cody Complex (9000 - 8800 BP) (Chenault 1999:75). Cody Complex points are characterized by parallel blade edges, collateral flaking, a lenticular or diamond cross-section, and an excurvate blade shape. Scottsbluff points have a square base, and abrupt shoulders while Eden points also exhibit a square base but usually have subtle or no shoulders. Based on the remaining morphological characteristics the large spear midsection can likely be attributed to either a Scottsbluff or Eden point type.

Figure 5. Sample of Unspecified Cody Point (RP-Wright-18-1-1)

James Allen (Figure 6)

Four of the eight Paleoindian points can be described as lanceolate points with concave bases, parallel-oblique flaking, basal grinding, rounded blade shoulder, and no fluting present. These points are spear sized and most closely resemble James Allen projectile points. Allen points, also referred to as James Allen-Fredrick points, have been dated to between 9500-8000 BP and the type site is the Jimmy Allen site located in southern Wyoming (Anderson 1989; Benedict 1981:123 Chenault 1999; Brunswig 2007; Pitblado 2000:144; Pitblado 2012). Well known sites in Northern Colorado that contain James Allen points include the Fourth of July Site, the Caribou Lake Site, and the Carey Lake Site (Chenault 1999; Benedict 1981:80; Pitblado 2000:143). The sites, small sites, and isolates at the Pass that include these points include Benedict 5GA53, Benedict 5GA56, 5GA32, RP17-101, and the Radiobeacon site.

Figure 6. Sample of James Allen points from Rollins Pass (RP17-101-4, Radiobeacon-1, Benedict 5GA53-1, Benedict 5GA53-2)

Angostura (Figure 7)

Two of the eight Paleoindian projectile points are characteristic of Angostura points or Mountain Angostura which demonstrate a laurel-leaf to lanceolate outline, subtle stems, a concave base, parallel-oblique flaking, and basal grinding (Herbert 1963). The typology is considered a mountain technological tradition but are known to intrude on the plains (Brunswig 2007; Frison 1997:87-91; Pitblado 2000). Previous research conducted by Pitblado (2003) has found Angostura to be the dominate type found within the southern Rocky Mountains. The appearance of Angostura points occurs between 9700 BP – 7550 BP (Brunswig 2007). Both Angostura points from Rollins Pass are from a single site, Benedict 5GA56.

Figure 7. Sample of Angostura points from Rollins Pass (Benedict 5GA56-1, Benedict 5GA56-2)

Unassigned Paleoindian (Figure 8)

Only one projectile point, from site Benedict 5GA53, is classified as unassigned Late Paleoindian (10,000-7500 BP). A point from Benedict 5GA53, a midsection, is considered Late Paleoindian due to the presence of a parallel oblique flake pattern. This flaking pattern is often associated with typologies such as James Allen points or Angostura. However, due to missing diagnostic portions the point it can only be categorized as probable Paleoindian. This designation is further supported by the exotic lithic raw material and thin lanceolate blade outline.

Figure 8. Unassigned Paleoindian midsection (Benedict 5GA53)

Early Archaic Period

Mt. Albion (Figure 9)

The Early Archaic period is represented at the Pass by the Mt. (Mount) Albion typology. Mt. Albion is characterized as a large dart size point with a slightly convex to straight blade margins, sloping shoulders, broad-shallow corner to side-notches, an expanding stem, and often exhibits a convex base (Black 1991; Benedict 1996:49; Benedict and Olson 1978:101). Mt. Albion projectile points are typically manufactured from quartzite and often demonstrate a preference for local toolstone of perceived lower quality than raw material seen during the Paleoindian period. The Mt. Albion complex is considered a mountain typological tradition and is associated with the Mountain Refugium Model proposed by James Benedict (1978). This model hypothesizes that Mt. Albion represents an abandonment of the drought-ridden plains and plateaus to seek refuge within the relatively cooler and moist Rocky Mountains. Furthermore, Benedict and Olson (1978) argue that in the Continental Divide area, the Mt. Albion complex

people, who were considered to be based in the hogbacks/foothills to the east of the Pass, exploited the mountains seasonally during the Altithermal (Tate 1999). Known Mt. Albion sites include the 5BL70, Hungry Whistler, Cherry Gulch, Wilbur Thomas Shelter, and the Ptarmigan site (Anderson 1989: 125; Benedict and Olson 1978:101; Benedict 1981). These points have been regional component dated to occur between 6600-6370 BP or 4650- 4420 BC (Benedict 2012; Benedict and Olson 1978; LaBelle and Pelton 2013; Meyer 2020). At Rollins Pass, there is one example of a Mt. Albion point from site Benedict 5GA51.

Figure 9. Mt. Albion Point from Rollins Pass (Benedict 5GA51-14).

Middle Archaic Period

McKean Complex/ Duncan-Hanna (Figure 10)

Within northern Colorado the Middle Archaic witnesses the beginning of the Duncan-Hanna or McKean Complex. This complex is considered a Southern Rocky Mountains phenomenon stemming from Wyoming (Kornfeld et al 2010). McKean complex sites are well documented in the South Platte River basin of northern Colorado (Morris et al. 1985; Perlmutter

2015:19). Three projectile points from site 5GA35 represent the McKean Complex at Rollins Pass (Whittenburg 2017). The complex includes McKean lanceolate points and stemmed Duncan-Hanna variants. The McKean lanceolate point is attributed to the earlier Middle Archaic and Duncan-Hanna variant types are considered to occur later (Kornfield et al 2010:122). Duncan-Hanna points are bracketed between (3400-1000 BC or 4600-3500 BP) and well-known sites include the McKean site (WY), the Scoggin site (WY), and the Dead Indian Creek site (WY) (Kornfield et al. 2010; Taylor 2010: 322; Whittenburg 2017: 47). The Fourth of July Valley site investigated by Benedict (1981) also demonstrates McKean components, placing the morphological tradition in the Colorado Front Range region (Anderson 1989; 133).

The Duncan-Hanna projectile point type is considered a stemmed variant within the McKean complex which expresses a high degree of bounded variation in outline characteristics. The morphology is typified by the presence of excurvate blade margins, the shoulders range from sloping to abrupt, stems can be either straight or expanding, and the bases can be both gently or deeply concave (Kornfield et al 2010). Three points from site Benedict 5GA51 were classified into this complex.

Figure 10. Sample of Duncan-Hanna points (McKean Complex) from Rollins Pass (Benedict 5GA51-106, Benedict 5GA51-6, Benedict 5GA51-2013-15).

Mallory (Figure 11)

The Mallory projectile point type is represented by one base fragment from site RP12-3. The Mallory point demonstrates the following traits: excurvate blade margins, abrupt shoulders, deep side-notching, and a single basal notch within a flat base morphology. These points are differentiated from later tri-notch forms by size, with Mallory points falling into the dart-sized point class. The type site for the Mallory point is the Signal Butte site located in western Nebraska (Taylor 2010: 326). Mallory points are cited to date between (4600-4100 BP) and are known from sites such as the Albion Boarding House site, the Vail Pass Campsite, and the Spring Gulch site (Anderson 1989; 167). Outside of Colorado, Mallory points are present at the Scoggin site located in Wyoming (Davis and Keyser 1999). Mallory projectile points are referred to as San Rafael Side-Notch points elsewhere in the United States.

Figure 11. Mallory base from Rollins Pass (RP12-3-1)

Yonkee (Figure 12)

Yonkee projectile points are large dart points with an excurvate blade outline, abrupt shoulders, corner-notching, a short stem, and a concave basal notch. It has been argued that Yonkee projectile points evolved directly from McKean shouldered points (Kornfeld et al 2010), however, outside of morphological similarities there is no evidence to support this assumption. Yonkee points are thought to date between 3200-2500 BP (Taylor 2010; 338). The type site for this typology is the Powers-Yonkee site located in southeastern Montana (Bentzen 1962). Within Colorado, Yonkee points occur at the Kaplan-Hoover site (Todd et al. 2001:133). At Rollins Pass two points were categorized as Yonkee points, both from site Benedict 5GA53.

Figure 12. Sample of Yonkee points from Rollns Pass (Benedict 5GA53-106, Benedict 5GA53-107)

Large Straight-to-Slightly Contracting Stemmed / Park Point (Figure 13)

The large straight-to-slightly contracting stemmed point type generally occurs beginning in the Middle Archaic but extends into the Late Archaic (Anderson 1989; 165). However, (Tate 1999) suggests this form is a Late Archaic phenomenon, citing sites like the LoDaisKa site, Fourth of July Valley site, and Devil's Thumb Trail site. Benedict and others refer to this form as the 'Park point' (Benedict 1981). There are no definitive dates associated with this point type but similar forms, such as Gypsum or Gatecliff Points, seen later in time and are dated to between 5020 BP- 4820 BP but possibly extend to 3020 BP (Anderson 1989; 164, Kindig 2000:112). Due to the general size, large straight-to-slightly contracting stemmed points will be placed within the Middle Archaic (Tate 1999). This typology is represented by five projectile points from sites Benedict 5GA51, 5GL2, RP15-1, RP17-1, and the Radiobeacon site. Morphological characteristics include excurvate to triangular blade margins, abrupt to shoulders, wide open

side-notching, an expanding stem, and a straight base. The cross section is lenticular and the flaking pattern is irregular.

Figure 13. Sample of 'Park' points from Rollins Pass (Radiobeacon, Benedict 5GA51-5, RP15-1-1)

Late Archaic Period

Late Archaic Corner-Notch (Figure 14)

The Late Archaic is characterized by dart-sized notched points. These points show subtle variation in morphology and within Colorado Archaeology are largely unclassified under broad local typologies (Tate 1999). Within the Colorado Rocky Mountains, these notched points have been referred to by the similarities to Northern Plains point types and have been lumped into typological categories, perhaps too often ignoring dissimilarities for the want of a better fit. While lumping is an issue in typology local types can also fall short of providing means to categorizing time and technological morphology. For example, Coney Corner-Notch, while valid within a site setting, have not largely been adopted regionally. To circumvent this issue with non-standardized named typological units, a descriptive typology is implemented within this

thesis to simplify slight morphological variations between points and allow the quantification of Late Archaic Corner-notched points.

Expanding Stem Corner-Notch Dart points are morphologically described here as having a broad triangular to slightly excurvate blade outline, abrupt to weakly barbed shoulders, broad expanding stems, and straight to slightly convex bases. It is broadly dated to the Late Archaic period (3000-1800 BP). This typology is demonstrated by 16 points from sites 5GA30, 5GA32, Benedict 5GA51, Benedict 5GA56, 5BL122, RP13-201, and RP15-4. This typological category displays internal variation and within this thesis is considered a separate typology from types such as Besant and Pelican Lake points.

Figure 14. Late Archaic Corner-Notch points (RP15-4-1, 5BL122-231, Benedict 5GA56-4, RP13-201)

Pelican Lake (Figure 15)

Pelican Lake projectile points are represented by seven projectile points from five sites (5GA30, Benedict 5GA51, Benedict 5GA53, 5BL122, RP-Wright-18-3) at Rollins Pass. This typology is described as having a triangular blade outline, light serration along the blade margins, deep and narrow corner-notching, barbed ears, an expanding stem, and straight to slightly convex base morphology. The Pelican Lake point is primarily considered a Northern Plains phenomenon, seen throughout Saskatchewan, Alberta, Montana, Wyoming, and northern Colorado. Pelican Lake projectile points are attributed to many sites in Colorado including 5GA35, 5GA36, and the Olson Site (5BL147), three game drive sites located at Rollin Pass (LaBelle and Pelton 2013; Whittenburg 2017). Other sites containing Pelican Lake points include Massey Draw and Ken-Caryl Ranch (Tate 1999). This typology is attributed to date from 3200 1750 BP (1250 BC-AD 230) (Whittenburg 2017).

Figure 15. Sample pf Pelican Lake points from Rollins Pass (RP-Wright-18-1-1, RP-Wright-18-1-2, 5GA30-1, Benedict 5GA51-3, Benedict 5GA51-5).

Besant (Figure 16)

Besant projectile points are characterized as having an excurvate blade outline, abrupt shoulders, side notching, broad base width, and straight basal morphology (Taylor 2010; 353). However, Besant points are recognized as highly variable in morphology (Hamza 2009). These points are well documented on the Northern Plains and are thought to date to between 2000-1500 BP (Hamza 2009). The type site for this projectile point complex is the Mortlatch site located in Saskatchewan, Canada (Hamza 2009; Taylor 2006). Besant points are affiliated with the Northern Plains but the typology extends into Colorado. At Rollins Pass, two sites and isolates (5GA30, Benedict 5GA51) contain four projectile points morphologically classified as Besant points.

Figure 16. Sample of Besant points at Rollins Pass (Benedict 5GA51-RP12-9, Benedict 5GA51-11)

Unassigned/Unknown Archaic (Figure 17)

The category of unassigned Archaic will incorporate points that are attributed to this broad period due to size and basic morphological characteristics but are not complete or distinct enough to be classified. In the Archaic, larger size and notching becomes a common characteristic used to categorize points into this broad period (7500 BP- 800 BP or AD 150). Points most often sorted into this category include midsection and distal-midsections. These portions are missing the most diagnostic portion, the base, which is predominately used to classify typology. At Rollins Pass's sites, small sites, and isolates (5GA29, 5GA32, Benedict 5GA51, Benedict 5GA53), 12 points have been placed into Unassigned Archaic.

Figure 17. Representative Unassigned/General Archaic points (Crawford, RP-Wright-18-1-1, Benedict 5GA51-16, 5GA32-4, Benedict 5GA51-17)

Early Ceramic Period

Hogback Corner-Notch (Figure 18)

Corner-Notch Hogback points are morphologically described as having an excurvate blade outlines, serrated blade edges, sometimes exhibit barbs tangs, are deeply corner-notched, and have varied basal shapes including convex, straight, and rounded basal morphology. This typology was first defined by Nelson (1971) and later refined by Benedict (Benedict 1996:50). It is considered a mountain technological tradition (Gilmore 1999; 298). This typology is thought to date to 1350 BP – 950 BP (AD 600-1000) (Nelson 1971; Benedict 1975a, 1975b, 1996; Whittenburg 2017). Hogback Corner-Notch points are particularly abundant in Colorado's Front Range and sites with these typological units include the Fossil Creek site, the Owl Canyon

Rockshelter, the Kinney Springs site, the Murray Game Drive site, Bode's Draw, Flattop Mountain Game Drive, and the Trail Ridge Game Drive site (Benedict 1975; Benedict 1996; LaBelle 2015; Meyer 2020). Additionally, many game-drive sites at Rollins Pass, such as 5GA35, 5GA36, 5GA48, 5BL147 (Olson Site), and 5BL148 (High Grade Site) also demonstrate Hogback Corner-Notch points in their assemblage. There are a total of 12 points from Rollins Pass that are classified as Hogback Corner-Notch points from resources 5GA32, Benedict 5GA51, 5BL122, 5GL2, and RP15-4.

Figure 18. Sample of Hogback Corner-Notch points (Benedict 5GA51-13, Benedict 5GA51-3, RP15-4-2, 5GA32-5)

Middle Ceramic/Protohistoric

Plains Side-Notch (Figure 19)

The Plains Side-Notch projectile point is characterized by an excurvate blade outline, abrupt shoulders, deep side-notching, and a slightly concave to straight base shape. The cross-section is lenticular and the flaking pattern is irregular. These projectile points are classified as arrow-sized points. Plains Side-Notch points date to 850 BP- 150 BP (AD 1100-1800) (Gilmore 1999; Kehoe 1966; Kornfeld et al. 2010; Whittenburg 2017). Sites located in Northern Colorado

with a Plains Side-Notch component include Roberts Buffalo Jump and the T-W Diamond Site (Johnston 2015; Meeker 2017). Projectile points of similar morphology are found at 5GA45 in the Caribou Lake Valley (Benedict 1985:148). Outside of Colorado, a site with Plains Side-Notch points includes the Vore Site (Reher and Frison 1980; Perlmutter 2015). At Rollins Pass, three projectile points are attributed to this typology, from sites including 5GA24, Benedict 5GA51, and RP13-302.

Figure 19, Plains Side-Notch points from Rollins Pass (RP13-302-6, RP11-7)

Prairie Side-Notch (Figure 20)

Prairie Side-Notch projectile points are described as small side-notched arrow points. The point is characterized by an excurvate blade shape, side-notching, abrupt to sloping shoulders, and a concave base morphology. The flaking pattern is considered irregular and the cross-section is lenticular. Kehoe (1966) assigns an approximate date of 1250 BP-360 BP (AD 700 -1590). The largest distinguishing factor between this typology and the Plains Side-Notch point is perceived skill of the manufacture and the lower quality raw material used to produce the tool.

Resources 5GA32 and RP13-302 at Rollins Pass have Prairie Side-Notch points (n=2) within the point assemblage.

Figure 20. Prairie Side-Notch points from Rollins Pass (5GA32-8, RP13-302-1)

Plains Tri-Notch (Figure 21)

Plains Tri-Notch projectile points have a triangular blade outline, abrupt shoulders, side-notching, and a basal notch within a straight base morphology. Plains Tri-Notch points co-occurs within the Middle Ceramic and Protohistoric periods (Meeker 2017; 23; Johnston 2015; 62). Small Tri-Notch points are associated with sites along Colorado's Front Range such as T-W Diamond, and the Robert's Buffalo Jump (Meeker 2017; 23). Other sites that have Tri-notch points include Glenrock Buffalo Jump the Piney Creek Site and the Eden-Farson Site located in Wyoming (Johnston 2015). Based on radiocarbon dates associated with the typology, Plains Tri-Notch points date roughly beginning in the latter half of the Middle Ceramic period and well into the Protohistoric period (~700 BP-90 BP or AD 1250-1860). Two projectile points from sites 5BL124 and RP13-302 are classified as Plains Tri-Notch points at Rollins Pass.

Figure 21. Plains Tti-Notch points from Rollins Pass (RP13-103-112, 5BL124-1)

General/Unknown Late Prehistoric (Figure 22)

Diagnostic characteristics of the Late Prehistoric 1800 BP-410 BP (AD 150-1540) include a reduction in size associated with the adoption of bow and arrow technology and a plethora of notched and unnotched point types. Points most often sorted into this category include midsections and distal-midsections. These portions are missing the most diagnostic portion, the base, which is predominately used to classify typology but have characteristics, like overall arrow size, that suggest a Late Prehistoric origin. A total of nine points were sorted into this category. Small stemmed projectile points can be described as arrow sized points with sloping shoulders, excurvate blade outlines, an elongated stem, and either rounded or straight base morphology. The morphologically of these small stemmed points, with the accentuation of the stem and shallow shoulders, suggests the tools were jam hafted. Small stemmed points in Colorado are not well dated but it is thought that this typology likely dates to the latter half of the Late Prehistoric and perhaps into the Protohistoric period. Two projectile points from 5GA32

and Benedict 5GA53 are classified as Small Stemmed points from the Rollins Pass campsite and isolates. One projectile point has many notches from site 5GA24. It is small in size with the distal tip missing. A total of five notches are present. Due to these several notches the point no longer retains a functional aspect, and it is unclear if it was primarily manufactured as such or was later reworked.

Figure 22. Unassigned/General Late Prehistoric (Benedict 5GA53-2013-110, 5GA32-7, 5GA24-6)

Discussion of Relative Chronological Sequence

Rollins Pass is an intermountain pass that provides an elevation low point to travel between Colorado's western slope, the intermountain basins of the Southern Rocky Mountains, and the Front Range. This ease of travel has made the Pass popular both to animals and people, providing ample opportunity throughout prehistory for hunter-gatherers to exploit game and travel between the Middle Park area and the Front Range. To address Rollins Pass prehistoric campsite/isolate use through time, projectile points were examined and categorized into nine represented periods. This categorization was determined through projectile point typology.

Typologies were assigned using local classification derived from dated context in Northern Colorado and other regions. The chronological sequence represented at Rollins Pass sites and isolates follows broad patterns seen throughout mountain/foothill sites along Colorado's Front Range. Time represented at Rollins Pass includes the 1) Late Paleoindian period, 2) Early Archaic, 3) Middle Archaic, 4) Late Archaic, 5) Early Ceramic, and 6) Middle Ceramic/Protohistoric (Middle Ceramic-Plus). General patterns for the chorological sequence of the Pass and Northern Colorado as a whole will be discussed below.

The Paleoindian presence in Colorado's alpine environment is largely expressed by Late Paleoindian complexes, dating after 10,000 BP. However, a few cases of Clovis (12,000-11,000 BP) or Folsom (11,000-10,000 BP) projectile points exist in high-altitude settings (*i.e.* Clovis has been recorded in Rocky Mountain National Park above 3000 meters) (Brunswig 2007; Chenault 1999; 80). Late Paleoindian traditions in the mountain and foothills are recognized due to work conducted by James B. Benedict, Bryon Olson, Elizabeth Morris, and Mike Metcalf in the 1960s-1970s. This work established the occurrence of prehistoric people throughout Colorado's Southern Rocky Mountain ranges above 3,000 meters including areas such as Fourth of July Valley, the Indian Peaks Wilderness, the James Peak Wilderness, Rocky Mountain National Park, Niwot Ridge, and Rollins Pass. It is thought that at this time subsistence in the Colorado Mountains focused on smaller and more varied game than that pursued in the Plains (Chenault 1999; 80). Additionally, the people occupying the mountains are thought to be two contemporary groups 1) a Plains Paleoindian group who intermittingly used the mountains, and 2) a second group that was closely tied to the mountains (Chenault 1999: 81). The Rollins Pass Paleoindian assemblage falls nicely into the occurrence of Late Paleoindian complexes and supports groups of prehistoric people closely linked to high-altitude landscapes.

The Paleoindian to Archaic transition is characterized by increase of morphological point types, a decrease in technological complexity, and a more diverse diet. A shift in the environment during the Early to Middle Holocene promoted modification in lifeways and Cassells (1983) argues that the Archaic in many areas in North America was an optimal ratio of people and the environment, suggesting resource availability and less competition. The Archaic is specifically known from the transition away from lanceolate point forms and for the explosion of projectile point types which supports the notion of a diversified toolkit (Reed and Metcalf 1999: 7; Tate 1999: 91). During this period there is a general decrease in projectile point size and an appearance of stemmed and notched types. The diversity in projectile point morphologies may be the result of several factors including 1) the Archaic period lasted a long time providing time (8000+ years) for variability to occur and 2) groups were less mobile and more isolated from both trade of material and ideas thus forming divergent point styles (Reed and Metcalf 1999: 83) Regardless of the mechanism, the Archaic presence in Colorado, particularly within the mountains is difficult to study given the lack of a uniform typological system for the region. This issue is addressed in this thesis by attempting to apply local typologies before broader regional point traditions.

In Colorado, the Early Archaic (7500-5000 BP) is the transition from the Paleoindian period and is argued by Black (1991) to have been relatively uneventful on the High Plains. While there appears to be a cultural continuity on the Plains, the Mountains demonstrate different lifeway choices (Tate 1999; 92). Benedict and Olson (1978) hypothesized the Mountain Refugium Model to contextualize Colorado's Early Archaic archaeological record (Benedict and Olson 1978; Benedict 1979). The Mountain Refugium Model suggests that prehistoric people sought refuge in the mountains during the Altithermal from the drought-affected plains and

western plateaus. This model is seemingly supported by the arrival Mt. Albion complex which appeared to have used the high-altitude areas in the mountains seasonally, in an Up-Down model of movement between the mountains and the plains (Benedict and Olson 1978). Another hypothesis put forth by Benedict (1990) suggests that travel through the mountains was conducted in a Grand Circuit model of movement. This model of movement is hypothesized to have begun during the Early Archaic and continued through to the Early Ceramic. The Grand Circuit involves a rotary movement of people beginning east on the Front Range moving up into the Laramie Basin, west into the Western Slope, then traveling through Rollins Pass to access the Front Range again. The circuit was contingent on seasonal access and is supported by lithic raw materials recovered at Rollins Pass. Both the Up-Down and Rotary Circuit models are characterized by high residential mobility where prehistoric populations only seasonally utilized and exploited mountain environments (Benedict 1990; Benedict 1992; Pelton 2012). These models may explain the presence of prehistoric people at Rollins Pass but it does not mean they are mutually exclusive, and it is likely all co-occurred in some form (Pelton 2012). An additional hypothesis put forth by Black (1991) defines and discusses the 'Mountain Tradition' which addresses distinguishing Archaic developments in the Rocky Mountains and suggests year-round occupation. This tradition is separated from other surrounding traditions based on several characteristics including settlement systems that emphasize upland environment use and cultural material similarities to the Great Basin (Black 1991:4). It is suggested that populations that comprise of the Mountain Tradition were a part of a Great Basin group which left during the radical Pleistocene-Holocene environmental transition to settle the Rocky Mountains, thus accounting for the cultural material morphological correlation (Black 1991:17). Black (1991) further argues against Benedict and Olson's (1978) Mountain Refugium Model, stating that the

archaeological evidence indicates that Mt. Albion and other Early Archaic types are more aligned with populations living in the mountains rather than groups that seasonally exploited high-altitude environments from the Foothills and Plains.

The Early Archaic record at Rollins Pass, outside of the game-drive sites, contains a single Mt. Albion projectile point. Game-drives 5GA35 and 5GA36 have four Mt. Albion points attributed to their point assemblage. The example of Mt. Albion in the high country, argued by Black (1991:11) to be a part of the Mountain Tradition following other occurrences in high-altitude settings in the Colorado Rocky Mountains, but the low occurrence in the many surrounding sites, small sites, and isolates below the game-drive systems speaks to a less consistent use of Rollins Pass, individually, as a settlement location for Early Archaic hunter-gatherers and more to mobile groups coming in and using Pass resources periodically, which resulted in less of a signature on the landscape.

During the Middle Archaic (5000-3000 BP), within Northern Colorado there is an increase in intensive plant processing demonstrated by the increased amount of ground stone present (Tate 1999). Additionally, there is a continuation of the exploitation of a small-medium sized game in the mountains (Cassells 1997; Tate 1999). The environment during the Middle Archaic is associated with improving conditions or becoming more temperate, following the Altithermal episode (Tate 1999; 95). This archaeological period is largely characterized by the McKean complex but other point forms such as Mallory, large straight-to-slightly contracting stemmed points (Park points) and later within the end of the Middle Archaic and into the Late Archaic, Yonkee points, are present. Sites with Middle Archaic components in the mountains include Fourth of July Valley site, Albion Boardinghouse site, Coney Lake site, Flattop Mountain Game Drive site, Berthoud Bridger site, and Devil's Thumb Trail site (Benedict 1981;

Benedict 1996; Benedict 2000; Tate 1999). Rollins Pass has a moderate Middle Archaic presence, consisting of Duncan-Hanna points, and large straight-to-slightly contracting stemmed points (Park points). The Middle Archaic is represented by eleven projectile points from six sites/small sites/isolates and equates to 12% of the total Rollins Pass projectile point assemblage.

In the Late Archaic period (3000 BP- 1800 BP or AD 150), there is a continuation of subsistence patterns of increased plant and small game use, seen in earlier Archaic periods. During this period there is a rise in the number of sites present on the Colorado landscape, suggesting a combination of factors including an increase of population, resource intensification, and reduced mobility (Tate 1999). The archaeological signature within high altitude environments also increases during this time with a perceived rise in Native American exploitation of the alpine. Within in the mountains, at this time, subsistence evidence is gathered primarily from the game-drive systems located along the Continental Divide (Tate 1999). These systems indicate populations during the Terminal Archaic exploited reliable medium sized migratory game. Projectile point data, recovered from game-drive intercept zones and nearby butchering areas, suggests that prehistoric hunter-gatherers in Northern Colorado intensified their use of Rollins Pass during the Late Archaic (LaBelle and Pelton 2013; Meyer 2019; Whittenburg 2017). While previous research conducted on the game-drives (5GA35, 5GA36, 5GA37, 5BL147, and 5BL148) indicates intensified used during this period; no direct evidence between the numerous game-drive systems and the sites/small sites/isolates located below the exposed ridgelines exist at Rollins Pass, but the co-occurrence suggests that prehistoric peoples mapped on to reliable resources (LaBelle and Pelton 2013; Meyer 2019; Whittenburg 2017). Sites with Late Archaic components in the Northern Colorado Rocky Mountains include Joe Wright Site, Blue Lake Valley Site, and Coney Lake (Benedict 1990; Tate 1999). Typology during this period

is dominated by notched point types such as Besant, Pelican Lake, and a variety of large corner-notched dart point forms. Rollins Pass has a high representation of Late Archaic in the point assemblage. A total of 30 points date to this period from 13 sites. The Late Archaic period represents 33% of the total projectile point assemblage. One site in particular, Benedict 5GA51, supplies the bulk of the Late Archaic sample. Despite site Benedict 5GA51 individual contribution to the data, overall, the point assemblage has a visible increase of Late Archaic aged points within the archaeological record at Rollins Pass, suggesting 1) there was an increase Late Archaic presence at the Pass or 2) the higher representation of Late Archaic could be the result of time averaging.

During the Early Ceramic period (1800 BP-800 BP or AD 150-1150) there is an increased prehistoric signature on the landscape in the form of open campsites that were occupied for longer lengths of time. Additionally, this period witnesses the introduction of pottery in many areas throughout the Colorado Front Range. In the mountains the Early Ceramic is typified by occupations in the high country near seasonal sources of water or game drive features as demonstrated by Joe Wright site, the Murray Game-Drive Site, Coney Lake Site, the Scratching Deer Site, and site 5BL68 (Gilmore 1999; 217-220). As a whole, the Late Prehistoric period is summarized as having greater population pressures, reduced mobility, and the development of territoriality. Gilmore (1999) argues that the intensive utilization of the mountains beginning in the Early Ceramic is a direct result of these increasing pressures and decreasing mobility elsewhere in Colorado. The Late Prehistoric also saw the transition of the atlatl dart to bow and arrow technology. Arrow technology affected the morphology of projectile points by reducing the overall size (Shott 1997). The Early Ceramic is typified by corner-notch arrow points with an increased occurrence of blade serration. Small arrow points, both corner-

notch and side-notched forms, become the index fossils for the Late Prehistoric. The Early Ceramic period is defined principally by the Woodland culture and Woodland variants which originate from the Midwest (Cassells 1997; Gilmore 1999; 175). While the Late Prehistoric is characterized by the presence of small arrow points the co-occurrence of dart sized points suggests that these technologies were likely used at the same time before bow-arrow technological complex succeeded the atlatl. Rollins Pass has twelve Early Ceramic Corner-Notch Hogback points from six sites/small sites/isolates at the Pass. The Early Ceramic makes up 13% of the total projectile point assemblage at Rollins Pass non-game-drive resources.

The Middle Ceramic (800 BP-410 BP or AD 1150-1540) followed many of the same subsistence patterns established during the Early Ceramic. The archaeological record appears to demonstrate a steep decline in Middle Ceramic representation in Colorado. The sites typically are comparatively sparser and often have a lower assemblage diversity (Gilmore 1999; Zier 1999). Many Middle Ceramic components are found within sites with Early Ceramic components, suggesting areas of persistent use that may be tied to seasonal rounds and/or group identity. Sites in the mountains with Middle Ceramic components include the Murray Game Drive Site and the Old Man Mountain site. The Rollins Pass campsite and isolate assemblage has three Plains-Side Notched points, two Prairie Side-Notched points, and two Plains Tri-Notch points. The Middle Ceramic contributes 7% of the total projectile point assemblage at Rollins Pass.

The Protohistoric period (410-90 BP or AD 1540-1860), also referred to as the Late Ceramic period, in Colorado is typified by the appearance of European and Euromerican goods. This period largely has an extension of projectile point morphologies seen in the Middle Ceramic with the eventual introduction of metal points. Considering the morphological overlap, the Late

Ceramic typologies are lumped here into Middle Ceramic/Protohistoric or Middle Ceramic-Plus to account for the continuation of side and tri-Notch point forms, given the difficulty of separating these into two different periods.

Conclusion

Rollins Pass has a deep chronological history characterized by the projectile point typologies. In terms of frequency every archaeological period beginning with Late Paleoindian to the Middle Ceramic-plus periods are represented (10,000-90 BP). This distribution indicates the pass was used throughout the majority of prehistory. However, time at the pass is not equally represented with the highest representation occurring during the Late Archaic period followed by Early Ceramic, the Middle Archaic, and then the Late Paleoindian period. Each of these spikes occur during periods associated with shifts in lifeways, likely occurring with changes in subsistence, technology, and population.

To assess time at the Pass another way; the chronological representation of projectile points at Rollins Pass is compared to the cultural historical sequence several broad patterns emerge (Figure 23). Essentially comparing overall percentage of points represent within the sites, small sites, and isolates vs. actual length of periods. This comparison is key in understanding intensity of use since not all periods are of equal length. The Late Paleoindian period appears underrepresented at the Pass at 8.7% when contrasted against the 25% the period represents within the prehistoric chronological sequence. This pattern may be the result of more mobile groups traveling through the Pass and depositing less material on-site. The percentage of projectile point frequency for the Archaic (58%) indicates that this period is a possible study area associated with populations and mobility of prehistoric people in the mountains. Meaning the

Archaic representation matches the expectation of occupation presence presented by the Archaic in the cultural history sequence (58%:58%). The Late Prehistoric (including the Protohistoric) presence at the Pass is higher (30%) than the cultural sequence suggests it should be based on the total time represented by the period(s) (17%). This increased occurrence may be tied to population pressures on the plains and increased resource/subsistence diversification attributed to this period (Gilmore 2008; Pelton 2012).

Additionally, when archaeological periods are compared by the ratio of single and multicomponent cultural resources another pattern can discerned (Figure 24). The recovered Late Paleoindian-aged projectile points are predominately a part of dense multicomponent sites which suggest the location of these sites endured through time. At Rollins Pass the Archaic as a whole has a nearly equal representation of single (40%) and multicomponent (60%) sites which indicates reoccupation of previously established sites The slight dominance of multicomponent sites during this general period suggests that prehistoric populations already viewed the Pass as a persistent place with redundant use of space. Beginning the in the Late Archaic, however a shift can be seen in the component type with an increase in single component sites and isolates. Similar to the general Archaic trend, the Late Prehistoric components are encompassed mostly of multicomponent sites and small sites (73%), with single component sites/small site representing (27%). This pattern further supports that Rollins Pass represented and area of persistent and reoccurring occupation.

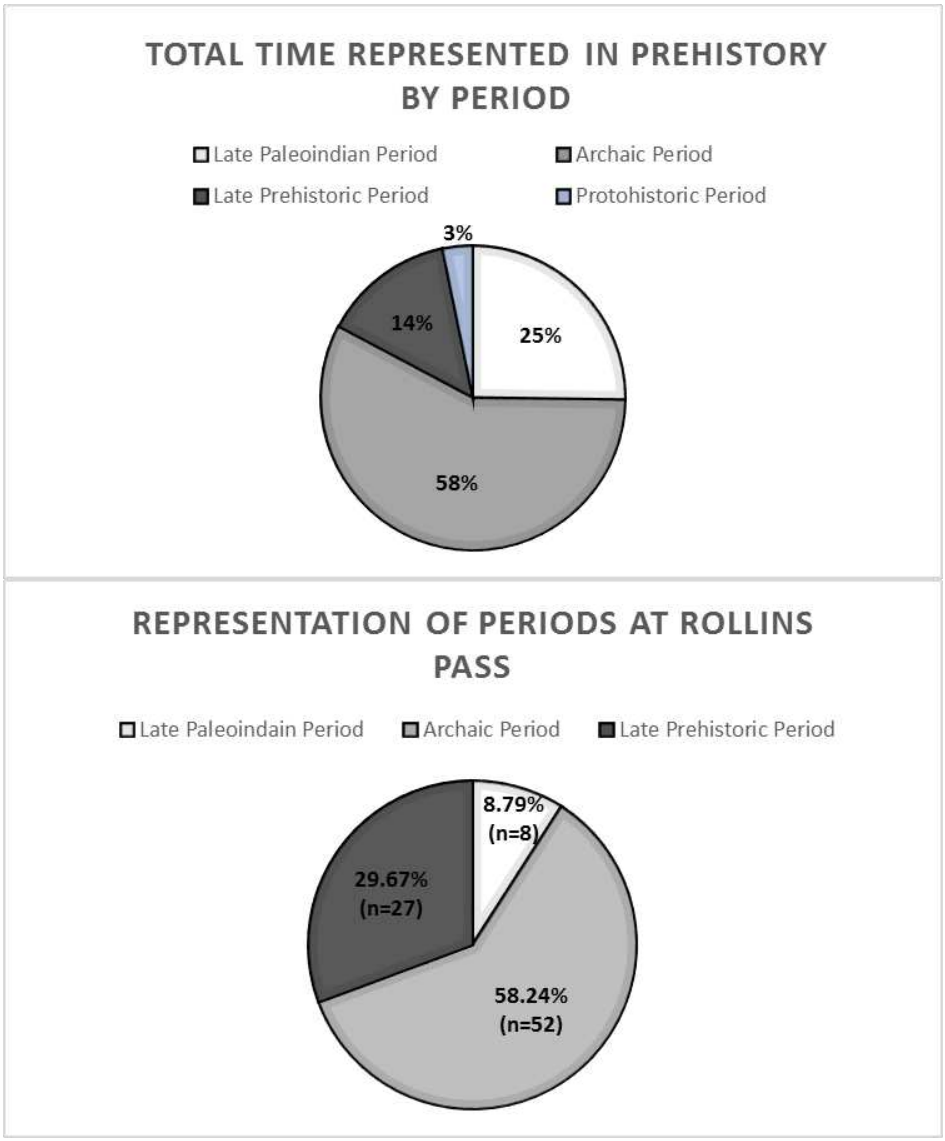

Figure 23. Graph showing the percentage of each period against the whole of Northern Colorado prehistory (above) and the percentage of periods represented at Rollins Pass sites and isolates (below).

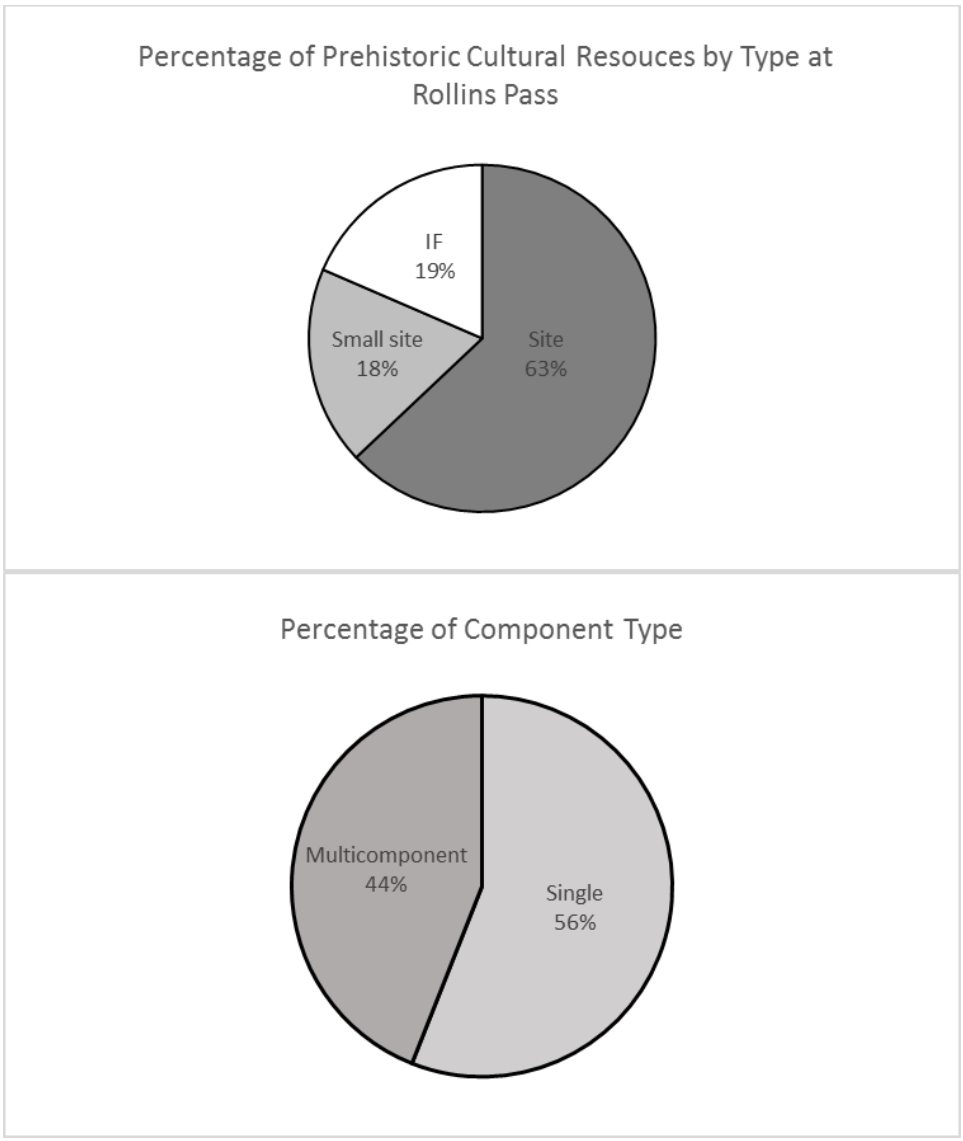

Figure 24. Graphs depicting cultural resource type at Rollins Pass (above) and the percentage of component type (below)

The Late Paleoindian period in is often characterized as diversification from earlier Paleoindian groups. The Late Paleoindian typologies at the Pass (Cody complex, James Allen, and Angostura) are point types defined on the Plains but beginning in the Cody complex there is a steady intensification of Late Paleoindian use of the Rocky Mountains. As a result of ongoing research, it is becoming clear Late Paleoindian occupations are increasingly well represented in the high-altitude environments suggesting well adapted prehistoric populations. Rollins Pass's

Paleoindian assemblage supports this conclusion (Brunswig 2007; Pitblado 1999; Whittenburg 2017).

A shift in subsistence and settlement patterns tied to more local resources is expressed in the Archaic. The Middle Archaic period is poorly defined, but largely characterized by the McKean complex, a tradition affiliated with mountain use in Colorado and Wyoming (Kornfield et al. 2010; Morris et al. 1985). This pattern continues into the Late Archaic, the most represented period at Rollins Pass. The surge of Middle and Late Archaic representation at Rollins Pass could be the result of a combination of factors occurring in the Archaic including an increase of population and resource intensification. This trend is also reflected in many game-drives sites which have a large representation of components dating to these periods, further supporting the intensification of locally available mid-sized game (Benedict 1981, Benedict 1996, Benedict 2000; Benedict and Cassells 2000; Cassells 2000; LaBelle and Pelton 2013; Whittenburg 2017).

The Early Ceramic is a period defined by a shift in lifeways with changes to technological, subsistence, settlement, and population. The higher representation overall coincides with periods attributed to significant shifts in technology, subsistence, and settlement patterns where prehistoric people changed how they interacted with the environment.

The examination of typology to assess the chronology sequence reveals a persistent prehistoric use of the Rollins Pass. Evidence of occupation begins in the Late Paleoindian era and continues to beyond the Middle Ceramic period. While use of the Pass is supported, it does not appear to be consistently used with the same intensification. The fluctuations could be the result of numerous pressures affecting population, mobility, and access. The surge in the Archaic, particularly in the Late Archaic, shadows the general trend of increased archaeological

presence. While intensification of Pass use is on par with the amount of time the period represents during the Archaic period the Late Prehistoric era witnesses an increase. This shift supports the general trend of Late Prehistoric intensive utilization of mountain resources discussed above.

The chronological sequence at Rollins Pass indicated it is a persistent place to prehistoric hunter-gatherers. This is further supported by the occurrence of multicomponent or palimpsest sites. Of the sites, 59% are multicomponent and 41% are single component. Small sites represent a total of 20% of the sample with 75% being single component and 25% being multicomponent. Isolates comprise 20% of the Pass's total prehistoric cultural resources, all of which are single component. The densest sites, such as 5GA24, 5GA32, Benedict 5GA51, and Benedict 5GA53 are multicomponent and indicate that these sites were revisited again and again throughout time. In other words, multicomponent archaeological resources suggest persistent places.

A persistent place can be defined as area with repeated use during long-term regional occupations (Buckner 2020; Schlanger 1992). According the Schlanger (1992) persistent places are associated with 1) unique qualities particularly suited to certain activities/behaviors; 2) natural features that focus reoccupations; and 3) accumulations on landscapes resulting from extended occupation/re-visitation independent of cultural features, but dependent on the presence of cultural material. Repeated use of Rollins Pass identifies a relationship between a fixed place and shifting environments. This relationship may indicate possible motivation for the use of Rollins Pass throughout the past; this concept will be further explored in later chapters.

CHAPTER THREE: LITHIC RAW MATERIALS OF ROLLINS PASS CAMPSITES AND ISOLATES

Lithic raw materials or toolstone have long been an avenue in which research regarding accessibility and prehistoric mobility has been examined (Andrefsky 1994; 2005). The sourcing of raw material outcrops is a common method used to assess hunter-gatherer mobility ranges (Binford 1979; Naze 2013). It is through the comparison of artifact toolstone and known outcrop locations that researchers can address toolstone accessibility and use. This avenue of research aims to demonstrate that outcrop locations and lithic raw material discard locations are an effective means to address mobility range and therefore to some extent accessibility to the place of discard (Bamforth 2009; Ellis 2011). The analysis of raw material in conjunction with highly curated tools, like projectile points, is the medium in which toolstone accessibility and later curation will be addressed within Rollins Pass's sites, small sites, and isolates.

Many methods have emerged to connect raw material outcrops to artifact assemblages, including geochemical analysis, petrographic analysis, and ultraviolet fluorescence analysis. However, analyzing toolstone is often difficult due to highly variable chemical signatures, even within a single outcrop. Beyond obsidian, which chemical signature is unique enough to be sourced confidently; cherts, quartzites, and petrified woods are difficult to source and often fluctuate too much in their chemical/mineral makeup to be attributed accurately to a single location using chemical analysis. However, while difficult chemical analysis has successfully sourced lithic materials such as Flattop chert from eastern Colorado and quartzite from the Gunnison Basin (Hoard 1993; Pitblado et al. 2008). The most common method to 'source' lithic raw material is visual or macroscopic analysis. Visual analysis can be bolstered to become more objective with the use of a comparative lithic library. A lithic library ideally has a collection of

known-sourced lithic raw material samples to be used as a comparison to debitage and tools found within archaeological sites. Through the comparison of known raw material sources, accessibility or availability of the procurement source from the place of discard can be addressed. In turn, by analyzing accessibility, raw materials may be determined as distant or local. How local the procurement of raw materials may be used to investigate how local toolstone and accessibility shape conservative or expendable toolkit strategies.

Local and distant raw material acquisition provides clues on prehistoric mobility and local resource availability. Assessing local procurement can be approached by examining either debitage or formal tools, and each avenue can provide important information regarding technological organization. However, in palimpsest sites analyzing debitage or non-diagnostic tools can become muddled when looking for temporal patterns, such as raw material preference and/or accessibility. This is because debitage and many stone tool types cannot be assigned to specific periods due to their uniformity in morphology throughout all periods, therefore these lithic artifacts are not considered a meaningful source of temporal analysis as individual artifacts within a multicomponent assemblage. To mitigate the issue of overlapping time, raw material analysis will be applied to projectile points which are diagnostic of time. Projectile points, a formal tool, is often associated with more distant toolstone outcrops than informal tools or debitage. The reasoning behind this assumption is based on the notions of conservation and expendability. In other words, researchers assume that formal tools are highly curated and therefore these tools have a higher representation of being manufactured from high quality (often assumed non-local) lithic raw materials (Andrefsky 1994: Goodyear 1979). However, this expectation shifts through time and often is linked to changes in mobility, social pressures, and raw material accessibility (Andrefsky 1994; Andrefsky 2005; Gilmore et al. 1999). This idea is

clearly demonstrated during the shift from the Paleoindian period to the Archaic period. The Paleoindian period, considered highly mobile, is largely associated with distantly acquired very high-quality lithic materials while the Archaic period is associated with locally available and lower quality toolstone indicating a shift in mobility and settlement patterns (Gilmore et al. 1999; Sassaman et al. 1988). Several studies suggest that accessibility to lithic raw material is the main factor to in the production of stone tool forms as related to mobility and land use (Andrefsky 2005; Daniel 2001; Dobosi 1991; Goodyear 1993; Meltzer 1984; Seeman 1994; Wiant and Hassen 1985). However, other studies indicate that raw material that lithic raw-material procurement may play little or no part in human land-use practices (Andrefsky 2005:236; Brantingham 2003). This acquisition of raw materials and the distance to discard is what some researchers refer to as range mobility (Bamforth 2009; Gramly 1980; Naze 2013). Mobility range within this research will be discussed in terms of local lithic raw material outcrops vs. assumed non-local lithic raw material in relation to the place of discard in order to assess the role of lithic raw materials has in projectile point use strategies and the prehistoric use of Rollins Pass.

Methods

Rollins Pass itself has no known toolstone outcrops, however, the surrounding regions are known to produce high quality chippable material including Troublesome Formation chert, Windy Ridge orthoquartzite, Table Mountain jasper, and Parker petrified wood (Bamforth 2006; Benedict 1981, Benedict 1992; Black 2000; Naze 2013). In order to assess prehistoric mobility through the Pass and how raw material accessibility effected discard, the toolstone of the projectile point assemblage was examined and compared to a lithic library housed in Colorado State University's Center for Mountain and Plains Archaeology Lab.

The ratio of local versus distant toolstone materials present within the projectile point sample were compared. Lithic raw materials will be first compared to known local sources before its source will be considered to be from further distant locations. The determination of local vs non-local raw materials is based on foraging radius research done by Naze (2013) for his dissertation. The study focuses on ethnographic hunter-gatherer foraging radii (Table 5) to assess potential home ranges for Paleoindian groups (Naze 2013). Raw material will be determined "local" if the source/outcrop is within a 75 km radius of the place of discard and non-local if it is sourced beyond a 75 km radius (Figure 25). This distance is based on minimum and maximum foraging radii of ethnographically documented pedestrian hunter-gatherer groups (Table 5). At Rollins Pass the justification for 75 km radius to determine local sources is due the seasonal use of the Pass itself. Prehistoric Native American groups are not thought to have been living on the pass year-round but instead were using the high-altitude intermountain pass as a travel corridor and/or as a destination associated with hunting migratory game (Benedict 1990; Benedict 1992).

Table 5. Variation in Maximum Dimensions of Mobility Ranges of Ethnographically Studied, Pedestrian Hunter-Gatherer Bands. Table adapted from Naze (2013; Table 8-1) Dissertation.

Cultural Group	Region Inhabiting	Band Name or Other Designation	Maximum Dimension of Band Range (km)	Reference
Bushman (of !Kung dialect)	Kalahari Desert of South Africa	Dobe	22	(Yellen 1976: Map 2.2)
Efe (Pygmies)	Ituri Forest of West Africa	Andilokbe	22	Bailey (1989:669)
Hadza	Savanna of East Africa	Mangola	45	Tomita (1966: Figure 2)
Bushman (of Gwi dialect)	Kalahari Desert of South Africa	≠xade	54	Silberbauer (1981: Figure 16)
Netsilik Inuit	Arctic of North America	Arviligjuar-muit	80	Balikci (1968: Figure 1)
Nunamiut Inuit	Arctic of North America	Tuluaq-muit	143	Campbell (1968: Figure 2)

Toolstone from unknown sources or raw materials sourced outside the distance of 75 km will be considered non-local or distantly procured. This is based on the low quantities of these various

material within the projectile point assemblage and on the assumption that unknown sourced materials are not likely procured within the 75 km limit, this expectation is based on the observation that there are no known sources for these toolstone types. In other words, it is better to assume unknowns are non-local materials with no proof of procurement sites within the 75 km local limit.

Examining lithic raw material and the distance to procure it will help demonstrate possible movement ranges through Rollins Pass. Due to local toolstone accessibility, the representation of raw materials at Rollins Pass should be heavily skewed to these local materials. However, in order to accomplish partitioning raw material 'localness,' the projectile point assemblage was compared to a lithic library to assign toolstone outcrop provenience.

Many known lithic sources are located within Northern Colorado's mountain and foothill region; this cluster of resources forces mobile hunter-gatherer groups from surrounding lithic poor regions to migrate to access quality chippable stone materials (Black 2000). Black (2000) study reviews lithic raw materials surface to better clarify the true availability of sources used prehistorically in the Rocky Mountains. Rollins Pass while surrounded by areas of known lithic raw materials, does not have toolstone source located on the pass itself. This already places the hunter-gatherers using the Pass in a position to gear up, or to gather and minimally process stone for tool manufacture, before interacting with Rollins Pass as either a destination or travel corridor. The sourced materials, discussed below, are from quarries predominately located within the mountains and parks of Grand County, where Black (2000) cites 41 quarries have been documented. The following categorization of lithic raw materials represented at Rollins Pass and known source sites provides a foundation of local and non-local procurement systems; and future lithic source analysis may better identify unknown sources to better understand technological and

behavioral choices by prehistoric hunter-gatherers at the Pass. This chapter will focus on the results of this comparison to determine if lithic raw materials represented at Rollins Pass are from distant or local sources and to establish source material procurement patterns.

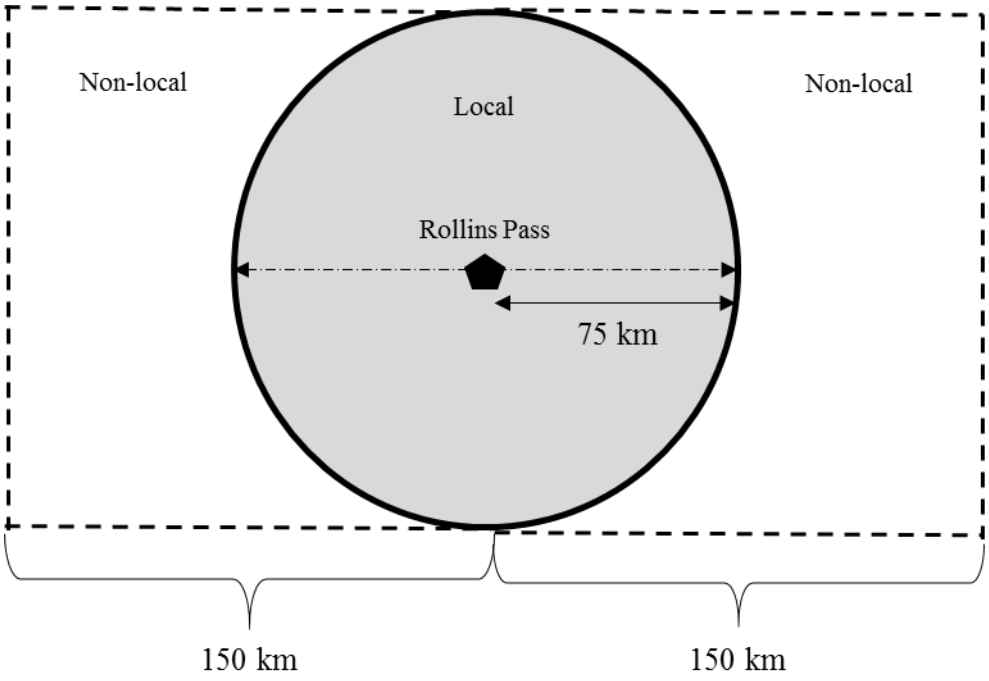

Figure 25. Diagram depicting the distance of locally and non-locally procured lithic raw materials. (Based on Naze 2013)

Visual Lithic Analysis

Visual raw material analysis, or macroscopic lithic analysis, is the traditional method used to establish connections between artifact raw material procurement and toolstone outcrop locations. Visual analysis can be a subjective method however the use of a well-sourced lithic library can mitigate the subjective nature of resource assignment. Visual analysis employed within this research considered and compared factors such as 1) color, 2) luster, 3) texture, 4) presence/absence of inclusions or impurities, 5) cortex if present, and 6) homogeneity in order to determine raw material source categorization. The lithic library has many samples donated by the

late James B. Benedict who originally recorded many of the sites included in this thesis. The lithic library at the Center for Mountain and Plains Archaeology at Colorado State University has 150 + samples in which to compare. Samples are predominately from Colorado but examples from Wyoming, Arizona, Nebraska, North Dakota, and Texas are also present. Many samples from a single source from the lithic library contained several examples which demonstrates the range in appearance a single toolstone can take. For the lithic analysis completed for this thesis, I primarily examined and compared materials sourced within Colorado which had accompanying UTMs. After comparison, visual analysis attributed the projectile point raw material to four known sources, two local and two non-local. Any unidentifiable raw material was considered unknown and therefore assumed to be procured from a distant or non-local source (over 75 km). The raw materials utilized at Rollins Pass are further described and discussed in following section.

Known Lithic Raw Material Outcroppings

Local raw materials include Troublesome Formation chert and Table Mountain chert/jasper which have known outcrops that occur within a 75 km radius of Rollins Pass making them easily accessible to prehistoric people utilizing Rollins Pass. Lithic raw materials with known non-local (further than 75 km) source areas include Windy Ridge orthoquartzite and Parker petrified wood. I provide a description of each toolstone as well as the projectile point count assigned to each raw material grouping below.

Troublesome Formation Chert (Figure 26)

Troublesome Formation chert and chalcedonies have a known outcropping located in Grand County which is located 64 km from Rollins Pass. The Troublesome Formation also produces a chert material often referred to as Kremmling chert and is visually very similar to the broader Formation (Black 2000:134; Whittenburg 2017). Large lithic sources are located southeast of the Town of Kremmling with the main source area that occurs in the drainage of Barger Gulch (5GA195) (Naze 2013). Within this thesis, Kremmling chert will be lumped into the greater Troublesome Formation due to the difficultly differentiating the Kremmling outcrop between other Middle Park sources.

The lithic material is considered a high-quality microcrystalline rock that is considered to have a predictable breakage. The chert/chalcedony is highly variable in appearance and can range from an opaque white to a semi-translucent white to semi-translucent light brown/grey. The texture can also range from rough to semi-glassy. The lithic material often displays white or cream opaque inclusions. Thirty-nine projectile points are attributed to this raw material.

Figure 26. A sample of projectile points mnaufactured from Troublesome Formation chert.

Windy Ridge Orthoquartzite (Figure 27)

Windy Ridge orthoquartzite is described as a light gray, fine-grained quartzite with a known outcrop occurring at the Windy Ridge quarry site (5GA872) near Rabbit Ears Pass in Grand County, located approximately 88 km from Rollins Pass (Bamforth 2006; Benedict 2000:79; Black 2000:135) The lithic material is the product of silicified Cretaceous sandstone belonging to the Dakota group (Naze 2013). While Windy Ridge orthoquartzite is a part of the Dakota quartzite outcrops, it can be categorized separately due to factors such as texture and color. The material is fine-grained and a large majority is light gray in color. However minor color variety grades from light tan to medium brown do exist. Within Northern Colorado, Windy Ridge orthoquartzite is highly represented in many Paleoindian assemblages such as the Carey Lake site and 5PA158. The prevalence of this specific source within Paleoindian assemblages suggests that prehistoric peoples in the area mapped on to this resource early within Northern Colorado's intermountain travel corridors. Rollins Pass has 12 projectile points that are manufactured from Windy Ridge quartzite from the sites, small sites, and isolates.

Figure 27. A sample of projectile points mnaufactured from Windy Ridge orthoquartzite.

Table Mountain Jasper (Figure 28)

An outcropping of Table Mountain jasper is located at Windy Gap, Middle Park, Grand County, approximately 30 km from Rollin Pass (Black 2000:134). Known procurement sites include a source on Table Mountain and others situated to the west-southwest. A large lithic procurement site atop the mountain was first reported by Ives (1942:453) and later recorded as 5GA5. Additional procurement sites include 5GA119 and 5GA121-5GA130 (Naze 2013). This jasper occurs in the Grouse Mountain basalt and younger, secondary gravel sources (Black 2000:134). This lithic material is red, maroon, brown, or a deep-yellow in color that can exhibit all colors in one sample through mottling. The luster is semi-glossy in its sheen. Four projectile points have been categorized as being manufactured from Table Mountain jasper.

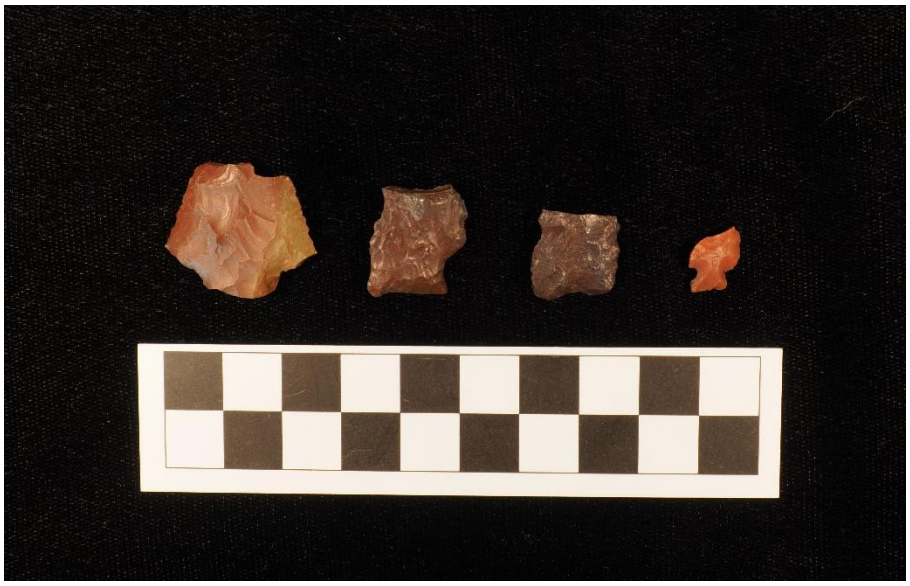

Figure 28. A sample of projectile points manufactured from Table Mountain jasper.

Parker Petrified Wood (Figure 29)

Parker petrified wood, also referred to as Dawson petrified wood and as Elizabethan petrified wood, has a source located approximately 120 km - 160 km to the east of Rollins Pass in an outcropping from the Palmer Divide area of Arapahoe, Douglas, and Elbert Counties, Colorado. Palmer Divide extends to the east from the mountains, separating the watersheds of the South Platte, located to the north, and the Arkansas River, situated to the south (Black 2000:134; Naze 2013). Known lithic procurement sites located in an upland setting, southeast of Cherry Creek Reservoir, include sites 5AH411, 5AH682, and 5AH684. A large lithic procurement site east of Kiowa is recorded as 5EL257 (Naze 2013). This silicified wood is predominately deep yellow with brown and clear banding/striations. The texture often has the grain of the silicified wood and the luster can range from rough to semi-glassy. Parker petrified wood projectile points (n=2) make up 2.2% of the total sample from Rollins Pass.

Figure 29. A sample of projectile points manufactured from Parker petrified wood.

Unknown Lithic Raw Material Outcroppings (Figure 30)

Just over a third, 40%, of the raw materials used to manufacture the projectile points at Rollins Pass campsites and isolates could not be matched to known outcrops. Unknown sources do not necessarily mean that the lithic material is exotic, however, it is assumed here that the procurement likely occurred outside the 75 km radius used to establish local versus distant toolstone sources. These materials will be considered non-local and therefore grouped into the 'distant' category.

Figure 30 A sample of projectile points manufactured from unknown raw materials.

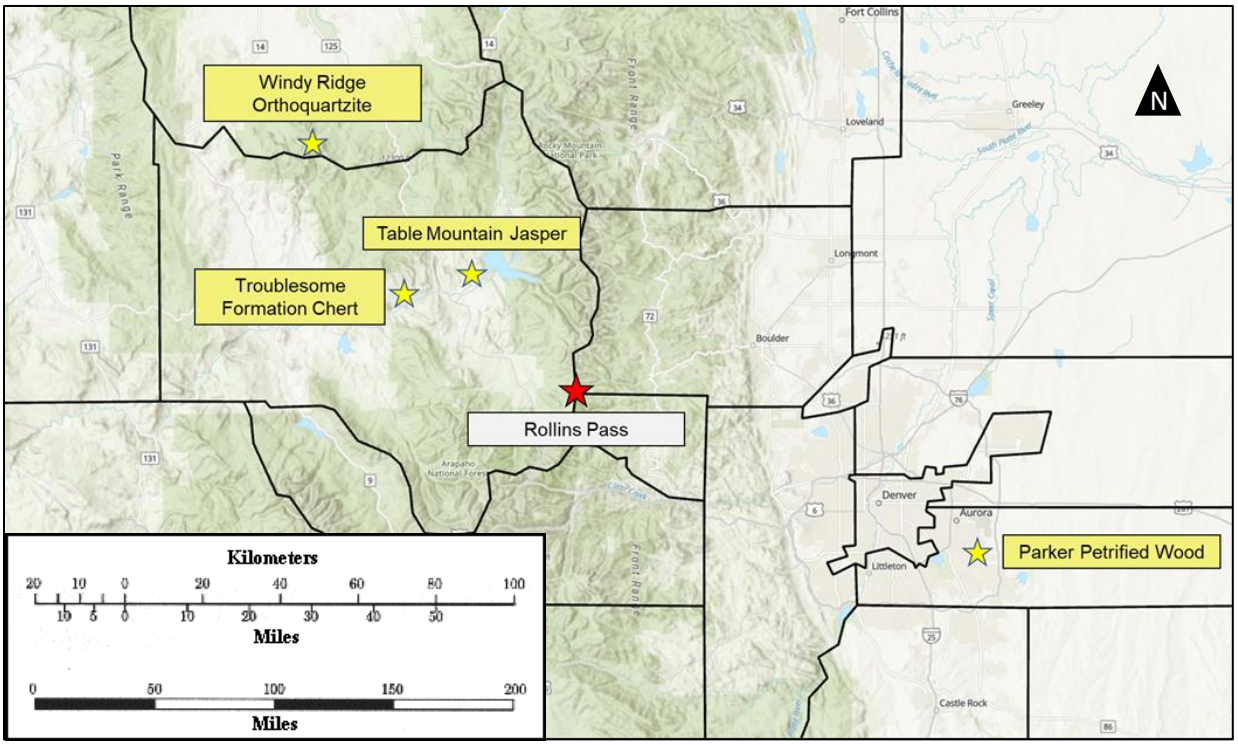

Figure 31. Map depicting the approximate location of known lithic sources in comparision to Rollins Pass.

Discussion and Conclusion

Just under two-thirds (60%) of the raw materials represented at Rollins Pass sites and isolates are from sources to the west of the pass, outcropping in Middle Park area. Lithic material sourced from east of the pass created 2% of the sample, and the final 38% are from unknown, presumably non-local sources. Troublesome Formation chert, and Table Mountain jasper are considered local with procurement areas located within 75 km from Rollins Pass. Windy Ridge orthoquartzite is excluded from local categories because its main procurement area is positioned approximately 88 km from the Pass. The representation of local raw materials (47%) suggests that prehistoric people using Rollins Pass mapped on and took advantage of nearby (within 75 km) toolstone outcroppings (Figure 31 and Figure 32). The occurrence of local lithic materials further indicates that the people of the Pass could have 1) geared up at these sources before moving through the Pass to access the Front Range, and/or 2) are local populations utilizing the mountains and intermountain basins primarily as a home range.

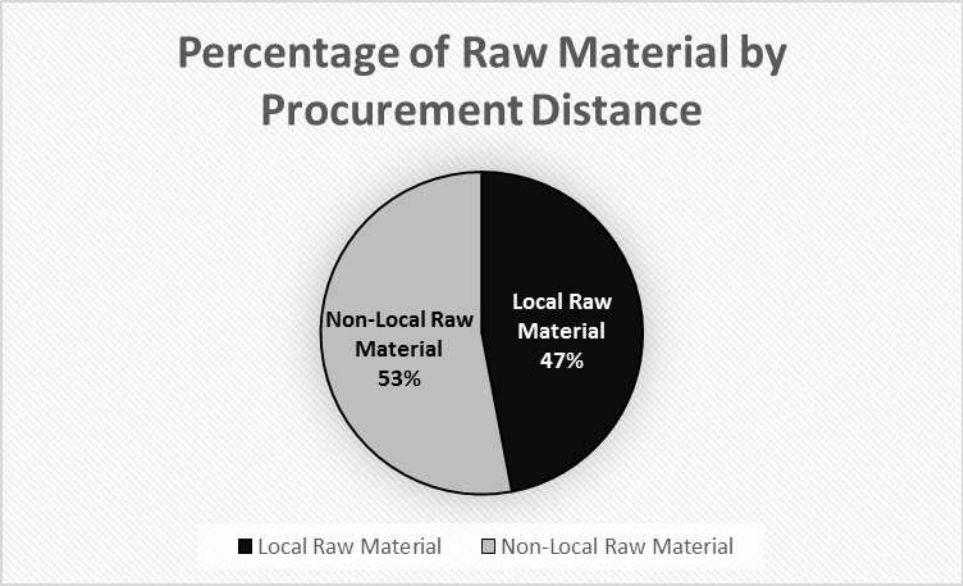

Figure 32. Total representation of lithic raw material sources from Rollins Pass sites, small sites, and isolates

Movement models to and through Rollins Pass are addressed by James B. Benedict (1992) in the Up-Down and Rotary Models respectively. These proposed movement trends are hypothesized to be reflected in the archaeological record through lithic toolstone procurement and discard. The Up-Down model proposes movement up and down between the Front Range and the mountains, suggesting that Plains and Foothill groups traveled into the high country to access resources. This same pattern of up and down movement can be applied to populations migrating between the Western Slope and the mountains; which of the known sourced lithic samples represented in the projectile point assemblages, may support movement from west to east through the Pass rather than from east to west. The Rotary Model theorizes that prehistoric groups traveling through intermountain travel corridors within Northern Colorado are a part of a large circular seasonal movement pattern that 'begins' in the Front Range, travels north into the Laramie Basin, drops down in the intermountain parks like Middle Park, and then moves east back across the Continental Divide and down to the foothills. While each model accounts for a hypothesis of prehistoric movement that can be applied to Rollins Pass, it should be noted that depending on the mobility ranges or seasonal rounds throughout prehistory, neither is mutually exclusive or necessarily applicable to Rollins Pass projectile point assemblage.

Rollins Pass Raw Material Use Through Time

The Late Paleoindian period raw material sources are dominated by the presence of Dakota Formation quartzite, likely originating from the Windy Ridge Quarry site. Of the eight Late Paleoindian projectile points four are attributed to this source. Troublesome Formation chert/chalcedonies were also present (n=3) among the Paleoindian points (Figure 32). The presence of Troublesome Formation chert and Windy Ridge orthoquartzite raw material indicates early resource mapping on to high-quality toolstone outcropping west of the pass. Only

one point from the Late Paleoindian assemblage is attributed to an unknown (therefore non-local) source. The high occurrence of local materials to Rollins Pass suggests the Late Paleoindian hunter-gatherers were familiar to large toolstone procurement sites near Rabbit Ears and Barger Gulch. This mapping onto nearby lithic resources indicates more local populations which were more intensively using the mountains (Pitblado 1999).

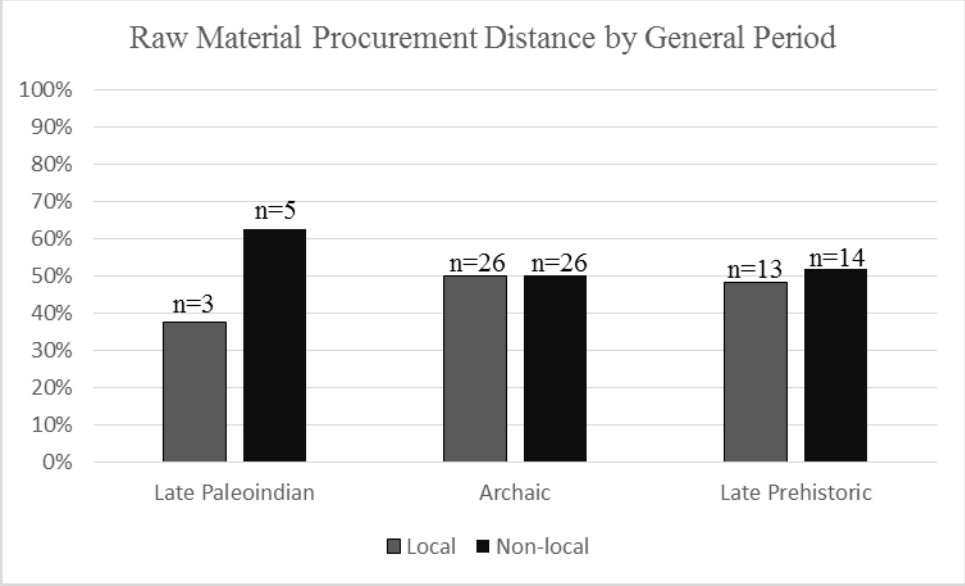

Figure 33. Graph displaying the lithic procurement distance by general period. Y-axis depicts frequency percentage, as arrayed by the three main archaeological periods in this study.

The Archaic period demonstrates an even split between locally procured lithic materials (50%) and unknown or non-local materials (50%) (Figure 33). The Early Archaic, a sample of one, is manufactured from a non-local raw material. The Middle Archaic and Late Archaic demonstrate trends similar with the Archaic period as a whole with roughly even split between projectile points manufactured from non-local sources and local sources. While the trends are similar both the Middle and Late Archaic period do display a slight increase in locally procured raw materials. The small increase in local utilization may be the result of increased access to materials local to the Rollins Pass area or may indicate periods of higher projectile point retrieval

of projectile manufactured from non-local materials suggesting a heightened conservation strategy (this will be explored further in Chapter Five). This minor division could be the result of factors such as more localized mobility ranges within the mountains with an increase occurrence of large mobility ranges interacting with Rollins Pass and/or a decreased reliance on non-local resources due to shifts in mobility ranges or exotic toolstone access. Overall, the lithic raw material suggests continued use of procurement areas established in the Late Paleoindian period with an approximately equal use of non-local and local materials.

The Late Prehistoric period still has relatively even distribution of local (48%) and distant/unknown toolstone (52%). The Early Ceramic period closely follows close the patterns set by the Archaic with 58% of projectile points manufactured from local materials and 42% from non-local toolstone. The Middle Ceramic-Plus displays an almost identical pattern to the Early Ceramic, with toolstone being 57% local and 43% non-local. General Late Prehistoric projectile points are produced from 25% local toolstone and 75% from non-local materials. The occurrence of non-local and local materials in the Late Prehistoric period suggests populations utilizing Rollins Pass had similar mobility ranges and raw material access as previous periods. The approximately even use non-local and local suggests that motivations for using the Pass fell outside of general trends for the Late Prehistoric for the Colorado Front Range region. The Late Prehistoric is defined as a period of increased population pressures within the Plains and Foothills, intensification in mountain utilization, and increased territoriality and trade (Gilmore 1999). I predicted that this period would manifest as an increased reliance on non-local raw materials, however the discard rates and raw material choices/accessibility at Rollins Pass were not overtly affected by these stressors.

Lithic procurement and distance to discard are a measure in which mobility and toolkit design can be explored. The distance materials are acquired are hypothesized to play into how those materials are then curated, and whether the materials are conserved or are considered expendable. Local lithic material is assumed to be used for more expedient tools and exotic or distant lithic materials for formal curated tools. Andrefsky (1994) examined the relationship of high-quality toolstone availability and its effects on informal/formal technologies. The findings indicated that in areas with abundant high-quality material available there was no differentiation on the preferential toolstone used to produce informal and formal tools. While Andrefsky's (1994) study addressed the difference of expedient vs formal tool conservation, it was hypothesized here that raw material that is readily accessibility will result in the higher discard of projectile points that are ideal candidates for rejuvenation. This is based on the assumption that since raw material is easily accessible, that accessibility decreases the need or motivation to heavily curate tools by conserving lithic raw materials. Rollins Pass is situated in a location that has access to local high-quality raw material resources and is in a setting that promotes the use of finished formal tools. Despite this, the lithic raw material found at the sites, small sites, and isolates suggest there is no strong use preference and discard, outside of the Late Paleoindian period, between local or non-local materials is almost even. Therefore, it is unlikely that the quality or accessibility of lithic materials in itself (whether it is local or not) is a reliable factor in the curation choices seen at Rollins Pass. This relationship will later be evaluated in Chapter Five by comparing the degree of curation and lithic raw material procurement distance represented within Rollins Pass projectile point assemblage.

CHAPTER FOUR: CURATION

Based on ethnographic analogies it is commonly accepted that stone tool curation was practiced by prehistoric peoples (Towner and Warbuton 1990). Curation can be characterized as demonstrating advanced manufacture, transport, reshaping, or caching (Nelson 1991: 62). This is opposed to expediency which is considered to be tools produced to participate in situational needs and that exhibit minimal technological effort. Expedient tools are attributed to occur in highly dependable conditions, and in contrast, curation anticipates future or specific needs where time, resources, or energy is limited (Nelson 1991). The curation of stone tools is a choice aimed to mitigate a limitation or to take advantage of resources (Bleed 1986; Bamforth 1986). The degree of lithic tool curation can serve as a proxy measurement for mobility, raw material accessibility, and toolkit design. The main objective of this chapter is to assess how behaviors are expressed by curation and projectile point use strategies at Rollins Pass. Below I explore the patterns of projectile point curation and discard by examining projectile point portion, fracture type, and the presence/absence of rejuvenation.

Toolkit design can also infer prehistoric behavior through technological organizational choices (Bleed 1986). Highly curated tools are presumed not to be discarded where the gear was used, but instead inside campsites or short-term occupation locales (Binford 1979). This argument is based on on-site and off-site artifact use outlined by Foley (1981). This outline breaks down assumed life histories of various artifacts. The model of thought suggests that all projectile points, a formal tool, were likely manufactured on-site, were used off-site, and discarded on-site (Foley 1981). This assumption is linked to the notion that projectile points functioned as projectile armatures used for hunting or conflict resolution purposes (Andrefsky

2005; Goodyear 1974). Therefore, the discard within a campsite likely does not represent the place of use (Binford 1980; Binford 1982). Differentiating the place of discard from the area of presumed use may suggest tool function, maintenance, and the reason for discard. Additionally, understanding how use activities, resource access, and landscape may affect curation choices may allow the inference of behavioral choices between prehistoric people and their environment. One such method to assess curation is to examine toolkit design.

Bleed (1986) describes prehistoric hunter-gatherer toolkit design as primarily stressing reliability or maintainability as a central technological strategy. A reliable toolkit is defined as always working when needed and having a premeditated function. Hallmarks of a reliable toolkit include dependability, sturdy construction, and carefully fitting of parts. Additionally, reliable toolkits will have been maintained outside its use context (Nelson 1991; Bleed 1986). Maintainable toolkits, in contrast, work well under many different circumstances and employ replicable parts. This design is often referred to as flexible or multipurpose (Nelson 1991). Either toolkit design can be seen as an adaptive strategy to human-environmental issues or availability opportunities (Binford 1979). Therefore, examining how prehistoric people adapted their toolkit based upon need can provide clarity on how prehistoric people interacted within a specific environment (Bleed 1986). This interaction between toolkits and resources furthermore provides insight regarding possible motivations in utilizing specific landscapes. Investigating Rollins Pass as a focal point, one can discern two obvious motivations for using this intermountain corridor: travel and hunting. The numerous game-drive features located on Rollins Pass is a testament for the prevalence of hunting at the pass, but is that reflected by projectile point discard for the sites, small sites, and isolates? In a sense all projectile points, highly curated tools, are parts of a reliable toolkit, fashioned to execute a specific purpose and taking advantage of predictable

resources (Bleed 1986; Nelson 1991). Borrowing from Bleed (1986) reasoning on toolkit design, projectile point use strategies will be examined. Projectile point use strategies will be categorized into expendable or conservative (Table 6) approach which is the measurement that will be used to assess projectile points use design at Rollins Pass (Bamforth 1986; Bleed 1986). An expendable strategy should demonstrate a high degree of utility left after discard. An incentive for an expendable toolkit design is raw material access and suggests that groups with local access may not conserve lithic materials through heavy curation. If there is a high degree of utility remaining it is assumed that the tool was intentionally discarded (as compared to lost) because the time or energy investment exceeded the need for continued curation. To clarify, an expendable strategy is not the same as expendable or expedient tools which are quickly produced, usually informal tools, and manufactured for situational needs. A conservative toolkit should demonstrate low remaining utility or be completely exhausted at the time of discard. This would suggest that the people implementing a conservative approach likely are doing so because of limited raw material accessibility or high mobility (Bamforth 1986).

Table 6. Table defining conservative and expendable projectile point use strategies at Rollins Pass.

Use Strategy	Portion Recovered	Utility Remaining	Rejuvenation	Fracture Type
Conservative	Distal, Midsection, Proximal	Low	More likely to exhibit indication of rejuvenation (and exhaustion)	More likely to be associated with on-site breakage types (manufacture)
Expendable	Distal-midsection, Proximal-midsection, Near complete, Complete	High	May have little or no indication of rejuvenation	More likely to be associated with off-site breakage types (use)

Methods

Curation, use-life, and discard at Rollins Pass campsites and isolates is addressed through three methods: 1) projectile point portion, and 2) fracture type, and 3) the presence/absence of rejuvenation. The projectile points were examined and evaluated as having or not having remaining utility. The degree of remaining utility can be indicative of how toolkits are organized to perform. Whether the projectile points designed use life is considered expendable or not is based in conservation. It is hypothesized that if Rollins Pass was not utilized as destination involving predictable hunting resources, projectile point use design may reflect a conservation approach conducive to encounter activities associated and mobile groups using the Pass as a travel corridor. In contrast, if Rollins Pass was utilized as a destination for reliable seasonal hunting as suggested by the several game-drive systems the projectile point use strategy may be fashioned to meet a premediated task, and as such may be discarded with potential continued utility within a campsite setting after the preplanned task was completed. Examining projectile point curation provides insight into toolkit choices prehistoric people made regarding Rollins Pass.

Examining curation through these methods measures the prevalence of conservation or expendability within the projectile point assemblage to ascertain evidence of prehistoric use of Rollins Pass as an intermountain travel corridor and/or as a destination. Method details for each curation examination approach shall be discussed individually below.

Projectile Point Portion

Projectile point portions are a direct measure to evaluate rejuvenation potential and continued utility. The author determined projectile point portions of the Rollins Pass sample, presented here based on Meltzer's (2006) study of Folsom projectile point portions. The portions are separated into seven categories 1) distal, 2) distal-midsection, 3) midsection, 4) proximal-midsection, 5) proximal, 6) near complete, and 7) complete (Table 34). Portions are recorded for all 91 projectile points from the pass's sites, small sites, and isolates. Patterns discerned from the data may indicate thresholds for continued use or when rejuvenation is no longer efficient.

Thresholds for continued utility refers to the ability to rejuvenate or restore function to the projectile point after damage as a projectile point. This thesis examines the representation of projectile point portions available to rejuvenate by grouping the above-mentioned portions into either high utility or low utility portions. If a projectile point is discarded despite possible rejuvenation, a choice, made by a prehistoric flintknapper which determined that the restoration of the tool function is not an efficient use of time or energy. Discard is considered an on-site activity while use is assumed to be an off-site activity. It assumed that off-site use has occurred due to the presumed function of the projectile point as a projectile armature employed in hunting which usually does not take place within a space designated for resting, tool manufacture, tool maintenance, and/or food preparation. Additionally, the presence of curated tools found in a campsite context imply different mechanisms for their discard based on portions present/absent. For example, at an open campsite, there may be a high prevalence of proximal portions rather than other projectile point portions. This may suggest dehafting/retooling activities, where points deemed to have exhausted their use-life and considered unsalvageable and are replaced in the haft for a new or newly reworked tool (Keeley 1982; Towner and Warburton 1990). The discarded tool, in this case, represents a tool no longer considered useful. Portions represented at

campsites allude to activities performed off-site but also how willing prehistoric people were to discard portions with continued utility.

Rejuvenation potential is assumed to be higher in projectile point portions that

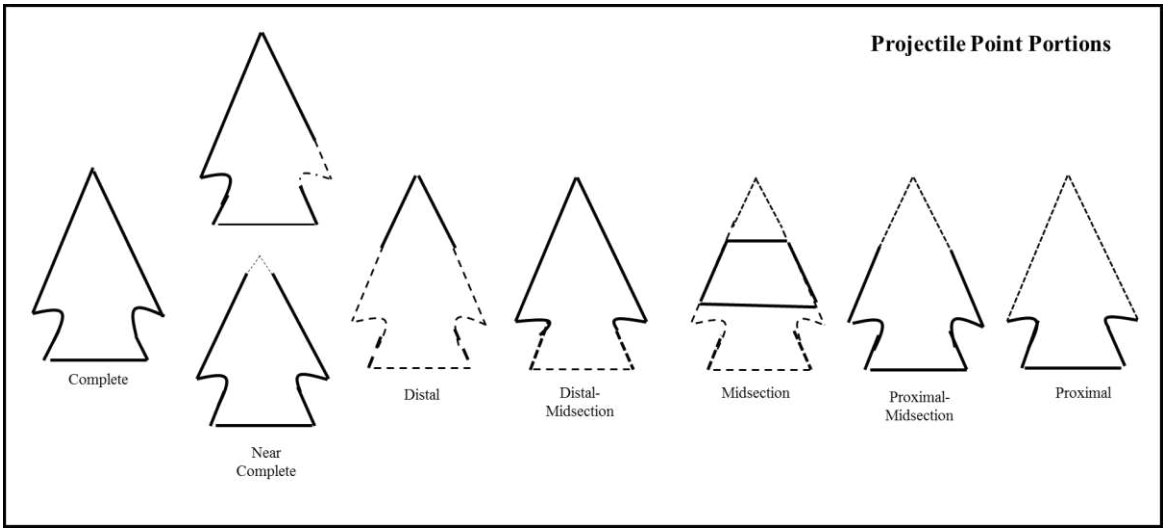

Figure 34. Illustration showing the different projectile point portions (Based on descriptions from Meltzer 2006).

demonstrate larger surface area. Stone tool manufacture and maintenance are considered a subtractive technology; therefore, it is hypothesized that more complete (and larger) portions are more likely to be rejuvenated than more fragmented (and smaller) portions. It is my hypothesis that portions such as distal-midsections, proximal-midsection, and near-complete points represent portions that have higher remaining utility (high utility portions) and should lend themselves to being rejuvenated. In contrast portions such as distal tips, midsections, or proximal portions are thought to contain little remaining utility (low utility portions) to efficiently rejuvenate projectile points. However, these postulations are by no means a strict rule and is likely the result of converging choices as many factors affect the decisions of prehistoric hunter-gatherers in terms of projectile point rejuvenation including raw material quality and raw material access, nature of the break, projectile technology, and overall toolkit design. These factors no doubt influenced the decisions to rejuvenate or discard tools. Therefore, in order to

assess curation indicators in the context of projectile point use strategies other influences need to be explored. As such, in addition to rejuvenation (Present/Absent), assessing the effects of technological strategies (Spear/ Dart/ Arrow), lithic raw material procurement distance (Local/Non-local), and projectile point portion (High vs Low Utility), can help deconstruct possible motivations for conservation/expendability by revealing possible technological, accessibility, and/or behavioral decisions made by prehistoric hunter-gatherers. And so, the examination of projectile point portions aims to address trends of curation, discard, and projectile point use strategies represented at the Rollins Pass sites and isolates.

Complete, near complete, proximal-midsection, and distal-midsection portions within the Rollins Pass assemblage demonstrate high continued utility by retaining enough surface area to have a high time/rejuvenation return. Low utility point portions are represented by distal tips, midsections, and proximal portions which are considered portions with low time/efficiency rejuvenation pay-offs. The highest projectile point portion represented in the Rollins Pass non-hunting sites assemblage is proximal portions followed by proximal-midsections. The lowest frequency portions found at the pass is distal-midsection (n=2) and distal (n=4) portions (Table 7).

Table 7. The frequency and percentage of projectile point portion from the 91 points from Rollins Pass campsites and isolates.

Portion	Utility	Frequency	Percentage
Distal	Low	4	4%
Distal-Midsection	High	2	2%
Midsection	Low	15	16%
Proximal-Midsection	High	20	22%
Proximal	Low	14	15%
Near Complete	High	26	29%
Complete	High	10	11%
Total		91	100%

If separated by eras the Late Paleoindian period is characterized primarily by proximal-midsections. The Early Archaic is represented by a complete projectile point. The Middle Archaic and Late Archaic periods are dominated by high utility portions. The Early Ceramic and Middle Ceramic-Plus eras also have a high representation of high utility point portions. The high discard rate of high utility portions suggests an expendable projectile point use strategy. Access to several high-quality lithic raw materials infers security over reuse as a projectile point use design, thus organizing toolkits to reliably perform for specific tasks (Nelson 1991).

The Late Prehistoric demonstrates the highest percentage of complete projectile points when compared to the Archaic and Paleoindian periods (Table 8). This trend of completeness could be due to a shift to smaller, more abundant arrow point technology, aimed at producing more and resulting in the pattern of more losses of complete or near complete points. On average it is more efficient to produce small arrow points to use in a quick-fire, long-distance hunting; however, doing so prehistoric people possibly lost more points, some within the carcasses of animal. These embedded points were inadvertently discarded in camp or the place of primary butchery, later exposed and released with the deterioration of cast-off animal remains.

It should be noted that the high representation of proximal/midsections and proximal portions could also be the on-site retooling activities conducted after a hunting event. Retooling refers to the activity of dehafting a broken point, usually snapped proximal or proximal-

midsection portions, in order to salvage the haft to reuse. Additionally, the overall pattern of discard to an extent may be related to natural and anthropogenic forces, like colluviual erosion and illegal collection.

Table 8. The Table is depicting the frequency and the percentage of complete points by general period. The percentage is based on complete points divided by total points per individual period (i.e. Paleoindian – 1/8=13%).

Period	Frequency of Total Points	Frequency of Complete Points	Percentage
Paleoindian	8	1	13%
Archaic	52	4	8%
Late Prehistoric	27	5	19%

Another aspect (outside of technological strategies) to consider is the location where the complete points are found. There is possibly a correlation between complete points and the close proximity to game-drives, as seen in site Benedict 5GA51, which may represent potential slope wash from the above hunting sites (5GA35, 5GA36), a large butchering locale, and/or a natural funnel also used for some hunting activities. Further study, not conducted within this thesis, will be needed to assess Benedict 5GA51 site type which may shed light on large accumulation of projectile points on the site's surface. The placement of sites, small sites, and isolates on the Pass will need to be explored in future research but holds promise to address possible connections to the many game-drive features.

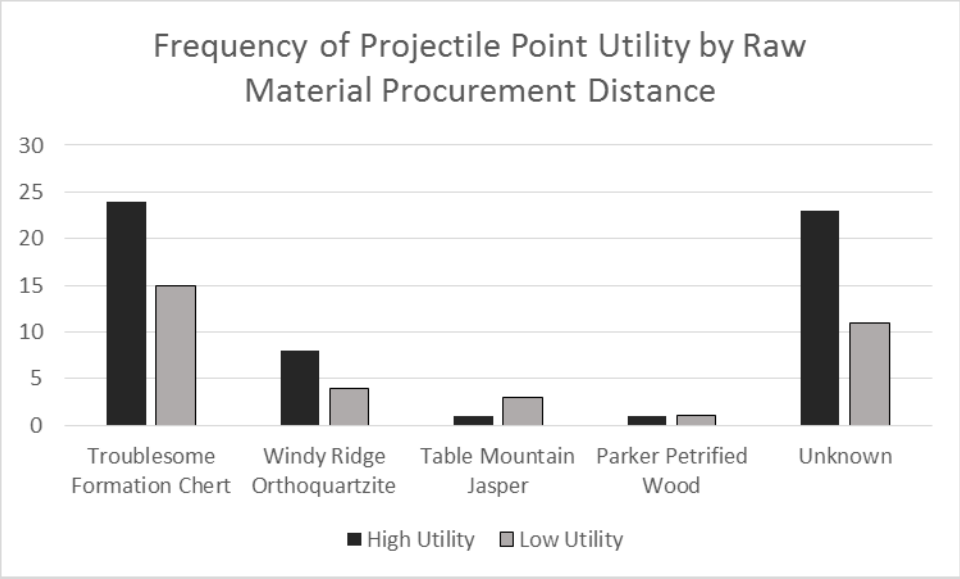

Figure 35. Graph showing projectile point utility by lithic raw material

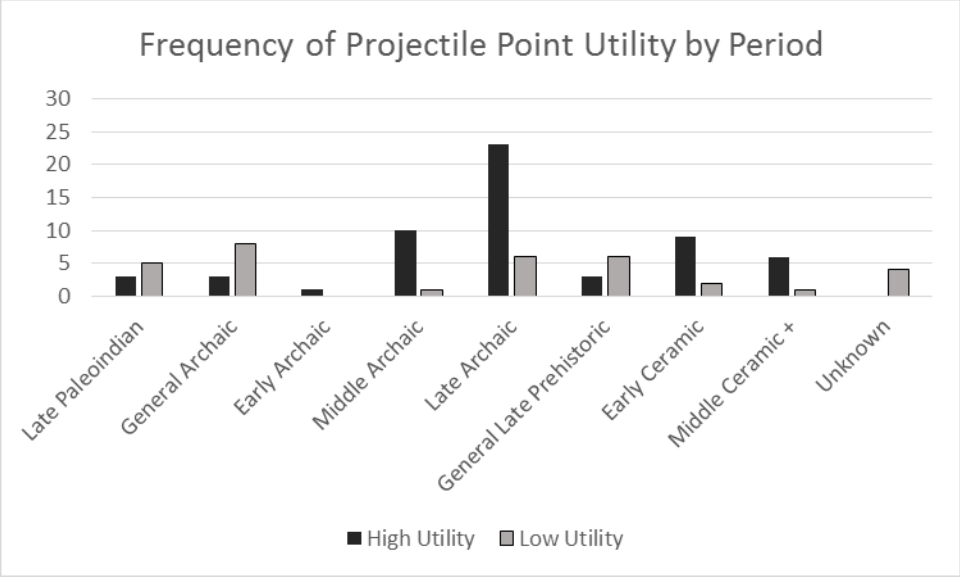

Figure 36. Graph showing projectile point utility by period

Projectile point portions at Rollins Pass sites, small sites, and isolates are a part of an expendable projectile point use design. Examining the ratio of discarded high utility and low utility projectile point portions (Table 9). suggests prehistoric people were taking advantage of highly predictable resources during a short period through a reliable toolkit design (Bleed 1986).

The assessment of Rollins Pass as a destination is further supported when examining the point portion data by raw material which indicates that raw material procurement distance did not largely affect discard patterns. In other words, regardless of procurement distance, high utility point portions are discarded throughout time at a higher rate than low utility point portions (Figure 35 and Figure 36). Further discussion on projectile point portion, time, and raw material will occur in the following chapter.

Table 9. The frequency and percentage of high and low utility portions from Rollins Pass campsites and isolates.

Portion	Frequency	Percentage
Low Utility	33	36%
High Utility	58	64%
Total	91	100%

Fracture Type

Fracture type has, largely through experimental archaeology, connected breakage patterns to specific activities such as use or manufacture. Some studies looking at projectiles and fracture patterns include Dockall (1997), Iovita et al. (2012), and Hutchinson (2010) and demonstrate that there are fracture types that are associated with specific conditions which can be used to aid in understanding projectile point use-life and discard. It is an expectation that the fracture types associated with manufacture or rejuvenation will differ from fracture types associated with being projected through the air as seen in hunting activities and therefore provide clues to how projectile point use designs were implemented. Fracture types associated with use in the projectile point assemblage indicate different activities conducted off-site and later discarded on-site at the 26 sites, small sites, and isolates. These fracture types suggest possible motivations related to an expendable or conservative projectile point use strategy. Expendable strategies are anticipatory, are not readily rejuvenated, and are created for specific tasks. Expendable points are

designed to take advantage of predictable resources like migratory game (Bleed 1986). A conservative point strategy, in contrast, is designed to be rejuvenated as needed, repaired during use, and is considered more situational. Therefore, I am hypothesizing that expendable point strategies should demonstrate discard of projectile points with high utility left and fracture types associated with use and designed to address a specific task. Consequently, once the task is completed the tools can be discarded despite having utility left. In contrast, a conservative point strategy is predicted to have low utility portion, demonstrate rejuvenation, and have fracture types associated with manufacture or rejuvenation.

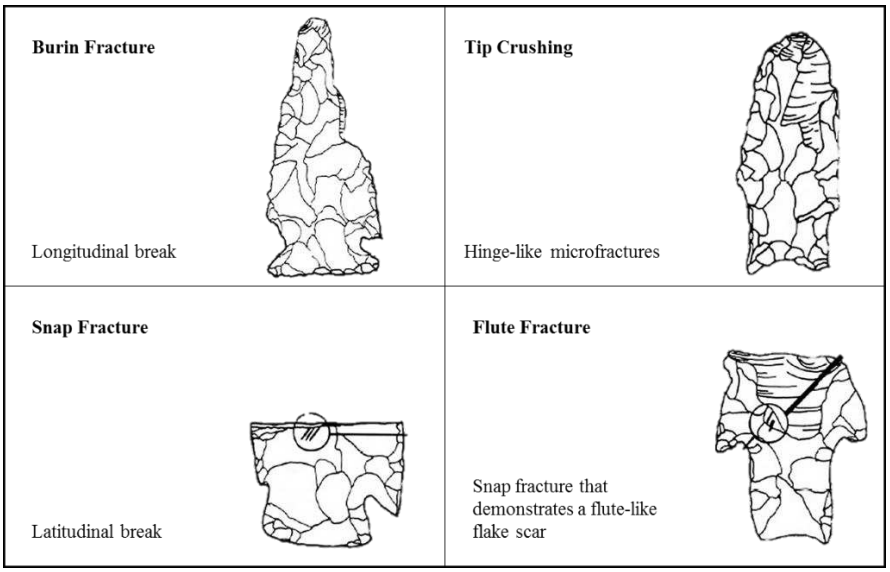

Figure 37. Projectile point illustrations of breakage patterns based on Dockall (1997).

Numerous studies have investigated the relationship between fracture type and function including, Fischer et al (1986), Dockall (1997), and more recently Hutchings (2011). All aforementioned studies addressed velocity and experimental research to conclude how function dictates fracture. Projectile point fracture types are categorized into groupings which are thought to be attributed to activities such as manufacture or use (i.e. hunting). The fracture types designation are as follows 1) flute fracture, 2) tip fracture or crushing, 3) burin fracture, 4) snap fracture, and 5) complete undamaged projectile points (Figure 37 and Figure 38). Many of the

points demonstrate multiple fractures, therefore the categorization of fracture types into the categories will only include the largest or most prevalent fracture type. Breakage patterns most commonly associated with projectile forces during use are flute fractures, tip crushing, and snap factures (Bergman and Newcomer 1983; Coppe and Rots 2017; Dockall 1997; Hutchings 2016). Burination can be the result of both use and manufacture (Dockall 1997). These patterns are correlated to projectile points making contact to hard surfaces such as bone, rock, or the ground at high speeds (Coppe and Rots 2017).

Figure 38. An example of fracture types from the Rollins Pass assemblage (left to right): snap fracture, burin fracture, flute fracture, and tip crushing.

In a study examining fracture type between arrow points and spear-thrown projectiles, Coppe and Rots (2017) discussed a correlation between fracture type and what the projectile point came in contact with. In ballistic experiments with gelatin targets, there was a connection between burination when projectile points came in contact with bone, and correlation between spin-off and hinge fractures and contact with skin/gelatin (Coppe and Rots 2017). In simpler

terms, burin fractures are produced through the projection of stone tools and results from a twisted or rotating impact that results in a vertical or L-shaped breakage (Dockall 1997). However, vertical fractures, also resembling an “L”, are also known to occur in manufacturing activities and are sometimes demonstrated in the absence of tangs and/or bases of projectile points (Dockall 1997).

Experimental research suggests that high-velocity impacts can cause many different fractures which may differ depending on what the point came in contact with. Tip crushing and flute fractures are the result of impacts with hard surfaces and are considered direct evidence of use as a projectile (Ahler 1971; Dockall 1997:325) Tip crushing and similarly flute fractures are the result of the distal region failing through either cone- or bending-initiation with propagation along one surface (Dockall 1997).

Snap fractures can be produced by several activities including manufacture, hunting, butchery, and retooling (Dockall 1997). Dockall (1997) discusses fatigue wear which is defined as a mechanical failure of the lithic projectile. This mechanical failure is the result of the tensile strength of the lithic raw material collapsing under forces of impact. This can result in varied fracture types, including a snap or bending fracture.

At Rollins Pass sites, small sites, and isolates the highest represented fracture type was a snap fracture. The second highest type was tip crushing, followed by flute fractures, and the least represented fracture type was a burin break (Table 10). There does not necessarily seem to be a pattern of fracture types through time but instead a reoccurrence of fractures resulting from specific activities.

Table 10. The frequency and percentage of fracture types from Rollins Pass campsites and isolates projectile points.

Fracture Type	Frequency	Percentage
Snap	66	73%
Flute	6	6%

Tip Crush	5	5%
Burin	4	4%
Complete	8	9%
Unknown	3	3%
Total	91	100%

In further analyzing the environmental and behavioral landscape of Rollins Pass, sources for this mechanical failure are likely the result of primarily hunting and/or butchery activities. However, a shift in technological strategy may contribute to the differing frequencies of snap fractures present between dart (n=35) and arrow sized (n=21) projectile points. Also, worth considering is the technological strategy also could account for the higher percentage of complete and near complete arrow sized projectiles associated with the Late Prehistoric (n=12) (Table 11). This technological shift may stress the willingness to 'lose' points or result in less successful retrieval rates of arrow points due to projectile technological strategy and size. Essentially the technological strategy of an arrow point aims to have smaller projectiles and a hunting strategy that stresses a numerous quick-fire approach. In contrast, spear and atlatl dart points are typically larger and have an inherently higher level of curation potential due to size alone.

The high representation of proximal/midsections and snap/horizontal transverse fractures were likely related to differences in the contact material and propulsion (Coppe and Rots (2017). I proposed that the snap fractures may be the result of impact with an animal's hide signifying hunting activities. Alhers (1971) argues, however, that snap fractures can also result in activities outside of hunting such as butchery where projectile points are serving dual functions as a hafted knife. Therefore, the high occurrence of snap fractures in the Rollins Pass assemblage are likely the result of hunting but butchering activities may account for a portion of the occurrence (Dockall 1997). Trends in projectile point size may additionally provide a means to assess the

likelihood that points were used in butchery activities. For example, general size suggests that Late Prehistoric projectile points are not expected to have served a multipurpose function that Archaic or Paleoindian points could have, by providing a sufficient cutting edge to process game.

Table 11. The frequency of fracture type by period from projectile points at Rollins Pass campsites and isolates.

Fracture Type	Late Paleoindian	General Archaic	Early Archaic	Middle Archaic	Late Archaic	General Late Prehistoric	Early Ceramic	Middle Ceramic+	Unknown
Snap	6	10		6	19	9	8	4	4
Flute				3	3				
Tip Crush					1		2	1	
Burin	1		1		2				
Complete	1			1	2		1	2	
Unknown/ exhausted		2		1					

Fracture types represented at Rollins Pass sites, small sites, and isolates indicate that the points discarded on-sites were largely broken during off-site use. Off-site use is more likely when taking into account the lack of rejuvenation present in most specimens, limiting the evidence for manufacture breakage. However, to better understand the relationship with fracture type, manufacture breakage, and rejuvenation a future study assessing debitage and raw material should be conducted on single occupation sites (or with individual sites with adequate spatial data). More on rejuvenation is examined in the section below.

Rejuvenation

The rejuvenation of chipped stone tools can be defined as the refurbishment of a broken tool into a functionally equivalent tool. While the role of rejuvenation within curation is poorly understood, rejuvenation of stone tools, such as projectile points, has occurred throughout prehistory (Towner and Warburton 1990). Projectile points are a highly curated tool that requires an energy investment that is much greater than that is required in the manufacture of expedient

flake or informal tools (Hayden 1974; Keeley 1982; Towner and Warburton 1990). Therefore, the initial energy investment put into the production of projectile points suggests a motivation to prolong the tools use life. The presence of resharpening and rejuvenation may also indicate a conservation projectile point strategy, and therefore suggesting raw material accessibility stressors.

Table 12. The frequency of presence/absence of rejuvenation by period from projectile points at Rollins Pass campsites and isolates.

Rejuvenation	Late Paleoindian	General Archaic	Early Archaic	Middle Archaic	Late Archaic	General Late Prehistoric	Early Ceramic	Middle Ceramic +	Unknown
Yes		3	1	4	10	1	2	1	
No	2	7		4	14	8	9	6	2
Unknown	6	3		3	4	1			

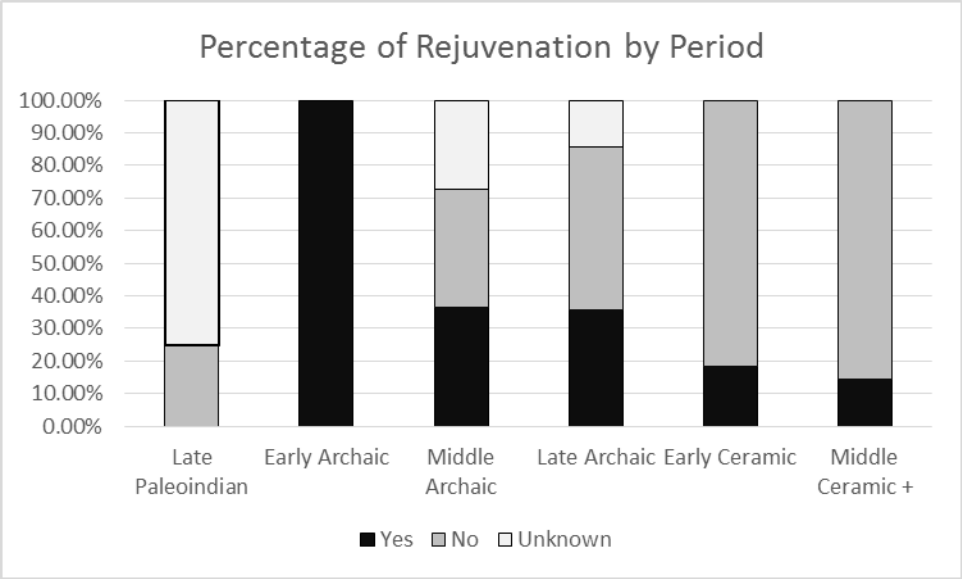

Figure 39. Graph showing the presence/absence of rejuvenation by period

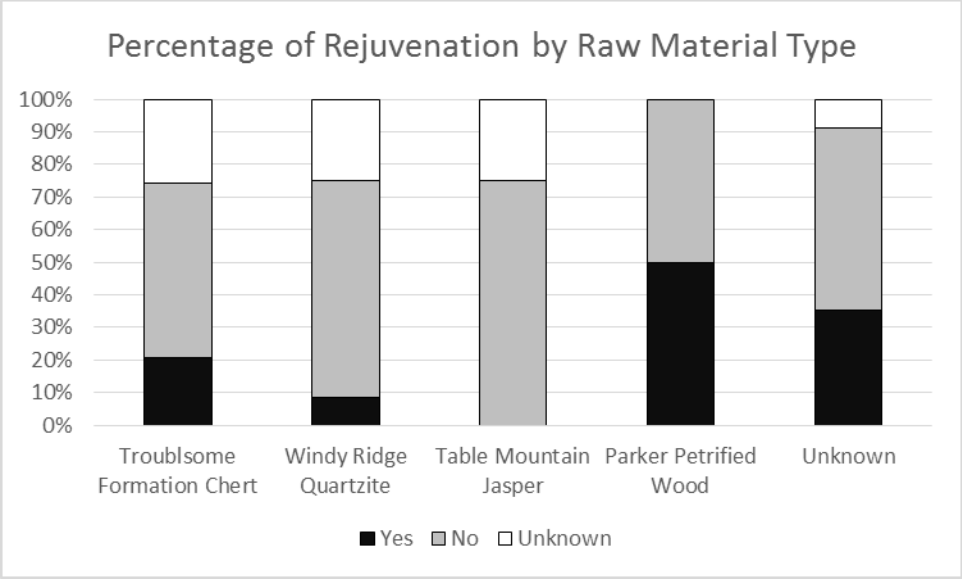

Figure 40. Graph showing the presence/absence of rejuvenation by lithic raw material.

The presence or absence of rejuvenation is an avenue to assess lithic raw material conservation through the extension of tool use life. At its core, the presence/absence of rejuvenation addresses continued or anticipated future use. For projectile points, rejuvenation allows for the examination of curation intensity for a tool type already associated with curation. Intensive curation through rejuvenation suggests that raw material accessibility may be limited while lack of rejuvenation may suggest access to local raw materials. Additionally, the lack of curation, outside of raw material accessibility stressors, may suggest potential motivations regarding Rollins Pass prehistoric use (travel corridor vs destination). Indicators of the presence of rejuvenation assessed in this study include 1) edge refurbishment, 2) an obtuse or flattened distal portion, 3) ear/tang or basal repair, 4) and an asymmetrical blade margin.

In total, more than half of the total projectile point assemblage do not have indications of rejuvenation (Table 12; Figure 39; Figure 40). If the sample is broken down by archaeological period, there appears to be a pattern of increased rejuvenation in the Middle Archaic followed by a decrease in rejuvenation in the Late Archaic. The occurrence of rejuvenation continues to

decrease into the Early Ceramic and Middle Ceramic periods. Arrow points are more efficient to produce, smaller, and have less surface area to rejuvenate Furthermore, only 37% of high utility point portions, including near complete points, show any degree of rejuvenation. The lack of rejuvenation present in the projectile point assemblage indicates a more expendable projectile point use strategy (Figure 41). The presence or absence of rejuvenation provides a clue to occupation span and potential mobility at the Pass. Projectile point portion, lithic raw material, and the occurrence of rejuvenation broadly infer that prehistoric people, beginning in the Middle Archaic, likely visited the area as a destination for reliable resources and had an expendable projectile point use strategy. Occupation span appears to be lower, perhaps days to weeks, which is supported by the lack of rejuvenation and the lower occurrence of low utility portions present within the total projectile point assemblage. Additional analysis on curation and time will be examined in Chapter Five.

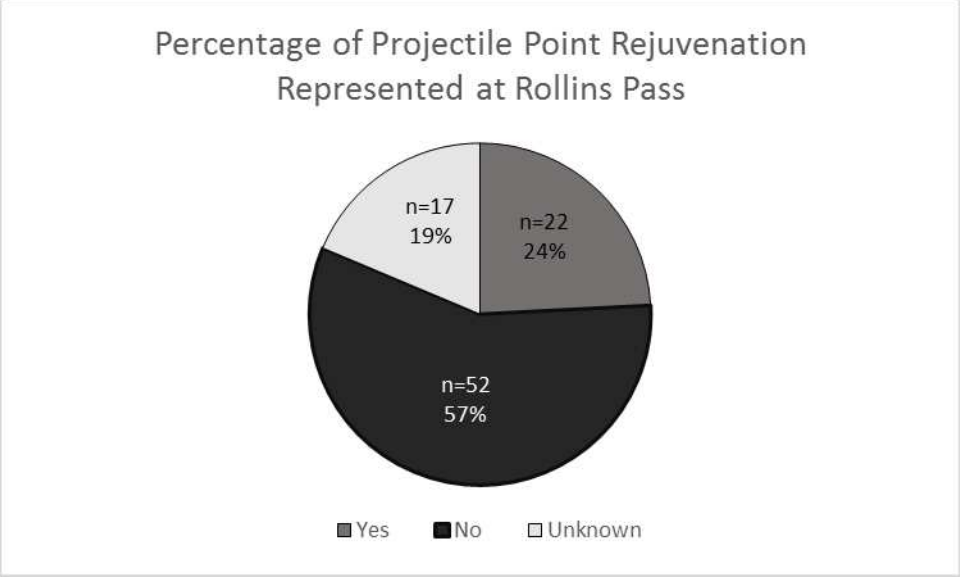

Figure 41. Graph displaying the complete representation of projectile point rejuvenation presence/absence.

An expendable strategy is supported by the abundance and easy access to local lithic raw materials. The discard of local lithic raw material with little to no evidence of rejuvenation may reflect a recent gear up from nearby toolstone sources. A recent resupply of lithic material decreases the need to conserve. The higher representation of rejuvenation in non-local materials reflects material conservation before discard. In contrast, non-local lithic materials are most prevalent in Early Ceramic to Middle Ceramic-plus periods. Additionally, the pattern of low rejuvenation ratios (Table 12) in projectile points manufactured from non-local materials in the Early-Middle Ceramic-Plus may be, in part, the result of bow and arrow technology. Curation and lithic raw material will be further analyzed in the following chapter.

Conclusion

Based on breakage patterns seen within Rollins Pass projectile point assemblage, it suggests use through hunting, and possibly to a lesser extent, butchery activities, as evidenced by snap factures which occurred before the points were discarded on-site (Dockall 1997). Projectile point portions suggest that throughout prehistory projectile points were discarded with remaining high utility. The ratio of discarded high utility and low utility projectile point portions, high 64% to low 36%, indicates prehistoric hunter-gatherer were taking advantage of highly predictable seasonal resources and therefore employed an expendable projectile point strategy (Figure 42 and Figure 43).

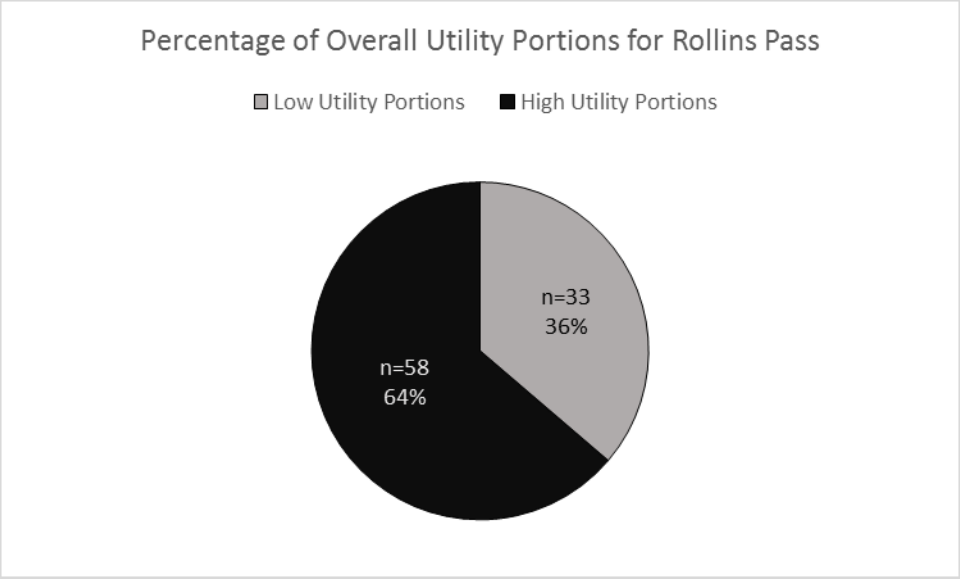

Figure 42. Figure displaying the total representation of utility portions (High vs Low) at Rollins Pass

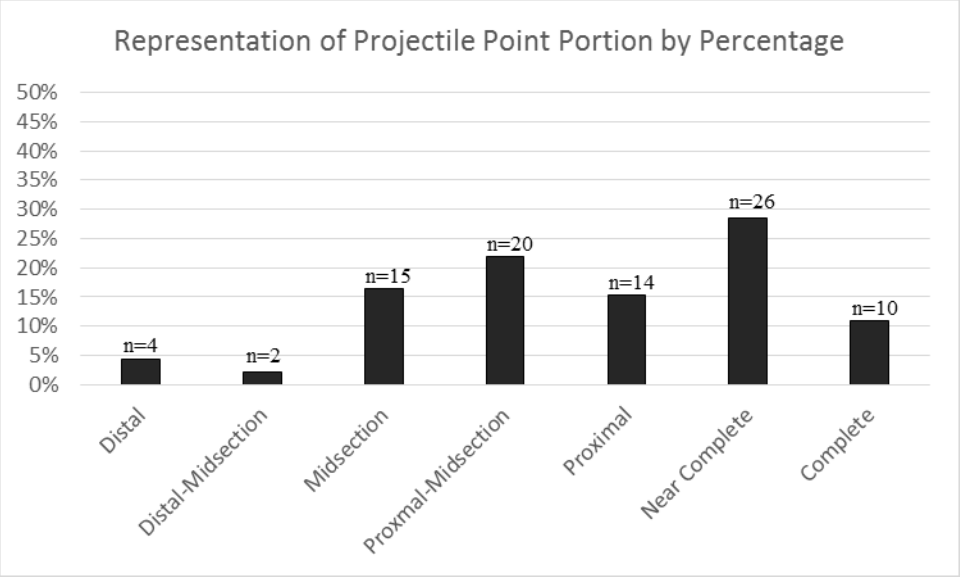

Figure 43. Figure displaying the percentage of portion type in the projectile point assemblage

Table 13. The frequency of point portions by period from projectile points at Rollins Pass sites, small sites, and isolates

Portion	Late Paleoindian	General Archaic	Early Archaic	Middle Archaic	Late Archaic	General Late Prehistoric	Early Ceramic	Middle Ceramic +	Unknown
Distal									4
Distal-Midsection		1				1	1		
Midsection	2	6			3	4	1		
Proximal-Midsection	2	1		5	8	1	3		
Proximal	3	3		1	4	2	1	2	
Near Complete		2	1	4	12	1	5	3	
Complete	1			1	3		1	2	
Total	8	12	1	11	30	9	12	7	4

The exception to this pattern is the Late Prehistoric period, which suggests high utility portions is to some extent the result of technological strategies, as opposed to earlier dart and spear point technological strategies (Table 13). Technological strategy may directly affect the ability to rejuvenate due to size difference between spear, atlatl, and arrow points. The smaller the point, the less surface area to rejuvenate. Therefore, the arrow point, having the least amount of surface area in comparison to previous technological strategies is expected to have the least representation of rejuvenation. However, overall technological strategies employed by prehistoric groups do not appear to promote raw material conservation but instead displayed a willingness to discard projectile points with rejuvenation potential. Providing support for the higher occurrence of an expendable strategy is further reinforced by the lack or rejuvenation present in the point assemblage.

Lithic tools in prehistory were employed to solve specific difficulties between people and their environment (Odell 1996). How projectile points were used and discarded is a part of technological strategies assumed to reflect varying degrees of curation present in the archaeological record and may reflect different lithic toolkits and resource pressures affecting prehistoric groups in Northern Colorado through time. The examination of projectile point curation intensity is invaluable to understand the motivation and use of Rollin Pass sites, small

sites, and isolates. Conservation or expendability within the Pass's projectile point assemblage, as assessed through curation, provides insights to how prehistoric peoples accomplished goals and solved potential difficulties with their environment.

Rollins Pass is an intermountain corridor used for both travel and both encounter hunting and destination hunting activities throughout time. The presence of game-drive features infers a motivation for seasonal communal hunting and the aggregation of prehistoric peoples (LaBelle and Pelton 2013; Meyer 2019; Whittenburg 2017). The use of hunting and the presence of camp activities would leave a signature within the Pass's many sites, small sites, and isolates. Projectile points at Rollin Pass, as a highly curated tool type, are presumed to represent anticipated needs. While inherently projectile point use is to address an anticipated need, tool strategy is to address predictable, specific tasks or encounter based needs. The forethought in projectile point use strategy promotes the notion of conservation or expendability that can be used to assess whether Rollins Pass was used for travel and/or hunting during short periods when resources were likely highly predictable (Bleed 1986). The signature for a conservative design is expected to exhibit low utility portions and exhausted projectile points discarded in the Pass's non-hunting sites. While a low degree of continued curation is expected within points that demonstrate high continue utility is an expendable point use strategy. Additional factors that likely affect toolkit design include group mobility, access to high-quality toolstone, and projectile technological strategy which may be revealed through curation shifts through time and will be explored more in-depth in the following chapter.

CHAPTER FIVE: TIME, RAW MATERIAL, AND CURATION AT ROLLINS PASS CAMPSITES AND ISOLATES

In this thesis, I hypothesized that the intensity in which past peoples applied curation to projectile points fluctuated through time as social and environmental pressures shifted. These shifts can be segmented by time to critically evaluate patterns which may infer different strategies or motivations for the prehistoric use of Rollins Pass. Projectile point use strategy is evaluated through the visible curation on individual projectile points then collectively comparing the entire sample to understand trends than may emerge through time. On the individual level projectile points cannot indicate the strategy employed however repeated patterns can indicate prehistoric choices regarding human-environmental interaction at the pass. The interaction of prehistoric people at Rollins Pass reveals potential motivations and how those incentives were anticipated within projectile point use and discard. Rollins Pass is well known for the large concentration of stone hunting features that drape across many of the alpine ridges, suggesting the Pass had reliable and predictable resources, therefore, providing a motivation for continued prehistoric use. Additionally, the Pass is one of the lowest passes in north-central Colorado, allowing easy access to the mountain parks and the Front Range. These motivations or human-environmental interactions are not mutually exclusive but are proposed to manifest differently within a curation strategy. Discussed below is how time, toolstone, and curation intensity affect the decisions for projectile point use strategies and how Rollins Pass may have been utilized in prehistory.

Curation, within the context of this thesis, is evaluated by examining projectile point portions, rejuvenation, and fracture types against typology. Raw material procurement distance will also be evaluated to determine how toolstone accessibility affected projectile point

expendability or conservation. These comparisons will allow possible patterns to be recognized structured by chronological units. Patterns in toolkit design and therefore projectile point use strategies, through time are derived from assumptions based on mobility patterns, resource mapping, and projectile point craftsmanship (Binford 1979; Binford 1980; Nelson 1991).

Curation intensity is hypothesized here to be manifested following general trends in prehistory (Table 14). The Paleoindian period is expected to have a high degree of curation present due to several factors including common use of exotic high-quality raw materials, high craftsmanship, high mobility, and the technological design associated with spear points. The Archaic period expected to demonstrate a decrease in curation intensity when compared to the previous Paleoindian period. This period further also exhibits a dramatic amount of change between the Early and Late eras. Projectile points from the Early Archaic in Northern Colorado have often been associated with lower craftsmanship and local lower quality lithic materials. These assumptions lead to the hypothesis that the Archaic saw a shift in mobility and technological strategy that did not support the need for heavily curated projectile points. The level of curation is presumed to adjust to a suite of changing pressures as the Middle and Late Archaic periods arrive. This modification is anticipated to have manifested in smaller dart points manufactured from a more diverse sample of raw materials. This shift to smaller dart points may be the result of more mobile groups, higher overall populations, and/or increased territoriality, since a reduction is size would decrease the amount of lithic raw material used to produce it, promoting toolstone conservation. This is based on the assumption that people are more local and are having to work more local resources more intensely and/or attempting to get ‘more bang for your buck’ per each gearing up activity. The Late Prehistoric is hypothesized to exhibit a

moderate amount of curation due to higher mobility, lithic raw material accessibility, and technological choices. These expectations will be evaluated below.

Table 14. The frequency of lithic raw material type by period.

Period	Troublesome Formation Chert	Windy Ridge Orthoquartzite	Table Mountain Jasper	Parker Petrified Wood	Unknown	Total
Late Paleoindian	3	4			1	8
Early Archaic		1				1
Middle Archaic	5	2			4	11
Late Archaic	15	3	2		10	30
General/Unknown Archaic	3	1	1	2	3	10
Early Ceramic	7				4	11
Middle Ceramic +	3	1	1		2	7
General/Unknown Late Prehistoric	3				9	13
Unknown					1	1
Total	39	12	4	2	34	91

Results

Late Paleoindian

Paleoindian projectile points are renowned for their high level of craftsmanship often representing the pinnacle of tool curation through all North American prehistory. The literature on Paleoindian curation has put forth many theories discussing how projectile point craftsmanship, group mobility, and raw material mapping have contributed to the level of curation seen in this 2,500-year span (Chenault 1999: 3). Within Northern Colorado, Paleoindian sites are present in the mountains, but of those represented are predominately dated to the Late Paleoindian period (Pitblado 1999). It has been hypothesized that snowpack likely did not allow travel through until the Late Paleoindian period, overall limiting access too many high-altitude mountain passes, however, more recent research is testing this assumption (Pitblado 2017). Rollins Pass has six sites that demonstrate a Late Paleoindian component indicating that by this period the intermountain travel corridor was navigable by Native American hunter-gatherers.

Seven of the eight projectile points demonstrate snap fractures. Proximal portions are the most prevalent, followed closely by proximal-midsection and midsection portions. Only one

point (RP17-101-4), found in 2017, is complete. These fractures and portions indicate that the points likely broke from use (off-site) and were later discarded within a camp setting (on-site). The combination proximal portions and snap fractures are often associated with off-site use and resulting in discard during dehafting activities. This portion is preserved within the haft after impact then discarded, within a campsite setting, where tool maintenance activities occur. This pattern of proximal portions supports that some of the Late Paleoindian points were discarded in this manner. Higher utility portions and a complete point, however, indicate a willingness to discard tools despite their potential for rejuvenation. The higher utility portions represented at the Pass challenges the idea of excessive curation affiliated with the Paleoindian period and suggests the lack of pressure to curate and rejuvenate this formal tool type. Raw material accessibility could directly affect the pressure to conserve materials. However, most projectile points are manufactured from a non-local toolstone (Table 14; Figure 44).

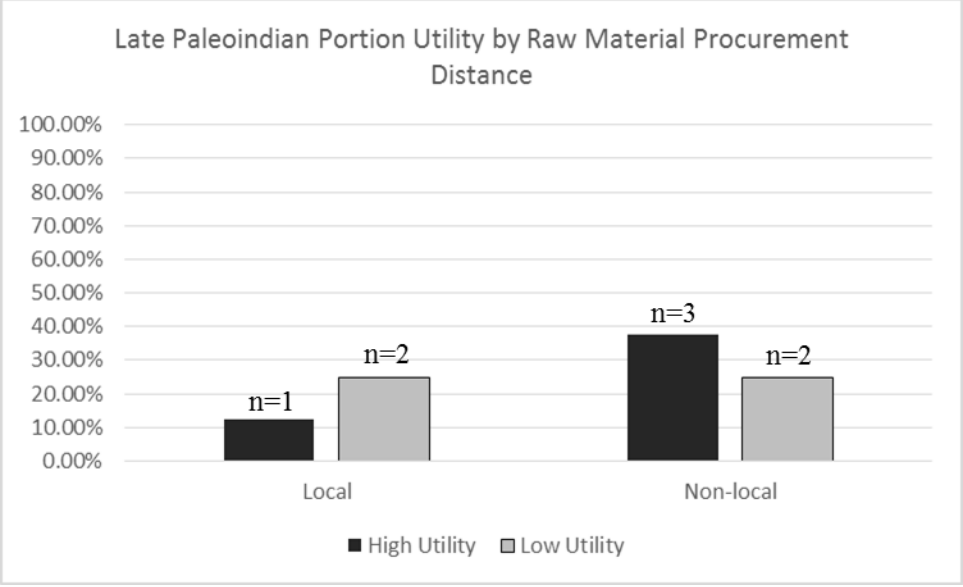

Figure 44. Graph depicting the ratio of high utility and low utility portions by lithic raw material procurement distance during the Late Paleoindian period

The projectile point portions indicate a mixture a toolkit designs/projectile point use strategies during this time, with both expendable and conservative approaches. A general pattern is difficult to discern due to small sample size, but the data indicate that the half (n=4) of the projectile spear points were discarded on-site because they could not readily be rejuvenated and therefore were considered to have reached the end of their use-life. This discard pattern is the expected outcome once a tool can no longer be rejuvenated. It should also be noted that the higher presence of low utility portions (proximal and/or midsection) and the lack of rejoined specimens suggests the remaining high utility portions, such as distal-midsections, were taken off-site, indicating a possible conservative projectile point use strategy. The discarded high utility portions (n=4) infer a possible alternative strategy and may be influenced by access to several high quality lithic raw material procurement sites. Most high utility portions are manufactured from a non-local toolstone (Windy Ridge orthoquartzite) and suggests that prehistoric people may had recently geared up at nearby sources, and therefore these points were considered expendable. The Late Paleoindian projectile point assemblage indicates hunter-gatherer groups mapped onto and heavily exploited Windy Ridge orthoquartzite which made up a total of 50% of the assemblage. The lithic raw material indicates a heavier reliance on non-local materials (63%) may suggest a large mobility range.

Early Archaic

In Northern Colorado, the Early Archaic record has a shift in the perceived quality produced by hunter-gatherer groups of projectile points as manifested by the Mt. Albion tradition (Benedict and Olson 1978). This change is based on the assumption that there was a lesser need to curate due to lower mobility, increased accessibility to local toolstone, and a shift in

technological strategy between hunting strategies. The morphological change between earlier spear and later dart points is due to the shift in technological strategy. Dart points use less lithic raw material per point enabling the craftsman to potentially produce more points at any given time with a lesser need to maintain and conserve (Hughes 1998). The reduction in size may imply a decrease of intended use life because the smaller surface area provides less rejuvenation potential. Furthermore, the decrease in intended use-life suggests, in comparison to spear points, that dart points became more expendable is partially due to hunting techniques associated with atlatl use. This increased expendability is tied to the direct method of use between spear and atlatl projectile points. Smaller surface area and higher velocity of use suggest potentially more damage with less ability to rejuvenate, due to a decreased surface area. These factors indicate that the changeover from spear to atlatl dart points was a decrease in curation investment. This hypothesis is compounded by the increased use of local lithic materials which infers that prehistoric groups in Northern Colorado mapped onto and continued to exploit local (within Northern Colorado) lithic sources.

The accessibility of local raw materials may further increase factors relating to the expendability of the toolkit in regard to the Early Archaic. This era is represented by the Mt. Albion Complex. The Mt. Albion point from site Benedict 5GA51 demonstrates little evidence for rejuvenation despite the remaining high utility, which would support an extended use life. This point is manufactured from Windy Ridge orthoquartzite, a non-local raw material (+ 75 km). The sample size does not allow an examination to broader themes seen across Northern Colorado associated with Mt. Albion mountain use. Due to a small sample size, it is unclear how the Early Archaic period differed from the Late Paleoindian or subsequent Middle Archaic Period in terms of projectile point use strategies at Rollins Pass.

Middle Archaic

The Middle Archaic in Northern Colorado is represented by a continued increase of morphological expressions and diversification of food resources with an intensified use of mountain environments. The Middle Archaic appears to demonstrate two trends; 1) emphasizes dehafting activities within the camp setting and 2) the discard of near-complete points with minimal damage. The Middle Archaic is represented at Rollins Pass by eleven points from four sites and two isolates. This period represents 12% of the entire projectile point assemblage. Portions most represented are proximal-midsections, followed by near-complete points. The highest frequency of fracture types is a horizontal snap fracture and flute fracture. These fracture types are correlated to use activities. Projectile point analysis indicates that most of the Middle Archaic assemblage are high utility portions that hypothetically demonstrate profitable rejuvenation potential (Figure 45). The Middle Archaic assemblage is dominated by local toolstone sources including Troublesome Formation chert (n=5) with a smaller quantity of projectile points manufactured from unknown or non-local lithic raw materials like Windy Ridge orthoquartzite (n=2). The presence of rejuvenation during this period is largely absent. The lack of rejuvenation and the discard of high utility portions indicate that during the Middle Archaic, Rollins Pass saw a continuation of projectile point curation favoring discard, highlighting the expendability of projectile points during this time. The presence of rejuvenation and high utility portion suggest that before discard the projectile point was conserved for future anticipated use.

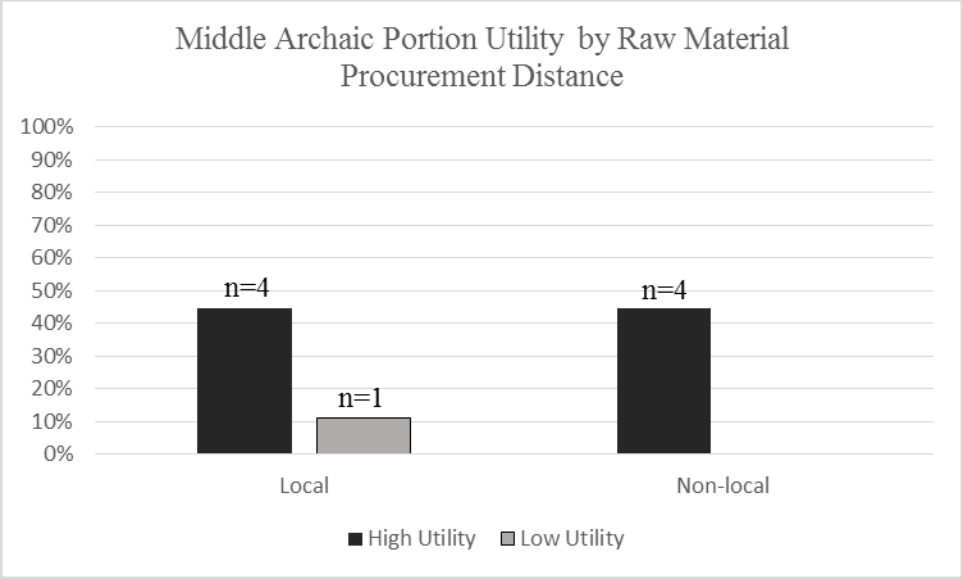

Figure 45. Graph depicting the ratio of high utility and low utility portions by lithic raw material procurement distance during the Middle Archaic period.

However, despite the presence of rejuvenation, the discard or high utility portions still indicates that prehistoric people using Rollins Pass practiced an expendable projectile point use strategy. This assumes the production and use of these points were curated to address a predictable, reliable, and specific hunting task. The discard after the task was completed at the Pass suggests the anticipated need was linked to a destination location rather than conservation strategy for encounter type hunting.

Late Archaic

The Late Archaic period is marked as a continuation of hunting and gathering subsistence trends seen in previous periods with further diversification in projectile point morphology. This period is considered to have the highest archaeological signature within Northern Colorado, meaning that out of the recorded prehistoric sites, the highest represented period is the Late Archaic (Tate 1999: 95) The Late Archaic period is the most represented within the Rollins Pass

site, small site, and isolate projectile point assemblage. Curation data for the Late Archaic period is summarized below.

The most represented projectile point portion is proximal-midsections followed by near-complete and complete points. A high occurrence of snap fractures suggests point use as a hunting or butchery implement. The combination of portions and fracture type suggest that Late Archaic projectile points were discarded after off-site use despite many retaining high rejuvenation potential (high utility portions). The high frequency of points that could have been rejuvenated but were instead discarded indicates that an extended use life was not a part of toolkit design of hunter-gather population during the Late Archaic. Curation during this time suggests that many of the points discarded at the sites, small sites, and isolates are the result of dehafting activities with a large sample of proximal or proximal-midsections. However, the Late Archaic is dominated by near-complete points which demonstrates expendability for high utility portions (Figure 46).

Similar to the Middle Archaic, the Late Archaic also saw a lack of rejuvenation. Raw material use during this period further suggests a similar mobility range as seen in previous periods. The Late Archaic, displays a slightly higher occurrence of local lithic materials (n=16, 53%), over non-local material use (n=14, 40%). This rise in local materials perhaps indicating prehistoric groups had smaller mobility ranges. A tentative pattern based on curation intensity and raw materials suggest that Late Archaic Native Americans using Rollins Pass had a small preference for locally available toolstone than earlier Archaic subperiods. However, regardless of raw material procurement distance, the Late Archaic point assemblage indicates that hunter-gatherer groups employed an expendable projectile use strategy. This indicates that the Pass was regarded as a destination during this period.

The Late Archaic is the highest represented projectile point period at Rollins Pass. The majority of these Late Archaic points are attributed to a single site (Benedict 5GA51), however, even if this site assemblage is removed from the overall sample, the overall representation of the Late Archaic at the Pass is not altered. This increase in a Late Archaic presence suggests an intensification of prehistoric use of the Pass during this time. The intensification could be the result of diversification of resources pursued at high altitude and increased population. Additionally, several game-drive sites (5GA35, 5GA36, 5GA37, 5BL147) situated on the pass have typologies associated with the Late Archaic, further indicating these hunting systems were at least in use by this period. While it is not conclusive that the sites, small sites, and isolates on the Pass are directly associated with the game-drives, it is likely that the people camping at the Pass were likely aware, if not utilizing of the hunting features. The many hunting features symbolize the exploitation of a predictable resource, medium-sized migratory game, and represent a draw for prehistoric peoples in Northern Colorado.

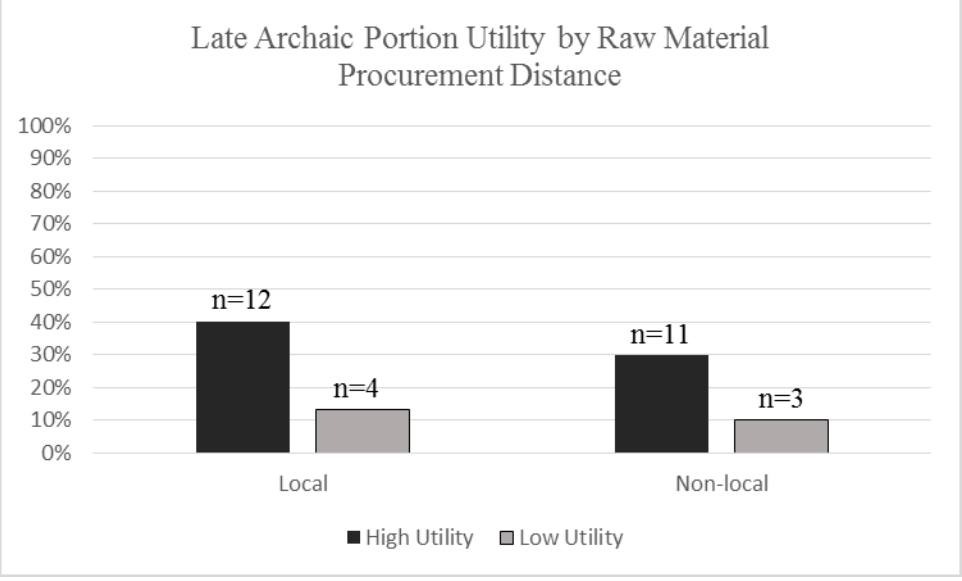

Figure 46. Graph depicting the ratio of high utility and low utility portions by lithic raw material procurement distance during the Late Archaic period.

Early Ceramic

The Early Ceramic is largely regarded as a period of transition with cultural materials trends influenced by Native American groups to the east. In general, the record shows an increase in campsites affiliated with the Early Ceramic which were occupied for longer periods and/or with greater regularity (Gilmore 1999). The Early Ceramic is represented by twelve projectile points from six sites which is 13% of the entire assemblage. The point portions most represented include near-complete points followed by high utility portions. As seen in previous periods the most common fracture is a snap facture, largely association to hunting or butchery use. Additionally, tip crushing has a higher prevalence suggesting damage inflected by use, not manufacture. Evidence of rejuvenation is at 17% of the Early Ceramic or two out of twelve points. Raw materials include Troublesome Formation chert (n=7) and toolstone from unknown sources (n=4). The increase of non-local material use, in comparison to the previous periods could suggest a greater mobility range for prehistoric people using the Pass at this time, a trade network, or a decreased access to local raw material procurement areas due to increasing territoriality.

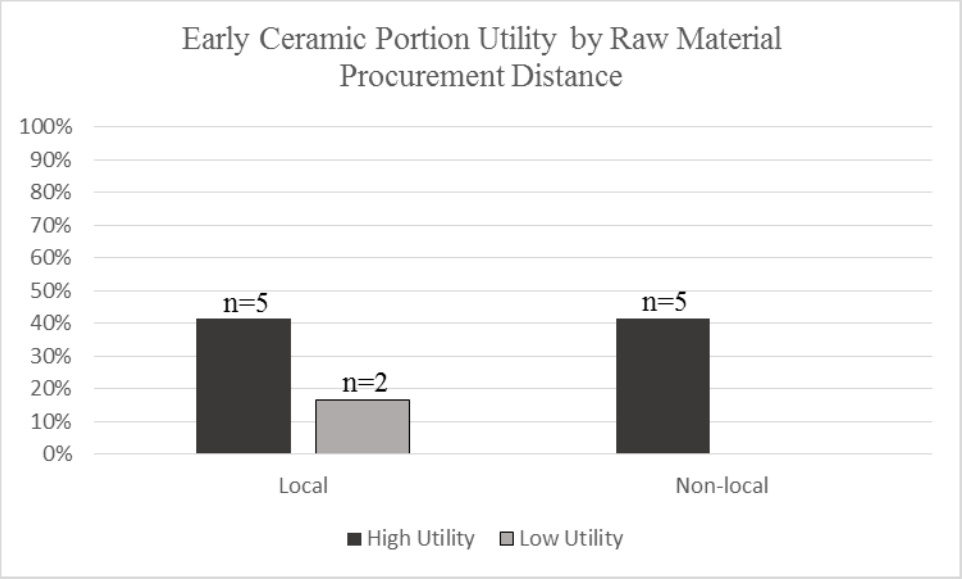

Figure 47. Graph depicting the ratio of high utility and low utility portions by lithic raw material procurement distance during the Early Ceramic period.

It was estimated, in this thesis that curation intensity would be lower in the Late Prehistoric, beginning in the Early Ceramic, due to technological choices such as the shift to bow and arrow technology (Bettinger and Eerkens 1999; Gilmore et al. 1999; Thomas 1978). The use of bow and arrow technology has been hypothesized to be linked to economic, environmental, and interpersonal violence pressures during the Late Prehistoric (Blitz 1988). In terms of technology, the smaller and higher numbers of arrow sized points needed within a toolkit may have provided an advantage depending on external factors (Blitz 1988). This increase in manufacture may indicate the more expendable nature of this technological strategy; smaller points require less lithic material per a point, and more can be readily fired at a given time (Nassaney and Pyle 1999).

Arrow points are identifiable by size alone, usually, with the perhaps the exception of some transitional Late Archaic forms, are considerably smaller than pervious projectile point types. This significant difference in arrow technology may have made it difficult to rejuvenate

arrow points but likely made the need to rejuvenate less necessary. An advantage to arrow technology it that points can be produced from smaller pieces of toolstone and as such more can be produced from a single core. This mass production may have lessened the need to revive projectiles as it was less expensive in time and raw material used to produce a new tool. Furthermore, the nature of arrow point suggests the likelihood of these projectiles being lost and or broken was higher than previous larger and often thicker projectile points, therefore, built to accommodate this technological choice of "make more-use less raw material-lose some". This technological strategy may be reflected in the low degree of curation exhibited during the Early Ceramic, designed to be a more expendable than in previous periods. Complete points, near complete points, and proximal-midsection portions (n=9, 81%) are most often observed for Early Ceramic at Rollins Pass and appear to reinforce the notion of arrow point expendability. Therefore, high utility portions located at Rollins Pass campsites and isolates may be the result of a technological shift that favors expendability and/or could represent an expendable projectile point use strategy associated with an anticipated and predicable resource related to seasonal resources and hunting (Figure 47).

Middle Ceramic - Plus

In Northern Colorado, Middle Ceramic components often co-occur with Early Ceramic components (Gilmore 1999:245). This makes separating time specific archaeological signatures difficult. Additionally, the number of sites with to the Middle Ceramic components decreases throughout Northern Colorado. The decrease in Middle Ceramic sites in the archaeological record could also be the result of increased mobility, environmental pressures, migration out the area into other regions, and/or potential territoriality, and conflict. The Middle Ceramic to

Protohistoric eras is represented by small side and tri-notched points before the transition to metal points. Four side-notch points and two tri-notch points make up the Rollins Pass Middle Ceramic-Plus assemblage, all of which are either complete or near complete (Figure 48). The discard of these points, like during the Early Ceramic, may be due to a technological shift associated with the arrow point use strategy and/or were lost within the carcass of animals brought back to camp. The projectile points associated with this period rely on local lithic materials with smaller quantities of distant materials and toolstone from unknown sources. The continued use of local materials suggests that raw material accessibility through direct procurement occurred in the Middle Ceramic period.

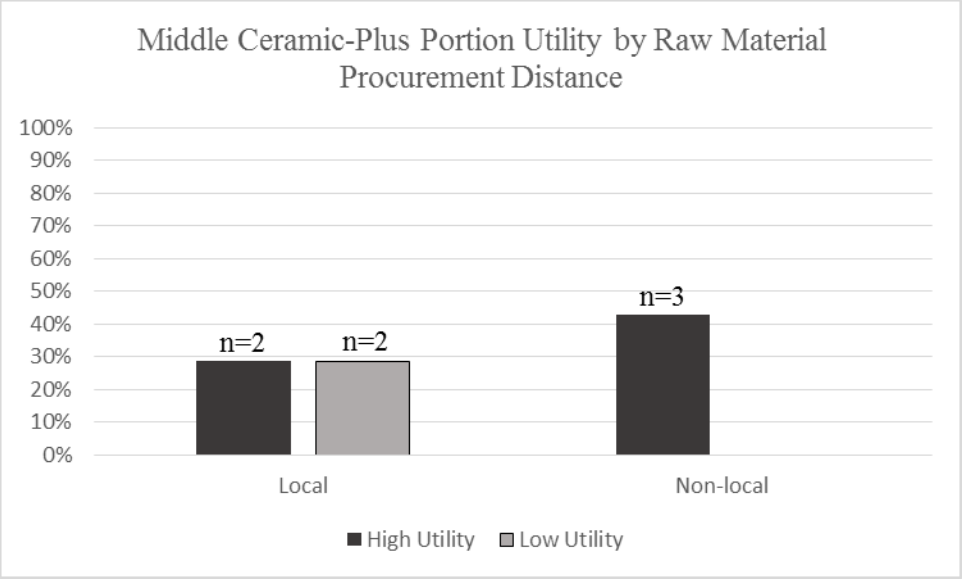

Figure 48. Graph depicting the ratio of high utility and low utility portions by lithic raw material procurement distance during the Middle Ceramic- Plus period.

Discussion

The presence of projectile points at campsites suggests a different sequence of events resulting in discard than that would occur in the game-drives systems located on the ridges

above. This assumption is linked to the notion that projectile points functioned as projectile armatures used for hunting or conflict resolution purposes (Andrefsky 2005; Goodyear 1974). Therefore, the discard within a campsite likely does not represent the place of use (Binford 1980; Binford 1982). Evidence gathered from experimental archaeological data suggests the Rollins Pass points found at the sites, small sites, and isolates were overwhelmingly used as a projectile armature associated with hunting or butchery activities. The deposition of projectile points in a campsite setting is mainly attributed to three activities; 1) manufacture, 2) dehafting, or 3) were lost within an animal carcass. These avenues of discard are presumed to reflect differently within the archaeological record through patterns in projectile point portions and fracture type. Discard in itself can be used as a clue towards an overall projectile point use strategy. Projectile point use strategy is a combination of proactive planning and reactive assessment. By evaluating the importance of rejuvenation and the continuation of a projectile point's use-life, or lack thereof, projectile point use strategies can be assessed. Strategies that stress rejuvenation (conservation) and mobility with low utility point portions or discard (expendability) and destination with the discard of high utility portions, complete points, and/or near complete points. Additionally, the assessment of lithic raw material in conjunction with time and curation provides a further indication of strategies by evaluating expendable and conservative approaches.

The many game-drive features located on the ridges above are thought to have been in used beginning in the Archaic through to the Protohistoric. This is supported by the projectile points typologies found in the intercept zones (LaBelle and Pelton 2013; Meyer 2019; Whittenburg 2017). The creation and modification of the hunting systems essentially created an enterprise targeting a reliable resource of medium-sized game. While there is no direct evidence tying the many sites, small sites, and isolated finds to game-drive use, it is safe to assume the

hunting features provided a draw to prehistoric use of the Pass as a destination. Evidence to support Rollins Pass as a destination, likely through the draw and use of the numerous game-drive sites, is represented by the dominate representation of complete, near-complete, and high utility point portions. The discard of points when rejuvenation is possible if not profitable suggest a projectile point strategy that does not stress maintainability but instead a tool to be used and discarded for a reliable and specific task. Alternatively, the discard of low utility portions or exhausted points could indicate conservation or toolstone suggesting more nomadic population using Rollins Pass as an intermountain travel corridor. Outside of examining raw material and assumed mobility range, the evaluation of Rollins Pass as a travel corridor is difficult to perceive within projectile point assemblages. However, the presence of non-local materials and point rejuvenation provide clues to examine this possibility (Figure 46). Therefore, fracture type, projectile point portion, and lithic raw material accessibility through time provide a measure to assess prehistoric projectile point use strategy and how hunter-gatherer interacted with the Rollins Pass landscape.

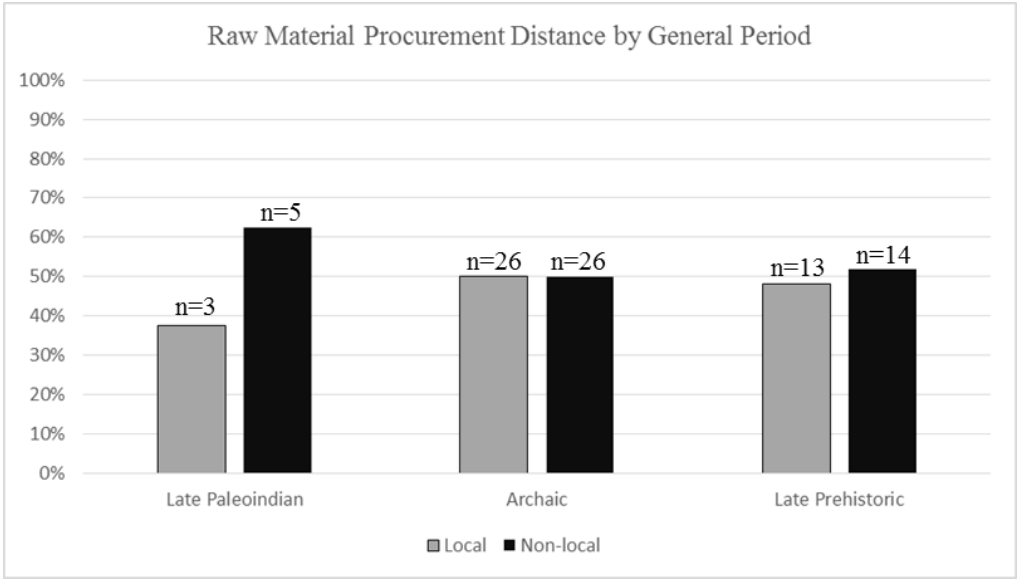

Figure 49. Graph depicting the percentage of local/non-local raw material use by general period at Rollins Pass campsites and isolates.

The Late Paleoindian period at Rollins Pass demonstrates two patterns related to projectile point discard, both an expendable and conservative approach. Projectile point portions and lithic raw material indicate that people during this time were willing to discard formal tools with potential continued utility regardless of toolstone procurement distance (Table 49). Raw material accessibility appears not to have a large influence on the rate of discard during this period. Low utility portions are represented evenly by local and non-local lithic materials. For this period low utility portions are entirely characterized by proximal portions. The proximal portions are indicative of dehafting activities. The removal of presumable high utility portion suggests a conservative point use strategy. However, the discard of complete or high utility portions, manufactured predominately from non-local materials, indicate an expendable projectile point use strategy. The small sample suggests that the during the Late Paleoindian, half the sample of points at Rollins Pass were considered expendable, directly contradicting the assumption that Paleoindian projectile points represent the pinnacle of curation and raw material conservation.

The Archaic period point assemblage is dominated by high utility portions with two-thirds of the projectile points manufactured from local raw materials. This high rate of projectile point expendability suggests that raw material access was not a stressor during the Archaic. The lack of conservation indicates that prehistoric populations knew the region and perhaps treated the Pass as a destination rather than a travel corridor along a seasonal or annual round. The discard of high utility portions or complete projectile points suggests that once their objective was complete the projectile points were discarded since the tools had completed their intended purpose. As a whole, the Archaic-aged projectile points are equally manufactured from local (50%) and non-local (50%) toolstone which indicate that prehistoric people mapped onto local

sources but also actively and consistently brought in non-local materials, thus suggesting raw material during this period is not a good indicator of local populations using the Pass. However, the equal use of raw materials and the discard of high utility point portions indicates that despite procurement distance prehistoric hunter-gatherers appear to use the Pass as a destination. Inferring populations were using Rollins Pass as a reliable and predictable seasonal resource. Though the overarching theme during the Archaic indicates a destination, beginning in the Late Archaic there is a shift in perceived mobility to and through the Pass, manifested by prehistoric cultural resource type in the ratio of sites, small sites, and isolates. It is during this period that an increase of isolates or small sites occur. The higher number of isolated resources (resources of 14 artifacts or less) may indicate an upsurge of encounter hunting and/or the increased use of Rollins Pass as a travel corridor between the Western Slopes and the Front Range for small groups of prehistoric peoples.

The Late Prehistoric period at Rollins Pass displays a continued general pattern of local lithic raw materials with complete, near complete, or higher utility portions. This period represents the most near complete and complete projectile points per assemblage at 48% (n=13). This higher occurrence likely indicates technological choices associated with the shift to a bow and arrow hunting strategy or potentially lost arrow points within animal carcasses. The continued use of local raw material, particularly from the Troublesome Formation, further suggests that toolstone accessibility was not significantly altered from the Late Archaic period. As seen in the Late Archaic period there is continued non-local toolstone usage. The steady use of non-local or unknown lithic raw materials in conjunction with high utility point portions does suggest more group mobility, increase resource mapping, or destination use of Rollins Pass. The resources with a Late Prehistoric component mostly exist in multicomponent sites inferring that

these sites represent persistent places. The notion of persistent place in itself suggests a destination. Overall, based on point portions, lack of rejuvenation, and toolstone procurement distance ratios the assemblage indicates that, as seen in previous period, the Late Prehistoric use of the Pass aligns with an expendable projectile point use strategy.

Regardless of local versus non-local procurement of lithic raw materials, the sites, small sites, and isolates at the Pass demonstrate a higher occurrence of high utility portions over low utility portions. This pattern suggests that many of the discarded points at the 17 sites, four small sites, and five isolates were the product of an expendable projectile point use strategy linked to a specific task within a reliable and predictable environment. The approximately equal use of local and non-local lithic materials throughout prehistory suggests that hunter-gatherer groups had consistent access to many high-quality lithic sources and/or the purpose of visiting the Pass negated the need to further curate. Varying projectile point strategies and Rollins Pass use motivations could also depend on resource context. The sites, small sites, and isolates at the Pass 11 include multicomponent sites/small sites, ten single component sites/small sites, and five single component isolates. Within single component (single use) or large multicomponent sites (places of repeated use), the presence of curation intensity may additionally indicate motivations for the prehistoric use of Rollins Pass. Furthermore, tying in large multicomponent sites located along the pass suggest these sites are persistent places or a destination. Several of the largest sites (5GA24, 5GA32, Benedict 5GA51, Benedict 5GA53, and Benedict 5GA56) are multicomponent sites situated near game-drive systems (within one mile). The context of these sites in particular suggests that the hunter-gatherer groups using and reusing this site location regarded Rollins Pass as a destination. Additionally, the high occurrence of isolates or single component sites does not detract from a destination conclusion when curation intensity is taken into account. While

Rollins Pass projectile point use strategy indicates an expendable strategy over a conservative one, it does not negate past groups also used the pass as a travel corridor, however the signature for this motivation appears to partially obscured or perhaps interlaced with Rollins Pass's use as a destination.

CHAPTER SIX: DISCUSSION AND CONCLUSION

The aim of this thesis project was to outline and explore prehistoric use of Rollins Pass outside of the numerous game-drive sites. The various sites, small sites and isolates demonstrate constant use of the pass from the Late Paleoindian period into, if not beyond, the Middle Ceramic era. The author has presented 1) a chronological reconstruction of 17 sites, four small sites, and five isolates, 2) the breakdown of local and non-local lithic raw materials, 3) the analysis of projectile point curation and 4) the examination of curation intensity/projectile point use strategies and lithic raw material through time. This thesis used several lines of evidence to examine projectile point use strategy in order to assess potential motivations for prehistoric people to travel to and/or through Rollins Pass.

Typology was used to outline a chronological sequence of Rollins Pass. Through typological cross-dating it was determined that the Pass has 8 Late Paleoindian points, 1 Early Archaic point, 9 Middle Archaic points, 31 Late Archaic points, 13 General Archaic points, 12 Early Ceramic points, 7 points that can be attributed to the Middle Ceramic and Protohistoric periods, and 7 General Late Prehistoric points. Typologies represented include an unspecified Cody Complex point, James Allen, Angostura, Mount Albion, Mallory, Shouldered McKean, Park/Gypsum point, Yonkee, Besant, Pelican Lake, Late Archaic Corner-Notch, Hogback, Plains Side-Notch, Prairie Side-Notch, and Plains Tri-Notch points. General and unassigned typologies for each period was also examined and assigned. Through projectile point examination these sites, small sites, and isolates revealed that 44 % of the resources are multicomponent and 56 % are single component. The chronological sequence at Rollins Pass sites, small sites, and isolates was then used as the framework for subsequent analysis.

Lithic raw materials were assessed with the assistance of a lithic library housed at the CSU-CMPA lab; this analysis was completed in order to categorize local and unknown/non-local toolstone within the projectile point assemblage. The determination of local and non-local lithic raw materials at Rollins Pass sites, small sites, and isolates allowed for the broad examination or raw material accessibility, resource mapping, and potential mobility range. Local toolstone represents a total of 47% of the whole assemblage while non-local material is 53%. Troublesome Formation chert (local) and Windy Ridge orthoquartzite (non-local) were the most consistently used raw material at the Pass followed by unknown or presumed non-local materials. The occurrence of non-local toolstone decreased beginning in the Middle Archaic when compared to earlier periods, however, a trend of approximately equal utilization of local and non-local material use began during this period and continued through to the Middle Ceramic/Protohistoric period. This steady trend appears to indicate that raw material procurement distance largely did not play a large role in discard patterns at Rollins Pass.

The examination of projectile point curation through projectile point portion, fracture type, and the presence or absence of rejuvenation was employed to gauge projectile point use strategy. These analyses aimed to address whether a point was 1) used on-site or off- site, 2) being maintained to keep extend its use life or discarded despite having a potential for rejuvenation, and 3) to determine if there were patterns of conservation or expendability in projectile point use at Rollins Pass. The point use strategy is comprised of whether prehistoric people using Rollins Pass were affected by stressors, such as raw material accessibility, and if they planned to interact with the Pass as a destination or a travel corridor. Data show that the discard of near complete points and high utility point portions infers that the point strategy did

not stress maintainability or conservation but instead reliability and expendability for a preplanned or predictable situations.

Projectile point use strategy can deduce prehistoric people's motivations for being at Rollins Pass. Motivations could include exploitation of reliable resources (destination game drives) or as travel corridor with potential encounter hunting and resource collection. These motivations are not mutually exclusive, but projectile point discard patterns within a campsite setting provides insight to prehistoric objectives at the Pass. Fracture types indicate use rather than manufacture of projectile points. This suggests the tools were used for hunting or primary butchering activities. Additionally, many high utility portions display minimal to no rejuvenation attempts. Discard of high utility portions with evidence of off-site use (return to a camp post-hunt) indicates a willingness to abandon portions with potential continued use which could indicate a preplanned objective was likely met within an area known to have reliable resources. In contrast, the discard of low utility portions with evidence of off-site use (gathered from fracture types) fits into a preconceived assumption that projectile points use life pattern of discard when rejuvenation is not possible. This assumption is based on the hypothesis that the curation of the projectile point will always stress conservation, and when rejuvenation is no longer a viable option, discard occurs. The pattern being that the low utility portions or exhausted points are discarded in campsite setting because they no longer have a profitable use. The expectation being that perceived low utility projectile point portions represent raw material conservation and maintainability with the removal of high utility portions, such as distal-midsections, to rejuvenate/re-base. Portions likely to be removed are distal-midsections and proximal-midsections. Assessing projectile point use strategy at Rollins Pass reveals that foragers consistently discarded higher utility portions as compared to low utility portions. The

prevalence of high utility portions within a non-game-drive site setting suggests that these points represent a use strategy that does not stress the conservation of raw material and maintainability of tool use. The approximately equal occurrence of local and non-local lithic material further suggests that raw material conservation and procurement distance was not a significant stressor in any period. Only 19 % of local toolstone of the total projectile point sample displays evidence for rejuvenation as compared to 29% for non-local raw materials. However, the data does show a trend of higher levels of low utility portions and a slight increased use of local material beginning in the Late Archaic. This shift started in the Late Archaic and continued beyond the Middle Ceramic, may indicate increased use of the Pass as an intermountain travel corridor.

Projectile point fracture patterns further indicate that the points were used off-site and discarded on-site during campsite activities. Point portions are dominated by high utility portions which infer a willingness to discard projectile points with a potential continued use life. This willingness to discard suggests that, overall, points found in the sites, small sites, and isolates within Rollins Pass were brought and used with a specific purpose and discarded once that task was complete. This projectile point use strategy suggests that populations throughout time considered Rollins Pass a destination. However, a shift in the Late Archaic to Middle Ceramic eras also indicate another point use strategy with a slight increase of local raw materials and higher occurrences of rejuvenation, suggesting populations relied more local materials and toolstone conservation strategies. However, the collective even representation of local and non-local toolstone use and expendable point use strategy falls out of general patterns of increased population and subsistence shifts witnessed in the foothills and plains during these periods (Gilmore 2008).

The intensified use of high-altitude sites, small sites, and isolates, with an increased amount of cultural material deposited at Rollins Pass matches with the general perceived intensification of game-drive use in Northern Colorado (Meyer 2019). This increase in cultural material may reflect larger groups using the Pass at one time (within specific periods) or could infer that many groups are using the Pass throughout time. Additionally, the length of occupation would have affected the archaeological signature with larger or denser sites potentially being the product of longer stays, not necessarily larger groups of people. At Rollins Pass the game-drives features are argued to represent communal hunting sites, therefore the archaeological signature at these sites and other surrounding site likely reflects larger groups of people converging and participating on hunts that could last days too weeks. While the mirroring in intensification trends through time is not direct evidence for the connection of sites/isolates and game-drive systems, it does support a motivation for prehistoric peoples use of the Pass as a destination and as a persistent place. In total, this thesis suggests there is evidence based on a consistent use of an expendable projectile point use strategy that Rollins Pass functioned as a destination, and in all probability as an intermountain travel corridor through all of prehistory.

Future Research

While the research conducted for this thesis outlines the chronology of Rollins Pass sites, small sites, and isolates, further research can be conducted to address complete toolkit strategies and the spatial relationships to the numerous game-drive systems. Future research should aim to examine the lithic raw material of debitage and other tool classes or Rollins Pass sites and isolates to analyze the occurrence of local and non-local toolstone over an entire assemblage. Assessing these other artifacts will greatly increase the understanding of raw material

accessibility of known lithic sources can help situate sites, small sites, and isolates within a mobility ranges or seasonal rounds. Perhaps deducing if prehistoric population mobility ranges are local mountain-based systems or large, cyclical subsistence settlement patterns (Meyer 2019: 145). Additionally, debitage type and size class can further address tool manufacture and maintenance which would shed further light on rejuvenation, curation decisions, and toolkit design.

In terms of spatial analysis, the location of the 26 sites and isolates should be examined with least-cost pathways to gauge the potential relationship of these sites and isolates with the game-drive systems located on the ridges above. With the assessment of least cost pathways, the distribution of potential sites used for post-hunt activities could be tested against experimental or ethnographic data. This could be accomplished through the use of high-quality DEM and satellite imagery to determine the relationship between several large multicomponent sites and stone hunting features. These areas on analysis would allow researchers to account for natural barriers such as slope or bodies of water. Taking all these factors, including known site locations, into account, a model could be made to calculate models examining pathways between hunting sites with campsites in a replicable manner.

Final Thoughts

Rollins Pass represents a region with a wide-ranging representation of time and is the backdrop to diverse site types including a high concentration of game-drives complexes as well as numerous other sites, small sites, and isolates (LaBelle and Pelton 2013; Meyer 2019). It was the aim of this thesis to investigate 26 of these sites, small sites, and isolates to better understand Pass use as a whole. While this document provides a small contribution in Colorado high-altitude

archaeology; it communicates through projectile points analyses that 1) time represented at the Pass spans from the Late Paleoindian period through to the Middle Ceramic/Protohistoric periods, 2) that raw material represented at the pass, for most of prehistory, was an approximately equal ratio of local and non-local toolstone, 3) fractures types indicate off-site use, and 4) the discard of high utility portions and low rejuvenation rate infer that prehistoric people were practicing an expendable projectile point use strategy suggesting the Pass was used as a destination. The data collected and presented for this thesis are not intended to be the final report on Rollins Pass. Instead, it is meant to be a foundation that can be added to and refined by additional investigations and analysis. As more data becomes available through future fieldwork and analysis, the Rollins Pass archaeological record can present a more holistic picture of hunter-gatherer populations in Northern Colorado and high-altitude mountain use through time.

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APPENDIX A: PROJECTILE POINT DATA

Site	Artifact #	Age	Typology	Max length (mm)	Max Width (mm)	Max Thickness (mm)	Mass (g)	Collection	Portion	Rejuvenation	Fracture type	Raw Material	Raw Material Source
5GA24	1	Early Ceramic	Arrowpoint - Corner Notch	17.6	13.77	3.94	0.9	Benedict	Distal-Midsection	Yes	Snap	Chalcedony	Unknown
5GA24	6	General Late Prehistoric	Unknown	14.62	13.87	2.61	0.4	CMPA	Proximal-Midsection	No	Snap	Chert	Unknown
5GA24	7	Middle Ceramic	Plains Side Notch	10.11	11.33	2.66	0.2	CMPA	Proximal	No	Snap	Chert	Troublesome
5GA24	8	N/A	Unknown	19.88	13.21	1.7	0.3	CMPA	Distal	No	Snap	Chalcedony	Unknown
5GA26	1	N/A	Unknown	18.27	12.68	3.06	0.6	Benedict	Distal	No	Snap	Chert	Troublesome
5GA27	1	General Late Prehistoric	Unknown	10.96	12.01	2.28	0.4	Benedict	Midsection	No	Snap	Chert	Troublesome
5GA29	1	General Archaic	Unknown	15.96	18.34	3.95	1.3	Benedict	Proximal	Unknown	Snap	Chert	Troublesome
5GA29	2	Late Archaic	Archaic Corner Notch	30.63	21.17	4.53	2.7	Benedict	Proximal-Midsection	No	Burin	Chert	Troublesome
5GA29	3	General Archaic	Unknown	8.83	21.2	5.32	1	Benedict	Proximal	Unknown	Snap	Chert	Troublesome
5GA30	1	Late Archaic	Pelican Lake	28.32	24.22	4.63	3.3	Benedict	Near Complete	Yes	Tip Crush	Chert	Unknown
5GA30	2	Late Archaic	Besant	17.45	15.31	5.15	1.8	Benedict	Proximal-Midsection	No	Snap	Chert	Table Mtn. Jasper
5GA32	1	General Late Prehistoric	Unknown	19.49	13.67	3.8	1	Benedict	Midsection	No	Snap	Chert	Unknown

Site	Artifact #	Age	Typology	Max length (mm)	Max Width (mm)	Max Thickness (mm)	Mass (g)	Collection	Portion	Rejuvenation	Fracture type	Raw Material	Raw Material Source
5GA32	2	Late Archaic	Archaic Corner Notch	22.87	15.99	3.86	1.2	Benedict	Proximal-Midsection	No	Burin	Chert	Unknown
5GA32	3	Early Ceramic	Hogback	19.95	14.47	3.15	1.1	Benedict	Proximal-Midsection	No	Snap	Chert	Troublesome
5GA32	4	General Archaic	Unknown	16.17	14	3.76	1.2	Benedict	Proximal	Yes	Snap	Chert	Table Mtn. Jasper
5GA32	5	General Archaic	Unknown	26.74	18.54	3.13	1.8	Benedict	Distal-Midsection	Yes	Snap	Chert	Unknown
5GA32	6	Early Ceramic	Hogback	27.71	15.46	2.35	1.1	CMPA	Near Complete	No	Snap	Chert	Unknown
5GA32	7	General Late Prehistoric	Stemmed-Unknown	37.4	14.12	3.44	2	CMPA	Near Complete	No	Snap	Chert	Troublesome
5GA32	8	Middle Ceramic	Prairie Side Notch	12.79	9.96	2.11	0.2	CMPA	Proximal	No	Snap	Chert	Table Mtn. Jasper
RP17-101-4	14	Late Paleoindian	James Allen	36	11	3	UNK	CMPA	Complete	No	N/A	Quartzite	Windy Ridge
B.5GA51	1	Late Archaic	Archaic Corner Notch	46.01	24.26	8.35	8.2	Benedict	Proximal	Unknown	Snap	Chert	Troublesome
B.5GA51	2	Late Archaic	Archaic Corner Notch	24.24	13.98	3.17	1	Benedict	Proximal	Unknown	Snap	Chert	Troublesome
B.5GA51	3	Early Ceramic	Hogback	29.51	13.7	3.95	1.8	Benedict	Near Complete	No	Snap	Chalcedony	Unknown
B.5GA51	4	Middle Archaic	Shouldered McKean	35.11	22.38	4.17	3.8	Benedict	Complete	Yes	N/A	Chert	Troublesome
B.5GA51	5	Middle Archaic	Park point	16.39	15.65	3.34	0.9	Benedict	Near Complete	No	Snap	Quartzite	Windy Ridge
B.5GA51	6	Middle Archaic	Shouldered McKean	22.26	15.51	3.25	1.1	Benedict	Proximal-Midsection	Yes	Unknown - Reworked	Chert	Unknown
B.5GA51	7	Late Archaic	Archaic Corner Notch	27.84	24.57	4.94	4.7	Benedict	Midsection	No	Snap	Quartzite	Unknown

Site	Artifact #	Age	Typology	Max length (mm)	Max Width (mm)	Max Thickness (mm)	Mass (g)	Collection	Portion	Rejuvenation	Fracture type	Raw Material	Raw Material Source
B.5GA51	8	Late Archaic	Archaic Corner Notch	28.24	20.16	4.46	3.3	Benedict	Proximal	No	Snap	Quartzite	Windy Ridge
B.5GA51	21	N/A	Unknown	17.96	9.8	3.59	0.6	Benedict	Distal	No	Snap	Quartzite	Unknown
B.5GA51	9	General Late Prehistoric	Unknown	17.66	19.48	4.1	1.2	Benedict	Midsection	No	Snap	Chalcedony	Unknown
B.5GA51	10	Early Ceramic	Hogback	15.62	24.78	5.75	2.4	Benedict	Proximal	No	Snap	Chert	Troublesome
B.5GA51	11	Late Archaic	Besant	15.16	18.84	5.57	1.7	Benedict	Near Complete	No	Snap	Chert	Troublesome
B.5GA51	12	Early Ceramic	Hogback	20.86	14.21	4.51	1	Benedict	Near Complete	Yes	Tip Crush	Chert	Troublesome
B.5GA51	13	Early Ceramic	Hogback	17.67	13.74	2.47	0.7	Benedict	Complete	No	N/A	Chert	Unknown
B.5GA51	14	Early Archaic	Mt Albion	23.75	24.12	6.15	3.5	Benedict	Near Complete	Yes	Burin	Quartzite	Windy Ridge
B.5GA51	15	Late Archaic	Besant	16.09	17.32	5.38	1.4	Benedict	Near Complete	Yes	Snap	Quartzite	Unknown
B.5GA51	16	General Archaic	Unknown	32.02	17.98	5	2.9	Benedict	Midsection	No	Snap	Quartzite	Windy Ridge
B.5GA51	17	General Archaic	Unknown	16.54	17.5	3.72	0.9	Benedict	Midsection	No	Snap	Quartzite	Unknown
B.5GA51	18	Early Ceramic	Hogback	23.8	13.89	5.93	1.7	Benedict	Midsection	No	Snap	Chert	Troublesome
B.5GA51	19	General Late Prehistoric	Unknown	32.02	16.54	4.21	2.4	Benedict	Midsection	No	Snap	Chalcedony	Unknown
B.5GA51	20	General Late Prehistoric	Unknown	28.71	18.06	3.59	2	Benedict	Distal	No	Snap	Chalcedony	Unknown
B.5GA51	1	General Archaic	Unknown	32.43	23.3	5.09	3.3	CMPA	Midsection	No	Snap	Chert	Troublesome

Site	Artifact #	Age	Typology	Max length (mm)	Max Width (mm)	Max Thickness (mm)	Mass (g)	Collection	Portion	Rejuvenation	Fracture type	Raw Material	Raw Material Source
B.5GA51	3	Late Archaic	Pelican Lake	20.8	20.39	3.64	1.9	CMPA	Complete	Yes	N/A	Quartzite	Unknown
B.5GA51	5	Late Archaic	Pelican Lake	34.79	19.84	4.48	3.8	CMPA	Near Complete	Yes	Snap	Chert	Troublesome
B.5GA51	RP12-8	Early Ceramic	Hogback	26.59	17.5	4.17	2	CMPA	Proximal-Midsection	No	Snap	Chert	Unknown
B.5GA51	RP12-11	N/A	Unknown - dart	21.8	15.6	4.41	2.1	CMPA	Midsection	No	Snap	Chert	Troublesome
B.5GA51	RP12-9	Late Archaic	Besant	28.54	13.51	4.05	2.05	CMPA	Proximal-Midsection	No	Snap	Chert	Unknown
B.5GA51	RP12-10	Late Archaic	Archaic Corner Notch	23.61	15.62	4.59	2.3	CMPA	Proximal-Midsection	No	Snap	Chert	Troublesome
B.5GA51	RP12-2	Late Archaic	Archaic Corner Notch	30.32	23.62	6.37	4.8	CMPA	Proximal-Midsection	No	Snap	Chert	Troublesome
B.5GA51	2013-15	Middle Archaic	McKean-Shouldered	25.36	15.62	4.99	1.9	CMPA	Near Complete	Yes	Snap	Petrified wood	Unknown
B.5GA51	2013-14	Middle Ceramic	Plains Side Notch	22.04	14.46	2.71	1	CMPA	Near Complete	No	Snap	Quartzite	Windy Ridge
B.5GA51	2015-4	General Archaic	Unknown	23.92	13.54	3.58	1.6	CMPA	Midsection	No	Snap	Petrified wood	Parker
B.5GA53	PARKING LOT 1	Late Paleoindian	Unknown	14.6	20.52	4.43	1.8	CMPA	Midsection	Unknown	Snap	Chert	Unknown
B.5GA53	PARKING LOT 2	Late Paleoindian	James Allen	28.71	21.23	3.62	2.3	CMPA	Proximal	Unknown	Snap	Chert	Troublesome
B.5GA53	2013-104	Late Archaic	Pelican Lake	17.29	22.97	4.81	1.7	CMPA	Near Complete	Yes	Snap	Petrified wood	Unknown
B.5GA53	2013-105	Late Paleoindian	James Allen	29.39	22.15	5.48	3.5	CMPA	Proximal	Unknown	Snap	Quartzite	Windy Ridge
B.5GA53	2013-106	Middle Archaic	Yonkee	23.92	13.54	3.58	1.6	CMPA	Near Complete	No	Flute	Chert	Unknown

Site	Artifact #	Age	Typology	Max length (mm)	Max Width (mm)	Max Thickness (mm)	Mass (g)	Collection	Portion	Rejuvenation	Fracture type	Raw Material	Raw Material Source
B.5GA53	2013-107	Middle Archaic	Yonkee	27.45	26.64	4.07	3.5	CMPA	Proximal-Midsection	Unknown	Snap	Quartzite	Unknown
B.5GA53	2013-110	General Late Prehistoric	Stemmed-Unknown	26.14	16.46	4.49	2.1	CMPA	Proximal	Yes	Snap	Chert	Unknown
B.5GA53	2	General Archaic	Unknown	24.8	18	5.9	3.1	Benedict	Proximal-Midsection	Yes	Unknown - Reworked	Chert	Unknown
B.5GA53	15-2	General Archaic	Unknown	18.9	14.7	4.6	1.2	CMPA	Near Complete	Yes	Unknown - Reworked	Petrified wood	Parker
B.5GA56	1	Late Paleoindian	Angostura	43.21	19.98	8.89	8.6	Benedict	Proximal-Midsection	Unknown	Snap	Quartzite	Windy Ridge
B.5GA56	2	Late Paleoindian	Angostura	37.05	15.07	5.85	3.9	Benedict	Proximal-Midsection	Unknown	Burin	Chert	Troublesome
B.5GA56	3	Late Archaic	Archaic Corner Notch	28.75	19.99	4.34	3.3	Benedict	Near Complete	Yes	Snap	Chert	Troublesome
B.5GA56	4	Late Archaic	Archaic Corner Notch	32.83	25.8	5.11	4.8	Benedict	Near Complete	Yes	Snap	Chert	Troublesome
B.5GA56	5	Late Archaic	Archaic Corner Notch	23.67	24.77	5.65	4.1	Benedict	Midsection	Unknown	Snap	Quartzite	Windy Ridge
5BL122	rp10-02	Late Archaic	Archaic Corner Notch	18.42	16.64	3.22	0.9	CMPA	Proximal	Unknown	Flute	chert	Troublesome
5BL122	231	Late Archaic	Pelican Lake	44.7	19.0	5.1	3.6	CMPA	Near Complete	No	Snap	Chert	Troublesome
5BL122	232	Early Ceramic	Hogback	20.5	14	2.9	0.9	CMPA	Near Complete	No	Tip Crush	Chert	Troublesome
5BL122	233	Late Archaic	Archaic Corner Notch	21.9	25.5	4.5	2.9	CMPA	Midsection	No	Flute	Chert	Table Mtn Jasper
5BL124	1	Middle Ceramic - Protohistoric	Tri-notch	22.25	12.47	2.68	0.8	CMPA	Near Complete	No	Snap	Chalcedony	Unknown

Site	Artifact #	Age	Typology	Max length (mm)	Max Width (mm)	Max Thickness (mm)	Mass (g)	Collection	Portion	Rejuvenation	Fracture type	Raw Material	Raw Material Source
5GL2	1	Early Ceramic	Hogback	24.59	16.17	2.53	1.1	Benedict	Proximal-Midsection	No	Snap	Chert	Troublesome
5GL2	2	Middle Archaic	‘Park' point	22.63	19.54	5.98	2.5	Benedict	Proximal-Midsection	No	Flute	Quartzite	Windy Ridge
RADIOBEACON	1	Late Paleoindian	James Allen	38.8	22.81	5.25	5.3	Benedict	Proximal-Midsection	No	Snap	Quartzite	Windy Ridge
RADIOBEACON	2	Middle Archaic	‘Park’ point	24.25	24.26	4.04	2.3	Benedict	Proximal-Midsection	Unknown	Snap	Chert	Troublesome
RP12-3	3	Middle Archaic	Mallory	14.4	20.22	4.54	1.6	CMPA	Proximal	Unknown	Snap	Chert	Troublesome
RP12B-1	1	Late Archaic	Archaic Corner Notch	26.27	13.73	4.3	2.1	CMPA	Near Complete	No	Flute	Quartzite	Dakota
RP13-103	112	Middle Ceramic - Protohistoric	Tri-notch	20	15.98	3.67	1	CMPA	Complete	No	N/A	Chert	Unknown
RP13-201	222	Late Archaic	Archaic Corner Notch	23.6	20.59	4.08	2.6	CMPA	Proximal-Midsection	Yes	Snap	Chert	Troublesome
RP13-302	1	Middle Ceramic	Prairie Side Notch	17.98	8.58	1.51	0.2	CMPA	Complete	No	N/A	Chert	Troublesome
RP13-302	5	General Late Prehistoric	Unknown	14.59	12.71	2.83	0.5	CMPA	Proximal	Unknown	Snap	Chert	Unknown
RP13-302	6	Middle Ceramic	Plains Side Notch	23.25	25.56	4.69	2.2	CMPA	Near Complete	Yes	Tip Crush	Chert	Troublesome
RP15-1	1	Middle Archaic	‘Park' point	45.03	21.71	5.3	6.1	CMPA	Proximal-Midsection	No	snap	Chert	Troublesome
RP15-4	1	Early Ceramic	Hogback	19.38	15.72	2.57	0.6	CMPA	Near Complete	No	Snap	Chert	Troublesome
RP15-4	2	Late Archaic	Archaic Corner Notch	14.4	20.22	4.54	1.6	CMPA	Near Complete	Yes	Snap	Quartzite	Unknown

Site	Artifact #	Age	Typology	Max length (mm)	Max Width (mm)	Max Thickness (mm)	Mass (g)	Collection	Portion	Rejuvenation	Fracture type	Raw Material	Raw Material Source
RP17-1	3	Middle Archaic	Park' point	21.1	19.1	4.4	1.9	CMPA	Near Complete	Yes	Flute	Chert	Troublesome
RP-Wright-18-2-1	1	Late Paleoindian	Unspecified Cody	46.1	25	7.6	12.7	CMPA	Midsection	Unknown	Snap	Chert	Troublesome
RP-Wright-18-3	1	Late Archaic	Pelican Lake	53	25.5	4.5	6.2	CMPA	Complete	No	N/A	Chert	Troublesome
RP-Wright-18-3	2	Late Archaic	Pelican Lake	36.5	22.9	5.7	4.9	CMPA	Complete	No	N/A	Chert	Troublesome
Crawford	1	Late Archaic	Archaic Corner Notch	52.4	28.7	5.7	10	CMPA	Near Complete	Yes	Snap	Chert	Unknown
RP-Wright-18-1	1	General Archaic	Unknown	41.	15.4	5.4	2.7	CMPA	Near Complete	No	Snap	Petrified wood	Unknown

APPENDIX B: PROJECTILE POINT PHOTOS

Photo of Projectile Points from sites 5GA24-5GA29 and Radiobeacon (top to bottom-left to right) (Benedict Collection)

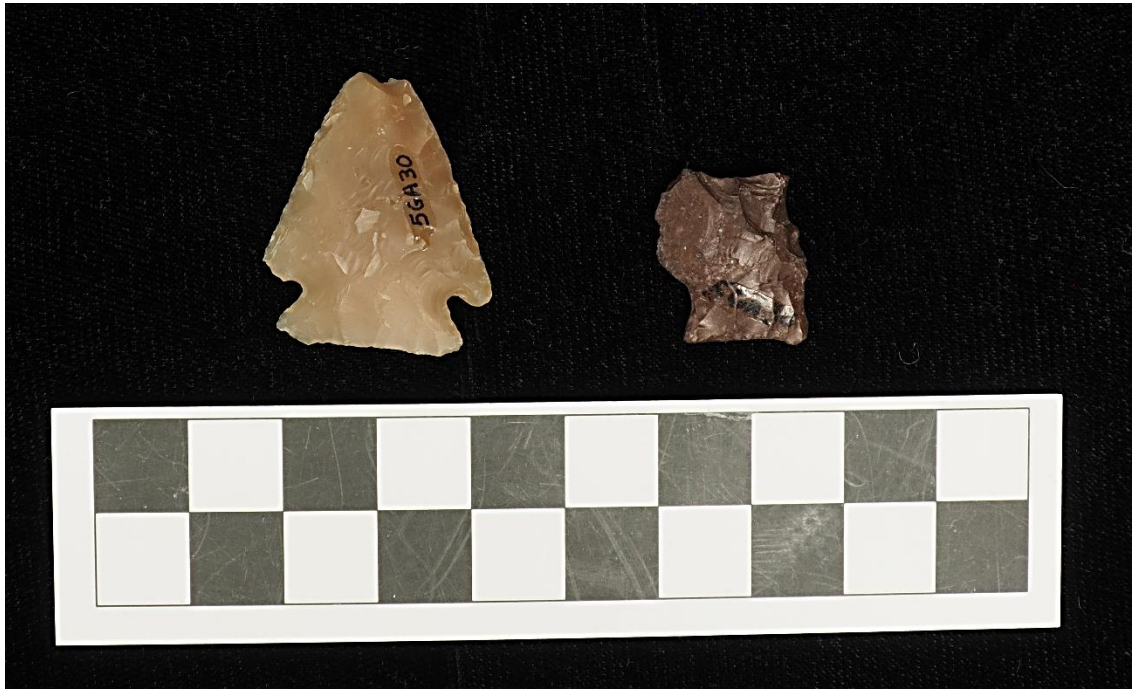

Photo of Projectile Points from Rollins Pass 5GA30 (left to right) 5GA30-1, 5GA30-2. (Benedict Collection)

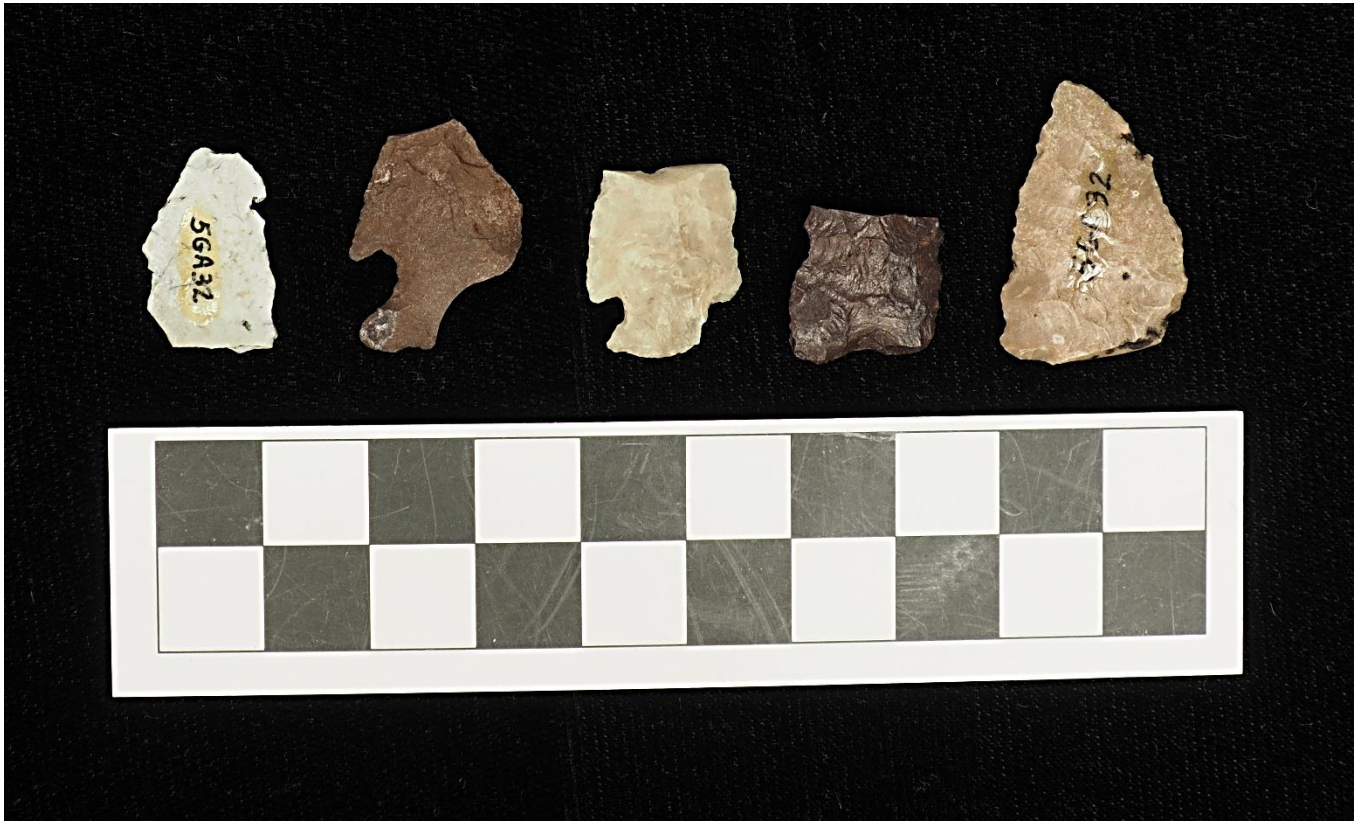

Photo of Projectile Points from Rollins Pass 5GA32 (top to bottom-left to right) 5GA32-1, 5GA32-2, 5GA32-3, 5GA32-4, 5GA32-5. (Benedict Collection)

Photo of Projectile Points from Rollins Pass Benedict 5GA56 (top to bottom-left to right) 5GA56-1, 5GA56-2, 5GA56-3, 5GA56-4, 5GA56-5. (Benedict Collection)

Photo of Projectile Points from Rollins Pass 5GL2 (left to right) 5GL2-1, 5GL2-2. (Benedict Collection)

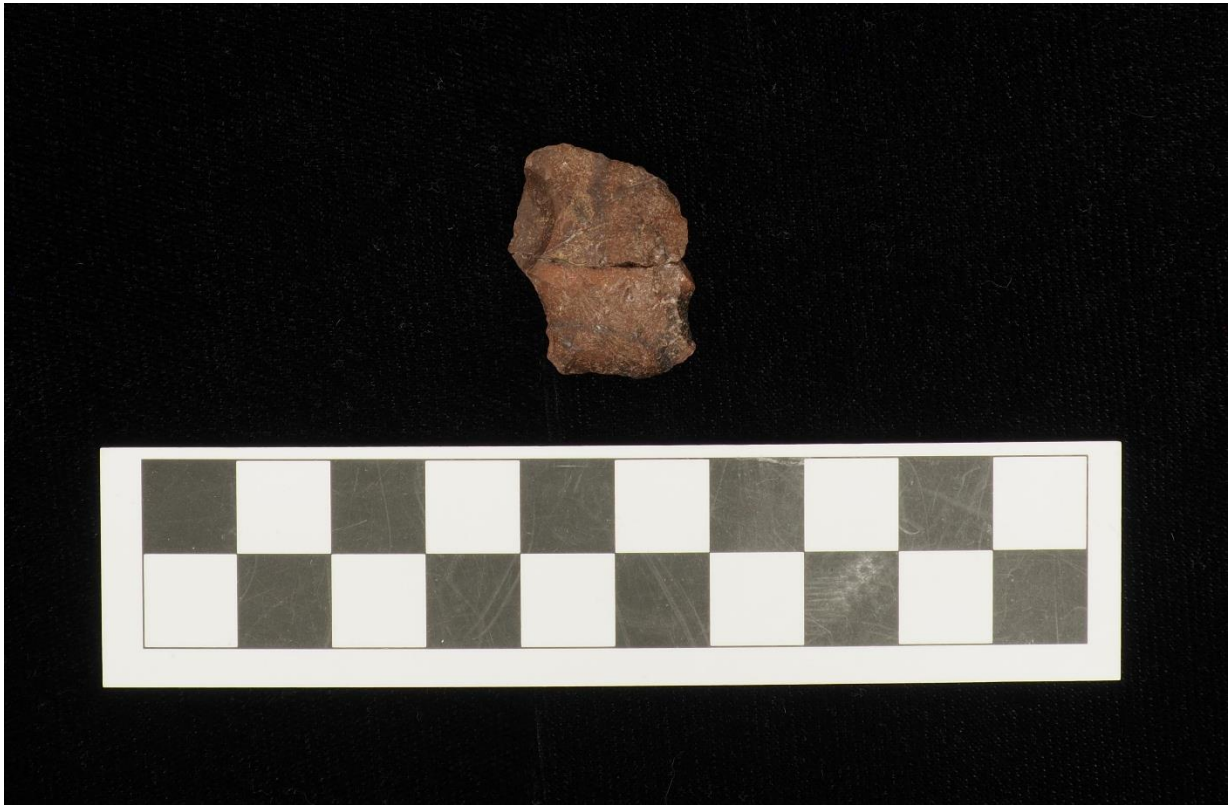

Photo of a Projectile Point from Rollins Pass Benedict 5GA53, Specimen-2. (Benedict Collection)

Photo of Projectile Points from Rollins Pass Benedict 5GA51 (starting from the top row and moving towards the bottom-row left to right) 5GA51-1, 5GA51-2, 5GA51-3, 5GA51-4, 5GA51-5, 5GA51-6, Middle row (1) 5GA51-7, 5GA51-8, 5GA51-9, 5GA51-11, 5GA51-12, 5GA51-13, Middle row (2) 5GA51-14, 5GA51-15, 5GA51-16, 5GA51-17, 5GA51-18, 5GA51-19, Bottom row 5GA51-20, 5GA51-21. (Benedict Collection)

Photo of Projectile Points from Rollins Pass Benedict 5GA53 (top to bottom-left to right) 5GA53-2015-2, 5GA53 (Plot)-1, 5GA53 (Plot)-2, 5GA53-106; 5GA53-105, 5GA53-RP14-1, 5GA53-104, 5GA53-107, 5GA53-110. (CMPA Collection)

Photo of Projectile Points from Rollins Pass Benedict 5GA51 (top to bottom-left to right) 5GA51-2015-4, 5GA51-2013-14, 5GA51-2013-15, 5GA51-1, 5GA51-3, 5GA51-5, 5GA51-RP12-2, 5GA51-RP12-8, 5GA51-RP12-9, 5GA51-RP12-10, 5GA51-RP12-11. (CMPA Collection)

Photo of Projectile Points from Rollins Pass 5GA32 (left to right) 5GA32-6, 5GA32-7, 5GA32-8. (CMPA Collection)

Photo of one projectile point from Rollins Pass 5BL124-238. (CMPA Collection)

Photo of one projectile point from Rollins Pass 5BL122-231, 5BL122-232; 5BL122-233, 5BL122-rp-10-02. (CMPA Collection)

Photo of Projectile Points from Rollins Pass (top to bottom-left to right) RP15-4-1, RP15-4-2; RP15-1-1; RP12-302-1, RP12-302-5. RP12-302-6. (CMPA Collection)

Photo of Projectile Points from sites (left to right) 5GA24-6, 5GA24-7, 5GA24-8. (CMPA Collection)

Photo of Projectile Points from sites (left to right) RP12-3, RP13-103-112, RP12B-1, RP13-201-222. (CMPA Collection)

Photo of Projectile Points from Rollins Pass (top to bottom) RP-Wright-18-2-1, RP-Wright-18-2-2, Crawford, RP-Wright-18-3-1, and RP-Wright-18-1-1. (CMPA Collection)

Photo of Projectile Point from site RP17-1 (RP17-1-1). (CMPA Collection)

Photo of Projectile Point from site RP17-101 (RP17-101-4). (CMPA Collection)