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MACRO AND MICROSCOPIC LITHIC ANALYSIS OF THE PINTO BASIN SITE CA-RIV-52 COLLECTION

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MACRO AND MICROSCOPIC LITHIC ANALYSIS OF THE PINTO BASIN SITE CA-RIV-52 COLLECTION

A Thesis

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

in

Applied Archaeology

by

Bernardo Alexander Renteria IV

March 2020

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Approved by:

Nicholas P. Jew, Committee Chair, Anthropology

Guy D. Hepp, Committee Member, Anthropology

ABSTRACT

The San Bernardino County Museum in Redlands, California holds the Pinto Basin archaeological collection. The Pinto Basin assemblage is a legacy collection for the Pinto point and related point types in the Mojave. The collection contains many artifacts including projectile points, drills, knives, manos, pestles, metates, hammerstones, and scrapers originally collected from the Mojave Desert during the late 1920's. This thesis research investigates the morphological characteristics of a sub-sample of chipped stone lithics by examining and comparing the metric elements of chipped stone lithics in relation to previously reported projectile point types. Lithics originate from the southern extent of Joshua Tree National Park. The collection comes from a variety of Holocene-era deposits.

The sub-sample includes bifaces, unifaces, expedient tools, and diagnostic projectile points. Bifaces include more formal technologies like the Pinto Complex, Gypsum Complex, and Late Prehistoric Complex. The sub-sample identifies numerous points not recognized under projectile point types. I classified such points as bifaces or unifaces. The collection is comprised of 282 chipped stone artifacts. The morphological analysis included artifact and material classification of each chipped stone artifact. Material classification showed Pinto Basin inhabitants held a predisposition towards quartz. Quartz was a preferred material to craft Pinto points. Expedient tools dominated the assemblage and displayed evidence of use-wear along margins. Expedient tools outnumbered diagnostic points which suggests inhabitants of the Pinto Basin preferred expedient tools for routine tasks such as cutting and scraping. The assemblage included diagnostic points from cultural complexes dated to the Early Holocene (Lake Mojave Complex), Middle Holocene (Pinto Complex, Gypsum Complex), and Late Holocene (Rose Spring Complex, Late Prehistoric Complex).

This analysis of the Pinto Basin collection demonstrates that ancient inhabitants of the Joshua Tree National Park area adjusted to changing environmental conditions. In particular, the Holocene epoch saw sporadic and unreliable precipitation rates in comparison to the relative stability of the preceding Pleistocene epoch. My analysis of the artifacts in this collection included recording the length, width, thickness, and weight for each artifact for comparative purposes. I also explored the resulting quantitative data using descriptive and comparative statistics, determining that clear patterns exist in the selection of certain raw materials in the Pinto Basin, especially quartz. My conclusions highlight the decisions made by past peoples as they adapted to a changing Mojave environment.

ACKNOWLEDGEMENTS

This thesis would not have been possible without the guidance and support from Dr. Nicholas Jew and Dr. Guy Hepp. I hold an incredible gratitude to Dr. Jew for assisting in my analysis of the lithic sub-assemblage and steering me towards success in the applied archaeology program. I thank Dr. Hepp for believing in my abilities as both a writer and an archaeologist. Dr. Hepp’s theoretical insight framed this thesis as an impactful research endeavor for archaeology. The support network that both Dr. Jew and Dr. Hepp created during all stages of my research solidified my passion and respect for archaeology. It is an honor to achieve a thesis meeting the expectations of Dr. Jew and Dr. Hepp.

I also extend my gratitude to Tamara Serrao-Leiva of the San Bernardino County Museum. Tamara’s belief in me as a researcher was a spark that ignited my determination to provide a research project meeting the museum’s professional standards. It is my aspiration to have added a deeper understanding of the Pinto Basin collection.

I thank my family. Mother and Father, your unwavering love and ever-present support in me granted the perseverance to finish my writing. I know I have made both of you proud. Pam, your compassion and care as a sister was invaluable to my success in school. And brother, I would not be where I am, if not for your spot-on advice and incredible intuition throughout my life. I will always have your back and I know you’ll always have mine!

DEDICATION

To my family, who believed in me every step of the way.

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CHAPTER ONE

PINTO BASIN ARCHAEOLOGICAL SITE

Pinto Basin Site CA-RIV-52

The Pinto Basin site is a desert valley located in the southern extent of Joshua Tree National Park. Pinto Mountains to the north, Eagle Mountains to the south, and Coxcomb Mountains to the east surround the site (Figure 1.01). The focus of this study, site CA-RIV-52, extends approximately seven miles westward from the Coxcomb Mountains (Campbell et al. 1935).

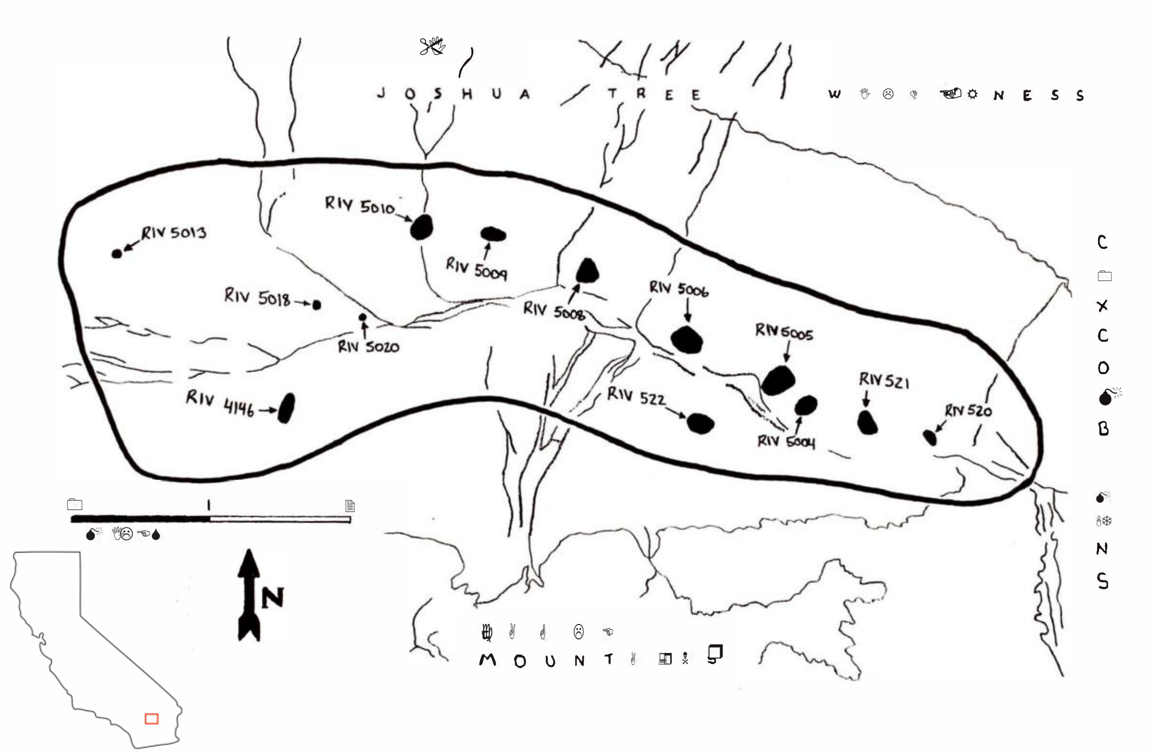

Figure 1.01: Pinto Basin with location of sites (redrawn after Schroth 1994).

The Pinto Basin collection is a legacy collection for the Pinto point. Beginning in the early twentieth century, Joshua Tree residents Elizabeth and William Campbell performed a site survey on the Pinto Basin. Holding no prior archaeological experience, the Campbells recorded and collected many lithic artifacts from Pinto Basin’s desert surface. The Campbells received professional assistance from Amsden, a lithicist, and Scharf, a museum specialist.

Scharf (1935) assisted in developing an archaeological site evaluation to accompany the Campbell report. Scharf’s primary intention was to address the environmental context of the Pinto Basin through an evaluation of local site geology. According to Scharf’s findings in the Campbell report, the Pinto Basin was a shallow lake during the Pleistocene (1935:19). A decline in rainfall contributed to the disappearance of the lake and surrounding marsh-like vegetation (Campbell et al. 1935). However, analysis of packrat midden samples from Joshua Tree National Park countered these early claims. Pack rat middens implied park climate has been stable throughout Late Pleistocene and Holocene (Holmgren et al. 2010). Pelletier (2014) further showcased lower elevations of the Mojave as stable starting at about 17,000 B.P. to 15,000 B.P. The Pinto Basin was a valley floor with local resources dependent on precipitation during the Pleistocene. As the Pleistocene progressed and transitioned into the Early Holocene, it seems unlikely a lake was present in the Pinto Basin. The Early Holocene and Middle Holocene would have been dominated by desert plant species and only sporadic precipitation events (Mayer et al. 2010; Pelletier 2014).

Amsden (1935) claimed smooth stone granite artifacts were of local manufacture. Such artifacts likely came from granite outcrops from two surrounding mountains. Flaked stone artifacts derive from a variety of materials, both local and nonlocal. Exotic obsidian and rhyolite flaked artifacts suggest some degree of transportation involved in the acquisition of these materials. One source of obsidian is located near Pinto Basin site. The Bristol Mountains would be the closest geologic formation for inhabitants of the Mojave to procure obsidian (Hughes 2018). Hughes (2018) also displayed numerous obsidian sources located in the Sierra Nevada mountain range. Obsidian could have been obtained from both local and more distant sources from California and surrounding regions. Scharlotta (2014) discussed two rhyolite sources located in the western Mojave Desert. Rosamond Hills and Fairmont Butte are two geologic formations situated in the Mojave that offered the option for inhabitants of the Pinto Basin to obtain rhyolite. Evidence of both local and nonlocal sources of raw materials imply Pinto Basin inhabitants as aware of the lithic toolkit in their environment.

Amsden also provided analysis of the recovered lithics. Amsden classified all artifacts as stone and further classified the artifacts into two designations: smooth and flaked. “Smooth” artifacts were comprised of groundstone, metates, pestles, and hammerstones. Flaked stone artifacts are choppers, keeled scrapers, fluted keeled scrapers, retouched flakes, leaf-shaped projectile points, Pinto-type points, and less typical forms (Campbell et al. 1935). Campbell and colleagues (1935) defined keeled scrapers as tools used to skin animals (Rogers 1939). Such artifacts in this thesis are referred to as expedient tools.

The Campbell report succeeded in describing site characteristics and classifying physical attributes of recovered Pinto Basin lithics (see Campbell et al. 1935). The input from Scharf and Amsden also improved the Campbell report in developing the first examination of Pinto Basin artifacts. The Pinto point type originated from the report’s initial classification of lithics. Because the manuscript provided the first lithic data on Pinto point type, my research project focuses on the legacy of the Pinto Basin collection, most notably the Pinto point.

It is a sizable endeavor to test the many Great Basin point types for validity in variation and style. The aims of this study concern only projectile point types in the Mojave Desert and surrounding regions. Further research will strengthen our understanding concerning the Pinto point. As Vaughan and Warren stated (1987:212), "…analysis of the [Pinto] assemblage would be the strongest test of the validity of the Pinto series." This thesis research provides a renewed understanding of the Pinto point type and the morphometrics involved in the collection that originally defined this specific type of point.

My interpretations impart an enriched understanding of southwestern Great Basin archaeology. I framed typology from a viewpoint of cultural complexes (Sutton et al. 2007) so that this research secured conclusions about the actual people inhabiting the Pinto Basin. Chapter Two explored the southwestern Mojave with emphasis on research (Bird et al. 2010; Cole 2010; Cook et al. 2010; Enzel et al. 2003; Holmgren et al. 2010, 2014; Kirby et al. 2017; Lightfoot and Cuthrell 2015; Louderback et al. 2011; Mayer et al. 2010; Miller et al. 2010; Sims and Spaulding 2017) that investigated local Mojave landscapes. Chapter Three discusses controversy surrounding the Pinto point. Chapter Four considered local Mojave Desert Cultural Complexes and morphological attributes of projectile points. Chapter Five entails the quantitative metric analysis and material type frequencies of the Pinto Basin sub-assemblage. Chapter Six incorporated data from Chapter Five to showcase Pinto Basin inhabitants as reserving quarts for manufacture of Pinto points. Chapter Six posits the people responsible for Pinto point manufacture as implementing their lithic toolkit of the Mojave in an organized approach for tool manufacture.

Ultimately, my research contributes to other studies in Great Basin archaeology by examining the Pinto Complex through a scrutiny of lithic raw materials. In this manner, my research was not focused on point types, but instead implemented typology as a springboard to better understand prehistory in the Mojave Desert and Joshua Tree National Park (Connolly et al. 2016). I identified quartz as holding a predisposed utility and material preference in the lithic toolbox of Pinto Basin inhabitants. Analysis of the sub-assemblage showcased quartz as the medium for more formal tools like Pinto points. The process of Pinto point manufacture entailed a collective understanding of Pinto Basin peoples to reserve quarts for making the perceived “ideal” Pinto point.

Theoretical Perspective

The lithic collection does not represent an accurate glimpse into prehistoric life but does provide insight into a specific type of technology employed in the Mojave. This is due to the manner of initial discovery of the Pinto Basin site (Campbell et al. 1935). As King (1975) pointed out, the work of the Campbells is best described as a reconnaissance. From the Campbell manuscript, Amsden states, “…everything recovered from the site was found on the surface” (Campbell et al. 1935:33). Surface artifacts may have also eroded or displaced from their primary contexts. Since the Campbells selectively collected only certain artifacts, the assemblage is biased, and the types of inferences that can be drawn are limited. However, the analysis of the projectile points recovered does provide the necessary information for reevaluating the nature and classification of this iconic projectile point type.

The surface survey completed by the Campbells likely missed vital artifacts such as debitage and shatter associated with the manufacture process of stone tools at Pinto Basin site. The absence of sub-surface information of Pinto Basin raises a cause for concern in forming accurate insight into past lifeways. However, my assertions made on the lifestyle of Pinto Basin inhabitants reference the lithic toolkit available to Pinto Basin inhabitants. Metric examination and identifying traces of use-wear provides an idea of lithic tool use (for example, cutting vs. scraping). According to Andrefsky (2005), processes of production, use, and post-depositional change imparts a dynamic character into a lithic tool. Such processes create both individual and shared characteristics amongst groups of artifact types. Individual lithic tools and the associated assemblage will change and evolve due to dynamic processes like human coordination, movement patterns, and trading relations (Andrefsky 2005).

Andrefsky’s framework of macro and microscopic lithic analyses is the backbone of my research. A morphological analysis assisted in identifying change, use-processes, and post-depositional change. These processes are present in a portion of chipped stone lithic tools. The assemblage provided a representative sample of lithic tools to garner data related to the morphological characteristics of Pinto point types. Conclusions concern the motives and technical choices made by makers of the Pinto Basin assemblage. The theoretical lens guiding interpretation relates to the theoretical concept of doxa. Doxa is, "…the unquestioned and unacknowledged shared backdrop of givens in discourse and social interactions" (Bourdieu 1977; Silliman 2001). Doxa implies the established order of being as intrinsic to the natural order of things. Human agents accept this order (Bourdieu 1977). Doxa implies human agents as cognizant during lithic tool manufacture which provides agency in decision making for tool manufacture, shape, and form (Bordieu 1977; Silliman 2001).

Bar Yosef and colleagues (2009) assisted in furthering theoretical insight. The operational sequence (OS) aided in understanding the Pinto type. Researchers use the OS approach to distinguish between type and technology. Typology is a term assigned to a lithic form and is not invested with the technical processes of lithic manufacture. The OS approach is invaluable by providing an exploration into the components of stone tool manufacturing processes. Analysis goes beyond the final tool product. The operational sequence includes replication of core reduction, analysis of scar patterns and superpositions, and technological classification (Bar Yosef et al. 2009). The OS approach assisted in documenting processes involved in lithic manufacture and further implies diagnostic lithics as not defined by point type. Operational sequencing incorporates the culmination of technological prowess by the makers.

The *chaîne opératoire* includes the human mental operations existing during processes of project realization (Sellet 1993). It accounts for systematic processes that change during lithic manufacture processes. The concept of *chaîne opératoire* assists the archaeologist in understanding cultural transformations connected to a raw material as it undergoes manufacture stages (Sellet 1993:106). The *chaîne opératoire* implies the existence of a toolmaker's mental template during processes of manufacture. Using *chaîne opératoire,* an archaeologist can account for mental processes inherent during stages of lithic tool production (Sellet 1993).

The operational sequence identifies technical steps transforming raw materials into manufactured tool, while the *chaîne opératoire* expands upon manufacture processes (Bar Yosef et al. 2009; Bleed 2001). The *chaîne opératoire* isolates stages of tool production and focuses on singular transformation processes that display technical skills held by the maker or makers (Bar Yosef et al. 2009). It encourages analyses of the systematic processes inherent in archaeological materials like lithics (Lemonnier 1992). Dynamic processes like social organization, social identity, and the practical end goal of the finished tool are all processes affecting decision making during the manufacture of projectile point. The *chaîne opératoire* informs the researcher of patterned activities that link cognitive processes to technological processes (Bleed 2001).

With a clear definition and goal of the *chaîne opératoire*, expanding upon how the *chaîne opératoire* works with archaeological analysis is critical. *Chaîne opératoire* offers the researcher a lens to identify with qualitative and quantitative significance the “why,” when toolmakers make raw material choices. Higher incidence of one material source over other sources implies an organizational pattern. Such organization is present in the minds of the toolmaker (Sellet 1993). Identifying chronological steps in lithic manufacture showcases decisions made by persons (Andrefsky 2005; Sellet 1993).

The *chaîne opératoire* is displayed in a northern Japanese context of Hokkaido. Researchers Nakazawa and Akai (2017) applied *chaîne opératoire* theory to showcase behavioral patterns that influence raw material selection. Nakazawa and Akai (2017) demonstrated mobile hunter-gatherers living in limited lithic resource availability regions chose a manufacture process that took little risk yet procured a working tool. Selection of a material source demands mental processes on behalf of the toolmakers. In a landscape where resources are scarce, raw material choices allow the researcher to make revealing inferences into the past (Nakazawa and Akai 2017).

Japanese researchers Kato and Tsurumaru (1994) referred to a sequence model called *gihō* (Bleed 2001). The *gihō* concept enables the researcher to reconsider established typologies. By identifying a distinctive step present in lithic manufacture processes, we achieve insight into key choices made during lithic manufacture by persons. Japanese archaeologists interpret distinctive manufacture processes as characteristics exclusive to past societies and cultures (Bleed 2001). Japanese sequential modeling focuses on the individual site and refrains from comparing similarities or differences with neighboring locales (Bleed 2001). Gihō provides clarity by offering the opportunity to better define and understand point types.

Researchers (Akoshima and Kanomata 2015; Morisaki et al. 2019; Nakazawa 2016; Nakazawa and Akai 2017; Nakazawa et al. 2019; Otsuka 2017) have conducted intensive morphological studies on lithic blade assemblages and mental processes. The application of the *chaîne opératoire* model in such research endeavors showcases great effectiveness in garnering a renewed understanding of lithic tool production. A blade assemblage excavated from the eastern edge of Hokkaido demonstrated a multitude of raw materials dominated by expedient tools. Raw materials include obsidian, shale, and other igneous rocks (Nakazawa et al. 2019). A morphological analysis from Nakazawa and colleagues (2019) focused on the edges of lithic tools. They found edge morphologies corresponded to a predisposed mentality held by the toolmakers. Certain edge shape forms performed specific tasks of cutting, scraping, sawing, and other utilitarian motions (Nakazawa et al. 2019). Such conclusions indicated a mental process occurring prior to lithic manufacture. Toolmakers held a predetermined function in mind for local materials to produce tools that accomplished specific tasks.

Examination of use-wear patterns staged the possibility that reduction occurred during tool use-life. This brings to light a scenario where people change morphological traits of lithics. Lithic tools lose their functional utility over time and renewed flaking of existing tools will change typological traits (Nakazawa et al. 2019). Reduction techniques imply tools evolve and change during their use-life. When persons craft new tools, older tools perform a more overarching set of tasks in their environment (Nakazawa et al 2019). Lithic assemblages benefit from *chaîne opératoire* by providing a theoretical framework that extends beyond the static state the tool was found.

Similar sequential systems have also occurred in North American contexts. The concept of behavioral chain illustrates all stages occurring for a singular element in a cultural system. Behavioral chains assist in recognizing material purposes. Materials may hold multiple purposes during their object-life (Bleed 2001; Schiffer 1975). I employed behavioral chains to contemplate reasons for material presence in the archaeological record (Schiffer 1975). Americanist sequence models also display manufacture stages present in lithic tool production which results in formation of detailed models and typologies (Bleed 2001; Holmes 1893). The researcher acknowledges a unique technical process via identifying production processes. As a result, sequence of production processes become the foundation for typologies and technical processes become a defining characteristic of lithic type (Bleed 2001).

Prehistoric technology holds information on technical strategies involved with tool manufacture (Dobres 1995). A cultural attitude exists in the maker's active construction of technology. Cultural norms influence what is considered a correct and incorrect approach in the creation of a lithic tool. Past toolmakers utilized material technology with expected outcomes (Dobres 1995). Such an understanding of culture realizes the intricate processes involved in technological realization. Dobres defines technology as, "…dynamic social interactions involved in the planning, production, use, repair, and discard of material culture" (1995:27). This definition implies the importance of analyzing the collective artifact assemblage. Diagnostic artifacts of well-known typological classification become critical to lithic analysis (Dobres 1995). Research (Campbell et al. 1935) often focuses on the most complete or best artifacts. We must place equal archaeological significance on all collected artifacts in association. The implementation of a holistic approach assists in the analysis of the technological whole.

Dobres (2010:108) noted people are experiential beings as they employed material culture to transform their world, and in turn, "made things meaningful." Bringing meaning to the world through technological achievement is not an individual task. The process of object creation brings persons together as social outlets bridge pathways for interpersonal communication (Dobres 2010). Such pathways influenced how people decided upon a suitable raw material. This also affected an acceptable shape and form for tools (Dobres 2010). The effect of social norms was present during technological choices, as such, technology becomes a social complex. As Dobres (2010) discussed, the process of turning material source into an object often incorporates social mechanisms. Through the social nature of tool making, people have access to a medium that will allow for communal exchange of knowledge. The material and its process towards tool realization becomes a catalyst for social dynamics to occur. Dobres (2010:109) states, "…object making informs the generative process of people making," because dynamic relations occur while transforming raw materials into a useful medium.

A factor to consider in tool manufacture is how persons choose raw material type for tools. Immediate availability of a local raw material influences toolmaker decision making with other factors also dictating lithic manufacture processes. In communities requiring low mobility, there are few lithic bifaces (Kelly 1988). This suggests people utilized the immediate resources surrounding their encampments and approached toolmaking in a practical manner. Low mobility implies a local lithic toolkit is already utilitarian in nature. Local availability takes an expedient flintknapping approach to produce working tool (Kelly 1988). More desirable rock sources may be obtainable to toolmakers, yet, abundant and immediately accessible lithic resources achieve similar outcomes in utilitarian effectiveness with low energy expenditure. If raw materials were to become scarce, persons then craft a superior tool reaping similar functional means, while also providing increased longevity (Kelly 1988).

This approach is not always applicable to archaeological sites. Trading relations, population increases, and adaptations to sudden climatic change may be present. Expectations about how people employed local resources displays migrating toolmakers use bifaces as cores (Kelly 1988). Flaking and sharpening biface edges proves useful during extended travel. Persons gain an advantage by maintaining a lightweight toolkit. Rare materials used for tools may be rejuvenated for reuse; a reason why obsidian and rare materials exist as smaller tool variants. Biface utility will transform and encompass a wide range of purposes, because biface reduction is an ongoing process to find renewed usage (Kelly 1988).

From the insight by Dobres, it becomes clear the lithic industry entails social dynamics. We must also acknowledge cultural significance of the physical object created. Lithics stored in museum repositories may appear in stasis, yet, much like the Fijian necklace, objects gain new connections and meanings via a process of external interaction (Gosden and Marshall 1999). Many of the lithics present in the Pinto Basin collection have travelled to local institutions and between museums. Some lithics in the collection have been display artifacts and bear remnants of glue on a single side, demonstrating the collection’s modern display history. We must bear in mind the creators behind the collection may have bestowed lithic tools with great meaning in their society (Gosden 2005).

Research Questions For my thesis, I analyzed a sub-assemblage from the Pinto Basin collection to support or refute earlier hypotheses proposed by

Schroth (1994). What are the metrics of the Pinto point identified in the Campbells' assemblage and other diagnostic points, bifaces, unifaces, and expedient tools? My analysis then shifted to an examination of raw materials used for toolmaking. Before an accurate investigation of toolmaking can begin, it was vital to explore the environmental setting behind the daily lives of the toolmakers. What did the Holocene environment entail, specifically in the Joshua Tree National Park region, and how did this Mojave environment affect the Pinto toolmakers? Is there a preference of local versus non-local materials for specific tool types? If so, what material is the most commonly used for diagnostic and expedient tools? Is there evidence that the peoples who manufactured these tools held a predisposition in procurement of raw materials? If so, what evidence supports this inference?

<u>Research Methods</u> I implemented an organized data collection strategy for each lithic artifact in the Pinto Basin sub-assemblage. This approach to the 282 distinct lithic artifacts allowed me the opportunity to better understand the sub-assemblage and answer the previously discussed research questions. For lithic analysis, I recorded length, width, and thickness and identified material composition. I examined expedient tool margins for use-wear or other signs of utilization. I produced an Excel spreadsheet with variables of: Material Type, Artifact Type, Length (mm), Width (mm), Thickness (mm), Weight (g), and Notes. Notes included any extra observations like multiple utilized margins, context, or other unique attributes the artifact may possess. An Excel spreadsheet

incorporated such categories under a Yes/No classification. This achieved efficient and organized referencing. This method of measurement, material identification, and morphological analysis of chipped stone tools is adapted from previous research by Jew and colleagues (see Connolly et al. 2016; Jew et al. 2013a, 2013b; 2015a, 2015b).

A standard, manual caliper that measures in millimeters was used for all lithic measurements. A low magnification hand lens (x10) was used to inspect every artifact for signs of use-wear, such as linear striations, impact fractures, or other evidence. The information recorded in the Excel spreadsheet produced adequate quantitative data to conduct a morphological analysis that compared intra-inter artifact variation.

From the quantitative data collected, I created several tables and figures illustrating morphological similarities and differences between artifacts. I conducted both descriptive and multivariate statistical analyses to compare different attributes of projectile points and other artifacts. These analyses allowed evaluation of previously discussed Pinto point typological classifications.

To maintain positive relations with the San Bernardino County Museum, extra care went into maintaining museum organization and improving catalogue records. Column titles: ID, CA-RIV-522, PB (Pinto Basin), Cat Number 1, Cat Number 2, created additional safeguards to ensure the Pinto Basin collection remained just as it was, before the conduction of this thesis research.

CHAPTER TWO

ENVIRONMENT

Overview of the American Southwest

Environment is an everchanging and transformative process. The Mojave over the past 1000 years has experienced major drying events (Cook et al. 2010). Two megadroughts hit the California and Nevada regions between 1200 B.P. and 700 B.P. Climatic shifts display the susceptibility for the Mojave to undergo environmental change.

The Pinto point first appeared in the archaeological record during the Holocene, a geologic period used in archaeology (Figure 2.01). The Holocene encompasses three distinct periods: the Early Holocene (10,000 B.P. to 8000 B.P.), Middle Holocene (7500 B.P. to 5000 B.P.), and Late Holocene (4000 B.P to 500 B.P.). As a chronological whole, the Holocene occurred between 10,000 BP and 500 BP. (Jones and Klar 2007). The Pinto Complex first emerged during the Early Holocene, at approximately 9000 B.P. (Jones and Klar 2007). The focus of this environmental inquiry focuses on the Early and Middle Holocene. There is a possibility the Pinto chronology also encompassed the Late Holocene. Due to this possibility, this chapter includes the Holocene as a whole.

Figure 2.01: Map showing general area of Pinto Basin (after Schroth 1994).

Research from Holmgren and colleagues (2014) suggested Joshua Tree National Park saw an increase in desert flora and fauna coinciding with the end of the Pleistocene and the beginning of the Early Holocene. Packrat middens and pollen spores displayed many desert species had returned to the Mojave region by the Middle Holocene (Holmgren et al. 2014; Mayer et al. 2010). Most perennial plant species disappeared by the end of the Pleistocene.

The last glacial period of the Pleistocene prevented migration of extralocal florae into Joshua Tree National Park. Lack of extralocal species implied Joshua Tree's environment had remained static throughout the Holocene. Supporting this notion is the early arrival of *Yucca brevifolia,* commonly known as the Joshua Tree. The Joshua Tree arrived into the Mojave Desert at around 14,000 B.P. (Holmgren et al. 2010). Numerous Mojave Desert plant species persisted in Joshua Tree National Park throughout the Holocene. Nonlocal Mojave vegetation was unable to spread into the American Southwest during the Early Holocene due to environmental drying (Cole 2010). Miller and colleagues (2010) also demonstrated an arid environment for the Mojave. Thus, desert taxa were well established during Middle Holocene.

Kirby and colleagues (2017) used sediment cores, taken from the basin of the Mojave River, to reconstruct Mojave Desert precipitation records. Increased clay presence indicated the Early Holocene had perennial lakes. Sediment core segments corresponding with Middle Holocene bear evidence of sands and cracked mud. Kirby and colleagues (2017) placed this period of aridity in the Middle Holocene between 7500 and 4000 B.P. The Holocene in the Mojave Desert commenced with renewed lakes and consistent seasonal precipitation. Holmgren and colleagues (2010) conducted a packrat midden study in Joshua Tree National Park that also displayed disappearance of water reliant plant species. These plant species become replaced by species favoring dry, arid landscapes (Holmgren et al. 2010). The transition from Early to Middle Holocene showcased a shift from wet conditions to sudden aridity. Kirby and colleagues (2017) placed increased precipitation events during the Late Holocene, at around 4000 B.P.

The Early Holocene held many lakes and marshes located in ecological-rich valleys. Human populations during the Early Holocene migrated into resource-rich valleys (Louderback et al. 2011). An intense period of aridity during the Middle Holocene implies declining populations in once life-sustaining regions. Louderback and colleagues (2011) showcased a significant drop in cultural materials during the Middle Holocene. Increased cultural materials on the eastern Great Basin suggests drying events did not affect inland areas of the Great Basin. Western Nevada, northwestern California, and the Mojave Desert were severely affected by such warming trends (Louderback et al. 2011).

Sims and Spaulding (2017) validated that the Mojave experienced times of sustained rainfall during the Middle Holocene. These prolonged and sporadic precipitation events hold significant implications for the American Southwest. Summer-flowering species during the Early Holocene suggest Mojave Desert people experienced summer rains. The sporadic nature of precipitation in the Mojave implies desert valleys could offer a resource-rich environment to Mojave Desert people. It remains valid that the Mojave Desert progressed into arid conditions throughout the Holocene, however, Holmgren and colleagues (2014) also showcased Mojave summers experienced minor precipitation during the Middle Holocene.

Bird and colleagues (2010) used ground penetrating radar in Dry Lake. The lake catches snowmelt and rain runoff from nearby San Gorgonio Mountain. GPR data revealed Dry Lake's basin reduced in size as the Holocene progressed (Bird et al. 2010). Water levels were at their highest during the Early Holocene. In the Middle Holocene, lake level sedimentation and parameters experienced significant lows. Bird and colleagues (2010) demonstrated Dry Lake reacted to a Southern California drought event.

Over the past decade, researchers (Bird et al. 2010; Cole 2010; Cook et al. 2010; Enzel et al. 2003; Holmgren et al. 2010, 2014; Kirby et al. 2017; Lightfoot and Cuthrell 2015; Louderback et al. 2011; Mayer et al. 2010; Miller et al. 2010; Sims and Spaulding 2017) employed various methods to improve understandings of climate. Such endeavors have provided accurate glimpses into environmental conditions of the Holocene. As such, environment is not a static concept. The present-day human effect on Tulare Lake showcases such a transformative process occurring now. A study conducted in the Tulare Lake Basin of California employed dendrochronology to extend climate histories from southern Sierra Nevada. According to Adams and colleagues (2015), an increase in precipitation started at around 700 B.P and likely indicates the effect of the Little Ice Age. The Little Ice Age defines a decrease in global temperature coinciding with increased rainfall during the Late Holocene, where global temperatures dropped to ice age conditions (Jones and Klar 2007). Despite increased precipitation events like the Little Ice Age, climate in the American

Southwest has been dominated by aridity. Megadrought events like the MCA which occurred during the Late Holocene, between 1200 B.P and 700 B.P., illustrate the tendency for environment to suddenly shift into drought (Jones and Klar 2007). Adams and colleagues (2015) concluded the environment of the American Southwest has remained in a state of drought, as their research solidified the periods of aridity will continue and likely worsen into present-day.

CHAPTER THREE

THE PINTO PROBLEM

Pinto Point Controversy

As Willey and Sabloff (1993:34) summarized, the archaeology of the early twentieth century was largely focused on establishing typologies and description, rather than interpretation. Both Taylor (1948) and Binford (1962) displayed American archaeologists of the early and mid-twentieth century were fixated on typological issues. Taylor (1948:92) addressed the landscape of American archaeology at the time by explaining archaeology was not investigating the dynamic nature of artifacts, but rather, was mostly engaged in categorization. Ford and Spaulding (1954) demonstrated similar issues plaguing an archaeology reliant on typology. Spaulding (1953) believed typologies could be identified from lithic assemblages with the use of statistical analysis. However, Ford (1954) argued typology as overly focused on an end goal of artifact type identification and failed to improve understanding of past cultures. Typology was imposed from an analysis of artifact assemblages by the researcher (Ford 1961). Binford (1962:224) echoed similar sentiments showing archaeology of the mid-twentieth century accumulated copious amount of data from field contexts, yet few researchers had used this information to infer complex conclusions about the past. This attraction to explore archaeology based on data accumulation and categorical ends from accepted point types twisted researcher motives to view the past through a lens of classification (Willey and Sabloff 1993). The prevalence of the Pinto point in current archaeology of the southwestern Mojave exemplifies an unintended consequence resulting from a researcher focus that centered on typological classification. Prevalence of lithics throughout the American Southwest continues to influence Great Basin research to emphasize lithic classification (Figure 3.02).

The Pinto Basin paper (see Campbell et al. 1935) was the first report to define the Pinto point type. The Campbells collected over 160 lithic artifacts resembling a Pinto-type point. The Pinto point form (Figure 3.01) is narrow shouldered and incurving base. There is often presence of side notches below the shoulder, with three serrations on each edge. Flaking often resulted in thick cross-sections. According to Campbell and colleagues (1935), thickness equals thirty percent of length. Multiple Pinto point subtypes exist, however, square shouldered and sloping shouldered are recognizable in the Pinto point form. Other qualities like a lack of shoulders, barbed shoulders, and single shoulder may be characteristic of other point forms found in the Mojave Desert and adjacent regions (Campbell et al. 1935; Vaughan and Warren 1987).

Depending on the interpretation by the researcher, numerous points may be misclassified under multiple point types. Past research (Basgall and Hall 2000; Botelho 1955; Formby and Frey 1986; Harrington 1957; Jenkins 1987; Lister 1953; Meighan 1989; Thomas 1981; Vaughan and Warren 1987) has revealed confusion surrounding Pinto point typological definition. Minute variations in metrics have often been used to justify differences in projectile point classification. The variation in Pinto shoulder types and the tendency for points to fracture in susceptible places like tip and base can further complicate point identification. Furthermore, Pinto points can vary in size (Figure 3.01 and Figure 3.02) and extend the range of Pinto classification to other point types throughout the Great Basin.

For these reasons, the Pinto controversy is the tendency for archaeologists to assign Pinto point classification to lithics excavated from Great Basin contexts because of similarities in shape and form of the projectile point, in addition to the geographic location where artifacts were recovered. A central goal of this research is to clarify misconceptions about Pinto point morphology by examining the lithics collected by the Campbells, which formed the basis of the original typological classification.

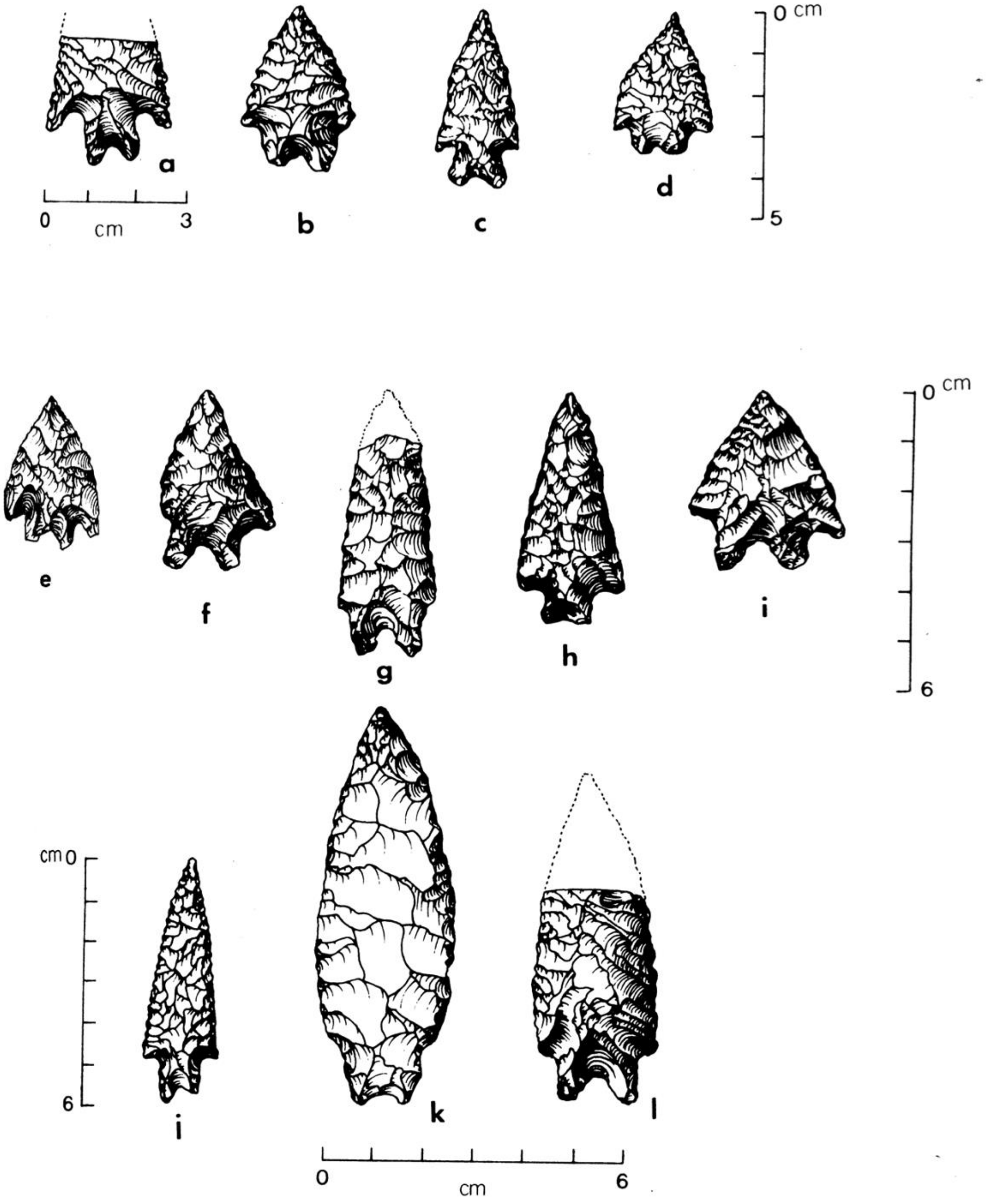

Figure 3.01: Examples of the attributes used to define a Pinto projectile point. Points a – j and point l are common square shouldered forms. Point k displays a larger sloping shoulder form (after Hester and Heizer 1973).

Botelho of the San Juan Mission (1955) reported finding many lithic projectiles in Utah. Later researchers (Botelho 1955; Formby and Frey 1986; Harrington 1948, 1957) noted finding points resembling the Pinto type in areas throughout the Great Basin. The Southwest Museum published a report detailing the Little Lake site in California, a site Harrington (1957) excavated numerous points from. Many of the points recovered by Harrington resembled the form and shape of the Pinto point type. A large amount of obsidian artifacts also came from the Little Lake site. Establishing age of artifacts through obsidian hydration is problematic. For instance, the southwestern Great Basin bears a faster hydration rate than in the northern Great Basin (Meighan 1981). Dating discrepancies of obsidian in the Great Basin have complicated archaeological interpretations.

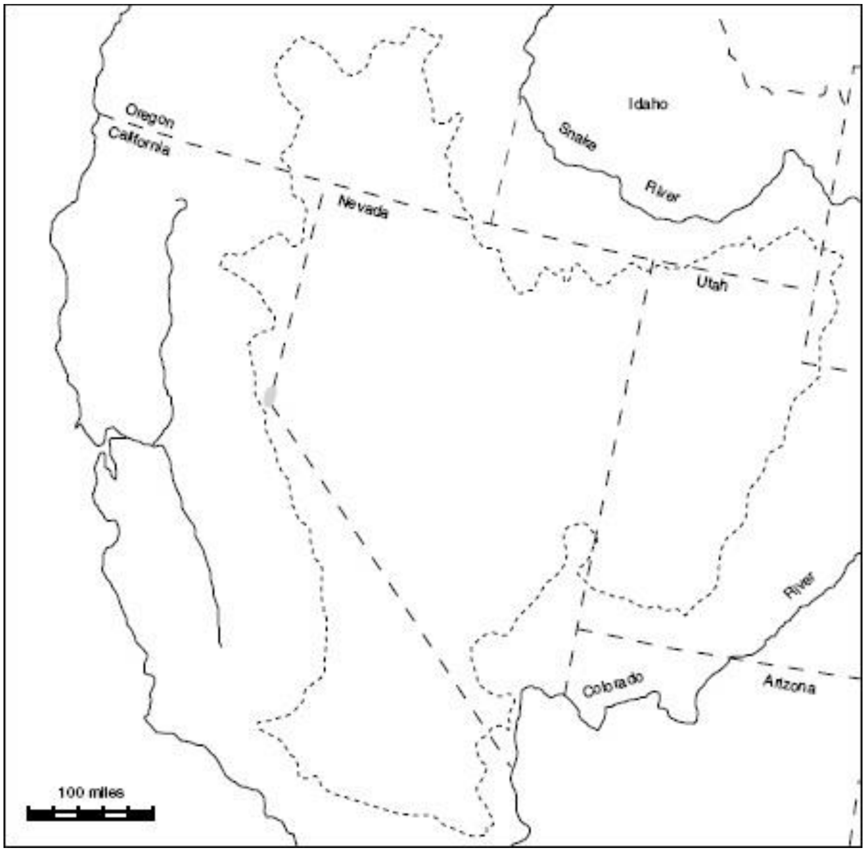

Figure 3.02: Extents of the Great Basin outlined by the dashed line (after R.B. Morrison 1991).

Archaeologists (Basgall and Hall 2000; Botelho 1955; Formby and Frey 1986; Harrington 1948, 1957; Jenkins 1987; Jenkins and Warren 1984; Meighan 1989; Thomas 1981, 1983, 1988; Vaughan and Warren 1987; Wallace 1958, 1962; Warren et al. 1980; Warren 2002) studying the Great Basin often focused on the Pinto point type. Wallace (1962) concluded that Pinto Basin inhabitants situated their encampments near water sources, as sporadic and volatile precipitation events allowed once arid regions to have a resource boom. Frequent precipitation allowed long-term encampments, thus enabling a hunting and gathering lifestyle (Wallace 1962). A thick form of many desert points implied a throwing-style hunting tool, most likely an atl atl, which is a dart and spear thrower projectile delivery system (Wallace 1962). Roth and DeMaio (2014) displayed numerous Pinto points as broken at the base and other studies (Botelho 1955; Formby and Frey 1986; Harrington 1948, 1957; Jenkins 1987; Jenkins and Warren 1984; Meighan 1989; Thomas 1981, 1983, 1988; Vaughan and Warren 1987; Wallace 1962; Warren et al. 1980; Warren 2002) also demonstrated high incidences of fracture in Pinto points. Roth and DeMaio (2014) concluded many of these breaks may have occurred during point use while in the shaft. The high frequency of basally broken Pinto points suggests hafting produces basal fractures. However, categorizing points as broken may ignore the possibility that Pinto points held a multifunctional nature. Many Mojave Desert types could have fulfilled other tasks during their object use-life. Once fractured, points may have fulfilled other utilitarian tasks like scraping, cutting, drilling, and activities not directly associated with killing game (Dobres 2010).

The Pinto controversy was also evident in the conclusions made by Thomas (1981), who described Pinto points as equal in shape and form to bifurcate stemmed points. Bifurcate stemmed points are most often found in central and western Great Basin contexts. The thick nature of the Pinto point also resembled Gatecliff, Lake Mojave, and Silver Lake points. The corner notching of some Pinto points paralleled many Elko, Gypsum, and Eastgate points. Researchers (Botelho 1955; Clewlow 1967, 1968; Davis 1963; Wallace 1962) often placed Gatecliff projectile points under Pinto type. The minor morphological or stylistic differences present amongst Great Basin projectile points created confusion during lithic identification when deciding whether to assign newly found points to a previously defined type, or, to create a new lithic type. This issue of classification and typological identification was a larger problem in archaeology on a national level during the early and mid-twentieth century.

Formby and Frey (1986) commented on the work of Rogers. After the Campbell publication, Rogers (1939) collected 20 lithic artifacts that, to his knowledge, exemplified the Pinto point type. Rogers suggested multiple subsets existed for Pinto point manufacture and attempted to establish a new typological classification called the Pinto-Gypsum complex (Formby and Frey 1986). Many sites in the American Southwest contained Gypsum points (Roger's typology) when in association with Pinto points (Formby and Frey 1986). The Pinto-Gypsum complex was posited to define such archaeological sites that displayed an abundance of both Pinto points and Gypsum points. Jenkins (1987) claimed the Pinto point was linked to a Pinto period.

Pinto Point Ambiguity

Projectile point form and shape is a subjective topic, varying in each published report. This extends beyond complete points, including fragment or partial points. Point fragments tended to be classified in alignment to other points commonly found in association, further contributing to the issues surrounding the very definition of a Pinto point. It is likely that researchers (Clewlow 1968; Davis

1963; Harrington 1948; Heizer et al. 1961; Steward 1937) often misidentified projectile points in the Great Basin and Mojave Desert regions resulting in confusion surrounding point types.

Researchers Thomas (1981) and Vaughan and Warren (1987) approached this problem by offering a Pinto definition. Previous studies (Botelho 1995; Clewlow 1968; Formby and Frey 1986; Harrington 1948; Heizer et al. 1961; Layton and Thomas 1979; Lou Davis 1963; Steward 1937) were quick to classify many Mojave projectile points as Pinto because of similarities in shape, form, and geographic location. Thomas (1981) crafted a reference known as the Monitor Valley Key for archaeologists to classify projectile points. The Monitor Valley Key provided a range of measurements of thickness, length, width, and other metrics allowing for a more accurate classification of projectile points.

Vaughan and Warren (1987) corroborated Thomas' classification key and argued an explicit definition of the Pinto point form did not exist. Vaughan and Warren (1987) identified attributes setting the Pinto point apart from other morphologically similar point types. Accurate classification and definition of Pinto point type was a serious issue that plagued archaeology of the American Southwest. Vaughan and Warren (1987) established measurement criteria to combat incorrect point classifications. Their research concluded Pinto points from the Mojave Desert are often percussion flaked and exhibit a thicker body. Thus, placing Pinto points in a classification that opposes other Great Basin point types (Vaughan and Warren 1987).

Meighan (1989) asserted that analysis of lithic points dominated Great Basin archaeology. Many sites in the Great Basin have lithic surface scatters due to many sub-surface contexts showing disturbance. Lithics preserve better than organic remains; as a result, projectile points become the primary artifact type and focus of many sites (Meighan 1989). Meighan concluded to avoid Pinto point confusion required reevaluation of lithic assemblages. The Pinto point form varied across Great Basin contexts suggesting stylistic forms are unique to time periods and regional areas. Researchers (Eugene 1955; Meighan 1981; Wallace 1962) used stylistic differences in the Pinto point to contrast other point types. The Pinto point type and the Gypsum point type were some of the first accepted and dominant point forms in the Mojave (Campbell et al. 1935; Harrington 1933). This resulted in subsequent classification that assigned projectile points to one or multiple point types.

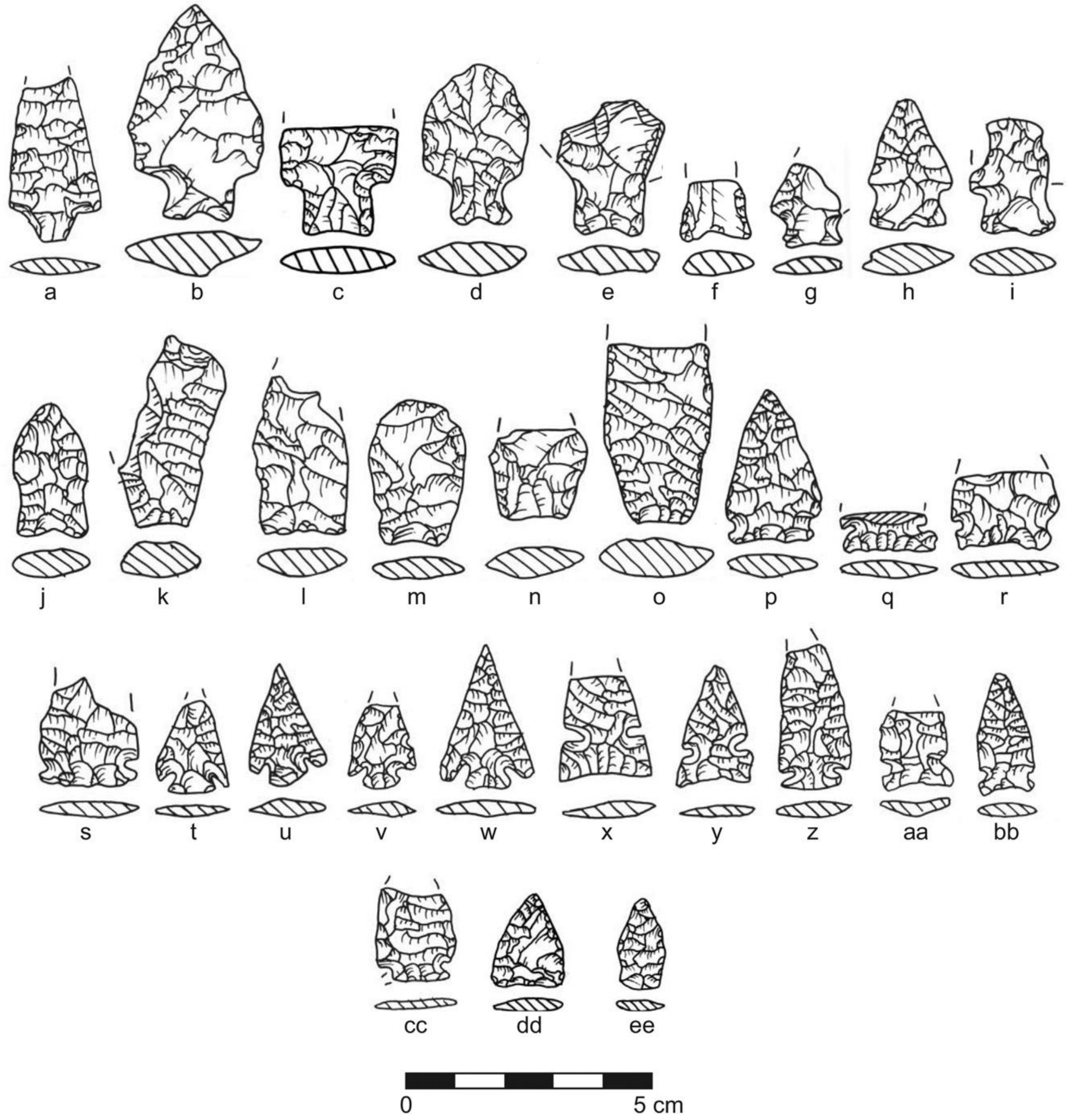

Figure 3.03: Projectile point types exhibited in the assemblage. Gatecliff contracting-stem: a, Gatecliff split-stem: b-e, Pinto: f-j, Humboldt: k-o, Salmon: p-s, Rosegate (Rose Spring): t-w, Desert Side Notched: x-y, Avonlea: z-cc, Cottonwood: dd-ee (after Keene 2018).

The Pinto point type was the basis for comparison of many later sites in the Mojave Desert which showed archaeologists' (Clewlow 1968; Harrington 1948; Heizer et al. 1961; Lou Davis 1963; Steward 1937) fascination for the Pinto type. More importantly, it only intensified the already controversial nature of classification of points types in the region. Basgall and Hall (2000) argued for two variations of the Pinto point in the Great Basin. There is a northern Gatecliff and a southern Pinto series. Basgall and Hall (2000) pointed out inconsistencies in the Pinto point form and concluded Pinto point variation is a by-product of materials and tools available to the maker during the manufacture process. These interpretations implied typological variance between northern and southern Great Basin contexts.

Researchers (Basgall and Hall 2000; Bettinger and Eerkens 1999; Bettinger 1997; Byrd et al. 2009; Formby and Frey 1986; Grayson 2011; Hockett 1995; Hockett et al. 2014; Keene 2018; Meighan 1964, 1981; Sutton 1996; Sutton et al. 2007; Thomas 1981, 1983, 1988; Vaughan and Warren 1987; Warren et al. 1980; Warren 2002) continue to contemplate Pinto origin, function, characteristics, and geographic and temporal range. Ambiguity persists about the features that distinguish a lithic point as Pinto. Huckell (1996) noted the Pinto point has become a catchall category for many recovered lithic artifacts in the Great Basin. Roth and DeMaio (2014) noted many of the issues plaguing accurate identification of the Pinto point remain present in current archaeology of the American Southwest.

Pinto Chronology Jenkins (1987) excavated Rogers Ridge; a prehistoric campsite located in the Central Mojave Desert. Jenkins concluded Pinto points preceded Gypsum points. This period of Pinto occupation lay between the Lake Mojave and Gypsum Periods of the Middle Holocene (Formby and Frey 1986; Jenkins 1997; Jenkins and Warren 1984). According to Jenkins (1987) a conservative date range for Pinto points was between 7000 B.P. and 5000 B.P.

Jenkins and Warren (1984) believed Pinto points may have first appeared at 6500 B.P. in the archaeological record, a time coinciding with a wet period in the Mojave and Pinto points are often located near dry Holocene riverbeds. This was the case in the initial Pinto point assemblages of the Campbell collection. Pinto points may have been a byproduct of cultural adaptation, as Pinto points occurred during a period of environmental change (Jenkins and Warren 1984). The culture responsible for the Pinto point lived during a drying period in the Mojave Desert. There was a lower number of game animals due to the disappearance of marshes in valleys as water became scare (Elson and Zeanah 2002; Grayson 2011). However, ecology varies throughout the Great Basin. Deserts, valleys, and mountainous zones encompass the region. Arid cannot describe all regions during the Middle Holocene (Elston and Zeanah 2002).

The Pinto point chronology may be older than previously believed. The Pinto point type is classified under the designation of Middle Holocene hunter-gatherers (Huckell 1996). Pinto points were likely in use during most of the Middle Holocene and may have appeared even earlier in the archaeological record. The Pinto point chronology expanded to between 9000 B.P. to 4000 B.P. (Huckell 1996). Smith and colleagues (2013) found established Great Basin point types chronologically sound. In a few cases, some point types were older than previously thought. Yet, Smith and colleagues (2013) posited these chronologies reliable only for the Central Great Basin.

CHAPTER FOUR

MORPHOLOGY OF THE MOJAVE DESERT

Debating Point Typologies

The previous chapter showcased the significance of the Pinto point in Mojave Desert archaeology and nearby regions. The Pinto point appeared in the Mojave Desert by the Early Holocene and continues to hold significance in archaeology of the American Southwest (Parezo and Janetski 2014). Due to its association with other point types, we now explore other projectile point types likely to have been connected to the Pinto point.

According to Flenniken and Wilke (1989), defining lithics under typological definition is ironic; we create typologies from broken fragmented points. It is often the case that precise measurements of artifact form and shape become the basis of typological definition. Yet, these measurements emanate from artifacts transformed by usage from the original maker and are afflicted by the elements over time. When projectile points break, sometimes toolmakers rework points for increased utilitarian longevity and instill a dynamic nature in projectile points (Flenniken and Wilke 1989; Hoffman 1985). In addition to collecting and reducing stone cores, people may have also reworked projectile points and reused them for novel purposes. This process of reworking points may destroy the minute characteristics which classify points under typological definition. Such transformative processes become useful when identifying Pinto points from the Campbell collection.

Processes of rejuvenation will reduce the weight of tools, making them smaller than the original point. The so called “perfect point” is present in only the minds of the toolmakers. Projectile points created attempt to mimic this “ideal” lithic form and shape, but the “perfect” point will never exist in the reality of the physical world (Bourdieu 1990). As rejuvenation processes occur, point form and shape drift farther from the imaginary “perfect point” present in the toolmaker’s mind. Bettinger and colleagues (1991) accumulated a mean weight for each projectile point type. The mean weights of rejuvenated lithic forms weighed less than original projectile points (Bettinger et al. 1991). Since rejuvenated forms did not outweigh archetypal points, Great Basin types like the Pinto point are solidified as a distinct Mojave Desert point type.

Projectile point types vary throughout the Holocene in Mojave Desert archaeology. Battleship curves exemplify such material culture changes (Bettinger 1997). The rise and fall of an accepted point type over time may be related to the makers’ changing vision of the “perfect point.” Differences in a point type’s form relate to a multifunctional intent by the maker (Lafayette 2012). However, such differences do not affect the point type from creating a defining characteristic linked to distinct cultural periods in the Mojave and the Great Basin as a whole (Sutton et al. 2007). These cultural complexes are often associated with a singular occupational site and exemplify the first occurrences of a projectile point form in the American Southwest (Campbell et al. 1935; Harrington 1933; Heizer et al. 1961).

While projectile point types remain relevant to present-day archaeology in the Great Basin, research that is only focused on typological classification fail to achieve a deeper understanding of the past (Binford 1962; Flenniken and Wilke 1989; Taylor 1948). I reference Sutton and colleagues (2007) to examine types with an emphasis on the cultural complexes that created diagnostic artifacts. I do not mean to suggest that typology is a detrimental methodology. Instead, typology provides a good starting point to understand past cultural complexes and I utilize the present analysis to place people at the center of this study and point types a useful secondary. It is critical to examine principal Mojave Desert cultural complexes. These projectile point types are organized chronologically as they progress through the Holocene.

The following cultural complexes may have influenced or have been influenced by the Pinto point type. These cultural complexes are likely to have held some degree of interaction in the Mojave Desert region. Researching local point types ensures accurate biface identification. A thorough analysis of the collection requires understanding typological variables affecting the Pinto point.

Lake Mojave Complex

Campbell and colleagues (1937) first classified many archaeological materials in the eastern Mojave. They noted presence of two distinct projectile points: the long-stemmed Lake Mojave points and the shouldered Silver Lake points; both are defined as spearpoints (Sutton 1996). Their placement in the Holocene is dated to 10,000 B.P. (Sutton et al. 2007). Other research showed the Lake Mojave complex occurred even earlier, at around 12,000 B.P. (Byrd et al. 2009). Lake Mojave was completely dry by end of the Early Holocene (Knell 2014). Many lakes in the eastern Mojave offered reliable water during the Late Holocene. Such water sources also provided floral and faunal resources to human occupants (Knell 2014). High incidences of Lake Mojave and Silver Lake points emanate from the eastern and central Mojave (Sutton 1996).

Pinto Complex The Pinto point followed the cultural periods of the Lake Mojave and Silver Lake typologies. Other research (Basgall and Hall 2000; Formby and Frey 1986; Keene 2018; Meighan 1981; Thomas 1981; Warren 1980) found similar stylistic and technologic variation in the Pinto form. The Pinto point form is the primary cultural climatic period of the Middle Holocene. The Pinto point followed the Lake Mojave Complex and lasted until 5000 B.P. (Sutton et al. 2007). Research (Basgall 2000b; Basgall and Hall 1994; Basgall and Pierce 2004; Gardner 2006; Hall 1993) conflicted such claims, as many argued the Pinto point coexisted with Lake Mojave and Silver Lake typologies. As future research grows, it is likely the Pinto point may have originated during the Early Holocene. The Pinto point exhibits a signature stem and indented-base. The common defining features of the Pinto point are narrow shouldered and incurving base. Most Pinto points bear evidence of reworking and were likely used as spear tips (Sutton et al. 2007).

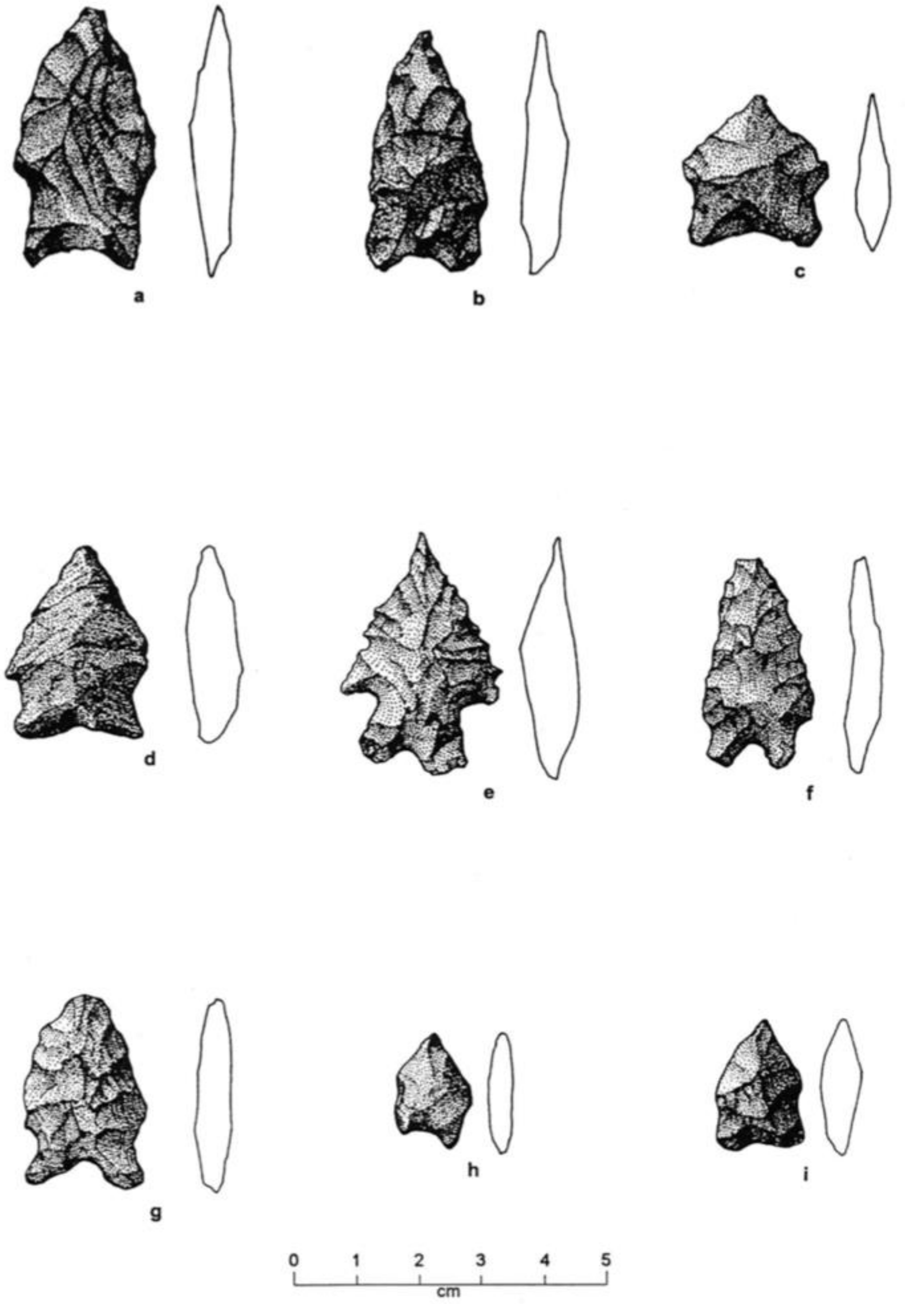

Figure 4.01: Pinto point examples (after Basgall et al. 2000). Note the variation points classified as Pinto projectile points.

Gypsum Complex Three main point types, Elko, Gypsum, and Humboldt, define the Gypsum Complex (Sutton et al. 2007). The Gypsum Complex occurred between 4000 B.P. and 1800 B.P. The Gypsum Complex arose when Mojave Desert conditions returned to cooler, wet conditions. It is rare to find Gypsum Complex points in southern regions of the Mojave (Sutton et al. 2007). Thomas (1981) described the Elko projectile point as a large, corner-notched projectile point. Thomas determined basal width as the key factor identifying Elko projectile points. Keene (2018) provided evidence to suggest Elko projectile points appeared at 6700 B.P. in the northern Great Basin. The Middle Holocene displayed high incidence of Elko points in northern contexts. As the Middle Holocene progressed, a generalized form of the Elko point appeared (Keene 2018). The Elko point occurred until 3000 B.P.

The Gypsum projectile point is often misidentified as Elko because of the larger size of Elko and Gypsum points relative to other point types in the Mojave (Thomas 1981). A key difference between these two, however, is that Gypsum points usually have squared shoulders with no side-notching, while Elko points exhibit side-notching (Figure 4.02). Harrington (1933) defined the Gypsum type during excavations at Gypsum cave because no other artifacts in the region at the time resembled the recovered lithics’ form and shape. As such, the Gypsum point is also another legacy point in the Mojave. Harrington (1933) also noted a plethora of artifacts like knives, dart points, and leaf-shaped blades in the Gypsum cave context. Thomas (1981) labeled Gypsum points under the Gatecliff series nomenclature. The Gypsum projectile point type is synonymous with Gatecliff Contracting Stem points (Thomas 1981). Sutton and colleagues (2007) provided a generalized description of the Gypsum series type as a well-shouldered point with a contracting stemmed shape. Harrington (1933) first noted “leaf-shape” as a starting point to identify Gypsum Complex. The Gypsum projectile point occurred between 4500 to 1400 B.P. (Byrd et al. 2009).

Thomas (1981) expressed the Humboldt series of points as varying in size. The points also show differentiation in form. The similarity between Humboldt Concave points and Pinto points is challenging (Warren 1980). Still, Humboldt points are lanceolate with concave bases. The true identifying factor requires measurement of basal width (Thomas 1981). The Monitor Valley Key is the most effective way to identify Humboldt series points.

Rose Spring Complex The Rose Spring Complex coincided with significant cultural change in the western Mojave. Rose Spring Complex artifacts are interpreted as arrowheads due to their association with bow and arrow technology (Clewlow 1967; Gardner 2006; Sutton et al. 2007). Many Rose Spring sites are situated along periphery of water sources. Rose Spring Complex occurred at 1800 B.P. when the MCA forced abandonment of many Rose Spring sites due to decreased water levels. Environmental change caused the Rose Spring Complex to see its end at 900 B.P. (Sutton et al. 2007).

The Rose Spring Complex consists of two main projectile points. There is the Eastgate point and Rose Spring point. Initial finding of Eastgate and Rose

Spring projectile points came from two sites in western Nevada (Heizer et al. 1961). Heizer and colleagues (1961) led excavations at a site called Jack Wagon Rock Shelter and characterized Eastgate into two separate forms: Eastgate Expanding-Stem and Eastgate Split-Stem. They defined Eastgate as including a wide range of thirteen points and grouped point form based on intuition (Heizer et al. 1961). Thomas (1981) felt the Eastgate points were synonymous to Rose Spring points. The Rose Spring Complex is a series of small, triangular projectile points. Sites exhibiting Rose Spring Complex points suggest populations increased in the American southwest (Yohe 1992). Rose Spring points are a by-product of technological innovation and are an adaptation to an environment renewed with resources (Sutton et al. 2007).

<u>Late Prehistoric Complex</u> The Late Prehistoric Complex occurred at 900 B.P. and is associated with a deteriorating environment resulting from the MCA. Sutton and colleagues (2007) display a population decrease occurred causing many sites to become abandoned throughout the Mojave Desert. Sites that do remain seem to serve only a seasonal purpose (Sutton et al. 2007). The Late Prehistoric Complex contains two projectile points: Cottonwood Triangular and Desert Side-Notched. Surface finds in the western parameters of the Owens valley yielded the Cottonwood Triangular typology (Ridell 1951; Thomas 1981). According to Thomas (1981), Cottonwood Triangular points are small, unnotched, and thin, triangular projectiles often located in Eastern Mojave contexts. The northern Great Basin also showcases some degree of Cottonwood

points (Sutton et al. 2007). The Desert Side-Notched type is also a triangular shaped projectile point dominating northern regions of the Mojave (Sutton et al. 2007; Thomas 1981). The Cottonwood Triangular and Desert Side Notched types were both used in bow and arrow technology. The distinctive small nature of the points, low weight, and minute thickness strengthen its connection to the bow (Sutton et al. 2007; Thomas 1981). The Late Prehistoric Complex lasted until the time of European contact (Sutton 1996; Sutton et al. 2007).

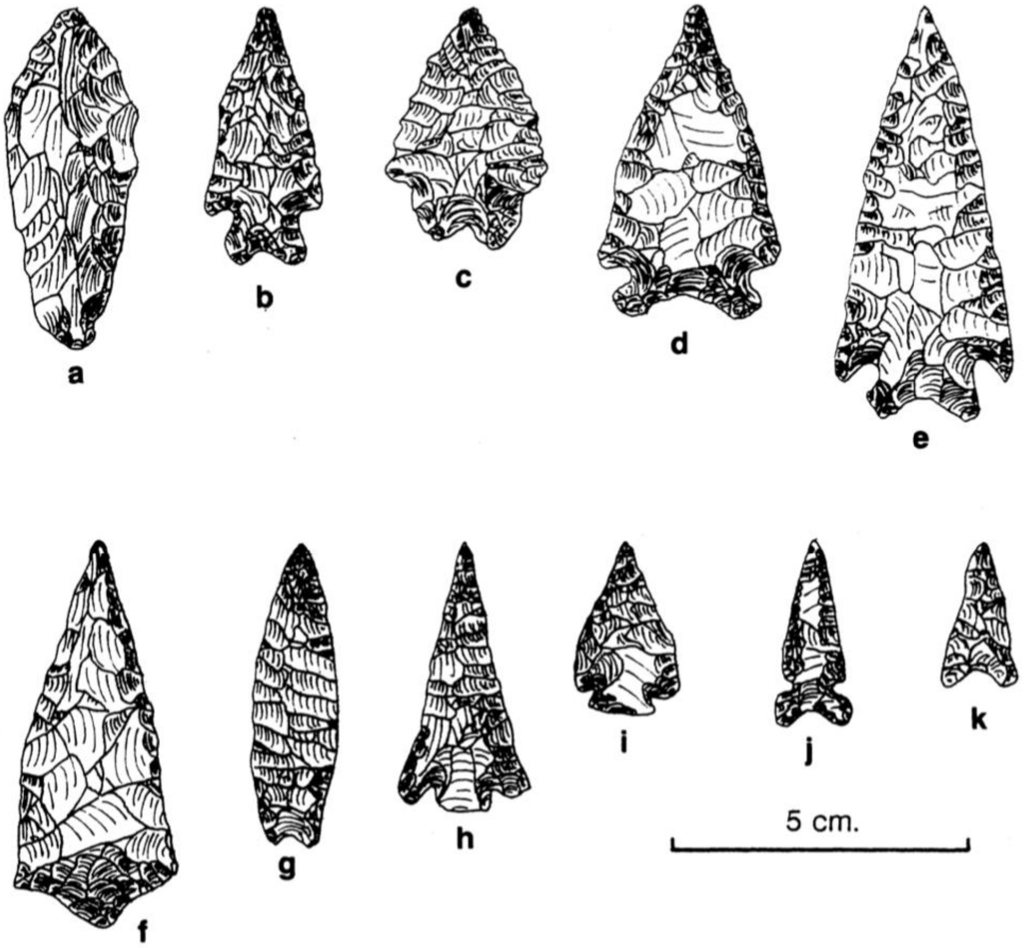

Figure 4.02: Mojave Desert projectile points: (a) Lake Mojave; (b-c) Pinto; (d-e) Elko; (f) Gypsum; (g) Humboldt Concave Base; (h) Eastgate; (i) Rose Spring; (j) Desert Side-Notched; (k) Cottonwood Triangular (after Sutton 1996).

CHAPTER FIVE

ANALYSIS OF CA-RIV-52 ASSEMBLAGE

Overview of the Sub-Assemblage

This chapter presents the results of my analysis of the lithic artifact collection. My analysis is the foundation on which I base inferences regarding decision making of Pinto Basin inhabitants, as discussed in Chapter Six. Multiple researchers have scrutinized projectile point types (Meighan 1981; Schroth 1994; Sutton 1996; Thomas 1981; Vaughan and Warren 1987). The purpose of such research has often been to identify projectile point types that became defining characteristics of the cultural complexes in Chapter Four.

Schroth (1994) performed a study of the Pinto Basin assemblage that strengthened the Pinto point type and its relation to archaeology of the American Southwest. Schroth defined many points in the Pinto Basin collection as Pinto, Elko, Gatecliff, and Rosegate. Schroth referenced the taxonomic key developed by Thomas (1981) and Vaughan and Warren (1987). Schroth recorded lithic attributes for each artifact in the Pinto collection according to raw material, cross section form, and noted metrics like length maximum, width maximum, thickness maximum, and further recorded various projectile point shoulder angles. Using these data and referencing the taxonomic keys by Thomas (1981) and Vaughan and Warren (1987), Schroth (1994) was able to classify many projectile points under a typological definition. Consequently, Schroth could only classify the intact projectile points deemed complete artifacts. The extensive metrics Schroth (1994) garnered also resulted in dual classification of many points. Dual classification occurred when projectile points exhibited metrics that could fit under multiple point types. Dual classification illustrates how a metric key for lithic identification can still create ambiguity during the process of point type classification.

Because the keys by Thomas (1981) and Vaughan and Warren (1987) require complete points to garner sufficient metric data for accurate classification, Schroth (1994) noted many fractured points could not be recorded under typological classification. Schroth also clarified many Pinto points emanated from other areas of the Mojave Desert and commented upon the inability to reference specific location data. Schroth mentioned accurate maps or notes were never created during collection of the artifacts due to a lack of relevant archaeological information. Inferences on specifics in the Joshua Tree region may fall as conjecture. Forthcoming analysis remains relevant if conclusions garner interpretations of Mojave Desert archaeology.

The sub-assemblage at the focus of this study encompasses lithics fitting a predefined category. Those categories are typological projectile points, bifaces, unifaces, and expedient tools. This will make up this thesis' sub-sample of the Pinto collection. An examination of raw materials is an appropriate first step. This will support a renewed understanding of the Pinto Basin collection by determining local versus non-local raw material used in stone tool manufacture (Jew 2013). The sub-assemblage includes the following raw materials (Figure 5.01 and Figure 5.02): Basalt (21%), Quartz (20%), Rhyolite (20%), Chert (14%), Chalcedony (11%), Jasper (10%), Diorite (2%), Quartzite (1%), Obsidian (1%), Dolomite (< 1%), Granite (< 1%).

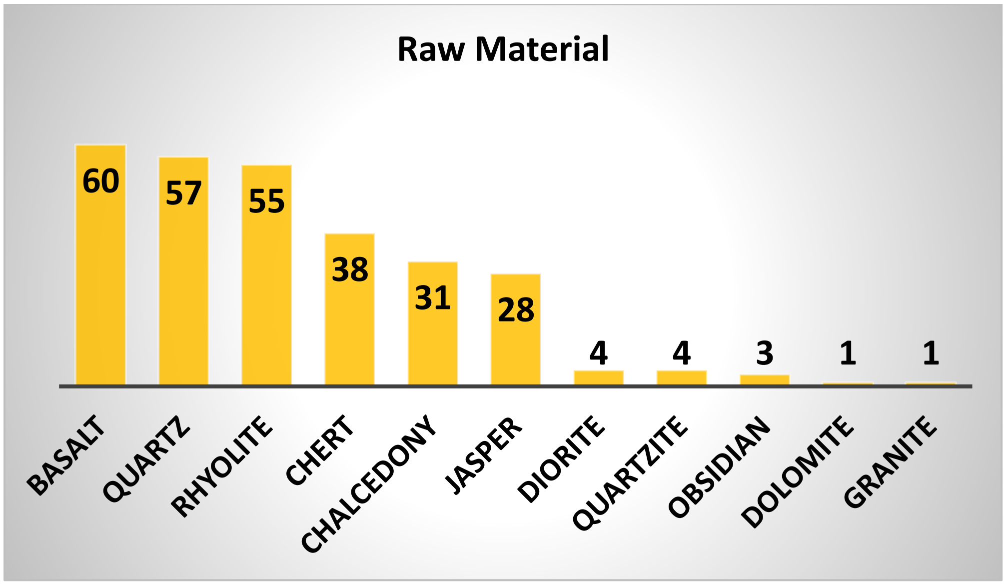

Figure 5.01: Raw material counts of the sub-assemblage of CA-RIV-52.

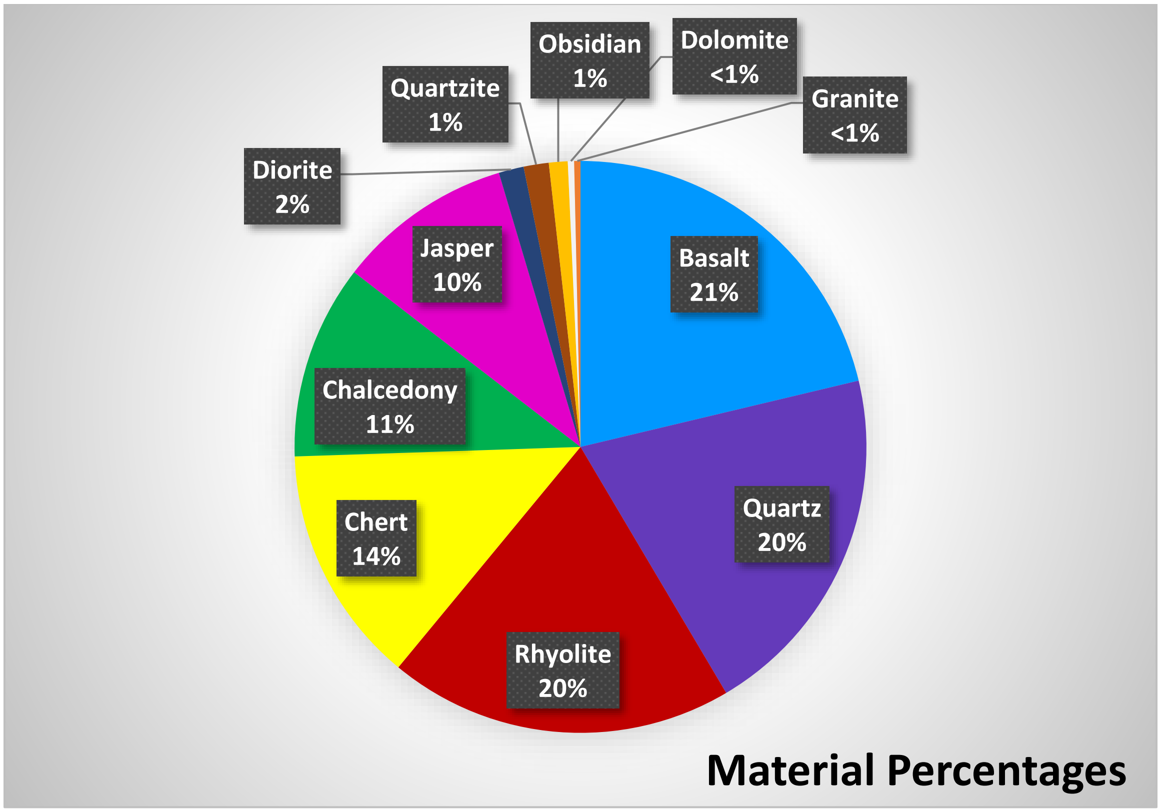

Figure 5.02: Material percentages of the sub-assemblage of CA-RIV-52.

Artifact types of the assemblage (Figure 5.03 and Figure 5.04) are expedient tools (54%), bifaces (31%), Pinto points (7%), unifaces (4%), Gypsum points (2%), and Rose Spring points (2%). Expedient tools include: drills, scrapers, and/or flakes that exhibit retouching or other edge damage. Edge damage along a single or multiple margins that appear to have limited post deposition movement likely resulted from possible tool use (Jew 2013:31). Lithic artifacts are simply labeled bifaces when flaking is present on both dorsal and ventral sides. There are many fractured bifaces and as a result, most lithics are not represented by an intact artifact. Thanks to the thorough work of Schroth

(1994), projectile points were already defined under known types. Amongst projectile point types, Pinto points are the greatest in number. Unifaces followed the Pinto Complex in terms of quantity. Gypsum Complexes and Rose Spring Complexes displayed the lowest quantities in the assemblage. Conclusions referenced larger regional complexes of the Mojave.

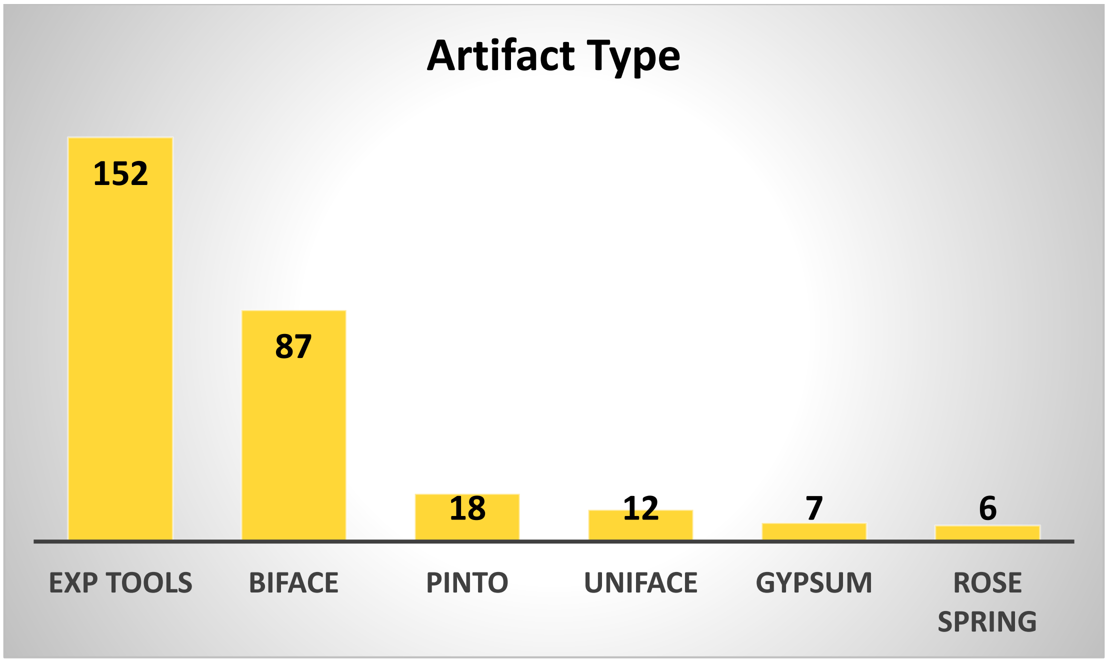

Figure 5.03: Artifact type counts of the sub-assemblage of CA-RIV-52.

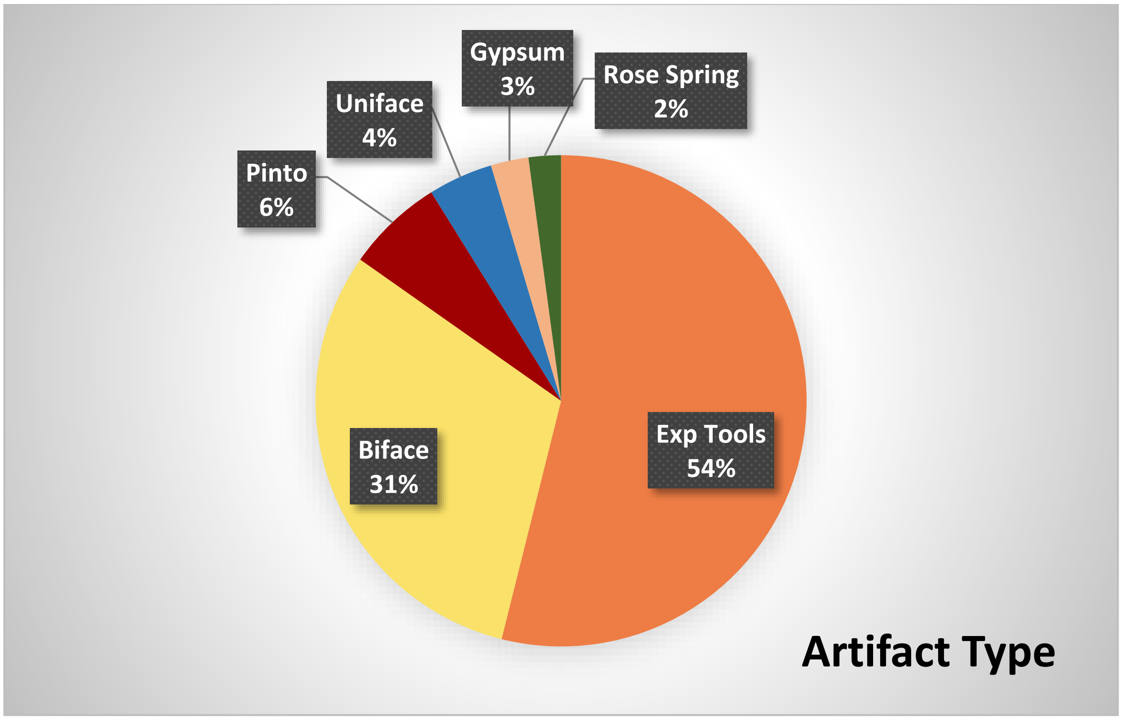

Figure 5.04: Artifact type percentages for the sub-assemblage of CA-RIV-52.

Pinto Complex

The sub-assemblage contained 18 identifiable points (Figure 5.05) from the Pinto Complex. Materials comprising the Pinto points included (Figure 5.06): quartz (78%), chert (11%), basalt (5%), and rhyolite (6%). Six Pinto points are complete specimens. The remaining 12 points displayed missing tips or evidence of some degree of fracture. An individual Pinto point labeled as chert (11%) is made from Monterey Chert. Quartz is a preferred medium to craft Pinto projectile points in the Pinto Basin (Schroth 1994). Metrics of the Pinto points included an average length of 32.69 mm, an average width of 20.69 mm, and an average thickness of 7.64 mm. The average weight was 5.23 g.

Figure 5.05: Identified Pinto points from the sub-assemblage of CA-RIV-52. Scale in mm.

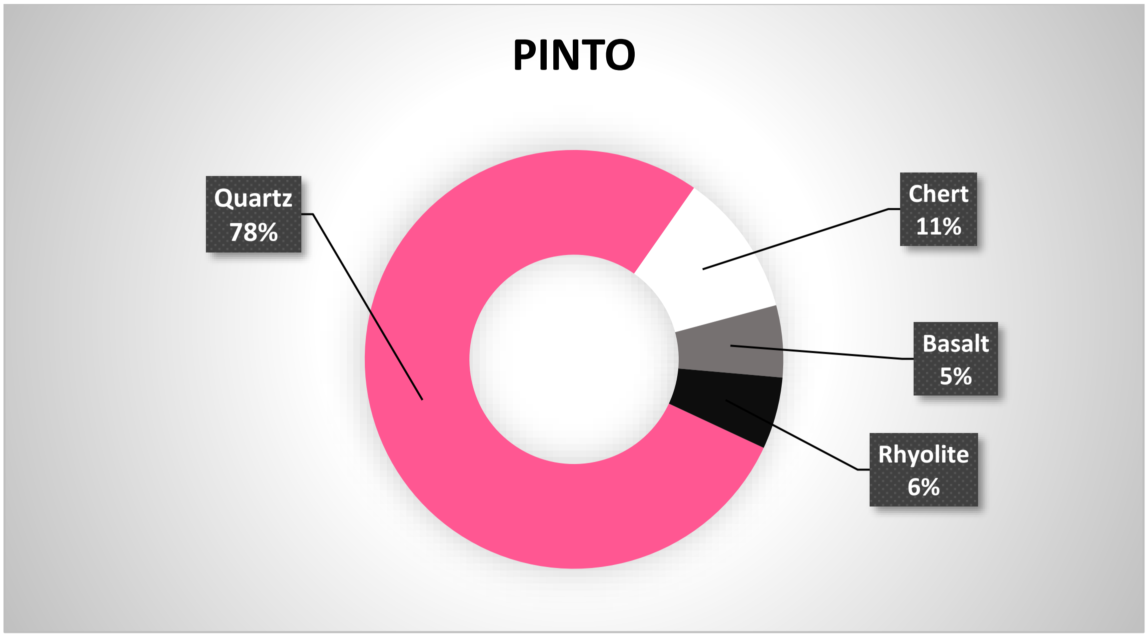

Figure 5.06: Material percentages of the Pinto Complex.

Table 5.01: Catalogue of Pinto points (averages in bold).

CA-RIV-522	PB	Cat Number	Material	Length (mm)	Width (mm)	Thick ness (mm)	Weight (g)
CA-RIV-522	PB 21	1.21X	Chert	28	16	7	3.13
CA-RIV-522	PB 21	1.21N	Quartz	27	19	6.5	3.29
CA-RIV-522	PB 21	1.21T	Quartz	20	19	6.5	3.37
CA-RIV-522	PB 21	1.21S	Quartz	32	19.5	6.5	3.45
CA-RIV-522	PB 21	1.21V	Quartz	30.5	18	6	3.69
CA-RIV-5009	PB 35	1.35D	Quartz	29	19	9	3.92
CA-RIV-5009	PB 35	1.35E	Monterey Chert	26	22	7.5	4.69
CA-RIV-5009	PB 35	1.35H	Quartz	29	19.5	7.5	4.77
CA-RIV-5009	PB 35	1.35L	Quartz	28.5	21.5	7	4.82
CA-RIV-5013	PB 28	1.28A	Quartz	38	21	7	5.21
CA-RIV-5008	PB 19	1.19	Quartz	26.5	24	7	5.24
CA-RIV-5010	PB 5	1.5	Quartz	37	20	7.5	5.4
CA-RIV-5005	PB 27	1.27	Quartz	29.5	20	9	5.58

CA-RIV-5008	PB 1	1.1A	Quartz	34	21	9.5	6.64
CA-RIV-5008	PB 1	1.1B	Basalt	43	24	6.5	6.8
CA-RIV-5009	PB 3	1.3	Rhyolite	42.5	20.5	8.5	6.82
CA-RIV-5004	PB 12	1.12Q	Quartz	48.5	24.5	9	8.5
CA-RIV-521	PB 30	1.30B	Quartz	39.5	24	10	8.85
				32.69	**20.69**	**7.64**	**5.23**

Gypsum Complex Based on criteria referenced by Sutton and colleagues (2007), seven points (Figure 5.07) are defined as the Gypsum point types. Materials comprising the seven points included (Figure 5.08): quartz (57%), rhyolite (29%), and basalt (14%). Gypsum points in the collection have an average length of 37.79 mm, an average width of 20.43 mm, and an average thickness of 8.36 mm. The average weight was 5.99 g of the seven Gypsum points. Two Gypsum points are fractured. One Gypsum point is broken along its basal edge. The remaining four projectile points are intact. All points exhibit evidence of edgewear and bag wear is evident for most points. The artifacts in the collection may have suffered damage due to natural movement in their bag storage.

Figure 5.07: Identified Gypsum points from the sub-assemblage of CA-RIV-52. Scale in mm.

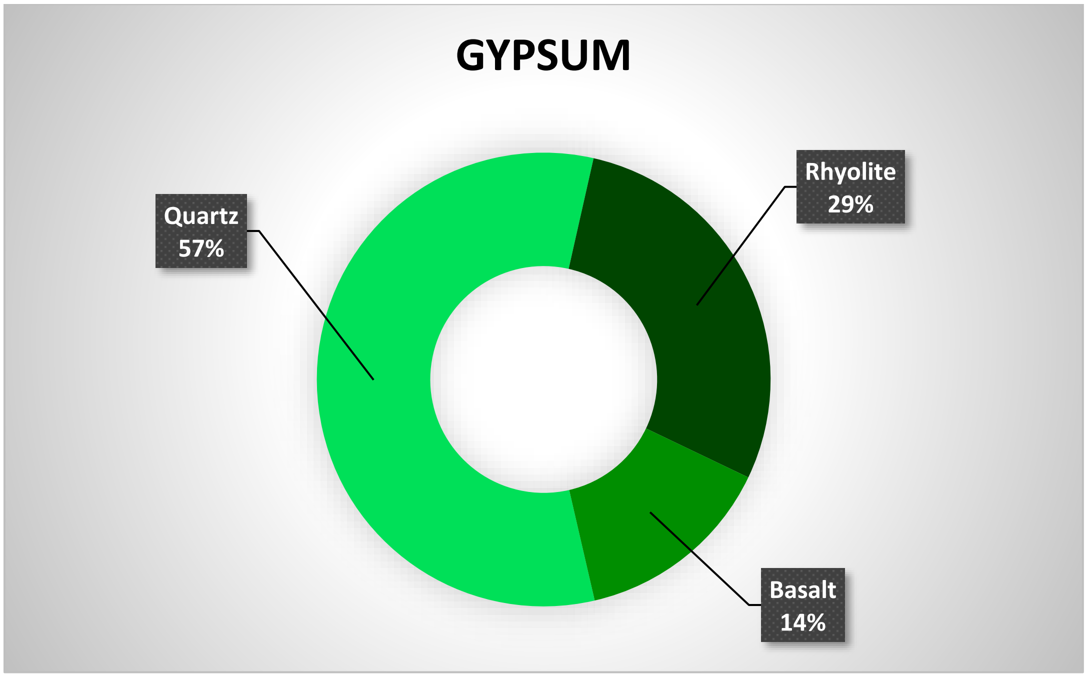

Figure 5.08: Material Percentages of the Gypsum Complex.

Table 5.02: Catalogue of Gypsum points (averages in bold).

CA-RIV-522	PB	Cat Number	Material	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
CA-RIV-522	PB 21	1.21E	Rhyolite	31	14	9.5	3.68
CA-RIV-520 (5020)	PB 31	1.31B	Basalt	28.5	22	7	3.77
CA-RIV-5006	PB 6	1.6	Rhyolite	29.5	18	11	4.78
CA-RIV-5004	PB 13	1.13B	Quartz	42	17	4	5.09
CA-RIV-5004	PB 12	1.12O	Quartz	52	20.5	8	6.61
CA-RIV-5004	PB 12	1.12P	Quartz	41	20	9.5	7.58
CA-RIV-521	PB 24	1.24M	Quartz	40.5	31.5	9.5	10.38
				37.79	**20.43**	**8.36**	**5.98**

<u>Late Prehistoric Complex</u> This sub-assemblage contained six points (Figure 5.09) from the Late Prehistoric Complex. As shown via Sutton and colleagues (2007), the six projectile points are Cottonwood Triangular. Materials comprising the six points included (Figure 5.10): chert (33%), jasper (17%), basalt (17%), quartz (17%), and obsidian (16%). A single Cottonwood Triangular point is manufactured from obsidian. The leftmost artifact from the figure below (Figure 5.09) shows the Cottonwood Triangle point made from obsidian. A significant issue stems from the similarity of obsidian to basalt in the collection. Many points are from a surface context. Sunlight has “baked" many basalt artifacts during their time on the desert surface. This “baking” has imparted a striking similarity to obsidian material. Yet, a key difference lies in the external appearance of the artifacts. Obsidian artifacts display a clear sheen, while basalt

artifacts display a dullness. This is evident in the two leftmost artifacts from the figure below. Metrics of the Cottonwood Triangular points displayed an average length of 14.58 mm, an average width of 13.08 mm, and an average thickness of 3.5 mm. The average weight of the six Cottonwood Triangular points was 0.47 g. All 6 points exhibited edgewear. Four points are fractured.

Figure 5.09: Identified Cottonwood Triangular points from the sub-assemblage of CA-RIV-52. Scale in mm.

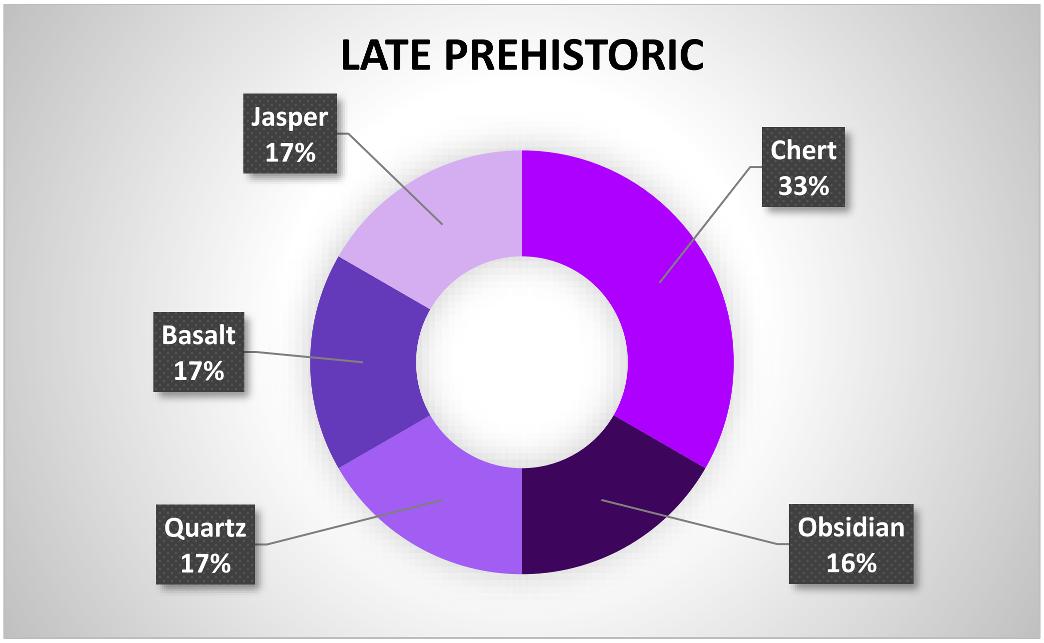

Figure 5.10: Material percentages of the Late Prehistoric Complex.

Table 5.03: Catalogue of Cottonwood Triangular points (averages in bold).

CA-RIV-522	PB	Cat Number	Material	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
n/a	n/a	n/a	Obsidian	12	11.5	3	0.37
n/a	n/a	n/a	Quartz	15	13	3	0.4
n/a	n/a	n/a	Basalt	14	13.5	3	0.44
n/a	n/a	n/a	Chert	12	16	2	0.44
n/a	n/a	n/a	Chert	14.5	13	5	0.53
UR-22	n/a	n/a	Jasper	20	11.5	5	0.65
				14.58	**13.08**	**3.5**	**0.47**

Bifaces The sub-assemblage contained 87 lithic bifaces (Table 5.04).

Bifaces are defined as being flaked on two sides meeting to form a single edge that circumscribes the entire artifact (Andrefsky 2005:22). Bifaces are usually preforms of more formal tools such as points, and depending on the stage of biface reduction, can resemble a variety of shapes and styles. These bifaces do not resemble any of the Mojave Desert projectile point types (Sutton et al. 2007). Materials comprising the 87 bifaces included (Figure 5.11): quartz (29%), basalt (22%), chert (13%), rhyolite (13%), jasper (9%), chalcedony (8%), quartzite (3%), obsidian (1%), dolomite (1%), and diorite (1%). Metrics of the bifaces included an average length of 29.98 mm, an average width of 23.52 mm, and an average thickness of 8.64 mm. The average weight was 7.6 g for the bifaces. Many of the bifaces are fractured. Only 10 are intact. There may be an issue with the weight of the biface assemblage as four bifaces were used in the past as museum displays and glue residue may throw off recorded weight.

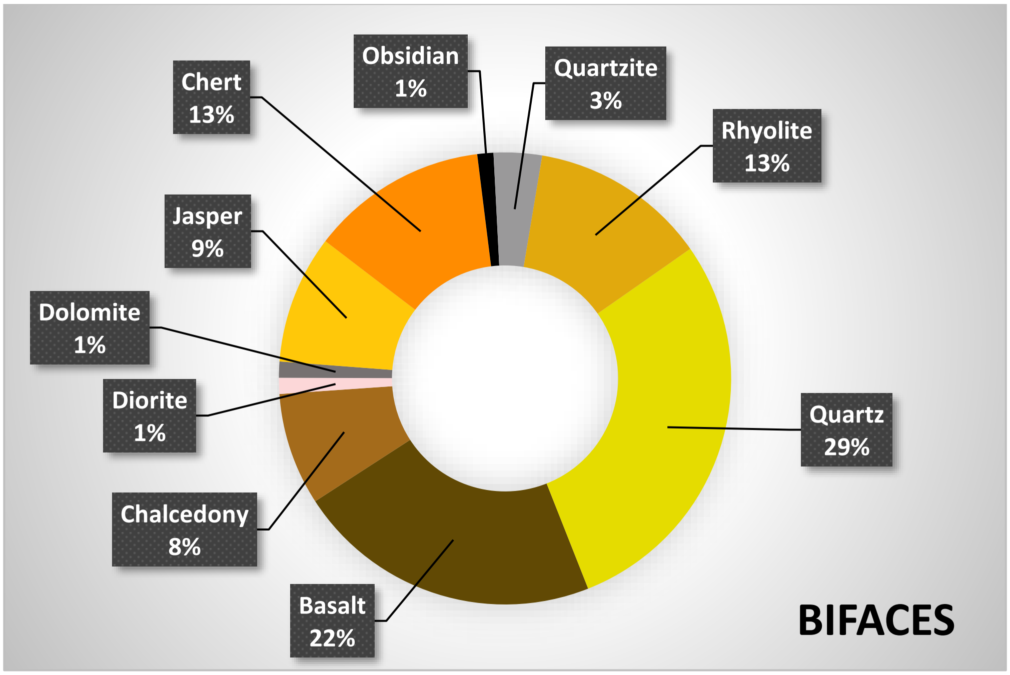

Figure 5.11: Biface material percentages of the sub-assemblage.

Table 5.04: Catalogue of bifaces (averages in bold).

CA-RIV-522	PB	Cat Number	Material	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
CA-RIV-522	PB 21	1.21O	Obsidian	14	15	4.5	0.65
CA-RIV-522	PB 21	1.21P	Chert	20	12	4.5	0.97
CA-RIV-522	PB 21	1.21W	Quartz	15.5	13.5	5	1.01
CA-RIV-522	PB 21	1.21R	Quartz	14.5	18	4.5	1.07
CA-RIV-522	PB 21	1.21Q	Quartzite	8	12	4	1.31
CA-RIV-522	PB 21	1.21I	Rose Quartz	25.5	14	4	1.52
CA-RIV-522	PB 21	1.21H	Quartz	13.5	17	7	1.66
n/a	n/a	1	Basalt	24	15.5	6	1.79
n/a	n/a	23	Chert	25	17	6	1.8
n/a	n/a	28	Diorite	16.5	16	7	1.9
n/a	n/a	34	Chert	20.5	18.5	5.5	1.9
n/a	n/a	35	Chert	15	19	7	2.04

n/a	n/a	40	Quartz	20	15.5	7.5	2.07
CA-RIV-5009	PB 35	1.35A	Chert	16	23.5	6	2.1
CA-RIV-5009	PB 35	1.35B	Quartz	24	20	7	2.19
CA-RIV-5009	PB 35	1.35C	Rhyolite	19	15.5	9.5	2.25
CA-RIV-5009	PB 35	1.35F	Jasper	16	20.5	7.5	2.54
CA-RIV-5009	PB 35	1.35G	Jasper	25	22.5	6	2.7
CA-RIV-5009	PB 35	1.35I	Basalt	23	16.5	6	2.89
CA-RIV-5009	PB 35	1.35J	Quartz	19.5	19	8.5	2.94
CA-RIV-5009	PB 35	1.35K	Monterey Chert	31	17.5	5.5	2.98
CA-RIV-5009	PB 35	1.35M	Rhyolite	23.5	21	5	2.99
CA-RIV-520 (5020)	PB 29	1.29C	Quartz	15.5	21	7.5	3
CA-RIV-5005	PB 36	1.36	Basalt	29	16.5	8	3.02
CA-RIV-5013	PB 28	1.28C	Rhyolite	20.5	21	6.5	3.05
CA-RIV-5005	PB 25	1.25A	Basalt	24.5	23	6	3.14
CA-RIV-5005	PB 25	1.25B	Quartzite	27.5	17	6.5	3.28
CA-RIV-521	PB 23	1.23A	Quartz	25	16.5	7	3.31
CA-RIV-521	PB 23	1.23C	Quartz	27.5	16	7.5	3.32
CA-RIV-521	PB 23	1.23D	Quartz	19	24.5	7.5	3.65
CA-RIV-521	PB 23	1.23E	Basalt	33	21	7	3.78
CA-RIV-521	PB 23	1.23F	Quartz	19.5	20.5	8	3.85
CA-RIV-521	PB 17	1.17B	Jasper	26	18.5	7	4.02
CA-RIV-521	PB 17	1.17E	Jasper	20.5	21	10	4.03
CA-RIV-521	PB 17	1.17F	Chalcedony	31	17	7.5	4.07
CA-RIV-521	PB 22	1.22B	Basalt	24	23.5	5	4.16
CA-RIV-5013	PB 38	1.38B	Quartz	29	17.5	8.5	4.22
CA-RIV-5004	PB 26	1.26	Basalt	27.5	24	6	4.22
CA-RIV-5005	PB 15	1.15	Jasper	19	25.5	7	4.3
CA-RIV-5004	PB 14	1.14	Jasper	30	21	6	4.59
CA-RIV-5004	PB 13	1.13D	Quartz	24	21	8	4.63
CA-RIV-5006	PB 7B	1.7B-1	Quartz	28	19.5	9	4.66
CA-RIV-5006	PB 7B	1.7B-2	Chert	28	21	8.5	4.82
CA-RIV-5004	PB 12	1.12G	Chert	34	19.5	9.5	5.14
CA-RIV-5004	PB 12	1.12L	Quartz	26	23.5	9.5	5.33
CA-RIV-5004	PB 12	1.12M	Rhyolite	34.5	22	7.5	5.41
CA-RIV-5004	PB 12	1.12R	Chalcedony	20	37.5	7	5.49

CA-RIV-5004	PB 12	1.12S	Quartz	25.5	20	9	5.53
CA-RIV-5004	PB 12	1.12T	Rhyolite	27.5	28	6	5.63
CA-RIV-5004	PB 12	1.12W	Quartz	33.5	25	9	5.69
CA-RIV-395	n/a	n/a	Dolomite	22	26	8	5.73
CA-RIV-395	n/a	n/a	Quartz	25	21.5	10	5.74
n/a	n/a	n/a	Jasper	32.5	21	9	5.76
CA-RIV-5018	PB 34	1.34A	Chert	28	27	9.5	5.89
CA-RIV-5018	PB 34	1.34B	Chalcedony	28	22	5	5.93
CA-RIV-5018	PB 34	1.34I	Basalt	18.5	31.5	12	6.46
CA-RIV-521	PB 30	1.30C	Quartz	39	21	11	7.01
CA-RIV-521	PB 30	1.30E	Chalcedony	40.5	24	8	7.05
CA-RIV-521	PB 30	1.30I	Basalt	28	31	8	7.2
CA-RIV-521	PB 30	1.30K	Rhyolite	34.5	21	12	7.28
CA-RIV-521	PB 24	1.24F	Quartzite	38	22	11	7.68
CA-RIV-521	PB 24	1.24G	Basalt	35.5	26	8.5	8.37
CA-RIV-521	PB 24	1.24H	Basalt	40.5	31	8	8.79
CA-RIV-521	PB 24	1.24I	Basalt	35.5	23	9	8.83
CA-RIV-521	PB 24	1.24J	Basalt	24.5	38	9	9.33
CA-RIV-521	PB 24	1.24K	Basalt	36.5	26	10.5	9.37
CA-RIV-521	PB 24	1.24L	Rhyolite	36.5	24.5	10.5	9.38
CA-RIV-521	PB 24	1.24P	Quartz	38	24.5	10	9.6
CA-RIV-521	PB 24	1.24O	Rhyolite	42	22.5	11	9.62
CA-RIV-521	PB 24	1.24N	Quartz	39.5	31	10	9.83
CA-RIV-521	PB 24	1.24Q	Chalcedony	37.5	27	13	9.88
n/a	n/a	n/a	Jasper	29.5	29	9.5	10.87
n/a	n/a	n/a	Basalt	31.5	31	9.5	11.68
n/a	n/a	n/a	Rhyolite	40.5	34.5	8	12.19
UR-22-1	n/a	n/a	Chert	47	26	11	12.77
UR-22-1	n/a	n/a	Chalcedony	46	29.5	10.5	13.29
UR-22-1	n/a	n/a	Basalt	41.5	30.5	12	14.25
UR-22-1	n/a	n/a	Basalt	38	35	13	15.35
CA-RIV-522	PB 16	1.16B	Rhyolite	52	30.5	13.5	16.03
CA-RIV-522	PB 16	1.16D	Chalcedony	41.5	30	16.5	16.52
CA-RIV-4146	PB 8	1.8C	Rhyolite	53	29	13.5	19.55
n/a	n/a	n/a	Basalt	52	32	10	20.11
n/a	n/a	n/a	Quartz	59	39	10	27.14
n/a	n/a	n/a	Chert	49.5	39	14	31.46

830-4-	411	30A	Quartz	54.5	35	16	33.11
n/a	n/a	n/a	Basalt	56	40.5	18	38.18
CA-RIV-522	PB 21	1.21IL	Quartz*	58.5	33.5	19	41.13
				29.98	**23.52**	**8.64**	**7.60**

Unifaces The sub-assemblage contained 12 unifaces (Table 5.05). A uniface is defined as a lithic artifact having flakes or retouch removed from only one side. Materials comprising the unifaces included (Figure 5.12): basalt (25%), chalcedony (25%), jasper (17%), rhyolite (17%), and quartz (16%). Metrics of unifaces displayed an average length of 34.83 mm, an average width of 24.79 mm, and an average thickness of 9.25 mm. The average weight was 10.39 g for the unifaces.

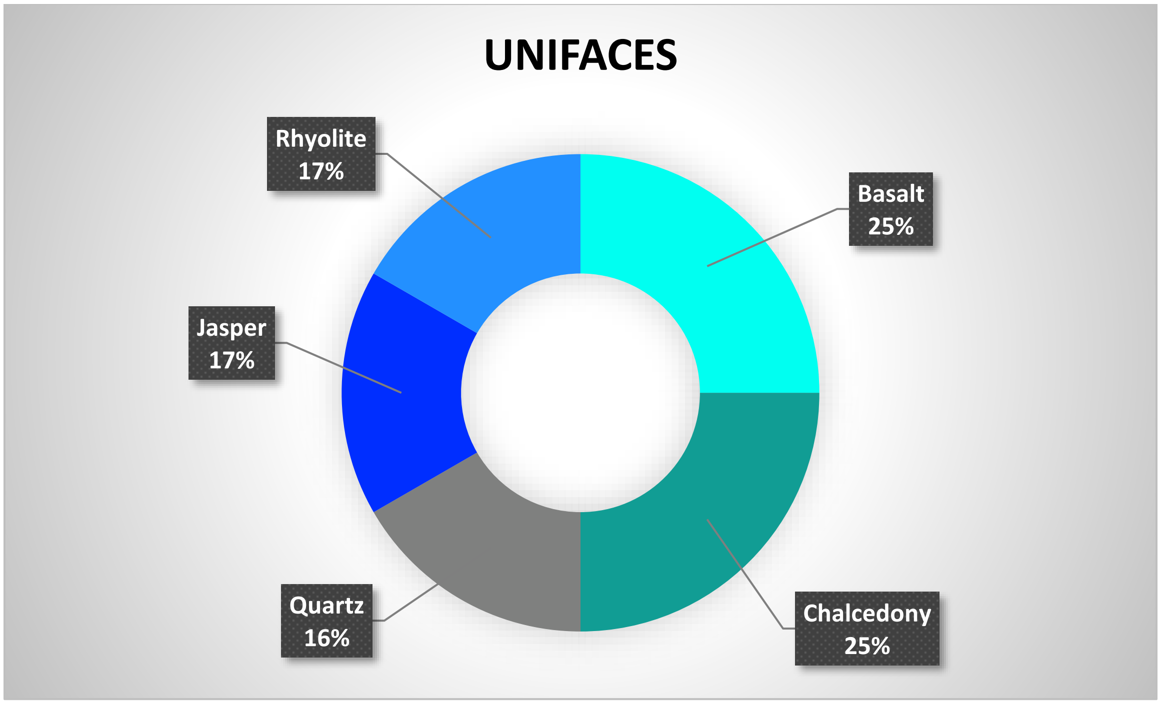

Figure 5.12: Uniface material percentages of the sub-assemblage.

Table 5.05: Catalogue of unifaces (averages in bold).

CA-RIV-522	PB	Cat Number	Material	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
n/a	n/a	n/a	Rhyolite	21	14	6	0.87
n/a	n/a	n/a	Basalt	22.5	21	4	1.51
2/1956	n/a	n/a	Chalcedony	27	20	7	2.88
CA-RIV-5004	PB 12	1.12K	Chalcedony	25	21	8	3.09
CA-RIV-5004	PB 12	1.12N	Basalt	33	22.5	5.5	3.44
CA-RIV-395	n/a	n/a	Chalcedony	38.5	24	4	3.72
CA-RIV-5018	PB 34	1.34C	Basalt	28	26	9.5	5.45
CA-RIV-5018	PB 34	1.34G	Jasper	35	24.5	9	5.9
CA-RIV-521	PB 30	1.30F	Quartz	44	24	11	6.6

CA-RIV-521	PB 30	1.30G	Quartz	30.5	29.5	7.5	7.91
CA-RIV-522	PB 16	1.16C	Rhyolite	48	33	14.5	24.45
CA-RIV-522	PB 16	1.16E	Jasper	65.5	38	25	58.86
				34.83	**24.79**	**9.25**	**10.39**

Expedient Tools The sub-assemblage contained 152 expedient tools (Table 5.06). Materials comprising expedient tools included (Figure 5.13): rhyolite (26%), basalt (23%), chert (15%), chalcedony (14%), jasper (11%), quartz (7%), diorite (2%), quartzite (1%), and granite (1%). Metrics of expedient tools displayed an average length of 33.9 mm, an average width of 24.22 mm, and an average thickness of 8.05 mm. The average weight was 8.13 g for the expedient tools. Of the 152 expedient tools, 143 exhibit edgewear and edge damage. Bag wear is evident on most expedient tools. There is one micro drill in the expedient tool assemblage. Once again, there is an issue of weight for the expedient tools, as many have glue residue from past museum display.

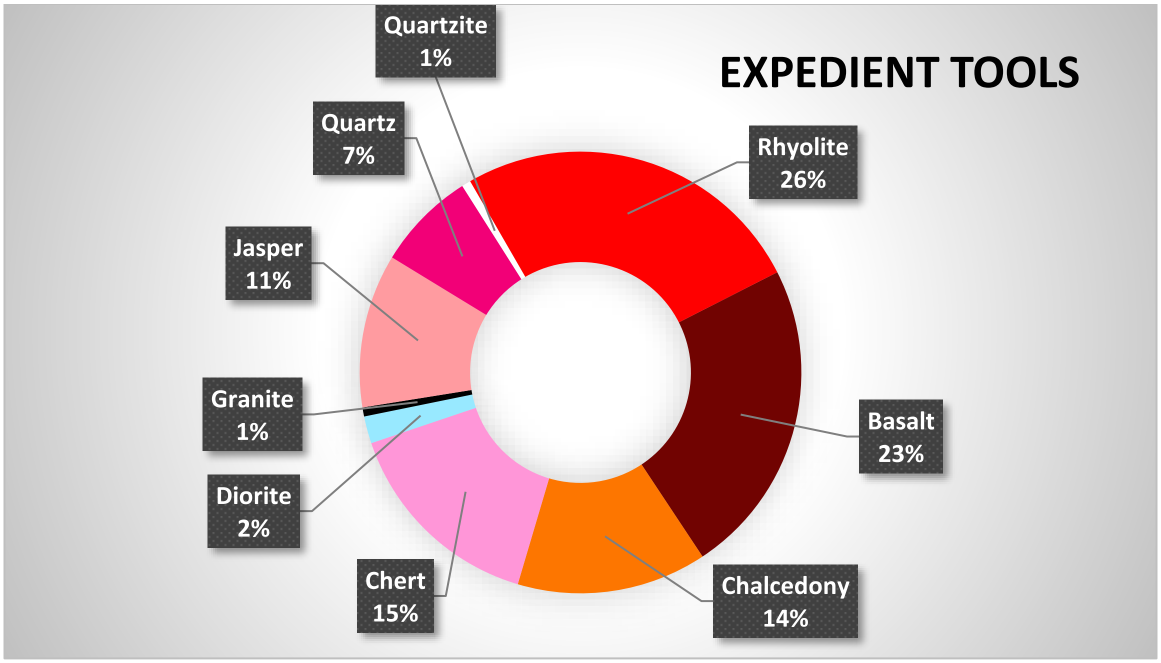

Figure 5.13: Expedient tools material percentages of the sub-assemblage.

Table 5.06: Catalogue of expedient tools (averages in bold).

CA-RIV-522	**PB**	**Cat Number**	**Material**	**Length (mm)**	**Width (mm)**	**Thickness (mm)**	**Weight (g)**
CA-RIV-522	PB 21	1.21M	Chert	14.5	13	3.5	0.54
CA-RIV-522	PB 21	1.21B	Chert	19.5	12	3	0.62
CA-RIV-522	PB 21	1.21Y	Chert	17	13	4	0.86
CA-RIV-522	PB 21	1.21F	Chert	20	16.5	3.5	0.98
CA-RIV-522	PB 21	1.21C	Rhyolite	21	18.5	3	1.02
CA-RIV-522	PB 21	1.21L	Chert	26.5	16.5	3	1.05
n/a	n/a	2	Basalt	28	13	3	1.06
n/a	n/a	4	Basalt	18	17.5	3	1.1
n/a	n/a	5	Basalt	21.5	16	3	1.14
n/a	n/a	6	Basalt	22	14	3.5	1.19
n/a	n/a	9	Chalcedony	16	15.5	5	1.26
n/a	n/a	10	Chert	23	20	3.5	1.31
n/a	n/a	13	Chert	18	10.5	6	1.41
n/a	n/a	11	Quartz	20.5	16	4.5	1.42

n/a	n/a	20	Quartz	29	22.5	2.5	1.53
n/a	n/a	21	Chert	21.5	16.5	3.5	1.59
n/a	n/a	22	Chalcedony	19	14	5.5	1.6
n/a	n/a	24	Chalcedony	18	13	5.5	1.6
n/a	n/a	25	Rhyolite	19	17.5	6	1.74
n/a	n/a	26	Basalt	28	18	3.5	1.76
n/a	n/a	27	Chert	33	11	4.5	1.77
n/a	n/a	29	Chert	20	18.5	5.5	1.81
n/a	n/a	30	Milky Quartz	21.5	12.5	7.5	1.82
n/a	n/a	31	Quartz	29	21.5	4.5	1.83
n/a	n/a	32	Chert	21	17.5	5	1.87
n/a	n/a	33	Diorite	25	18.5	4	1.88
n/a	n/a	38	Diorite	27	23.5	3	1.95
n/a	n/a	39	Diorite	23.5	19	4.5	1.96
n/a	PB 31	1.31C	Chert	22	21	3.5	1.96
CA-RIV-521	PB 10	1.10A	Rhyolite	30	15	5	1.97
CA-RIV-521	PB 10	1.10B	Rhyolite	25.5	18	6	2.01
CA-RIV-521	PB 10	1.10C	Chalcedony	32.5	12.5	5.5	2.07
CA-RIV-520 (5020)	PB 29	1.29A	Chalcedony	26.5	23.5	5	2.08
CA-RIV-520 (5020)	PB 29	1.29B	Jasper	28.5	17	6.5	2.12
CA-RIV-521	PB 20	1.20A	Rhyolite	25.5	21	4	2.13
CA-RIV-521	PB 20	1.20B	Jasper	22.5	19	5.5	2.21
CA-RIV-521	PB 23	1.23B	Rhyolite	25.5	21	5.5	2.24
CA-RIV-521	PB 23	1.23G	Basalt	25	18	4.5	2.25
CA-RIV-521	PB 17	1.17D	Rhyolite	29	22	4.5	2.26
CA-RIV-521	PB 22	1.22A	Rhyolite	31	23	5.5	2.33
CA-RIV-5013	PB 38	1.38A	Rhyolite	25.5	18	5.5	2.36
CA-RIV-5013	PB 38	1.38C	Rhyolite	27	20.5	4.5	2.38
CA-RIV-5010	PB 33	1.33A	Rhyolite	26	22.5	5.5	2.38
CA-RIV-5010	PB 33	1.33C	Rhyolite	29	21	7.5	2.45
CA-RIV-0	PB 9	1.9	Rhyolite	26.5	23	6	2.47
CA-RIV-5010	PB 39	1.39A	Chalcedony	23	24	5	2.48
CA-RIV-5010	PB 39	1.39B	Quartz	29	22	4	2.48
CA-RIV-5004	PB 13	1.13A	Chalcedony	23.5	20	6	2.57

CA-RIV-5004	PB 13	1.13C	Rhyolite	28	22.5	8	2.6
n/a	n/a	n/a	Rhyolite	28.5	16	8	2.7
n/a	n/a	n/a	Rhyolite	26	21	5.5	2.75
n/a	n/a	n/a	Basalt	36	22	4.5	2.82
n/a	n/a	n/a	Rhyolite	31	18	6.5	2.87
n/a	n/a	n/a	Rhyolite	38	26	3.5	2.91
n/a	n/a	n/a	Rhyolite	23	15	9	2.92
n/a	n/a	n/a	Rhyolite	37.5	20	5	3
n/a	n/a	n/a	Rhyolite	27.5	20	8	3.01
n/a	n/a	n/a	Rhyolite	27.5	18	5.5	3.01
n/a	n/a	n/a	Rhyolite	27.5	26	5.5	3.05
n/a	n/a	n/a	Rhyolite	29	22	5.5	3.07
n/a	n/a	n/a	Rhyolite	23	26.5	6	3.09
n/a	n/a	n/a	Jasper	27	18.5	7	3.09
n/a	n/a	n/a	Jasper	21	15	7	3.2
n/a	n/a	n/a	Jasper	36	19	6.5	3.22
n/a	n/a	n/a	Chalcedony	31.5	26	4.5	3.23
n/a	n/a	n/a	Quartzite	26	23	6.5	3.23
n/a	n/a	n/a	Basalt	23.5	16.5	7	3.31
n/a	n/a	n/a	Basalt	25	17	6.5	3.35
n/a	n/a	n/a	Basalt	28.5	22	6	3.36
2/1956	n/a	n/a	Basalt	30.5	25	6.5	3.48
2/1956	n/a	n/a	Basalt	29.5	23	5	3.6
2/1956	n/a	n/a	Basalt	26	18	8.5	3.65
2/1956	n/a	n/a	Basalt	28.5	16.5	6.5	3.78
2/1956	n/a	n/a	Basalt	28	16	8	3.8
2/1956	n/a	n/a	Basalt	28.5	24	8	3.84
2/1956	n/a	n/a	Basalt	25	19	8.5	3.91
2/1956	n/a	n/a	Basalt	35.5	27	7	4.17
2/1956	n/a	n/a	Basalt	22	29	6	4.26
2/1956	n/a	n/a	Basalt	33	23	5.5	4.33
2/1956	n/a	n/a	Basalt	33	17	6.5	4.45
2/1956	n/a	n/a	Chert	37.5	21.5	8	4.48
2/1956	n/a	n/a	Chert	29.5	24.5	8	4.52
2/1956	n/a	n/a	Chert	43	22	7	4.52
2/1956	n/a	n/a	Chert	29	22	6.5	4.6
2/1956	n/a	n/a	Chert	33	27.5	5	4.67

2/1956	n/a	n/a	Chert	30.5	17.5	10.5	5.04
2/1956	n/a	n/a	Chert	28.5	28	7.5	5.12
2/1956	n/a	n/a	Chert	44.5	17	16.5	5.17
2/1956	n/a	n/a	Chert	26	29.5	6	5.39
2/1956	n/a	n/a	Chalcedony	26	25	7.5	5.54
2/1956	n/a	n/a	Chalcedony	34.5	23	9	5.65
2/1956	n/a	n/a	Chalcedony	34	19.5	10	5.68
2/1956	n/a	n/a	Chalcedony	33	27	5.5	5.81
2/1956	n/a	n/a	Jasper	33.5	22	7.5	5.86
2/1956	n/a	n/a	Jasper	31	19.5	11	5.9
2/1956	n/a	n/a	Obsidian	39.5	22.5	8.5	6.15
CA-RIV-5006	PB 7B	1.7B-3	Rhyolite	29	20	11	6.21
n/a	PB 18	1.18B	Chalcedony	34	33	6	6.39
n/a	PB 18	1.18C	Chalcedony	38	29.5	6	6.61
n/a	PB 18	1.18D	Jasper	33.5	27.5	6	6.66
CA-RIV-5004	PB 12	1.12A	Rhyolite	40	32	17.5	6.72
CA-RIV-5004	PB 12	1.12B	Rhyolite	29.5	26	7	6.73
CA-RIV-5004	PB 12	1.12F	Chalcedony	37	29	8	7.1
CA-RIV-5004	PB 12	1.12I	Rhyolite	27	26	9	7.25
CA-RIV-5004	PB 12	1.12U	Basalt	37	30	9	7.28
CA-RIV-5004	PB 12	1.12V	Quartz	35	25	7	7.53
CA-RIV-395	n/a	n/a	Rhyolite	43	23	13	7.64
CA-RIV-395	n/a	n/a	Rhyolite	36	29.5	8	7.78
CA-RIV-395	n/a	n/a	Basalt	29	28	9	7.82
n/a	n/a	n/a	Jasper	45	29.5	6	8.17
n/a	n/a	n/a	Jasper	50.5	24.5	7	8.27
n/a	n/a	n/a	Jasper	37.5	34	8	8.41
n/a	n/a	n/a	Jasper	26.5	31	13.5	8.47
n/a	n/a	n/a	Jasper	35.5	32	8	8.49
n/a	n/a	n/a	Jasper	35.5	21	10	8.55
n/a	n/a	n/a	Jasper	43.5	23	10	9.25
n/a	n/a	n/a	Basalt	51	32.5	9.5	9.57
n/a	n/a	n/a	Basalt	41	34	9.5	9.58
CA-RIV-5018	PB 34	1.34F	Chert	51	33	12	9.58
CA-RIV-521	PB 30	1.30D	Rhyolite	35	31.5	10.5	9.85
n/a	n/a	n/a	Quartz	61	21	6	9.86
n/a	n/a	n/a	Quartz	42.5	29.5	11.5	10.17

n/a	n/a	n/a	Chalcedony	48.5	36	8.5	10.24
n/a	n/a	n/a	Chalcedony	31.5	26.5	15	10.47
n/a	n/a	n/a	Jasper	37.5	30	13	10.64
n/a	n/a	n/a	Basalt	35	31	10.5	10.76
n/a	n/a	n/a	Basalt	41.5	35	9.5	11.74
n/a	n/a	n/a	Basalt	34.5	32.5	11	11.91
n/a	n/a	n/a	Rhyolite	44	35	10	12.22
n/a	n/a	n/a	Rhyolite	47	34	9.5	12.55
n/a	n/a	n/a	Rhyolite	65.5	21.5	10	12.78
n/a	n/a	n/a	Rhyolite	38	30	10	12.86
UR-22-1	n/a	n/a	Chalcedony	41.5	25	10	13.1
UR-22-1	n/a	n/a	Rose Quartz	42	35	11	13.73
UR-22-1	n/a	n/a	Quartz	40.5	33	9	13.73
UR-22-1	n/a	n/a	Quartz	46.5	30	12.5	14.63
UR-22-1	n/a	n/a	Rhyolite	41.5	33	15	15.59
UR-22-1	n/a	n/a	Rhyolite	47.5	36	15	17.2
UR-22-1	n/a	n/a	Basalt	35	31	28	17.89
UR-22-1	n/a	n/a	Basalt	51.5	26	13	18.06
UR-22-1	n/a	n/a	Basalt	48	39.5	10	19.22
UR-22-1	n/a	n/a	Basalt	51	37	16	20.65
UR-22-1	n/a	n/a	Basalt	56	33	15	22.59
CA-RIV-4146	PB 8	1.8B	Chalcedony	67.5	31	11	26.37
CA-RIV-4146	PB 8	1.8E	Basalt	58.5	29.5	21	27.88
CA-RIV-4146	PB 8	1.8F	Basalt	85	46	7.5	28.71
CA-RIV-4146	PB 8	1.8G	Granite	46	33	17	30.22
n/a	n/a	n/a	Jasper	65	44.5	12.5	30.46
n/a	n/a	n/a	Chert	57	50	15	36.07
n/a	n/a	n/a	Chalcedony	80.5	35.5	25	46.15
n/a	n/a	n/a	Rhyolite	69	56	19	48.18
n/a	n/a	n/a	Chalcedony	91	57.5	33	173.41
				33.90	**24.22**	**8.10**	**8.13**

CHAPTER SIX

DISCUSSIONS AND CONCLUSIONS

The preceding Chapter Five used Mojave Desert morphology to classify the sub-assemblage into diagnostic points. Lithics not characterized under a cultural complex were classified as bifaces, unifaces, or expedient tools. The previous chapter also solidified the work of Schroth (1994) and strengthened the integrity of the Pinto collection at the San Bernardino County Museum. The initial research query of this thesis was answered by providing metrics for the Pinto point, other diagnostic points, and the whole sub-assemblage identified from Campbells' assemblage. The work of Schroth (1994) remains a successful research endeavor into the Pinto Basin collection.

I now shift focus to a secondary research question aimed at solidifying current understanding of environment for the Mojave and Joshua Tree National Park. Environmental research from Chapter Two (Bird et al. 2010; Cole 2010; Grayson 2019; Holmgren et al. 2010, 2014; Kirby et al. 2017; Knell and Kirby 2014; Louderback et al. 2011; Miller et al. 2010) demonstrated the region of Joshua Tree National Park initiated with a period of reliable, annual precipitation following the end of the Pleistocene. Precipitation rates present in the Late Pleistocene carried a resource-rich environment into the Middle Holocene. This resource-rich environment declined as the Middle Holocene underwent a gradual shift to aridity, strengthened by the simultaneous increase in desert plant species in the Mojave. Plants thriving in warm ecological conditions exhibited vast blooms throughout Pinto Basin (Mayer et al. 2010). Referencing Holmgren and colleagues (2014), packrat middens demonstrated Early Holocene summers in Joshua Tree displayed an abundance of summer-flowering species. The area of Pinto Basin was surrounded by local desert taxa and exhibited lower rates of precipitation than in the Early Holocene and Late Holocene. However, periods of aridity do not preclude existence of sporadic summer rain events occurring in Joshua Tree National Park.

Without data discernibly linking Pinto points to a date range, we can only infer inhabitants migrated into the Pinto Basin sometime during the Middle Holocene. There remains a possibility that toolmakers of the Pinto points occupied the Mojave during the end of the Early Holocene (Sutton et al. 2007). The Pinto point is the oldest diagnostic point in the sub-assemblage. The Lake Mojave and Pinto Complexes held a temporal overlap of usage during the Middle Holocene (Elston and Zeanah 2002; Sutton et al. 2007). The Pinto and Gypsum Complexes were followed by a transition into the Late Prehistoric Complex. Human occupation in the Pinto Basin lasted well into the Late Holocene. The higher quantity of Pinto points recovered, relative to other diagnostic points, suggests makers of the Pinto point dominated the time of occupation for the Pinto Basin (Figures 5.05, 5.07, and 5.09).

The transition from sporadic rainfall during the Early Holocene to a Middle Holocene dominated by extenuated periods of aridity implied the Pinto points were a by-product of people targeting smaller game. Sutton and colleagues (2007) indicated the Pinto Complex saw a rise in the reliance of small game when compared to the previous Lake Mojave Complex of the Early Holocene. The valley environment offered local small game and desert faunal resources to the inhabitants of the Pinto Basin. Resource availability was volatile and dependent on locales able to withstand long-term effects of aridity (Elston and Zeanah 2002; Sutton et al. 2007). Sudden precipitation events would have allowed inhabitants of the Mojave to venture farther out and expand resource networks as the Middle Holocene progressed.

I applied theoretical approaches of chaîne opératoire, operational sequence, and toolmaking as a social process to assist in my interpretation of the inhabitants of the Pinto Basin (Bar Yosef et al. 2009; Bleed 2001; Dobres 2010). *Chaîne opératoire* implied a mental template is present in the minds of the toolmakers when creating lithic tools. This mental template may be shared and then form a collective group understanding for the “perfect point.” This collective understanding becomes evident by likeness amongst projectile points in the archaeological record. Similarity in point forms suggest presence of organization and planning is present, therefore, toolmaking is a social process (Bar Yosef et al. 2009; Bleed 2001; Dobres 2010). Selection of raw material during lithic manufacture becomes a dynamic moment that influences the archaeological record.

Defining diagnostic points in Chapter Five was a vital first step in organizing the assemblage. I utilize data from raw material frequencies to explore how inhabitants of Great Basin desert contexts may have interacted with their environment. A theoretical lens of *chaîne opératoire* draws conclusions into the sub-assemblage. Toolmakers were influenced by the raw material accessible during stone tool manufacture (Bar Yosef et al. 2009; Bleed 2001). Rhyolite, basalt, chalcedony, and chert dominated manufacture of expedient tools. Other materials like jasper, quartz, quartzite, granite, and diorite encompassed around 22% of total raw materials used for expedient tool manufacture. Comparing these numbers to the Pinto points reveals a preference for material type. Quartz dominated the Pinto Complex in the sub-assemblage. Quartz encompassed 78% of Pinto points and was the preferred material in the manufacture of more formal tools (Figure 5.06). Yet, quartz made up only seven percent of expedient tools (Figure 5.13).

If raw material selection was a random endeavor, then such randomness would bear no consistency in raw material counts. Toolmakers of the Pinto Basin seem to have reserved quartz for more formal points like Pinto. Since quartz dominated the Pinto Point Complex (Figure 5.06) there is a predetermined utility for quartz in formal point manufacture. The lack of quartz present in expedient tools (Figure 5.13) showcases persons as not wanting to use quartz for expedient tools. More readily available materials like basalt, rhyolite, chert, and chalcedony better served expedient tool manufacture. Materials like rhyolite, basalt, or chalcedony were employed in the manufacture of expedient tools.

The *chaîne opératoire* approach revealed inhabitants with mobile lifestyles on northern Japanese islands used locally available lithic resources for working tools (Nakazawa and Akai 2017). Obsidian, shale, and other igneous rocks are in abundance in this Japanese context. The high quantity of obsidian and shale affected Japanese island assemblages. The abundance of igneous rock resulted in a conscious choice by Japanese toolmakers to craft expedient tools with obsidian (Nakazawa and Akai 2017). Local availability and easy access to rock sources became a significant variable that influenced toolmaker choice.

The operational sequence assists in aiding understanding of the diagnostic points. In particular, the operational sequence defines the beginning process involved in lithic manufacture. An operational approach focuses on raw materials selected for tool production (Bar Yosef et al. 2009). Quartz dominated the Gypsum Complex, accounting for 57% of the assemblage. Rhyolite and basalt comprised the remaining 43% of Gypsum points (Figure 5.07; Figure 5.08). Between both Pinto and Gypsum Complexes, quartz is a common denominator. Toolmakers chose quartz for their spearpoints on a higher frequency than other materials like basalt, rhyolite, or chert. However, the occurrences of basalt, rhyolite, and chert in diagnostic points implies people perceived the utility in these raw materials. Other materials like chalcedony and jasper were also used for unifaces and expedient tools (Figure 5.12; Figure 5.13). The lower rate of occurrence of quartz in expedient tools demonstrates an organized and collective understanding by peoples. People saw quartz as a medium to construct bifaces and diagnostic points. Its only equals in the biface category were more utilitarian materials like basalt and rhyolite. Quartz also played a role in unifaces (Figure 5.12). Unifaces displayed an equal standing amongst materials like basalt, chalcedony, jasper, and rhyolite.

The Late Prehistoric Complex saw a rise in trading relations as demonstrated with one of the few instances of obsidian in the sub-assemblage (Jew et al. 2015b). . This obsidian artifact is a Cottonwood Triangular arrowhead point (Figure 5.09). A decision was made by the toolmaker to reserve such a rare material for use as an arrowhead point. The other two instances of obsidian come in the form of an expedient tool, interpreted as a large flake, and a large biface, interpreted as a thinned biface (Andrefsky 2005). Since obsidian is a rare material in the confines of Joshua Tree National Park, it is likely the obsidian was repurposed from previous tools over time. Obsidian in such a small point form suggests rare materials, like obsidian, can be byproducts of recycled tools. Nevertheless, in this Mojave Desert context, it seems persons held a predetermined expectation to use obsidian as some sort of biface. Obsidian is the only rare exotic material seen in the Cottonwood Triangular typology.

Research from Hughes (2018) and Scharlotta (2014) demonstrated sources of obsidian and rhyolite located in the Mojave Desert. Rhyolite and obsidian were accessible to Pinto Basin inhabitants, yet, we find rhyolite is the only material of the two to have a strong presence in the sub-assemblage. People of the Pinto Basin were either unaware of this obsidian source or deemed the obsidian source inaccessible. Obsidian could have been obtained through trading relations, or perhaps, the Campbells failed to collect obsidian artifacts from the surface of the Pinto Basin. Yet, a third option exists for the discrepancies in obsidian compared to other material types. As Dobres (2010) has conveyed, the process of transforming raw material into an object with meaning, creates the person just as much as the manufacture process creates the tool. People of the Pinto Basin may have perceived their local resources in a manner that established their knowledge and validated their skillset via a locally available lithic toolkit. There is a possibility that the Pinto Complex used quartz and rhyolite in higher frequencies than obsidian and other raw materials due to an association between the person and the imagined “perfect point” (Bourdieu 1990). Quartz may have been a preferred material because it yielded a greater chance to produce the “perfect point.”

The dominance of quartz also translated into the Gypsum Complex and a small part of the Late Prehistoric Complex. Quartz was a material serving a wide range of purposes. The tendency to use quartz throughout the archaeological record in Joshua Tree National Park may be reasoning for its appearance in Pinto, Gypsum, and Late Prehistoric Complexes. People may have been more familiar manipulating quartz as a medium to achieve higher success in working tools. The high appearance of quartz in unifaces and bifaces further suggests familiarity. Strengthening such a claim is the low occurrence of quartz in expedient tools. Expedient tools are a category which transcends the chronological markers of diagnostic points. Expedient tools hold value throughout the ancient past. Utilitarian functions in daily life of the past required continual reliance of expedient tools. The low rate of (7%) quartz in expedient tools solidifies people reserved quartz for bifaces, unifaces, and diagnostic point production (Figure 5.13).

As demonstrated in this thesis, quartz was the medium for more formal points like Pinto (Figure 5.05; Figure 5.06). This example of choice entails knowledge of preferable crafting mediums and shared understanding of what defines the “ideal” Pinto point. The innate difficulty accompanying toolmaking processes to create the “perfect point” ultimately creates variation amongst final point types. Subtle differences between projectile point types has often been used to validate creation of distinct cultural complexes. However, I am suggesting such minor differences are not the byproduct of cultures producing new technologies, but instead, of an “ideal” point type becoming the manifestation of the person via their lithic toolkit (Bourdieu 1990; Dobres 2010). Highly diverse landscapes of the Great Basin shape the thinking of the toolmakers and alters their interpretation of the object. Viewing lithic manufacture in this manner suggests past peoples of the Mojave had a collective understanding of their environment and shared knowledge of a “perfect point” that suited their home contexts. If we apply such an approach to other regions of the Great Basin, then typology becomes a useful inquiry, while past inhabitants of the Great Basin becomes the central research objective.

I incorporated theoretical models like *chaîne opératoire*, operational sequence, and toolmaking as a social process, to expand upon the current view of how archaeologists can think beyond form, function, and material type. Instead, archaeologists should interpret projectile point types as a snapshot into a more dynamic human past (Taylor 1948). Research should rejuvenate understandings of Great Basin prehistory and place people as central to our understanding of the past. In addition, a holistic understanding of the past also considers climate, environment, and local resource availability which all influence peoples' cognitive choices made during processes of lithic tool manufacture.

Categorizing the Pinto point in the confines of measurement data must also account for processes of retouch, repurposing tools, and recycling raw materials. These processes undoubtedly problematize typologies. For these reasons, archaeologists should invest their research in understanding the various reasons and variables behind the decision-making processes associated with chipped stone tool manufacture. Taylor (1948) exposed descriptive archaeology as engaged in an investigation of points and not the past peoples creating lithic technologies. It is my aspiration to shift from studies focused solely on typology, because research that stops at classification undoubtedly creates a singular understanding of a lithic past, rather than improving upon our current understanding of the human past.

APPENDIX A

THE PINTO BASIN SUB-ASSEMBLAGE

Figure A.1: CA-RIV-5008, PB1; Pinto points.

Figure A.2: ISOLATE (context unknown), PB2; Expedient tool.

Figure A.3: CA-RIV-5009, PB3; Gypsum point.

Figure A.4: CA-RIV-5010, PB5; Pinto point.

Figure A.5: CA-RIV-5006, PB6; Gypsum point.

Figure A.6: CA-RIV-5006, PB7B; Expedient tools.

Figure A.7: CA-RIV-4146, PB8; Biface (second row, first from left), expedient tools, and fractured biface (third row, middle).

Figure A.8: ISOLATE (unknown context), PB9; Expedient tool.

Figure A.9: CA-RIV-521, PB10; Expedient tools.

Figure A.10: CA-RIV-521, PB11; Expedient tool.

Figure A.11: CA-RIV-5004, PB12: Expedient tools, bifaces, unifaces, one Gypsum point (third row, second from left), one Pinto point (third row, fifth from left).

Figure A.12: CA-RIV-5005, PB12; Expedient tools.

Figure A.13: CA-RIV-5004, PB13: Three bifaces, one uniface (second from left).

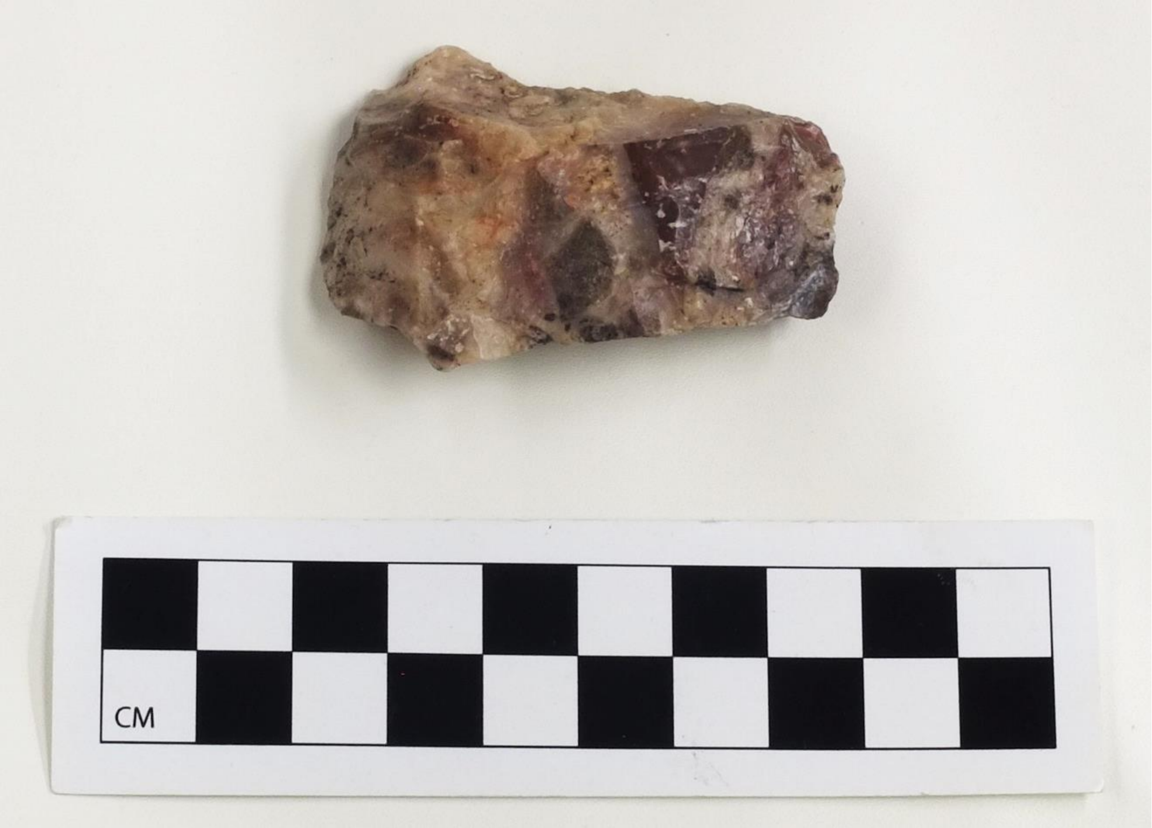

Figure A.14: CA-RIV-5004, PB14; Expedient tool.

Figure A.15: CA-RIV-5005, PB15; Expedient tool.

Figure A.16: CA-RIV-522, PB16; One Gypsum point (bottom row, middle), unifaces, and expedient tools.

Figure A.17: CA-RIV-521, PB17; Expedient tools.

Figure A.18: CA-RIV-5004, PB18; Expedient tools.

Figure A.19: CA-RIV-5008, PB19; Pinto point.

Figure A.20: CA-RIV-521, PB20; Two expedient tools.

Figure A.21: CA-RIV-522, PB21; whole and fractured Pinto points and one fractured Gypsum point (second row, fourth from left).

Figure A.22: CA-RIV-521, PB22; Expedient tools.

Figure A.23: CA-RIV-521, PB23; unfinished points.

Figure A.24: CA-RIV-5013, PB24; Fractured bifaces, unifaces, and expedient tools.

Figure A.25: CA-RIV-5005, PB25; Expedient tool (left) and biface (right).

Figure A.26: CA-RIV-5004, PB26; Expedient tool.

Figure A.27: CA-RIV-5005, PB27; Biface.

Figure A.28: CA-RIV-5013, PB28; Pinto point (middle) and two fractured points.

Figure A.29: CA-RIV-5020, PB29; Expedient tools, drill (middle), scraper (right).

Figure A.30: CA-RIV-5020, PB31; One Gypsum point (left) and expedient tool (right).

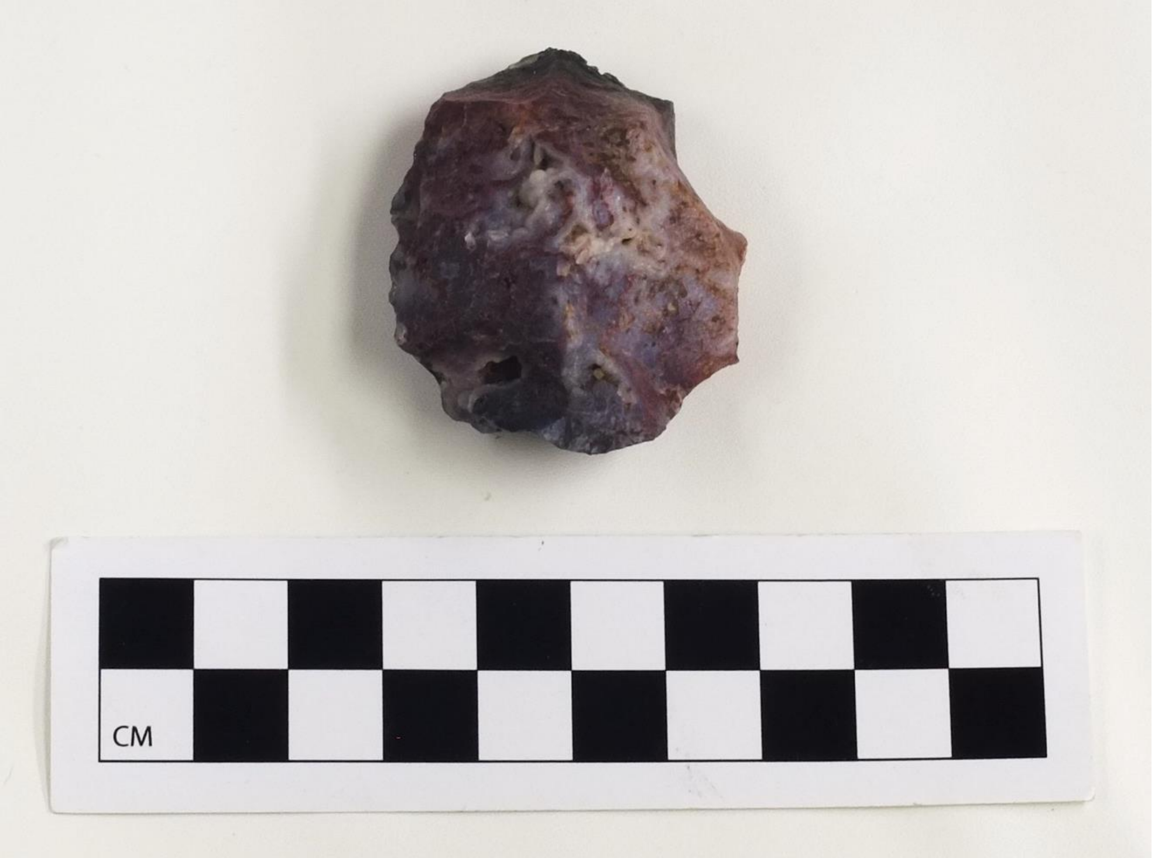

Figure A.31: CA-RIV-5013, PB32; Expedient tool.

Figure A.32: CA-RIV-5010, PB33; Expedient tools.

Figure A.33: CA-RIV-5013, PB33; Expedient tools.

Figure A.34: CA-RIV-5009, PB35; Pinto points and fractured points.

Figure A.35: CA-RIV-5005, PB36; Fractured point.

Figure A.36: CA-RIV-5010, PB39; Expedient tools.

Figure A.37: CA-RIV-5006, PB40: Expedient tools.

Figure A.38: CA-RIV-521, PB30; Pinto point (top row, first from left), bifaces, unifaces, and expedient tools.

Figure A.39: CA-RIV-5018, PB34; Expedient tools.

Figure A.40: SBCM 204. CA-RIV-395; Expedient tools.

Figure A.41: SBCM 206, 2/1956; Expedient tools and unifaces.

Figure A.42: UR22.1; Expedient tools and fractured bifaces.

Figure A.43: SBCM 206.UR 22; Late Prehistoric points, fractured Late Prehistoric point, bifaces, uniface, and expedient tool.

Figure A.44: SBCM 206; Expedient tools.

Figure A.45: SBCM 206; Expedient tools.

Figure A.46: SBCM 206; Expedient tools.

Figure A.47: SBCM 206; Expedient tools.

Figure A.48: SBCM 206; Expedient tools.

Figure A.49: SBCM 5572.5; Uniface.

Figure A.50: SBCM 5572.7; Expedient tool.

Figure A.51: SBCM 5572.8; Expedient tool.

Figure A.52: SBCM 5572.9; Fractured biface.

Figure A.53: SBCM 5572.10; Expedient tool.

Figure A.54: SBCM 5572.11; Expedient tool.

Figure A.55: SBCM 5572.12; Expedient tool.

Figure A.56: SBCM 5572.13; Expedient tool.

APPENDIX B

CATALOGUE OF THE PINTO BASIN SUB-ASSEMBLAGE

Accession	Cat Number	Material	Artifact	Notes
A2427-	1.21X	Quartz	Pinto point	complete point
A2427-	1.21N	Chert	Pinto point	complete point
A2427-	1.21T	Quartz	Pinto point	complete point
A2427-	1.21S	Quartz	Pinto point	complete point
A2427-	1.21V	Quartz	Pinto point	basal sect
A2427-	1.21IL	Quartz	Biface	mid sect
A2427-	1.21O	Obsidian	Biface	complete biface
A2427-	1.21P	Chert	Biface	half biface
A2427-	1.21W	Quartz	Biface	half biface
A2427-	1.21R	Quartz	Biface	biface, tip missing
A2427-	1.21Q	Quartzite	Biface	mid sect
A2427-	1.21I	Rose Quartz	Biface	mid sect
A2427-	1.21H	Quartz	Biface	basal sect
A2427-	1.21E	Rhyolite	Gypsum	point sect, basal missing
A2427-	1.21M	Chert	Exp Tools	scraper
A2427-	1.21B	Chert	Exp Tools	scraper
A2427-	1.21Y	Chert	Exp Tools	scraper
A2427-	1.21F	Chert	Exp Tools	possible macro drill
A2427-	1.21C	Rhyolite	Exp Tools	scraper
A2427-	1.21L	Chert	Exp Tools	scraper
12-5-	1	Basalt	Biface	complete biface
12-5-	2	Basalt	Exp Tools	edge damage
12-5-	4	Basalt	Exp Tools	edge damage

12-5-	5	Basalt	Exp Tools	possible edge damage, baked
12-5-	6	Basalt	Exp Tools	edge damage
12-5-	9	Chalcedony	Exp Tools	half missing
12-5-	10	Chert	Exp Tools	edge damage
12-5-	13	Chert	Exp Tools	sun-baked
12-5-	11	Quartz	Exp Tools	edge damage, fractured
12-5-	20	Quartz	Exp Tools	edge damage
12-5-	21	Chert	Exp Tools	edge damage
12-5-	22	Chalcedony	Exp Tools	possible drill
12-5-	23	Chert	Biface	possible side notch
12-5-	24	Chalcedony	Exp Tools	edge damage, bulb
12-5-	25	Rhyolite	Exp Tools	edge damage
12-5-	26	Basalt	Exp Tools	edge damage
12-5-	27	Chert	Exp Tools	possible edge damage, flake
12-5-	28	Diorite	Biface	sun-baked
12-5-	29	Chert	Exp Tools	edge damage, bulb
12-5-	30	Milky Quartz	Exp Tools	possible notching
12-5-	31	Quartz	Exp Tools	edge damage
12-5-	32	Chert	Exp Tools	edge damage, possible notching
12-5-	33	Diorite	Exp Tools	edge damage
12-5-	34	Chert	Biface	thick cortex
12-5-	35	Chert	Biface	mid sect

12-5-	38	Diorite	Exp Tools	side notching, ergonomic
12-5-	39	Diorite	Exp Tools	notching, rock discoloration
12-5-	40	Quartz	Biface	mid sect
A2427-	1.31B	Basalt	Gypsum	condition excellent, baked
A2427-	1.31C	Chert?	Exp Tools	worked edge
A2427-	1.35A	Chert?	Biface	broken, banded structure
A2427-	1.35B	Quartz	Biface	broken, possible leaf-shape
A2427-	1.35C	Rhyolite	Biface	broken, fine flaking
A2427-	1.35D	Quartz	Pinto point	complete point
A2427-	1.35E	Monterey Chert	Pinto point	complete point
A2427-	1.35F	Jasper	Biface	mid sect
A2427-	1.35G	Jasper	Biface	mid sect
A2427-	1.35H	Quartz	Pinto point	complete point, basal deformity
A2427-	1.35I	Basalt	Biface	complete biface
A2427-	1.35J	Quartz	Biface	complete biface, basal deformity
A2427-	1.35K	Monterey Chert	Biface	edge damage
A2427-	1.35L	Quartz	Pinto point	complete point
A2427-	1.35M	Rhyolite	Biface	complete point, edge damage
A2427-	1.10A	Rhyolite	Exp Tools	edge damage
A2427-	1.10B	Rhyolite	Exp Tools	worked edge, edge damage
A2427-	1.10C	Chalcedony	Exp Tools	worked edge
A2427-	1.29A	Chalcedony	Exp Tools	worked edge, flake, scraper
A2427-	1.29B	Jasper	Exp Tools	uniface, worked edges
A2427-	1.29C	Quartz	Biface	biface, worked edge
A2427-	1.36	Basalt	Biface	point sect, basal missing

A2427- 1.28A	Quartz	Pinto point	quartz pinkish in color
A2427- 1.28C	Rhyolite	Biface	mid sect
A2427- 1.25A	Basalt	Biface	complete point
A2427- 1.25B	Quartzite	Biface	dark discoloration
A2427- 1.20A	Rhyolite	Exp Tools	edge damage
A2427- 1.20B	Jasper	Exp Tools	edge damage, scraper
A2427- 1.23A	Quartz	Biface	complete biface, crude point
A2427- 1.23B	Rhyolite	Exp Tools	worked edge, edge damage
A2427- 1.23C	Quartz	Biface	complete biface, crude point
A2427- 1.23D	Quartz	Biface	complete biface, crude point, banded
A2427- 1.23E	Basalt	Biface	mid sect
A2427- 1.23F	Quartz	Biface	mid sect
A2427- 1.23G	Basalt	Exp Tools	worked side, possible tool, ergonomic
A2427- 1.17B	Jasper	Biface	mid sect
A2427- 1.17D	Rhyolite	Exp Tools	edge wear
A2427- 1.17E	Jasper	Biface	basal sect
A2427- 1.17F	Chalcedony	Biface	basal sect
A2427- 1.22A	Rhyolite	Exp Tools	worked edge, possible drill
A2427- 1.22B	Basalt	Biface	mid sect, worked edges
A2427- 1.38A	Rhyolite	Exp Tools	flake, blue pen marks, worked edges
A2427- 1.38B	Quartz	Biface	basal sect, worked edges
A2427- 1.38C	Rhyolite	Exp Tools	possible flake, worked edge, uniface
A2427- 1.33A	Rhyolite	Exp Tools	possible flake, worked edge, uniface
A2427- 1.33C	Rhyolite	Exp Tools	possible biface, worked edges, edge wear
A2427- 1.19	Quartz	Pinto point	red-orange band, edge wear, solitary storage
A2427- 1.6	Rhyolite	Gypsum	edge wear, solitary storage

A2427-	1.26	Basalt	Biface	basal sect, edge wear, solitary storage
A2427-	1.5	Quartz	Pinto point	finely worked, solitary storage, broken previously and repaired
A2427-	1.27	Quartz	Pinto point	tip broken, worked edges, solitary storage
A2427-	1.15	Jasper	Biface	worked edges, solitary storage
A2427-	1.14	Jasper	Biface	worked edges, preform, solitary storage
A2427-	1.9	Rhyolite	Exp Tools	worked edge, uniface, solitary storage, (isolate)
A2427-	1.1A	Quartz	Pinto point	tip missing, crude
A2427-	1.1B	Basalt	Pinto point	edge wear
A2427-	1.3	Rhyolite	Pinto point	deformed basal sect, finely worked edges, solitary storage
A2427-	1.39A	Chalcedony	Exp Tools	worked edge, blue pen marks
A2427-	1.39B	Quartz	Exp Tools	worked edge, edge damage
A2427-	1.13A	Chalcedony	Exp Tools	worked edges, uniface, possible core
A2427-	1.13B	Quartz	Gypsum	finely worked
A2427-	1.13C	Rhyolite	Exp Tools	uniface, finely worked, edge wear
A2427-	1.13D	Quartz	Biface	edge wear, edge damage
n/a	n/a	Rhyolite	Exp Tools	edge wear
n/a	n/a	Rhyolite	Exp Tools	edge damage, possible scraper/cutter
n/a	n/a	Basalt	Exp Tools	edge wear, possible scraper/cutter
n/a	n/a	Rhyolite	Exp Tools	edge wear, banded striations
n/a	n/a	Rhyolite	Exp Tools	edge wear, rough texture, aroma
n/a	n/a	Rhyolite	Exp Tools	edge wear, worked edges, possible scraper

n/a	n/a	Rhyolite	Exp Tools	edge wear, worked edges, possible scraper
n/a	n/a	Rhyolite	Exp Tools	edge damage, possible notching
n/a	n/a	Rhyolite	Exp Tools	possible scraper/cutter no signs of working, darker color
n/a	n/a	Rhyolite	Exp Tools	edge wear, possible scraper, point resemblance
n/a	n/a	Rhyolite	Exp Tools	worked edges, edge wear
n/a	n/a	Rhyolite	Exp Tools	worked edges, edge wear
n/a	n/a	Rhyolite	Uniface	worked edges, point resemblance
n/a	n/a	Jasper	Exp Tools	worked edge
n/a	n/a	Jasper	Exp Tools	worked edges, edge wear
n/a	n/a	Jasper	Exp Tools	finely worked edges
n/a	n/a	Chalcedony	Exp Tools	edge wear
n/a	n/a	Quartzite	Exp Tools	edge wear, edge damage
n/a	n/a	Basalt	Exp Tools	edge wear, edge damage
n/a	n/a	Basalt	Exp Tools	edge wear, possible scraper/cutter
n/a	n/a	Basalt	Uniface	smooth texture, worked edges
n/a	n/a	Basalt	Exp Tools	smooth texture, banded striations, worked edge
n/a	n/a	Basalt	Exp Tools	edge damage
n/a	n/a	Basalt	Exp Tools	edge wear
n/a	n/a	Basalt	Exp Tools	edge wear
n/a	n/a	Basalt	Exp Tools	edge wear, possible scraper/cutter
n/a	n/a	Basalt	Exp Tools	worked edge, edge wear, two-tone black/grey

n/a	n/a	Basalt	Exp Tools	worked edge, edge wear
n/a	n/a	Basalt	Exp Tools	worked edge, point resemblance
n/a	n/a	Basalt	Exp Tools	crude, debitage, many intrusions
n/a	n/a	Basalt	Exp Tools	edge wear, edge damage
n/a	n/a	Basalt	Exp Tools	worked edge, edge wear, edge damage, smooth
n/a	n/a	Basalt	Exp Tools	edge damage, edge wear
n/a	n/a	Chert	Exp Tools	many intrusions, edge wear, exterior dirty
n/a	n/a	Chert	Exp Tools	edge wear, possible scraper/cutter
n/a	n/a	Chert	Exp Tools	edge wear, possible scraper/cutter
n/a	n/a	Chert	Exp Tools	edge wear, edge damage
n/a	n/a	Chert	Exp Tools	worked edge, uniface, edge wear
n/a	n/a	Chert	Exp Tools	worked edge, uniface, smooth, edge wear
n/a	n/a	Chert	Exp Tools	edge wear, white in color, smooth
n/a	n/a	Chert	Exp Tools	edge wear, one side dirty, one side clean/smooth
n/a	n/a	Chert	Exp Tools	edge wear, smooth
n/a	n/a	Chalcedony	Exp Tools	edge wear, point resemblance
n/a	n/a	Chalcedony	Exp Tools	edge wear, smooth
n/a	n/a	Chalcedony	Exp Tools	edge wear, edge damage, dirty
n/a	n/a	Chalcedony	Exp Tools	edge wear, point resemblance
n/a	n/a	Chalcedony	Uniface	finely worked on one side, point resemblance

n/a	n/a	Jasper	Exp Tools	edge wear, banded striations
n/a	n/a	Jasper	Exp Tools	edge wear, banded striations
n/a	n/a	Obsidian	Exp Tools	flake, glassy
A2427-	1.7B-1	Quartz	Biface	worked edges, fragment, crude, thick cortex
A2427-	1.7B-2	Chert	Biface	worked edge, fragment, edge damage
A2427-	1.7B-3	Rhyolite	Exp Tools	pos flake, edge damage
A2427-	1.18B	Chalcedony	Exp Tools	edge wear, possible flake
A2427-	1.18C	Chalcedony	Exp Tools	pos flake, worked edge, edge wear, edge damage
A2427-	1.18D	Jasper	Exp Tools	worked edge, edge wear, edge damage
A2427-	1.12A	Rhyolite	Exp Tools	worked edge, fragment, edge wear, edge damage
A2427-	1.12B	Rhyolite	Exp Tools	edge wear, edge damage, thick cortex
A2427-	1.12F	Chalcedony	Exp Tools	worked edge, uniface, point resemblance
A2427-	1.12G	Chert	Biface	mid sect, worked edge, edge wear
A2427-	1.12I	Rhyolite	Exp Tools	edge wear, possible flake
A2427-	1.12K	Chalcedony	Uniface	edge wear, worked edges, possible flake
A2427-	1.12L	Quartz	Biface	mid sect, worked edges, edge damage, thick cortex
A2427-	1.12M	Rhyolite	Biface	worked edge, tip missing, rahter large, possible preform
A2427-	1.12O	Quartz	Gypsum	translucent, edge wear, edge damage
A2427-	1.12P	Quartz	Gypsum	edge wear, thick cortex
A2427-	1.12Q	Quartz	Pinto point	fragment, basal sect, edge wear, edge damage, clean snap

A2427-	1.12R	Chalcedony	Biface	point stem, fragment, edge wear, edge damage, clean snap
A2427-	1.12S	Quartz	Biface	edge wear, edge damage, tip missing
A2427-	1.12T	Rhyolite	Biface	mid sect, finely worked edges, edge wear, clean snap
A2427-	1.12U	Basalt	Exp Tools	possible flake, edge wear, edge damage
A2427-	1.12V	Quartz	Exp Tools	possible flake, edge damage, crude flaking
A2427-	1.12W	Quartz	Biface	point sect, basal missing, edge wear, edge damage, fractured
A2427-	1.12N	Basalt	Uniface	leaf-shaped, curved, edge damage, edge wear
n/a	n/a	Dolomite	Biface	point shape, vertical snap, edge wear, thick
n/a	n/a	Rhyolite	Exp Tools	edge damage, edge wear
n/a	n/a	Rhyolite	Exp Tools	edge damage, edge wear
n/a	n/a	Basalt	Exp Tools	worked edge, edge wear, edge damage
n/a	n/a	Chalcedony	Uniface	finely worked edges, one side dirty, edge wear, edge damage, possible arrow point
n/a	n/a	Quartz	Biface	mid sect, tip missing, basal missing, edge wear, edge damage
n/a	n/a	Jasper	Exp Tools	multiple strike points, edge damage, possible core
n/a	n/a	Jasper	Exp Tools	edge wear, edge damage, possible flake
n/a	n/a	Jasper	Exp Tools	worked edge, edge wear, edge damage, fractured
n/a	n/a	Jasper	Exp Tools	edge wear, edge damage, possible flake
n/a	n/a	Jasper	Exp Tools	edge wear, possible flake
n/a	n/a	Jasper	Exp Tools	edge wear, edge damage
n/a	n/a	Jasper	Exp Tools	edge damage, possible flake

n/a	n/a	Basalt	Exp Tools	edge wear, edge damage, possible drill/scraper/cutter
n/a	n/a	Basalt	Exp Tools	worked edge, clean snaps, possible core/scraper, solitary storage
n/a	n/a	Jasper	Biface	finely worked edges, edge wear, edge damage, solitary storage
A2427-	1.34A	Chert	Biface	worked edges, possible preform
A2427-	1.34B	Chalcedony	Biface	worked edges, possible preform
A2427-	1.34C	Basalt	Uniface	edge wear, possible scraper
A2427-	1.34F	Chert	Exp Tools	rippling on exterior, color changes, edge damage
A2427-	1.34G	Jasper	Uniface	edge wear, edge damage, possible scraper
A2427-	1.34I	Basalt	Biface	finely worked edges, edge wear, edge damage, point resemblance
A2427-	1.30B	Quartz	Pinto point	rose tint, dull tip, edge wear, edge damage
A2427-	1.30C	Quartz	Biface	point/basal sect, edge wear, edge damage
A2427-	1.30D	Rhyolite	Exp Tools	worked edge, clean snaps, possible scraper
A2427-	1.30E	Chalcedony	Biface	pinto point resemblance, fractured, basal sect, edge wear
A2427-	1.30F	Quartz	Uniface	thick, rough snaps, worked edge, edge wear, edge damage
A2427-	1.30G	Quartz	Uniface	edge wear, edge damage, point resemblance, possible preform, fractured
A2427-	1.30I	Basalt	Biface	finely worked edges, edge wear, point resemblance
A2427-	1.30K	Rhyolite	Biface	worked edges, possible preform, fractured, point resemblance
A2427-	1.24F	Quartzite	Biface	point frag, worked edges, edge wear, vertical and horizontal fractures
A2427-	1.24G	Basalt	Biface	point frag, basal sect, edge wear, worked edges
A2427-	1.24H	Basalt	Biface	point frag, point sect, edge wear, worked edges
A2427-	1.24I	Basalt	Biface	point frag, basal sect, edge wear, worked edges

A2427-	1.24J	Basalt	Biface	point frag, mid sect, edge wear, worked edges
A2427-	1.24K	Basalt	Biface	point frag, basal sect, edge wear, worked edges
A2427-	1.24L	Rhyolite	Biface	point frag, point sect, edge wear, worked edges
A2427-	1.24M	Quartz	Gypsum	complete, worked edges, edge wear
A2427-	1.24P	Quartz	Biface	mid and basal sect, edge wear, worked edges
A2427-	1.24O	Rhyolite	Biface	mid and basal sect, edge wear, worked edges
A2427-	1.24N	Quartz	Biface	glossy and clear, multiple fractures, worked edges, edge wear
A2427-	1.24Q	Chalcedony	Biface	point frag, tip, worked edges, edge wear
n/a	n/a	Quartz	Exp Tools	worked edge, edge wear, fractures
n/a	n/a	Quartz	Exp Tools	worked edge, edge wear, edge damage
n/a	n/a	Chalcedony	Exp Tools	worked edge, edge wear, edge damage
n/a	n/a	Chalcedony	Exp Tools	worked edge, edge wear, edge damage
n/a	n/a	Jasper	Exp Tools	worked edge, edge wear, edge damage
n/a	n/a	Jasper	Biface	point sect, finely worked, most likely arrow point
n/a	n/a	Basalt	Exp Tools	worked edge, edge wear, edge damage
n/a	n/a	Basalt	Biface	worked edge, edge wear, edge damage
n/a	n/a	Basalt	Exp Tools	worked edge, edge wear, edge damage
n/a	n/a	Basalt	Exp Tools	worked edge, edge wear, edge damage
n/a	n/a	Rhyolite	Exp Tools	def edge wear, possible scraper, worked edges, edge damage
n/a	n/a	Rhyolite	Exp Tools	worked edge, edge wear, edge damage

n/a	n/a	Rhyolite	Exp Tools	worked edge, edge wear, edge damage
n/a	n/a	Rhyolite	Exp Tools	worked edge, edge wear, edge damage
n/a	n/a	Rhyolite	Biface	point sect, finely worked, edge wear, worked edges
n/a	n/a	Chert	Biface	paper glued on side, worked edges, mid sect, edge wear
n/a	n/a	Chalcedony	Exp Tools	paper glued on side, edge wear, edge damage
n/a	n/a	Chalcedony	Biface	paper glued on side, point sect, edge wear, edge damage
n/a	n/a	Rose Quartz	Exp Tools	paper glued on side, worked edges, point sect, possible scraper
n/a	n/a	Quartz	Exp Tools	paper glued on side, point resemblance, thick, mid and basal sect, edge damage
n/a	n/a	Quartz	Exp Tools	paper glued on side, edge wear, edge damage
n/a	n/a	Rhyolite	Exp Tools	paper glued on side, def edge wear, possible scraper
n/a	n/a	Rhyolite	Exp Tools	paper glued on side, basal sect, edge damage, edge wear
n/a	n/a	Basalt	Exp Tools	paper glued on side, purple hue, edge dulling, sun-baked
n/a	n/a	Basalt	Exp Tools	paper glued on side, edge wear
n/a	n/a	Basalt	Exp Tools	paper glued on side, worked edges, edge damage
n/a	n/a	Basalt	Exp Tools	paper glued on side, fine point, edge wear, possible drill
n/a	n/a	Basalt	Biface	paper glued on side, basal sect, edge damage, edge wear, worked edges
n/a	n/a	Basalt	Exp Tools	paper glued on side, worked edge, sun-baked
n/a	n/a	Basalt	Biface	paper glued on side, mid sect, worked edges, edge wear
A2427-	1.16B	Rhyolite	Biface	finely worked, point sect, missing basal sect, def edge wear
A2427-	1.16C	Rhyolite	Uniface	finely worked edge, def edge wear, possible scraper

A2427- 1.16D	Chalcedony	Biface	basal sect, worked edges, edge wear
A2427- 1.16E	Jasper	Uniface	edge damage, worked edge
A2427- 1.8B	Chalcedony	Exp Tools	worked edge, edge wear, edge damage, fractures
A2427- 1.8C	Rhyolite	Biface	worked edges, edge wear, edge damage
A2427- 1.8E	Basalt	Exp Tools	edge damage
A2427- 1.8F	Basalt	Exp Tools	edge damage
A2427- 1.8G	Granite	Exp Tools	edge dulling
n/a n/a	Obsidian	Late Pre	intricately crafted, edge wear, edge damage
n/a n/a	Quartz	Late Pre	intricately crafted, edge wear, edge damage
n/a n/a	Basalt	Late Pre	intricately crafted, edge wear, edge damage
n/a n/a	Chert	Late Pre	intricately crafted, edge wear, edge damage, tip fractured
n/a n/a	Chert	Late Pre	intricately crafted, pressure flaking, heavy serration, tip fractured
n/a n/a	Basalt	Biface	worked edges, edge damage
n/a n/a	Quartz	Biface	dirty, edge damage
n/a n/a	Chert	Biface	smooth, red bands, edge wear
SE, CAL 30A	Quartz	Biface	possible pinto point, basal fracture, tip fracture, edge damage, serration
n/a n/a	Jasper	Late Pre	intricately crafted, edge wear, edge damage, basal side fracture, serration
n/a n/a	Basalt	Biface	vertical fracture, edge wear, edge damage
n/a n/a	Jasper	Exp Tools	notched, edge wear, edge damage, possible scraper
n/a n/a	Chert	Exp Tools	multiple fractures, edge damage
n/a n/a	Chalcedony	Exp Tools	def edge wear, edge damage, possible scraper
n/a n/a	Rhyolite	Exp Tools	possible notched, edge wear, edge damage

n/a	n/a	Chalcedony	Exp Tools	translucent, uniform color, worked edge, edge wear, edge damage, possible cutter

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