THESIS

THE FRAZIER SITE: AN AGATE BASIN OCCUPATION AND LITHIC ASSEMBLAGE ON THE KERSEY TERRACE, NORTHEASTERN COLORADO

Submitted by

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In partial fulfillment of the requirements

for the degree of Master of Arts

Colorado State University

Fort Collins, Colorado

Spring 2004

COLORADO STATE UNIVERSITY

April 2, 2002

WE HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER OUR SUPERVISION BY SCOTT A. SLESSMAN ENTITLED THE FRAZIER SITE: AN AGATE BASIN OCCUPATION AND LITHIC ASSEMBLAGE ON THE KERSEY TERRACE, NORTHEASTERN COLORADO, BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF MASTER OF THE ARTS.

Committee on Graduate Work

Adviser

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ABSTRACT OF THESIS

THE FRAZIER SITE: AN AGATE BASIN OCCUPATION AND LITHIC ASSEMBLAGE ON THE KERSEY TERRACE, NORTHEASTERN COLORADO

The Frazier site was discovered by Frank Frazier in 1965, and was excavated from 1965 to 1967 by the Denver Museum of Natural History under the direction of H. Marie Wormington. An analysis of the lithic assemblage and a description of the excavations are provided in this thesis because this information has never been published in any detail. The Frazier site is an Agate Basin bison kill-butchery site located near the town of Kersey, Colorado. The Frazier site is important not only because it is one of a few Agate Basin sites on the Northwest Plains, but also because it was the last major excavation directed by H. Marie Wormington for the Denver Museum of Natural History.

The Frazier collection is comprised of 1,161 lithic artifacts and 20,012 pieces of bone. Interpretations of Agate Basin activities at the Frazier site are based on the analysis of the lithic material (debitage and tools), and the raw material composition of the collection. In addition to a traditional lithic analysis, the Frazier collection is inspected through the use of minimum nodule analysis (MNA). An examination of the spatial distribution of cultural remains indicates that several distinct activity areas are located at the site.

The results of the analysis are used to compare the Frazier data with other Paleoindian sites in the region, particularly with Agate Basin period sites. Unlike the other long-term, multiple-event Agate Basin localities (Agate Basin site, Hell Gap site), the results of the analysis indicate that the Frazier site represents a single-event, short-term bison kill-butchery and processing occupation. The Frazier site therefore offers a different view of Agate Basin behavior on the Plains. Aspects of Agate Basin lithic technology, subsistence, site structure and function, and mobility at a kill/processing site are discussed.

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ACKNOWLEDGEMENTS

First and foremost I wish to thank H. Marie Wormington for her service to archaeology, and her interest in investigating the Frazier site when Frank Frazier first informed her of his find. Although I never had the chance to meet her, I know from her work and from her peers that she was a wonderful woman and a great archaeologist. This work is the result of her efforts during the 1965-1967 field seasons, and I only hope that if she could see it, she would be happy with the results.

I want to give special thanks also to the man who found the Frazier site over 30 years ago, Frank Frazier. Frank was even more helpful and inviting than I could have imagined. He provided me with documents and slides that were significant for this research. Frank and Lou Klein visited the Frazier site with me, and Frank divulged information to me about the investigations that can be found nowhere except in his head – for that insight I am forever grateful. Franks' support of me throughout this project has been a driving force for my research.

The completion of this project could not have been possible without the support and help of many people. I want to give special thanks to Larry Todd, my advisor and mentor, for reviving my interest and excitement about archaeology. Few people have the gift of exciting students to pursue their interests, and I am proud to have had the privilege to study under such a person. My committee, Larry Todd, Chris Zier, Matt G. Hill, Jeff Eighmy, and Gene Kelly, have been instrumental in the completion of this work. Each of these individuals commented on the original draft and provided me with much-needed direction and suggestions. Matt Hill deserves special acknowledgement for comments on several of the later drafts. Matt gave a

thorough review of the second and third drafts of this document, and I am indebted to him for his time. The man is a walking Paleoindian bibliography and I am fortunate to have worked with him.

Chris Zier has not only been influential in my thesis work, but I can trace the beginnings of my thesis directly to my association with him. While working at Centennial Archaeology as a "young buck", Chris introduced me to Kersey Terrace archaeology and Lou Klein. Although he probably didn't realize it at the time, Chris planted a seed in me for an interest in Paleoindian archaeology on the Kersey Terrace. Chris actually took me to visit the Frazier, Jurgens, and Klein sites during a highway project, years before I decided to analyze the Frazier collection. Thank you Chris for the great years of archaeological "growth" at Centennial and your invaluable comments on the thesis draft. There is no way I would be where I am today without your help.

Jeff Eighmy was always there when I needed him during my course work at CSU. I am honored to have attended the school when Jeff was at the helm. Although he forgot he was on my committee for a while, I will overlook it because I took nearly five years to finish. Thanks for keeping me honest and for not giving up on me and my work.

Gene Kelly has to be the most intelligent funny-man I have ever known. Hard to believe he used to drive a taxi through the streets of New York – I think he is a much better fit where he is now. Thanks for teaching me the basics of soil/geomorphology and for your comments on the draft.

Although Lou Klein recently moved from the Kersey Terrace, he lived in the area for most of his life and is more familiar with Kersey Terrace archaeology than any other person. Lou took the time to show me around and talk with me about Paleoindian lithics and he introduced me to Frank Frazier. Lou is a great man and I am thankful to have spent time with him discussing archaeology.

Jim Dixon and the faculty at the Denver Museum of Nature and Science deserve a special acknowledgement for their patience with me and for allowing me to study the Frazier artifacts. Jim, Craig Lee, and Ryntha Johnson were especially instrumental in helping me gain access to the collection in the first place. Jennie Borresen provided the faunal data for this report, and I have enjoyed working with her during the course of this project. It has been fun to see how our interpretations of the site compared when analyzing two different resources.

Several people that worked at the Frazier site provided me with information on the excavation itself. Calvin Jennings, Bob Ackerly, and Ruthann Knudson deserve a huge debt of gratitude for their ability to remember excavating the site.

After my first drive with Steve Kalasz from Fort Collins to Baggs, Wyoming, I knew I was going to like working with him. Steve spent many an hour teaching me how to deal with large data sets and how to use several computer programs. In addition to being a great archaeologist, Steve always knows how to have a good time, and I enjoyed working with him. Steve also provided comments on portions of this research that served to make the final product better than it would have been without him.

Erik Gantt has been an amazing friend and colleague throughout the long process of this endeavor. During our course work, we spent countless hours in front of a computer monitor while we conducted research – and we did some archaeology too. I feel extremely fortunate to have become good friends with Erik during our school days and he kept me going right up to the end of this project. I couldn't have done it without your help, support, and your friend keggy.

Mary Van Buren was a wonderful teacher and I want to give her a special thank you for taking the time to actually read my papers and provide "constructive" criticism. She taught me to be more concise in my thoughts and she definitely improved my writing skills.

Dan Amick provided comparative lithic data for this project. Thank you Dan for sharing your data with me, I wish that all archaeologists were as giving as you.

Steve Sherman, Oskar Burger, Paul Burnett, Jeff Adams, Rich Carlsen, Jon Tjornohoj, Cody Anderson, Andy Mueller, Ryan Byrely, Ryan Watson, Kellie Stroden, and Charles Egeland have been fountains of information during the course of this project – unfortunately only some of the information was actually useful, but the rest was just plain ol' fun and much more important in the long-run of mental well-being!! My graduate school cohort was great and we had a lot of fun besides learning. It has been so long since I actually attended the University that I will not mention any of them by name, but they all played a part in this project.

Special thanks to Tony Baker and Bob Patten who took their time to look at the Frazier collection and discuss Paleoindian technology with me. Tony provided additional help to me by allowing me to examine his personal collection and to borrow some of his pieces for raw material comparisons. Jason Labelle was kind enough to share data he compiled on the Claypool site, and was always available for questions concerning Paleoindian research in general. Fred Sellet offered his personal assistance with the minimum nodule analysis, but, sadly, I never made the time to visit him. He did, however, take some of his time at conferences to discuss the technique with me and his dissertation was a huge asset for the Frazier nodule analysis. Although nodule analysis has it's faults, I still believe that it is another useful tool for understanding the life-trajectory of an assemblage.

Dan Jepson was kind enough to permit me the use of several graphics from his reports. Thank you to Dan not only for the graphics, but for his support of my work over the years. John Kennedy is the most well-rounded archaeologist I have ever known. Not only does he know a ton of information on every chronological period, but he can also produce the most amazing graphics I have ever had the pleasure of "schlepping" into a report. John provided the wonderful illustrations of the projectile points in this thesis, and I cannot thank him enough for his personal time and effort. He also imparted his archaeological wisdom with me on an almost daily basis, it was fun debating lithic technology with him and it forced me to be a better archaeologist.

Comparative samples of raw materials were collected or obtained from numerous sources by many people, and I am indebted to them all. Alibates, Edwards, and Big Springs (Texas) were provided by Jason Labelle. Bob Patten and Tony Baker supplied Kremmling chert, Washington Pass (chuska) chert, and cumbres chert. John Kennedy offered up Flattop chalcedony and Knife River Flint. Hartville Uplift cherts and quartzites, and additional Flattop samples were obtained from the

Colorado State University comparative collection. Steve Kalasz supplied Trout Creek jasper. Phil Letourneau provided Tecovas Jasper.

During the course of this project, I received funding from the Karen S. Greiner Endowment for the Preservation of Colorado Archaeology, the Colorado State University Graduate Student Research/Travel Grant, and the Jim S. Greenacre Scholarship. Thank you to these organizations and the people that work behind the scenes to help graduate students like myself.

Mary Painter has been a wonderful friend and fellow archaeologist throughout this process. Chris Kinneer deserves a special thank you for "reminding" me of my thesis by deciding to go to graduate school himself. Thanks for the archaeological discussions – uh, let me do some more reading on that first....

My grandmother, Lureign Beights, and my parents, Doug and Sherry Slessman, were fortunate enough to attend my "graduation" party almost five years ago. They met with Larry Todd at the party, and Larry informed my grandmother that she had to keep on me about finishing the thesis. She took this duty to heart, and almost every time I speak with her she reminds me to "get that thesis done Scotty". Thank you grandma!! My parents have been extra supportive of me during this process, and I can't ever thank them enough for all they have done for me.

My wife and best friend Heidi has been, and continues to be, the most supportive and positive person in my life. She has stuck with me through the ups and downs of graduate school, and life in general. After the start of this project in 1999, Heidi and I added two more Slessman's to the clan – Anna and Samuel. Working on a thesis late at night and being "interrupted" by a screaming baby is an experience

that I won't forget, and one that I feel blessed to have. Heidi is beyond awesome, any woman that goes through pregnancy while being married to a poor graduate student and keeps it all together is an amazing woman. I am truly blessed to have her in my life and I would never have finished this project without her love and support. Although they don't know it now, my children have been a big reason I kept going on this project. How can I teach others how to finish what they start and to be a person of their word when I don't do the same myself?

Although I could not have completed this project without the help of the people mentioned above, all interpretations and mistakes within the thesis are solely my own. I apologize to anyone who I forgot to mention or who I incorrectly labeled in a photo, especially all of the good people who excavated the site over 30 years ago. As five years have passed since I began graduate school, I'm sure I forgot at least a few of you, and for that I sincerely apologize. I think Bob Marley condensed my acknowledgements when he said, "In this great future, you can't forget your past", thank you one and all for the promise of a great future!!

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Chapter 1

INTRODUCTION

In the early 1930s, shortly after J. D. Figgins documented the presence of "Early Man" in North America near Folsom, New Mexico, mammoth bones and stone tools were discovered in northeastern Colorado (Meltzer et al. 2002). Subsequent excavations by Frank H. H. Roberts Jr. at the Lindenmeier site north of Fort Collins in 1934 served to establish northeastern Colorado as a potentially significant region for investigation of early human occupation in North America (Gantt 2002; Roberts 1935; Wilmsen and Roberts 1984). The importance of the area was further demonstrated by the discovery and excavation of a series of now-classic Paleoindian sites, including Claypool (Dick and Mountain 1960; Malde 1960; Stanford and Albanese 1975), Dent (Wormington 1957), Drake (Stanford and Jodry 1988), Frasca (Fulgham and Stanford 1982), Jones-Miller (Stanford 1974), Jurgens (Wheat 1979), and Powars (Roberts 1937; Wormington 1957). Also investigated is the Frazier site, an Agate Basin complex bison kill-butchery/campsite near the small town of Kersey in Weld County, Colorado (Wormington 1988). Although the site was excavated, a full account of the mitigation and the cultural material found has not been published. This thesis partially rectifies this situation by reporting on the lithic assemblage from the 1960s excavations at Frazier, and is organized around three primary objectives.

The first of these objectives is to document and describe the history of archaeological investigations at the Frazier site. Second, is to summarize results of analysis of the lithic assemblage. Third, is to evaluate several ideas about the nature of

Paleoindian behavior at the Frazier site, specifically, and in the Northwestern Plains, generally.

The Frazier Site Analysis

This investigation is restricted to the analysis of stone tools, and the byproducts produced during the manufacture and use of stone implements (otherwise known as debitage). This lithic analysis revolves around an attribute-based, assemblage level analysis of the debitage, although the tool sample is also included. The debitage has never been examined in any detail, and only general counts have been provided on the tool sample (Wormington 1988:83). It is remarkable that the collection has remained, for the most part, intact after excavations in 1967. The assemblage was located at the Denver Museum of Nature and Science in the permanent archives, and the debitage was stored in the original paper bags used during excavations. Although it appears that some bone was discarded during excavation (the Frazier excavations used the same techniques of discarding axial elements as employed at the Hell Gap site, debitage was often reburied at sites [Borresen 2002; Gantt 2002:140-142; Rapson and Niven 2002]), H. Marie Wormington and the Denver Museum had the foresight to save the debitage for future study.

Valuable information regarding the Agate Basin period is now available thanks to the long-term curation of these artifacts and field notes. The current study of the Frazier collection highlights the importance of curating artifacts, particularly of specimens once believed to be unimportant such as debitage and axial bone elements. Over the last 20 years there has been a growing trend for the reanalysis of extant archaeological collections, and the analysis of collections that had not been properly curated (Frison and

Stanford 1982a; Gantt 2002; Hill 2001a; Meltzer et al. 2002; Sellet 1999). These studies would not be possible without the curation of the assemblages by professional and private institutions and/or individuals. With each reanalysis or analysis of Paleoindian assemblages, new information regarding technology, subsistence, mobility, and ceremonial practices comes to light. It is truly a benefit to archaeology that collections remain available for examination.

Paleoindian Adaptations on the Northwest Plains and the Frazier Site

In the current context, Paleoindian is used simply as nomenclature for distinguishing a group of highly mobile humans living in the Americas during the late Pleistocence-early Holocene (roughly 12,500 – 8,500 B.P.) that presumably relied heavily upon large game such as bison for subsistence. This generalization no doubt masks significant variability in the organization of Paleoindian settlement and subsistence. As more work is completed at Paleoindian sites, it becomes evident that they did not focus solely on large game. Other animals including deer, pronghorn, fish, waterfowl, and rabbit, have been found at Paleoindian sites (Borresen 2002; Hill 2002a; Walker 1982; Wheat 1979; Wilmsen and Roberts 1984:46). Although evidence of plant procurement is sparse, Paleoindian groups were undoubtedly aware of available floral foods. Not only does the definition of Paleoindians sell the people short in regard to their subsistence, it ignores the social and religious aspects of the groups. The full extent of Paleoindian lifeways is still being assembled from the archaeological record, and it is hoped that some of the observations provided in the current research provide important pieces to the Paleoindian puzzle.

A postulated pre-Clovis occupation of the New World continues to be discussed and debated as a precursor to the Clovis stage Paleoindian (Kulisheck 1994; Straus 2000). The debate is not unresolved as of yet, although evidence from the Chilean coast in South America indicates that people were living in the Americas by at least 12,500 B.P., roughly 1000 years earlier than previously believed (Dillehay 1997). Further support of a pre-Clovis occupation in the Americas has been indicated at the Cactus Hill site near Richmond, Virginia where stone tools were reportedly found underneath Clovis projectile points in a stratified context with radiocarbon dates as old as 16,000 B.P. (McAvoy and McAvoy 1997).

Paleoindian groups are part of the Paleoindian stage that is divided into several periods on the basis of diagnostic artifacts, technology, and radiocarbon dates. Figure 1 provides a chronological diagram for Paleoindians. The Paleoindian stage as defined here is split into three major periods or traditions, Clovis (11,500 – 10,900 B.P), Folsom (10,900 – 10,200 B.P.), and Plano (10,200 –8,000 B.P.). The Goshen complex cross-cuts both the Clovis and Folsom temporal periods, whereas several traditions including Agate Basin, Hell Gap, and Cody, are lumped into the Plano Tradition.

The major distinctions between these traditions are projectile point morphology, lithic technology, and associated radiocarbon dates. Clovis points are typically large, fluted, lanceolate specimens with concave bases, basal and lateral grinding, and outré passé flaking patterns. Folsom points are similar to Clovis weapon tips as they are also fluted and lanceolate in form. However, they are typically smaller and the flute extends nearly the entire length of the point in contrast.

? to 11,500 B.P.	**Pre-Clovis**	(Monte Verde 12,500 B.P.- see Dillehay 1997)
11,500 B.P.	**Clovis**	(Colby: 11,200 ± 200 B.P.; Dent: 10,600 ± B.P.)
11,000 B.P.	**Goshen**	(Goshen-Mill Iron: 10,760 ± 130 B.P. to 11,570 ± 170 B.P.)
	Folsom	(Folsom-Hanson: 10,080 ± 330 B.P.; Agate Basin,Folsom: 10,780 ± 120 B.P.)
10,500 B.P.	**Agate Basin**	(Agate Basin, Agate Basin: 10,430 ± 570 B.P. Brewster 9350 ± 450 to 9990 ± 225 B.P. Frazier 9550 ± 130 to 9650 ± 130 B.P.)
10,000 B.P.	**Hell Gap**	(Casper: 9,830 ± 350 B.P. to 10,060 ± 170 B.P. Jones-Miller: ca. 10,200 B.P.– see Stanford 1999:137)
9,500 B.P.	**Alberta**	(Hudson-Meng: 8990 ± 230 B.P. to 9,820 ± 160 B.P.)
9,000 B.P.	**Cody**	(Horner: 7880 ± 1300 B.P. to 9,390 ± 75 B.P. Jurgens: 9070 ± 90 B.P. – see Wheat 1979)
8,500 B.P.	**Fredrick**	(Fredrick-Hell Gap: 8690 ± 380 B.P.
	James Allen	(James Allen-James Allen: 7,900 ± 400 B.P.)
8,000 B.P.	**Early Archaic**	

Figure 1. Chronological diagram for Paleoindians on the Northwest Plains (based on Frison 1991:Figure 2.4, Tables 2.1 through 2.4; dates also used from Dillehay 1997; Stanford 1999; Wheat 1979).

The Plano Tradition incorporates a wide variety of lanceolate projectile points of many types, including Agate Basin, Hell Gap, Cody, Angostura, Jimmy Allen, Frederick, Eden, Scottsbluff, San Jon, Firstview, and Kersey. Many of these points exhibit parallel-oblique or collateral flaking patterns and un-fluted bases – a far different technology than the outré passé flaking and flutes noted on Clovis and Folsom points. Another major distinction between these traditions is the presence of mammoth at Clovis sites, and relatively little evidence of mammoth at Folsom and Plano period occupations.

Of particular importance to this thesis is the Agate Basin Complex. Although Agate Basin points were discovered at the Agate Basin site in extreme eastern Wyoming nearly 30 years earlier by a local rancher/avocational archaeologist, the Agate Basin cultural complex was first defined in 1961 by Frank H. H. Roberts, (Frison 1991:165). To date, only a handful of Agate Basin sites are known, although isolated Agate Basin projectile points are dispersed throughout the Plains and Eastern Woodlands. Agate Basin sites, or sites with Agate Basin components are shown in Figure 2, along with other selected Paleoindian sites on the Northwest Plains. The Agate Basin type-site is a large area that was repeatedly used as a kill/butchery/camp locality (Frison and Stanford 1982a; Hill 2001a:110-113). The Hell Gap site is located in a narrow valley in southeastern Wyoming that functioned as a butchery/camp site (Frison 1991:22-23; Rapson and Niven 2002; Sellet 1999). Several Paleoindian complexes are superimposed and partially mixed at the Hell Gap site, including an Agate Basin component (Irwin-Williams et al. 1973; Sellet 1999). A small Agate Basin component was identified at the Carter Kerr-McGee site, also in Wyoming (Frison 1984). Bison were trapped at the end of an arroyo and butchered at the locality.

Although no Agate Basin kill sites have been found east of the Plains, Agate Basin projectile points have been located at sites in the Eastern Woodlands, and into the Northwest Territory – Grant Lake Region (Justice 1987:33-34; Wright 1976). Agate Basin points were recovered at Rodgers Shelter, Graham Cave, and Arnold Research Cave in central and eastern Missouri (Ahler 1971, 1976:134-145; Chapman 1975). The point style is also found along the northeastern coast in New York and New Jersey (Funk and Schambach 1964; Kraft 1973).

The Agate Basin occupations on the Northwestern Plains are camps/kills/butchery locations that were occupied frequently throughout the Paleoindian stage, and these sites

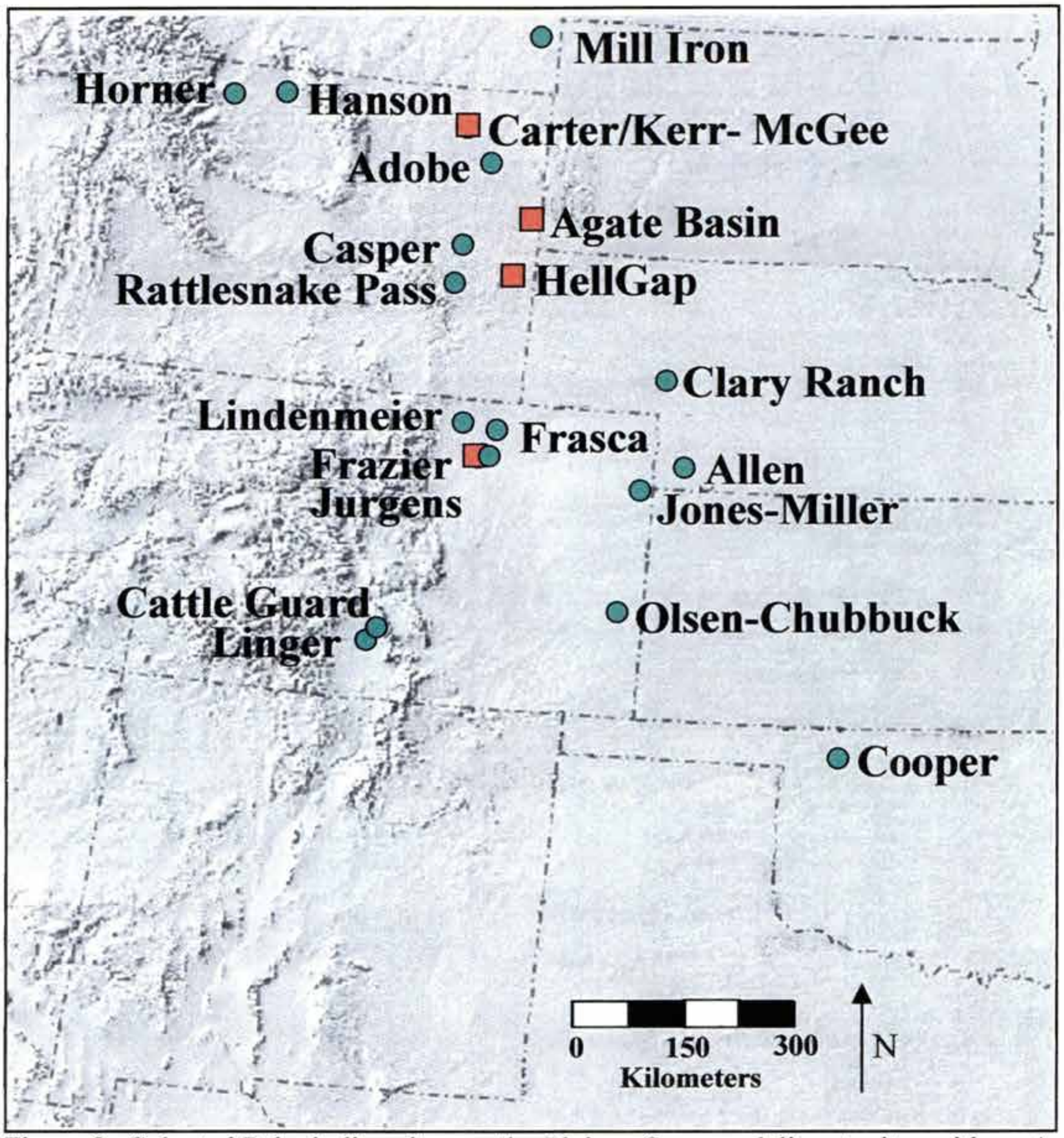


Figure 2. Selected Paleoindian sites on the Plains. Squares delineate sites with an Agate Basin component (map adapted from http://www.nationalgeographic.com/mapmachine).

are also affiliated with components other than Agate Basin. At the Hell Gap site, Sellet (1999:252-254) has illustrated that many of the components may be contemporaneous and are technologically similar. All levels at the Hell Gap site, including the Agate Basin component, produced evidence of a large amount of biface manufacture (Sellet 1999:253-254). Bifacial reduction of stone at the Agate Basin site, including the Agate Basin level, is also the main type of lithic technology (Frison and Stanford 1982b:122). Camp sites are generally associated with biface manufacture, and processing sites are affiliated with expedient tool production (Sellet 1999:254). Unlike the other Agate Basin occupations, the production of bifacial implements at the Frazier site does not appear to be the main focus of activities. Although bifacial reduction did occur, the production of expedient flake tools and maintenance of unifacial and bifacial implements is the dominant lithic activity. The Frazier site therefore offers a different view of Agate Basin groups on the Plains. The site is interpreted as representing a bison kill-butchery event. Lithic technology at the other Agate Basin sites was geared toward the production of bifacial implements, whereas the Frazier group was focused on creating and using butchery tools. Aspects of Agate Basin lithic technology, subsistence, mobility, and ritual practices at a kill/processing site are made available in the provided discussion of the Frazier site. An interpretation of subsistence activity at the site can be found in Borresen (2002).

Results of Analysis

Data produced during the analysis of the Frazier lithic assemblage provides another data set for an Agate Basin occupation, which itself is useful due to the general dearth of Agate Basin data. The available Agate Basin data sets are restricted to only the Agate Basin Type site – Agate Basin level, Hell Gap – Agate Basin level, and Carter/Kerr-McGee. Two of the most important outcomes of the research revolve around patterns of raw material utilization and the spatial distribution of cultural remains.

Lithic artifacts that originate from stone sources found at great distances [(Alibates (525 km) and Hartville (270 km)] from the Frazier site are smaller, exhibit prepared platforms, worn dorsal surfaces, and comprise the majority of scrapers and projectile points. These artifacts also have higher dorsal flake scar counts and generally lack cortex. Larger specimens with unprepared platforms, lower dorsal flake scar counts, and displaying more cortex, are made of raw materials available closer to the site (quartzite [<30 km], petrified wood [<30 km], Flattop Chalcedony [110 km]). Tools of these materials are primarily expedient flake tools and early stage bifaces. Artifacts from more distant sources appear to have been at the end of their use-life, with the Alibates sample exhibiting the greatest degree of exhaustion. The Hartville sample is also depleted, but not to same extent as the Alibates specimens, and 6 of the 8 projectile points are of Hartville material. The Flattop artifacts show relatively little attrition, but more than either the petrified wood or quartzite samples. The general trend of raw material utilization offers a scenario of mobility and stone utilization for the Frazier Agate Basin group. It appears the group was moving in a general south/north route along the Rocky Mountain Front Range, the most distant (time/space) stop being in the Texas Panhandle and then moving north to the Hartville Uplift in east-central Wyoming before moving south again toward the Frazier site.

The spatial distribution of cultural remains at the site indicates distinct activity areas. The eastern portion of the site is associated with projectile points, a few flake tools, hammerstones, choppers, and yellow ochre. Clusters of debitage, flake tools, scrapers, bifaces, and red ochre are present in the western portion of the site around a hearth. Additionally, a concentration of scrapers is located just north and west of the hearth area. Several inferences regarding site function can be gleaned from these observations. The eastern portion of the site is interpreted to be the kill location. This is an important observation since the site was considered to be only a butchery site during the original excavation. Wormington (1988:82) stated that "The kill site and primary butchering area was not found, although it must not have been too far away, for it is unlikely that heavy bison quarters would be carried any great distance". Projectile points and larger chopping tools were only found in this area, and an old arroyo is present in this location. The majority of the processing implements and debitage are noted around the hearth, away from the points and dismembering tools. Therefore it appears that portions of the bison carcasses were dismembered and brought near the hearth for further processing. The large amount of scrapers in the northwestern portion of the hearth area indicates that skinning and hide work occurred in a spatially distinct area.

The presence of ochre at the site suggests affinities with other processing camp sites such as Sheaman, Hanson, Lindenmeier, Stewart's Cattle Guard, and the Agate Basin Folsom level (Frison and Bradley 1980; Frison and Stanford 1982c; Wilmsen and Roberts 1984; Jodry 1999). Several flake tools in the Frazier collection exhibit red pigment on the surfaces of the implements. The spatial distribution of yellow ochre near the kill area, and red ochre in the processing area suggests differential use of hematite for ritual or hide preparation activity. A source for yellow ochre was identified by Wheat (1979:134) approximately 9.6 km (6 mi) east of the Jurgens site. He suggests that yellow ocher was heated to produce red ochre. Ochre has not been previously identified at an Agate Basin occupation, hematite is generally associated with Clovis and Folsom occupations although other ritual components have been noted at the Hell Gap Jones-Miller site (shaman pole) and an Archaic shaman hut at the Ruby site (Frison 1991:208). The presence of ochre at the Frazier site suggests a continuation of ceremonial or functional hide preparation practices during the Agate Basin period and emphasizes the role of social and ritual activities in Paleoindian culture.

Organization of the Thesis

The chapters that follow provide the first detailed record of the fieldwork at Frazier (Chapter 2) and describe the basic attributes of the data collection methods that condition all aspects of any subsequent analysis. Chapter 3 is concerned with the analysis and interpretation of the debitage and stone tool assemblage, and the raw material composition of the collection. Chapter 4 focuses on the spatial distribution of cultural remains, and Chapter 5 explores the results of the lithic analysis and compares the conclusions with other Paleoindian data sets from the Northwestern Plains.

Chapter 2

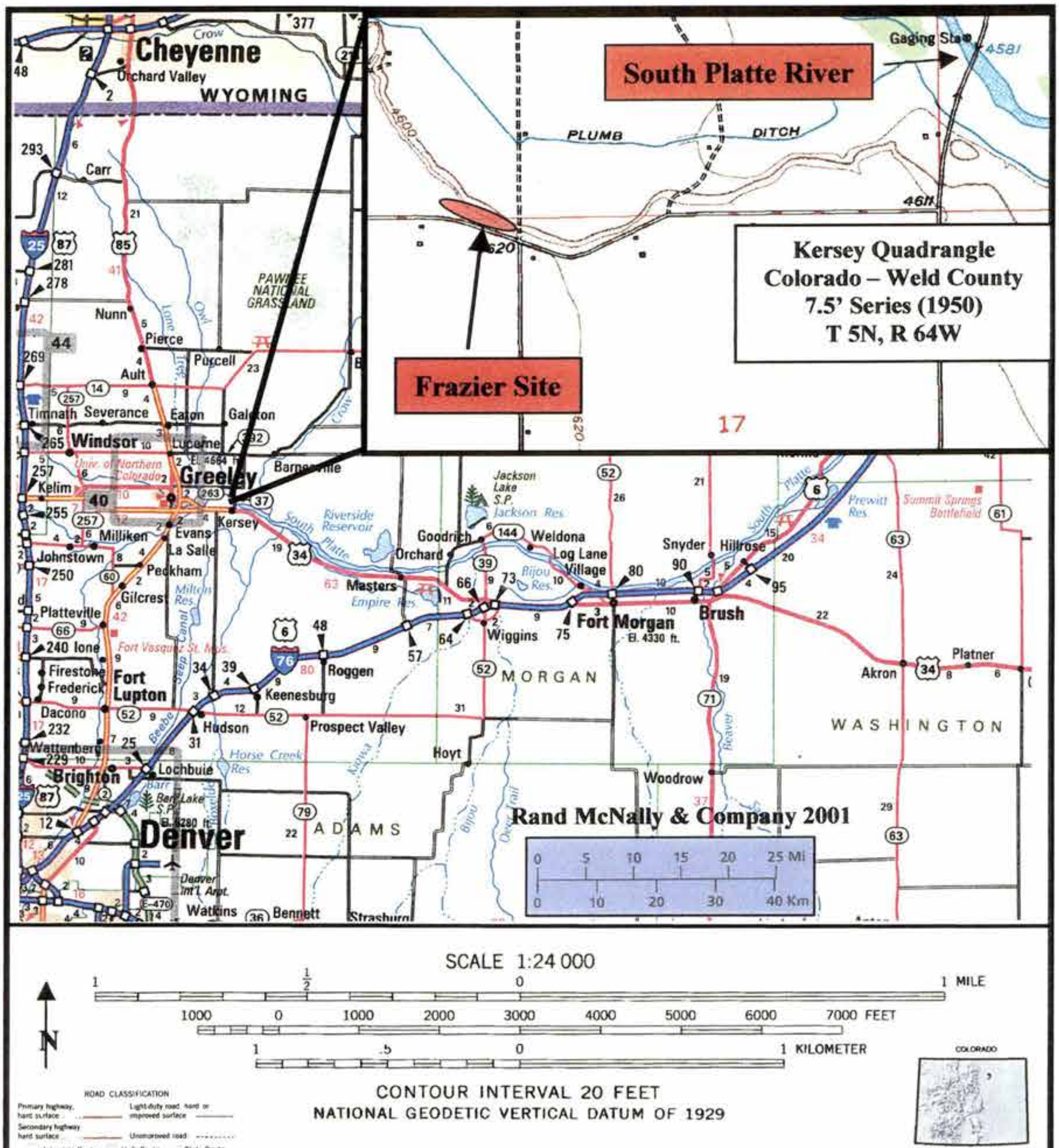
GENERAL SITE DESCRIPTION AND BACKGROUND

The Frazier site is one of many Paleoindian sites on the Northwestern Plains that have been excavated over the last century (Barbour and Schultz 1932; Dick and Mountain 1960; Figgins 1933; Frison 1974, 1991, 1996; Frison and Stanford 1982a; Irwin-Williams et al. 1973; Jodry and Stanford 1992; Stanford 1978; Wheat 1972, 1979; Wilmsen and Roberts 1984; Wormington 1957). Unfortunately, however, detailed information about the site and the associated materials have, up to this point, never been fully reported. Since the site is one of only several Agate Basin sites preserved in primary depositional context, information concerning the site is a welcome addition to the existing Paleoindian data base.

Site Setting and Paleo-Environmental Overview

The Frazier site is located in the Colorado Piedmont (Holliday 1997) approximately 2.2 km northwest of the town of Kersey in Weld County, Colorado (Figures 3 and 4). Elevation at the site is 1408 m (4620 ft). The confluence of the Cache la Poudre and the South Platte rivers is 4.3 km northwest of the site.

The Frazier site is one of several important Paleoindian sites clustered in northeastern Colorado on the Kersey Terrace. Other well-known Paleoindian sites include the Clovis-age Fox and Klein sites (Jepson et al. 1994), the Folsom-age Powars site (Jepson et al. 1994), and the Cody-age Jurgens site (Wheat 1979) (Figure 5).



(Scale and legend corresponds to inset topographic map)

Figure 3. Location of the Frazier site in northeastern Colorado.

Studies of the late Pleistocene and early Holocence paleo-environment suggest that the Great Plains were cooler and wetter than conditions today (Haynes 1993; Holliday 1997). From 18,000 to 12,000 B.P. the area was characterized by cold and dry

Figure 4. Aerial photo showing the location of the Frazier and Jurgens sites and their relationship to the edge of the Kersey Terrace. (Photo courtesy of Centennial Archaeology, Inc., Fort Collins, Colorado).

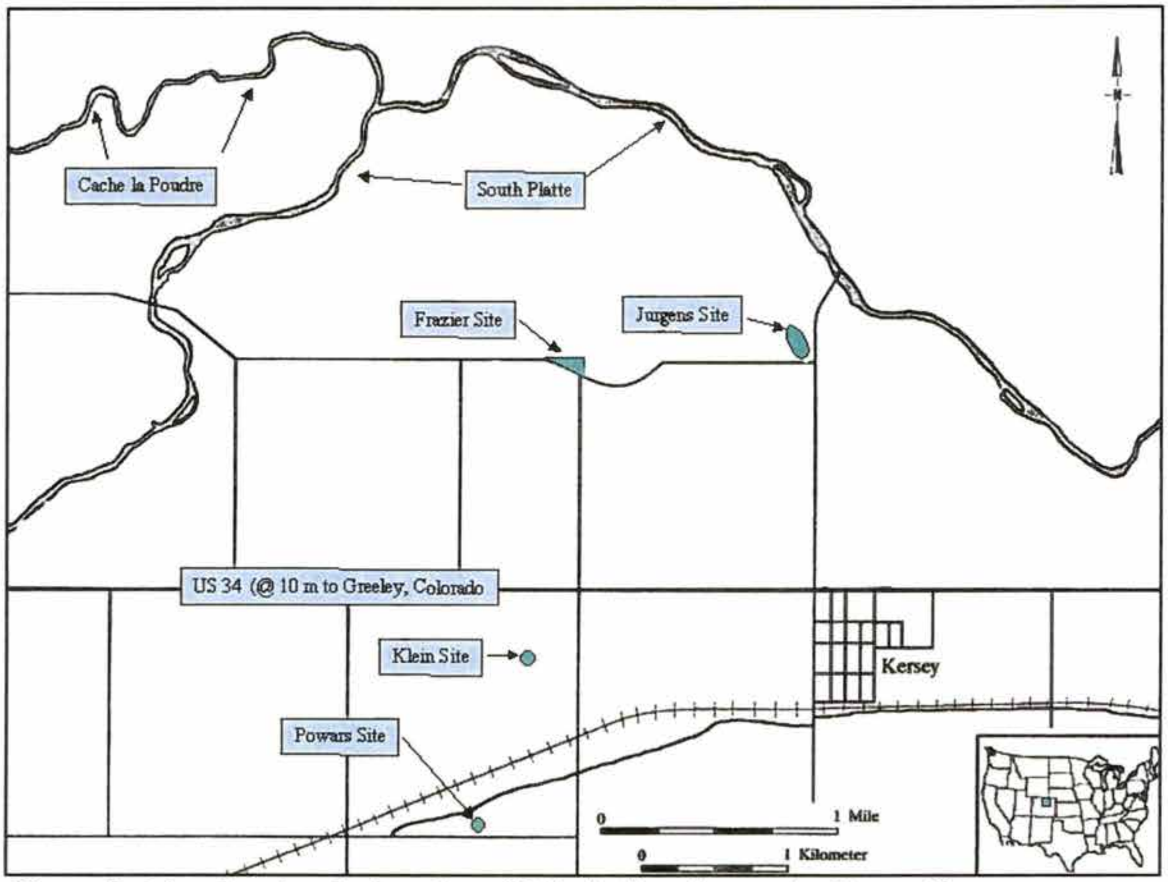


Figure 5. Map showing the location of Paleoindian sites on the Kersey Terrace. (modified from Jepson et al. 1994:Figure 12)

conditions as glaciers reached their fullest southern extent during the late Wisconsian (Pinedale) glacial maximum (between 18,000 and 14,500 B.P.). Average temperatures were between 18 and 27° F and precipitation levels were 15 to 55% lower than modern values (Brunswig 1992; Elias 1986; Leonard 1989). Tree line on the Front Range was significantly lower than present, reaching to as low as 488 m above sea level (Elias 1986; Elias and Toolin 1990). As glaciers began to retreat from 14,500 to 11,700 B.P. average temperatures increased. Seasonal temperature varied less than the preceding Ice Age environment, and precipitation levels were 10-25% more than present values (Elias 1995). The general environment of northeastern Colorado is thought to have been a mixed community of open grasslands and boreal forests (Brunswig 1992). Megafauna were prevalent in the region during this time period, and consisted of mammoth, horse, camel, bison, caribou, and musk-oxen (Walker 1987).

From 11,700 to roughly 11,300 the area continued to experience a shift to higher average temperatures and increasing precipitation (Elias 1990). Evidence from the Plains indicates that drought conditions occurred from 11,300 to 10,800 and probably resulted in the lowering of the water table (Haynes 1991). The lower water table is thought to have concentrated megafauna to fewer water sources and improved the effectiveness of Clovis hunters for killing game (Haynes 1991). The environment in general continued to see an increase in warmth and a decrease in precipitation during 10,800 to 10,000 B.P., although intermittent periods of wet and cool conditions existed (Haynes 1991). Periods of eolian deposition in northeastern Colorado indicate dryer conditions dominated the period (McFaul et al. 1994). Tree lines were retreating in the foothills and plains and mixed tall grass/short grass prairie expanded (Brunswig 1992). The grass prairie environment was well-suited to bison, and the species population increased dramatically as other large mammals failed to adapt (Guthrie 1980, 1984). Throughout the ensuing Plano (approximately 10,000 to 7,500 B.P.), drying and warming was the dominant climatic regime and prairie grassland proliferated (McFaul et al. 1994). Increased aridity and warmer temperatures during the latter portion of the period (8,000 B.P.), resulted in the expansion of semiarid to arid shortgrass and sagebrush/yucca communities and a decrease in mixed tall- and shortgrass prairie ecosystems (Brunswig 1992). Wooded areas were more common than today, and occurred along water sources such as terraces and playa edges like the Frazier site locale (Gleichman and Gleichman 1989; Scott 1979).

Geomorphological Overview

The Frazier site vicinity is characterized by the South Platte River floodplain and three alluvial terraces (Figure 6). Chronologically from oldest to youngest these are the Kersey (T_3), Kuner (T_2), and Hardin (T_1) terraces.

The Kersey Terrace is a gravel fill terrace formed by the braided South Platte River during the late Pleistocene. It lies about 10-12 m above the modern channel and was abandoned ca. 10,650 B.P. (Holliday 1987; McFaul et al. 1991). The Kersey terrace is the downstream equivalent of both the Broadway Terrace of the South Platte (Scott 1963) and the Pleasant Valley Terrace of the Cache la Poudre (Bryan and Ray 1940).

The Kuner Terrace lies approximately 3-5 m below the Kersey Terrace and dates to ca. 5120 B.P. (Zier et al. 1995). Several meters below the Kuner Terrace and about 1-3 m above the modern floodplain (T_0) are remnants of the Hardin Terrace. Recent work by Jepson et al. (1994) suggest this floodplain was abandoned about 140 years ago.

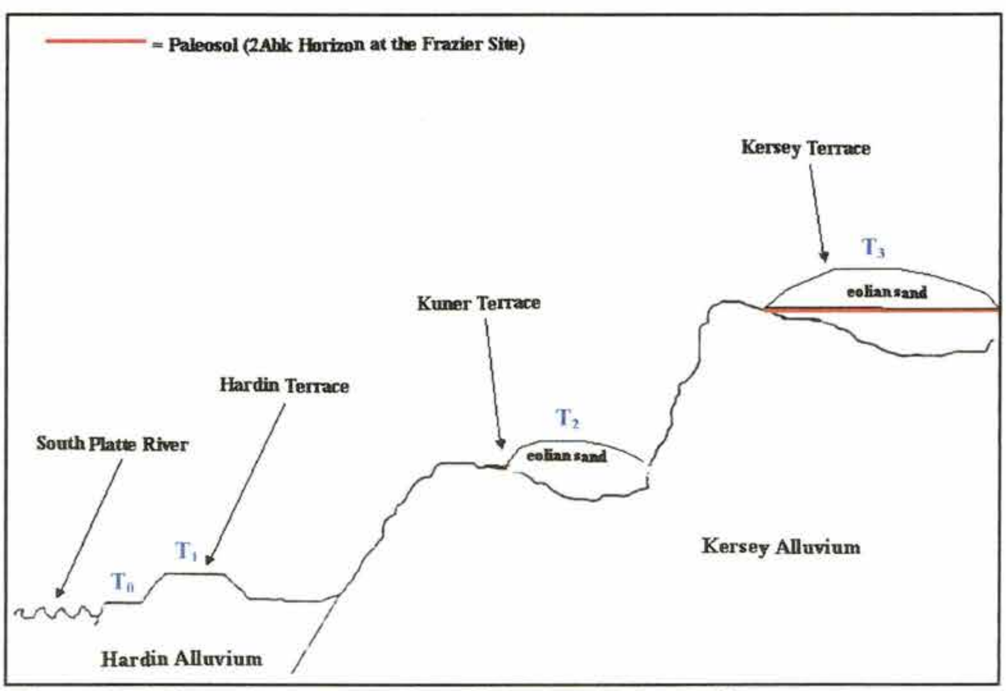
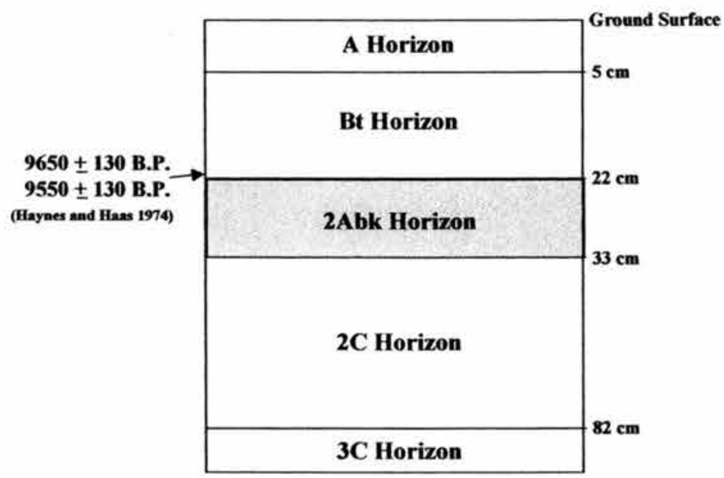


Figure 6. Schematic cross-section of the South Platte River terraces near Kersey, Colorado (modified from Jepson et al. 1994: Figure 11).

Incision of the South Platte River to the Kuner level is thought to correspond with the end of the Santanta Peak glacial advance (10,650 B.P.) in the Rocky Mountains. The Santanta Peak advance is correlated with an increase in precipitation and the maintenance of a high water table in the Colorado Plains region (Benedict 1985:164). Development of a dark gray paleosol in fine-grained alluvium occurred as a result of the wet conditions from 10,650 through 8,160 B.P. (Figures 6, 7, and 8). The paleosol, or 2Abk horizon, supports the notion that water tables on the Kersey Terrace remained high until at least 9,600 in the vicinity of the Frazier site (Figure 7) (Malde 1984; McFaul et al. 1991; Zier et al. 1993). Abandonment of the Kersey Terrace around 9,650 B.P. may have made the banks of the newly created river-facing terrace especially attractive to Paleoindians in search of food resources.

Localities associated with the abandoned Kersey floodplain have experienced varying degrees of eolian deposition (Jepson et al. 1994, Zier et al. 1995). Based on coring evidence and the presence of a buried paleosol (2Abk) under eolian deposits, Zier et al. (1995:73) postulate that a period of eolian deposition took place between 9600 and 6080 B.P. (Figure 6). This varied eolian deposition created dispersed dunes, some of which were buried and were responsible for the preservation of cultural material at the Frazier site. In areas where eolian deposition did not occur, gravel ridges of alluvial origin (South Platte abandoned terrace), were left adjacent to the floodplain or dune pockets. The gravel ridges would be necessary to move across the landscape and provide an accessible route for prehistoric hunters and animals. Humans could have used the floodplain, gravel channels, and dunes to their advantage by trapping game in the wet, clay soil.



Soil Profile Description

DEPTH (cm)	SEDIMENT UNIT	HORIZON	CHARACTERISTICS/COMMENTS
0-5	eolian	A	Dark yellowish brown (10YR 4/4 d) sandy clay loam; massive
5-22	eolian	Bt	Brown to dark brown (10 YR 4/3 d) subangular blocky, extremely hard (d) consistence, clay skins on ped faces
22-32	alluvium	2Abk	Grayish brown (10YR 5/2 d) sandy clay loam, hard consistence, Stage II carbonate accumulation, entire matrix whitened when dry
33-82	alluvium	2C	Brownish yellow (10 YR 6/6 d) sandy loam; massive, soft (d) consistence, disseminated carbonates
82 –105	Kersey alluvium	3C	Light yellowish brown (10 YR 6/4 d) loamy sand; soft (d) consistence

Figure 7. Schematic soil profile of the Frazier site. (Modified from Jepson et al. 1994: Figure 18).

Although different terminology is used, the Frazier paleosol (2Abk) is found at other Paleoindian sites in northeastern Colorado. At the Frazier and Jurgens sites, it is synonymous with Malde's (1984:15) gley layer. Cultural material at the sites was located within the bottom portions of the prismatic clay or the Bt horizon, the layer directly above the 2Abk horizon, and within the paleosol (Jepson et al. 1994:57; Malde 1984; Wormington 1988). A radiocarbon date on charcoal of 9070 ± 90 B.P. (SI-3726) at

Jurgens, Area 3 by Wheat (1979), and dates of 9,550 ± 130 B.P. and 9,650 B.P. ± 130 B.P. were cited by Haynes and Haas (1974) from the Frazier site for the base of the Bt horizon. (Figures 7 and 8). At the Lindenmeier site, artifacts were located within the top portions of the 2Abk and the bottom portions of the Bt (Haynes and Agogino 1960). The 2Abk corresponds to what Haynes and Agogino called Deposition D, which was formed during an extremely wet period. A radiocarbon date of 10,789 ± 375 B.P. is associated with the paleosol at the Lindenmeier site (Haynes and Agogino 1960).

Figure 8. Profile of the Frazier site soil horizons (photo courtesy of Centennial Archaeology, Inc.).

History of Excavations

The Frazier site was discovered in July, 1965 by Frank Frazier, a professional geologist and avocational archaeologist formerly of Greeley, Colorado (Figure 9). In July 1965 he learned of the discovery of Folsom materials north of Fort Collins when reading the "Antiquity of the Lindenmeier Site" (Bryan and Ray 1940) and "Ancient Man in North America" (Wormington 1957). At the time, "you could still drive into the Lindenmeier site and look around" (personal communication, Frank Frazier 4/14/01). Utilizing his knowledge of the local geology, he recognized that the Lindenmeier site was located on a late Pleistocence terrace that correlates with a terrace (Kersey) in the vicinity of Greeley. He decided to search for Folsom artifacts along the Kersey Terrace but found

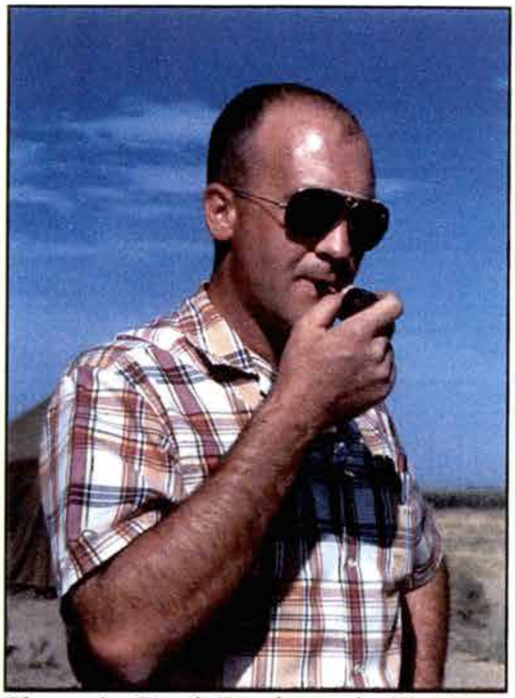


Figure 9. Frank Frazier at the Frazier site, 1967 (photo courtesy of Frank Frazier).

nothing. He did, however, discover bison bones, lithic debitage, formal tools, and six Agate Basin projectile points eroding out of a small cut bank on the Kersey terrace, 12 km (7.5 miles) east of Greeley (see Figure 4). Further searching yielded more bison bone, thirteen scrapers, two cores, and debitage in a smaller cut bank in the same area. Shortly thereafter, Frazier reported his discovery to the Denver Museum of Natural History (DMNH) although the curator of archaeology, H. Marie Wormington, was in Alaska at the time (Figure 10). Soon after her return, Wormington initiated limited testing operations in the upper portions of fourteen 5-x-5 ft (ca. 1.5-x-1.5 meters) units along the edge of the terrace beginning on August 12, 1965 to August 18, 1965 (Figures 11 and 12). Additional units were subsequently excavated between

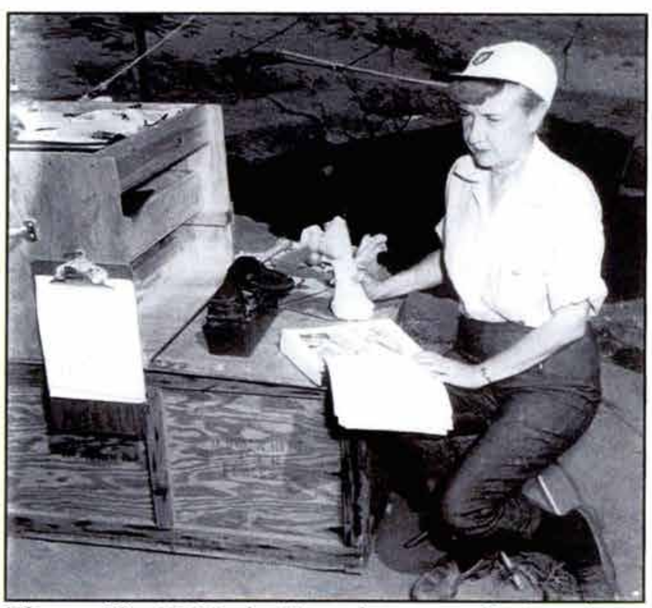


Figure 10. H. Marie Wormington at the Frazier site, 1966 (photo courtesy of the DMNH).

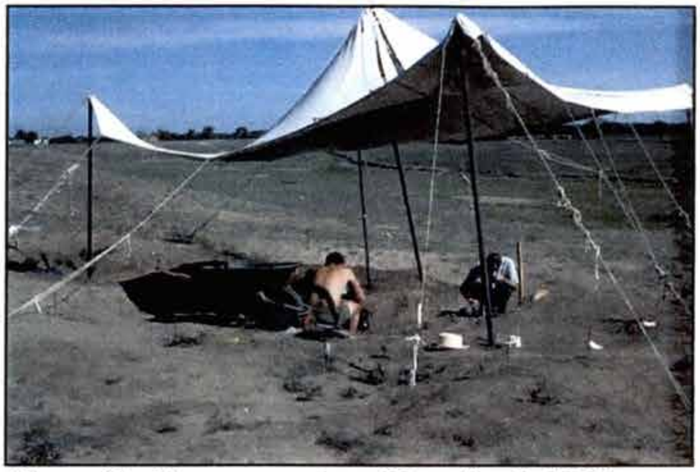


Figure 11. Test excavation of Locality 1, 1965 (photo courtesy of Frank Frazier).

Figure 12. Excavation in progress, 1965 (photo courtesy of DMNH).

September 2 and October 10, 1965. The field crew was comprised mostly of crew members working at the Hell Gap site under the direction of Henry Irwin, Cynthia Irwin-Williams, and George Agogino (Wormington 1966a:4).

Volunteers from the Department of Anthropology, University of Colorado, excavated units in September and October. These excavators and volunteers included Calvin Jennings, Larry Leach, Carol McMillan, A. Swedlund, and K. Sadler. A single projectile point base, bison bone and lithic material were recovered during the 1965 field season (Wormington 1966b:2; Wormington 1984).

Based on the findings from the limited excavations in 1965, Wormington applied for, and was awarded a $5869.20 National Science Foundation Grant under the auspices of the DMNH (Grant GS 1252). Excavations were conducted from June 18, 1966 to August 10, 1966 that revealed the presence of additional bison bones, debitage, and a single projectile point (Wormington 1966b:2, plan maps).

Prior to excavation of the site, a bulldozer/front-end loader scraped the overburden off the majority of the site down to the "Agate Basin level" (Bradley 1967:1). (Figure 13). The Air National Guard at Buckley Air Force Base provided without charge an air conditioned trailer for cooking, a 300 gallon water tank, sleeping cots, a large tent, and electricity generators (Figures 14 and 15). Funds that were allocated for the rental of a laboratory room in Greeley, Colorado were used to purchase diesel fuel, water, and materials for the construction of a bridge to haul heavy equipment into camp (Wormington 1966a:1). During the course of the 1966 excavations seven stray dogs became permanent fixtures at the site. Each dog was given an identification number, D1 through D7 (Figure 14).

Figure 13. Front-end loader scraping down to the "Agate Basin" level. David Acton supervising, 1966 (photo courtesy of Frank Frazier).

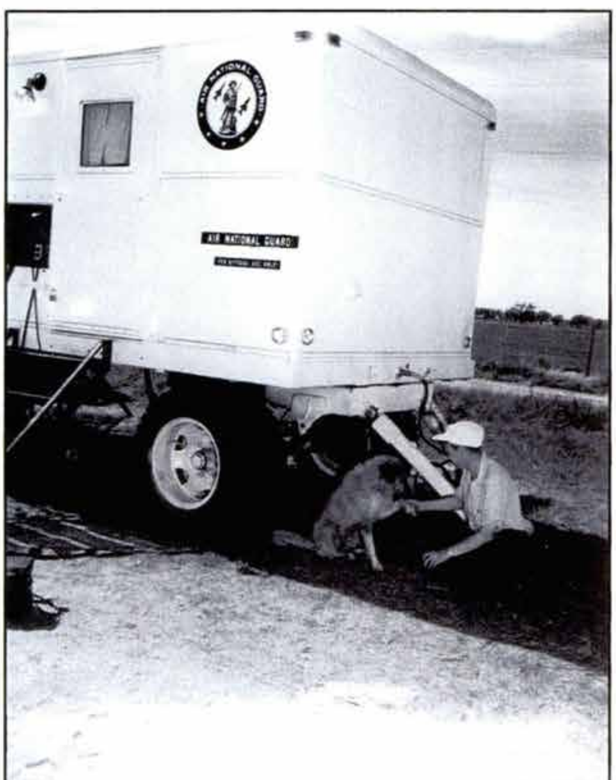


Figure 14. H. Marie Wormington and D1 (dog#1) at Air National Guard trailer (photo courtesy of DMNH).

Figure 15. Air National Guard generator and water tank arriving at the Frazier site (photo courtesy of Frank Frazier).

The 1966 crew chief was David Acton, then a graduate student at the University of Arizona. The field crew consisted of David Abrams, Susan Grant, Farroy Simnacher, Stephen Ayotte, Bob Ackerly, Barbara Luedtke, Ruthann Knudson, Bruce A. Anderson, Lynn and Hazel Anderson, Isaac Ridley Jr., and William Robert Biggs. Larry Leach served as a laboratory assistant, preparing maps, cleaning artifacts, and conducting preliminary analyses on the bison remains (Wormington 1966a:1-2). Harold Malde examined soil profiles at the site and in nearby gravel pits along the Kersey terrace to establish the nature of soil composition in the area (Acton 1966:2). Numerous people, both professional and amateurs, visited the site during the 1966 field season. Visitors recorded by Acton in his field book include Frank Frazier, Al Parish, Dean Reed, Henry Irwin, Ken Malone, Dennis Stanford, Ed Lewis, Vance Haynes, George Agogino and family, Raymond and Mrs. Tindale, Don Crabtree, Mike Roberts, Libby Adams, Omer Stewart, Bill Mulloy, Sam and Betty Arnold, and Mr. and Mrs. Vaughan (Figures 16 through 19).

Figure 16. Susan Grant and H. Marie Wormington show a recent find to Dr. and Mrs. Tindale (photo courtesy of Frank Frazier).

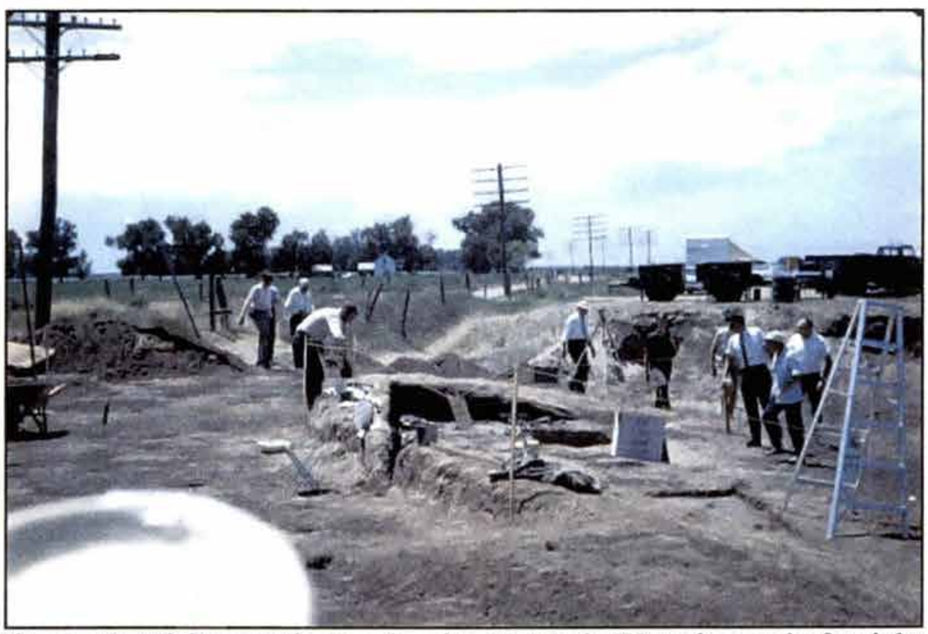


Figure 17. Visitors at the Frazier site, H. Marie Wormington in far right foreground with light blue shirt and white cap (photo courtesy of Frank Frazier).

A total of thirty-nine 5-x-5 ft units were excavated during the 1965 and 1966 field seasons (Wormington 1966a:2). In addition, 189 auger probes were dispersed

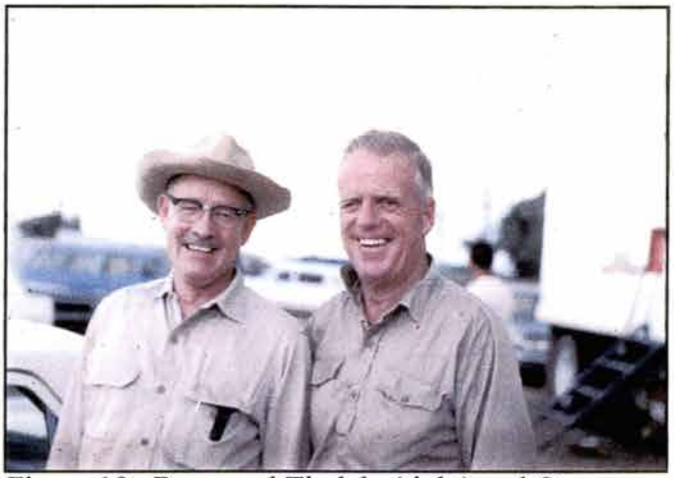


Figure 18. Raymond Tindale (right) and Omer Stewart (left) at the Frazier site, 1966 (photo courtesy of Frank Frazier).

over the edge of the terrace in order to establish the boundaries of the site (Figure 20). Bone fragments, a scraper, and several pieces of debitage were recovered from the probes. Frank Frazier loaned the artifacts he collected during 1965 and 1966 to the DMNH (Appendix A:Figure 1).

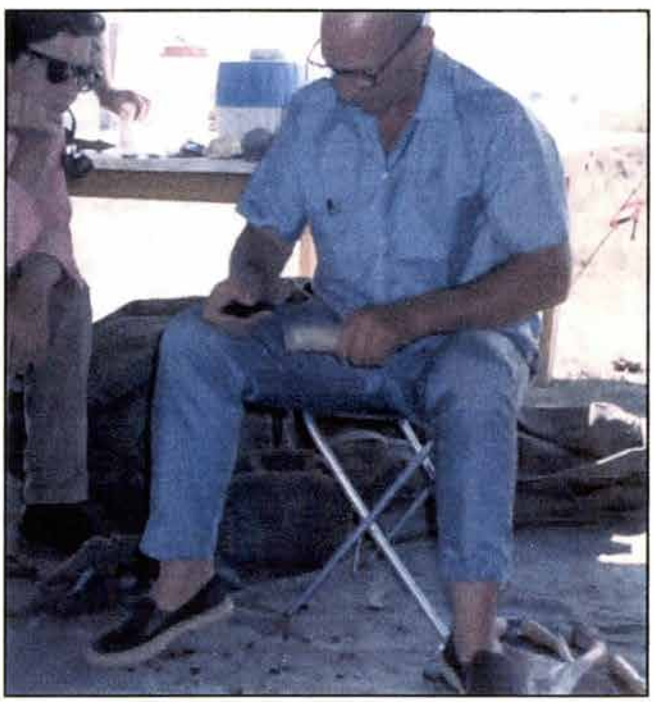


Figure 19. Don Crabtree flintknapping at the Frazier site, 1966 (photo courtesy of Frank Frazier).

Enthusiastic about the amount of cultural material recovered during the 1965 and 1966 field seasons, Wormington applied for a renewal of the National Science Foundation Grant GS 1252. Renewal of the grant (National Science Foundation Grant GS 1651) was awarded and excavation at the Frazier site occurred from June 16th, 1967 through August 25th, 1967. The Air National Guard was on maneuvers during this period, so equipment provided during the 1966 field season was not available. A large, 18 man squad tent was borrowed


Figure 20. Excavation units and auger probes (photo courtesy of Frank Frazier).

for dining and laboratory accommodations and a trailer was rented for a kitchen and an office (Wormington 1967:1). Field personnel lived in tents borrowed from the Colorado School of Mines (Figures 21 and 22).

Robert Bradley, a fellow doctoral student at Harvard with Marie Wormington, was the field supervisor during the 1967 excavations (Figure 23). Bradley, along with field member Robert William Biggs, established a site datum consisting of a wooden post set in cement (Figure 22). Other field members included Robert Burton, Susan Sasse, Geoffrey Conrad, Christopher Hall, Barbara Luedtke, Wayne Olts, Bruce A. Anderson, Ruth Ann Knudson, and Isaac Ridley. Robert Cowdrey, a petroleum geologist, and Kenneth Brown joined the excavations as volunteers on weekends. Visitors to the site during the 1967 field season included Frank Frazier, Harold Malde (further geological investigations), Dr. Rosaire, Dr. Tindale, Henry Irwin, Pete Meringer, Dr. G. Fay, Stanley Olsen, Dr. Joe Ben Wheat, Dr. Brunet and Larry Leach. Photos not presented in this chapter of excavations and people involved with the Frazier site are presented in Appendix A. The photos were collected by Frank Frazier and Marie Wormington during excavations, and Wormington gave her slides to Frazier shortly after her termination with the DMNH (personal communication, Frank Frazier 4/14/01).

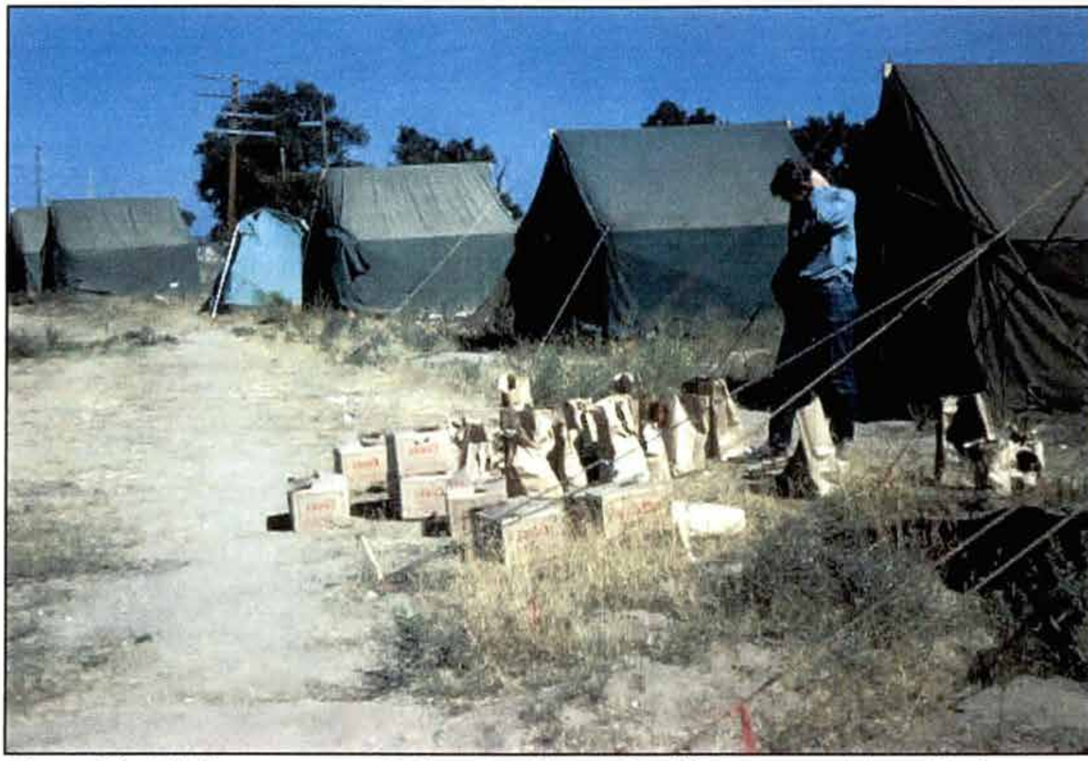


Figure 21. Field crew tents. Robert Bradley and artifacts are positioned in front of the large, 18 man tent used for storage and as a field laboratory, 1967 (photo courtesy of Frank Frazier).

Figure 22. Excavation in progress, Robert Bradley in foreground. Arrow points to 1967 datum (photo courtesy of Frank Frazier).

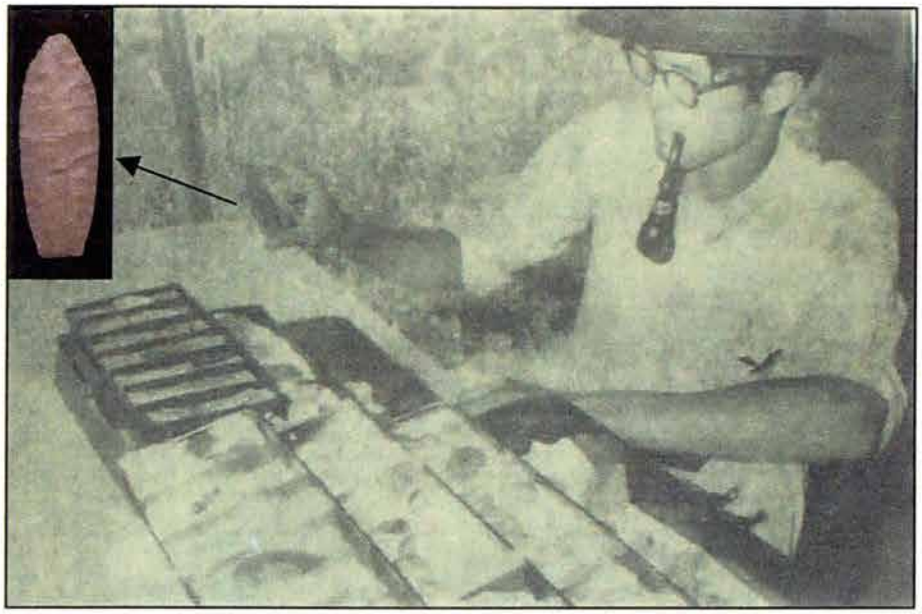


Figure 23. Robert Bradley holding the refit Agate Basin point. Photo taken from the Greeley Tribune, August 25, 1967 (Inset shows recent photograph of the specimen Bradley is holding).

During excavations in 1967 Bradley realized that several units, mainly in Locality 3, were only partially excavated during the 1966 season. Many of these units were buried by 3-4 feet of backdirt, courtesy of a bulldozer. He decided to attempt excavation of units that were more accessible, but only some of the units were actually fully excavated (Bradley 1967:53). Individual units that were not excavated in 1966 and revisited in 1967 include G-29, E-28, and G-22.

Bill Biggs and Robert Burton went with Joe Ben Wheat to the Jurgens site on Monday, July 24th for preliminary testing. Bruce Anderson joined Biggs, Burton, and Wheat on July 25th, and Robert Bradley and Marie Wormington visited Jurgens on July 28th (Bradley 1967:103-113). Joe Ben Wheat visited the Frazier site on July 30th and identified a calcaneum recovered from unit F-36 as that belonging to a deer or elk (Bradley 1967:115). Edwin Wilmsen visited the Frazier site on July 31st on his way to the Lindenmeier site (Bradley 1967:115).

Two known newspaper articles concerning the Frazier excavations were published. The layouts occured in The Denver Post (Sunday, August 27, 1967; "They Dig History") and the Greeley Tribune (Friday August 25, 1967; "Archaeologist Uncover Valuable Find Near Kersey). Both articles focused on "ancient" man, stone spear points, and bison bone. It is believed that the reason the site excavations were not made public until the end of the 1967 field season was that Wormington was concerned that if the site was not protected, it would be looted (personal communication, Frank Frazier 8/17/01).

Wormington (1967:2) reported that 85 5-x-5 ft units ($288m^2$) were excavated during the 1967 season, bringing the total number of excavated units at the Frazier site to 124 (Figure 24). She further stated that "Frank Frazier, the discoverer of the site, has continued to visit the site at frequent intervals and has found some additional bones and a few artifacts, but, on the basis of their location, it seems probable that they had eroded

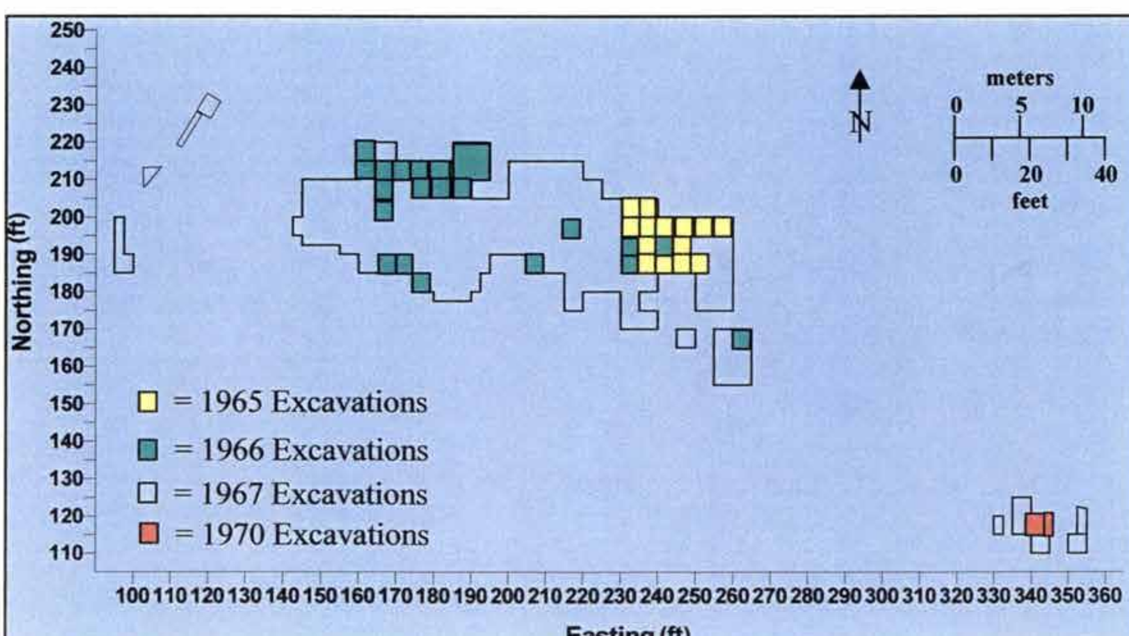


Figure 24. Plan map showing excavated locations and corresponding year at the Frazier site.

out and washed into the arroyo at an earlier period and were brought to the surface by the bulldozer used for back-filling" (Wormington 1967:2). A 5-x-5 ft and a 2.5-x-2.5 ft unit were excavated in 1970 by Frank Frazier and Robert Cowdrey in order to recover bone for radiocarbon dating (Figure 24).

Wormington (1967:2) noted that 50 stone tools were recovered during the 1967 season, two of which were projectile points that were located in an area of the site (Unit H23) where a projectile point was recovered in 1966. Scrapers, knives and gravers were situated in the western portion of the main grid block in the F38 area. The tip of an Agate Basin point that was recovered during the 1967 excavations was refit to a base section (Figure 23) discovered by Frank Frazier in a nearby arroyo in 1965 (Wormington 1967:2-3). Wormington (1967:3) reported that 50 left astragili, 7 from the surface and 43 from excavations, were counted from the 1965, 1966, and 1967 excavations indicating that a minimum number of 50 bison were killed, although Borresen (2002) reports that only 43 left astragili remain in the collection. Based on the prevalence of limb bones present at the site, Wormington suggested that "only portions of the animals were brought into camp and that the kill was made elsewhere…..The site where the animals were killed and preliminary butchering was undertaken doubtless lies somewhere in the vicinity, for it seems unlikely that heavy bison quarters would be carried for any great distance, but there is no evidence to indicate where this may be" (Wormington 1967:3).

Excavation Layout

The only topographic map of the site was prepared by Frank Frazier (Figure 25). During the 1960s investigation, letter designations were used for northings, and numbers corresponded to eastings (Figure 26). A new grid system is established for the current

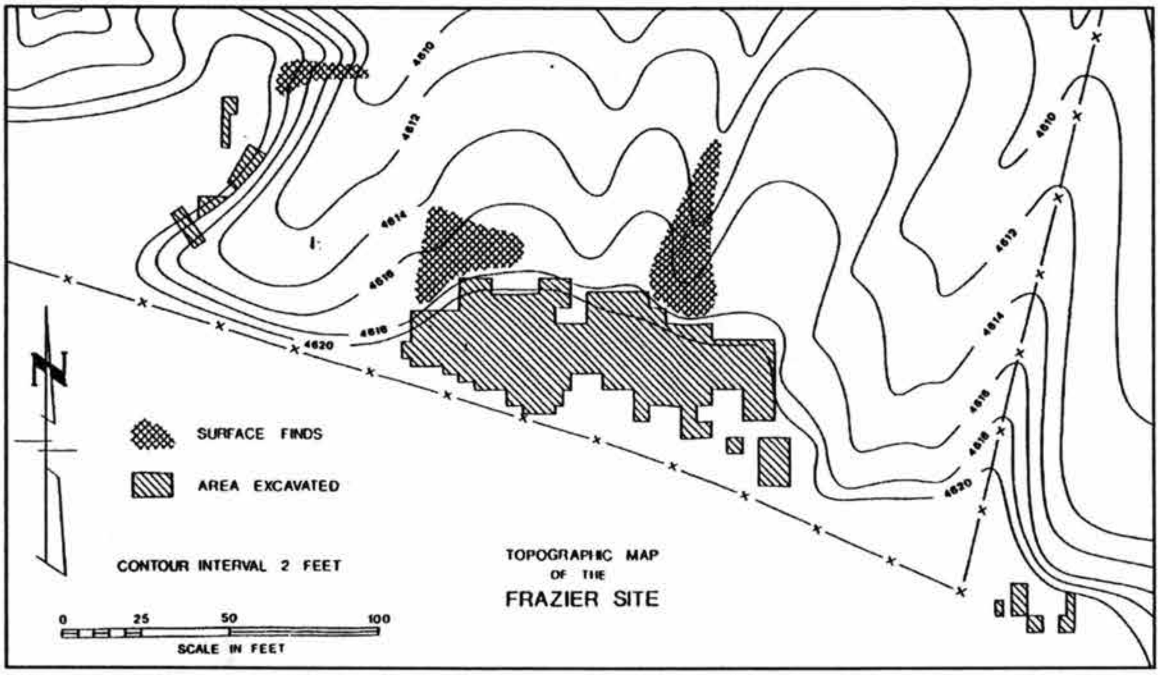


Figure 25. Topographic map of the Frazier site, originally produced by Frank Frazier.

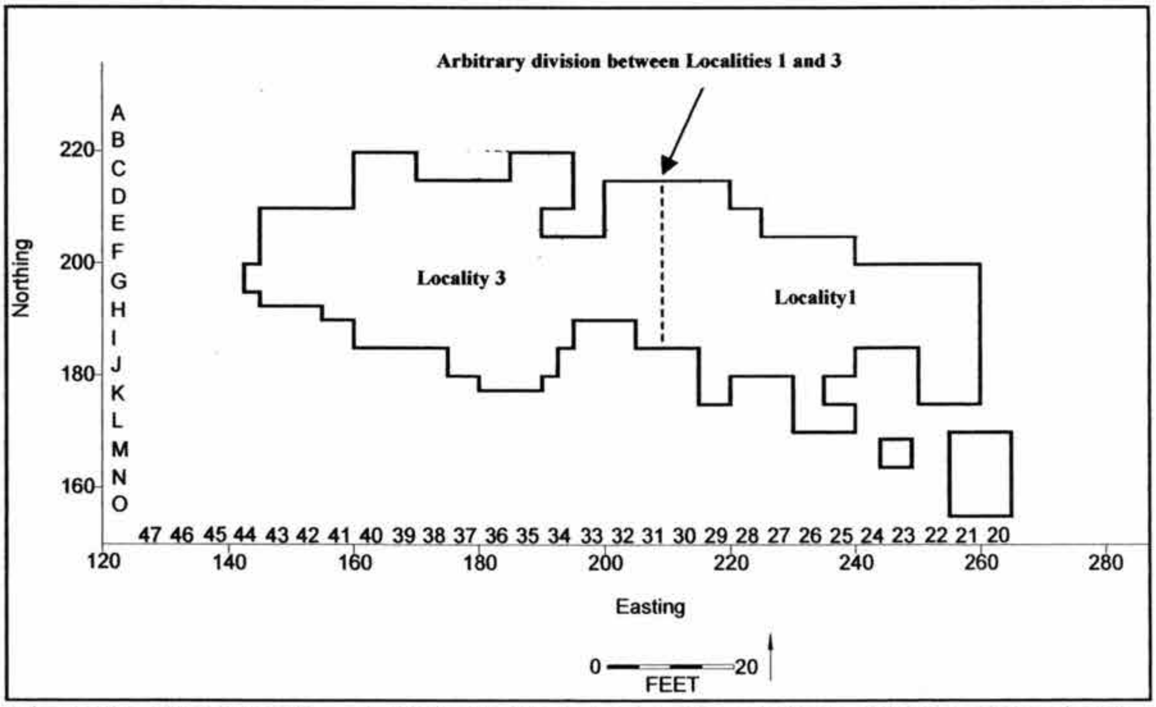


Figure 26. Map showing original grid block designations (interior letters and numbers) and new grid system (exterior northing and eastings). Arbitrary division between Localities 1 and 3 is noted.

research using numeric northings and easting, with the central portion of the main block arbitrarily assigned a 200N, 200E designation. Unit F32 on the Wormington grid block corresponds to unit 200N, 200E on the new system. The location of the original unit designations and the new grid unit is provided in Figure 26.

Wormington divided the site into localities, based on topographic features (Figure 26 and 27). Localities 1 and 3 comprise the Main Grid Block, with an arbitrary break between the two along the north-south axis of 30 and 31. These localities are bounded on the east by County road 51 and, on the west, by a drainage cut (Figure 27). Locality 2 is a long, narrow north-easterly extension of the Kersey Terrace just west of Localities 1 and 3 (Figure 27). Locality 2 is bounded on both the east and west sides by drainages. A test pit was placed on the eastern edge of Locality 2 and lithic and faunal material was recovered. Localities 4 and 5 are situated west of Locality 2 on small protrusions of the

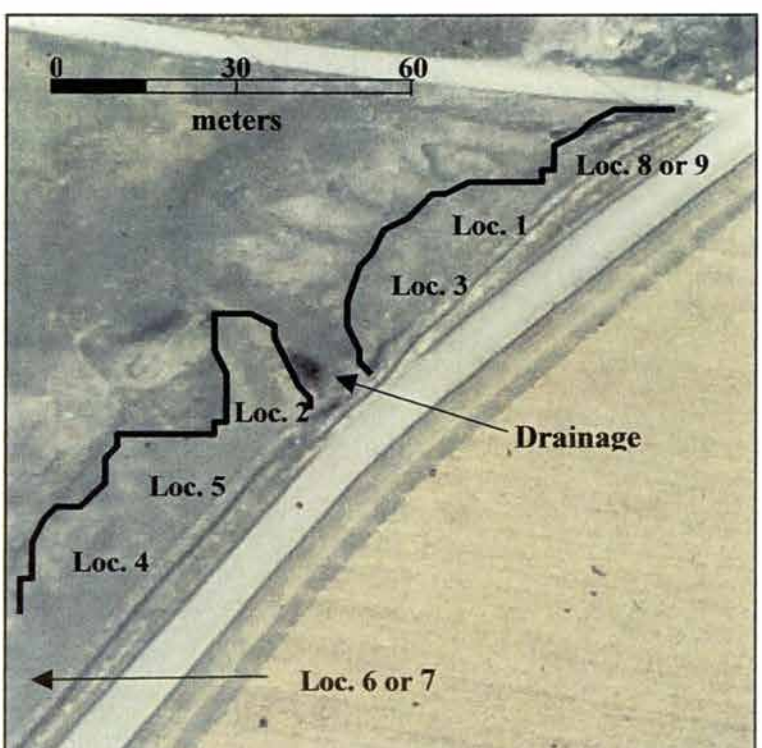


Figure 27. Aerial photo showing Locality designations (photo courtesy of Centennial Archaeology, Inc.)

Kersey Terrace (Figure 27). A few scattered artifacts were noted on the surfaces of these localities. A small amount of artifacts were found in Localities 6, 7, 8, and 9. Based on a field notes and maps, the general areas of these localities are postulated in Figure 27. Site overview photos matching the localities to present-day topographic areas are provided in Figures 28 through 30.

Excavation Techniques

The Frazier artifact assemblage is the result of excavations during 1965, 1966, and 1967 by the DMNH. Although screening of sediment occurred during the 1965 testing (personal communication, Calvin Jennings 4/2/02), it appears from photographs and informants that screens were not utilized in 1966 and 1967 and small artifacts could be located in backdirt piles (personal communication, Ruthann Knudson 4/15/02 and

Figure 28. Overview of Localities 1 and 3 looking west-northwest. Tree is at drainage separating Locality 3 and Locality 2, September 2001.


Figure 29. Overview of Locality 2 looking east-southeast. Figures at the eastern edge of the locality, September 2001.


Figure 30. Overview of Localities 2, 4, and 5 (possibly 6 and 7), from the tree on the eastern edge of Locality 2. Photo looking west-northwest, September 2001.

Frank Frazier 9/17/01). University of Wyoming students working at the Hell Gap site were utilized for some of the Frazier excavations in 1965 and 1966. Although all specimens were mapped at the Hell Gap site, select faunal items were discarded in the field based on size or completeness (Rapson and Niven 2002). It is likely that excavations at Frazier used a similar approach to faunal recovery, as small and fragmentary mapped bone is not currently present in the collection (Borresen 2002).

The excavation techniques used at the Frazier site have possibly biased the assemblage toward larger lithic pieces (tools and debitage), and complete, large skeletal elements. Microdebitage is present in the extant collection, but only from a few areas that were excavated meticulously. At this time, it remains unclear to what extent the excavation techniques have influenced the assemblage composition and spatial distribution of cultural remains.

Current Research

Frequencies, technological characteristics, and raw material use patterns in the Frazier site lithic assemblage have never been fully reported. Concerning the Frazier debitage, Wormington stated that "while there was some flaking and reworking of implements, flint knapping was not a major activity at the site" (Wormington 1984:13). A total of 942 individual pieces of debitage have been identified and analyzed during the current research. Blade technology, including blades and microblades were originally reported in a funding proposal written by Marie Wormington (1967a:2-3) and a preliminary report on the Frazier lithics by Crabtree (1968). The present research has verified the presence of blade-like flakes in the Frazier lithic debitage assemblage, however, they are not considered "true" blades (Andrefsky 1998:194-195). The Frazier blades are longer and wider than traditional blades and are believed to represent flakes produced during unidirectional core reduction.

A re-examination of the faunal assemblage was completed by Borresen (2002) that provides new information concerning the Frazier collection. Table 1 provides some basic data gathered by Borresen for the faunal assemblage. Of note is the discrepancy in MNI between the 50 reported by Wormington (1988) and the 44 by Borresen (2002). Borresen's numbers are based strictly on skeletal elements remaining in the DMNH collection, and it would appear that some specimens were either lost, discarded, or mis-sided in the field during the original excavations.

Interpretation of the spatial distribution of cultural material at the Frazier site consumes a major portion of this thesis. Spatial distribution of prehistoric remains is an important endeavor in order to understand what types of activities occurred at a site, and where these activities were delineated geographically. For example, Stanford (1999)

Table 1. Frazier Site Faunal Data (Borresen 2002:40-43)

Bone Description/Attribute	Count	Percent
MNI (Minimum Number Individuals)*	44	-
Total Bone/NISP (Number of Identified Specimens)	20,012	-
Bison NISP	19,798	99.9
Wolf/Dog NISP	8	
Deer NISP	1	
Gopher/Squirrel NISP	203	
Unknown NISP	2	
Bone Tools	3	-
HERD STRUCTURE**		
Male	6	15.4
Female	12	30.8
Immature	11	28.2
Unknown	10	25.6

* MNI based on left astragili count; ** Herd structure based on calcanea measurements

learned that two separate bison-kill events took place at the Jones-Miller site by identifying different types, and horizontal concentrations of, snails and lithic raw material. Jodry (1999) also identified an initial kill/kill area and several processing areas at Stewart's Cattle Guard by examining the horizontal distribution of bone, tools, and debitage. The spatial distribution of lithic tools and debitage at the Frazier site is inspected so that patterns of site use and activity can be reconstructed.

Agate Basin human behavior can be better understood through detailed analysis of the lithic debitage and re-analysis of the tool assemblage from the Frazier site. By focusing on projectile points, tools, and skeletal element frequencies of the bison bone we are seeing only a portion of the complete picture of past Agate Basin behavior at the Frazier site. As Todd (1987a:251) points out, "The number of sites serving as basis for an eventual understanding of past hunting practices is relatively large, but their interpretation, while analytic approaches continue to be refined, requires re-examination of previously described assemblages." Therefore, the Frazier site assemblage is "dusted off" and analyzed to provide a clearer picture of Agate Basin subsistence, mobility, and technology on the northwestern Plains.

Chapter 3

LITHIC ANALYSIS

This chapter presents the general theoretical approach and the methods used during the lithic analysis of the Frazier material. Results of the analysis, including data tables and figures, along with interpretations based on the results, are also provided.

Analytical Approach

As stated in the Introduction, this research is structured around three major goals. The research questions are tackled using a processual approach, namely through low- and middle-range theory concerned with the relationship between ecological factors and human behavior (Binford 1977, 1978; Clarke 1973; Kelly 1995; Schiffer 1976).

The first two research objectives, to document the history of excavations at the Frazier site and to collect data on the Frazier lithic assemblage, is considered to be first-order, primary, or low-level theory. Binford (2001a:674) describes primary observations as those that are generated during excavation, or simply data recorded on the archaeological record. The third goal of this research, to use the data to make inferences about human behavior at the Frazier site, is associated with middle range, or second and third-order theory. Second and third-order interpretations combine primary data with other variables such as environmental constraints, and compare the resulting patterns with other data generated from archaeological sites or regions (Binford 2001a:675). The variables used to gather primary data for the Frazier assemblage are largely chosen because they have been shown to relate to the production and use of stone tools (human behavior) in middle-range research such as experimental, actualistic, and ethnohistorical archaeology (Amick and Mauldin 1989; Binford 1978, 1981; Frison 1991:289-325; Frison and Bradley 1982; Keeley 1980).

This approach to interpreting the archaeological record is subsumed under behavioral ecology or ecological-evolutionary theory (Kelly 1995:50-51; Krebs and Davies 1993; Moran 1990; Winterhalder and Smith 1992). An ecological approach is used in this study to understand the relationship between human decision making and resource utilization, specifically the organization of lithic technology. Ecology is defined as "the study of the relations between organisms and the totality of the physical and biological factors affecting them or influenced by them" (Pianka 1978:2 cited by Kelly 1995:36). These relations can be subsumed under general categories such as time, space, energy, and risk (Jochim 1981; Kelly 1995; Krebs and Davies 1993; Moran 1990; Smith 1988; Winterhalder 1986). Kelly (1995:35-36) addresses the importance of an ecological approach because, "adaptation to the environment plays a major (but by no means singular) role in conditioning the variability seen in hunter-gatherer societies" and when he states that "discounting ecology, especially subsistence-related issues, discounts what must have been important to prehistoric hunter-gatherers and what is equally important to modern ones." Employing an ecological approach, according to Kelly (1995:35-36), allows analyses to focus on behavior and decision making in relation to environmental parameters.

Variables effecting behavioral decisions are complex and related to subsistence practices, settlement and landuse patterns, assumptions concerning future uses of a given tool kit and potential needs met by that tool kit, as well as a concern for when and where more lithic material might be procured. So, how do we begin to identify the complex decisions in a lithic assemblage? Two main approaches have been posed for understanding the organization of a lithic system (Sellet 1999:15). First, lithic activities at a particular site should be reconstructed. Second, tools that were produced off-site and discarded at a site should be identified. The first method will indicate what type of activities occurred at a site, the second approach can provide insight into the composition of the transported Paleoindian tool kit.

An ecological approach combined with the idea of *chaînes opératoires* (Lemonnier 1976) is useful for addressing the second approach described by Sellet. *Chaînes opératoires* is simply defined as the "description of all the steps through which a piece of raw material had to go, over the course of its life. It is a chronological segmentation of the actions and mental processes required in the manufacture of an artifact and its maintenance into the technological system of a prehistoric group. The initial stage of the chain is raw material procurement, and the final stage is the discard of the artifact" (Sellet 1999:38). The *chaîne opératoires* approach typically involves the use of nodule analysis in which individual lithic pieces are divided into separate "nodules" of raw material (Kelly 1985; Kornfeld and Larson 1993; Larson 1992, 1994; Larson and Kornfeld 1995; Sellet 1999).

The idea of *chaîne opératoires* is used in order to reconstruct prehistoric technological strategies employed by Paleoindian hunter-gatherers at the Frazier site. As a raw material specimen continues through its use-life trajectory before being discarded or lost, the documentation of the steps of its use-life (products and by-products) can reveal important dynamic organizational patterns regarding the technological decisions of prehistoric groups. It has been noted that many factors influence the composition of an efficient technological item or system (Kuhn 1995:xi). The technological system of a prehistoric group is a reflection of the subsistence organization that the group employed when faced with immediate needs, production and energy costs, physical stresses, time, efficiency, and social conventions and expectations (Bleed 1986:739). It is believed that when an individual is faced with such decisions, a choice will be made that will benefit the individual in the greatest way. This choice or decision has been called an "optimal foraging strategy" that minimizes time or energy spent searching for an item, such as lithic material or bison, and maximizes the return of the item (Hawkes 1990, 1992, 1993; Smith 1983, 1987, 1988; Smith and Winterhalder 1992).

Kelly (1988) has suggested that biface technology is considerably significant in regard to an efficient, optimal, lithic technology for mobile hunter-gatherer groups. He suggests that bifaces can serve three primary purposes: 1) cores; 2) long use-life tools; and 3) by-products of tool shaping. Kelly's bifacial roles are important when using an ecological, *chaîne opératoires* approach for lithic analysis. For example, Kelly (1988:719) indicates that groups in areas with abundant lithic resources had little need for bifacial cores, while raw material insufficiencies or long duration forays increased the probability of using bifacial cores. Logistical mobility is also an important variable in determining the role of bifacial cores (Kelly 1988:720). Unexpected or unanticipated tool needs will become more prevalent in relation to the length of a logistical foray. Although the role of bifacial cores is currently being questioned (Bamforth 2002a), a bifacial core would be the best equipped, or optimal, technological strategy for long-duration forays associated with highly mobile Paleoindian hunter-gatherers.

The discussion of bifaces in relation to landscape use and mobility provides one example of how lithic analysis can be informative when reconstructing the behavior of Paleoindian groups. One can predict that a functioning biface would not be intentionally discarded by a hunter-gatherer unless a much better, higher-quality material was encountered and he/she had the time and energy to invest in the production of tools with this higher-quality material. Therefore, predictions of biface use are not only concerned with the bifaces or tools in an archaeological assemblage, but also with the production and maintenance debris that is left as the by-product of tool manufacture.

Mobility patterns and predicted assemblage composition is related to human subsistence choices as outlined by Binford (1980). Two types of mobility, residential and logistical, are suggested for hunter-gatherers. Residential mobility refers to moving between camps. Residential camps are areas on the landscape that serve as "the hub of subsistence activities, the locus out of which foraging parties originate and where most processing, manufacturing, and maintenance activities take place" (Binford 1980:9). Logistical mobility is when a group or groups leave a camp in search for resources. Hunter-gatherer groups use both types of mobility, but are typically characterized by one of the two (Binford 1980:18-19; Sellet 1999:56). Several hypotheses of expected lithic composition in the archaeological record at residential or logistical sites (Binford 1980) can be postulated based on predicted choices of Paleoindian groups given certain environmental constraints.

Figure 31 provides a synthesis of the qualities of residential and logistical sites discussed in the following paragraphs. For highly mobile groups such as Paleoindians, residential sites should consist of debitage indicating a high percentage of biface production/core reduction (Sellet 1999:254). The tool assemblage should be comprised of a high number of broken bifaces/preforms, cores, and tools associated with everyday activities, such as cutting and scraping implements. Lithic raw material will likely consist of large pieces of local stone, and few pieces of non-local stone. Features should be more prevalent than at logistical sites. Residential sites are used repeatedly for long durations, and are located in geographical settings where several resources are present (water, stone, food).

Residential/long-term camp

- Bifacial cores/ broken bifaces and preforms
- Bifacial core reduction flakes
- Multiple features
- Local material for weaponry/formal tools
- Large debitage of local stone
- Small amount and size of non-local stone
- Low tool/debitage ratio

Logistical/short-term camp

- Few cores
- Expedient tool production of local stone
- Resharpening flakes of non-local stone
- Exhausted bifacial implements
- Single, if any, features
- Non-local material for weaponry/formal tools
- High tool/debitage ratio

Figure 31. Expected composition of residential and logistical sites.

Groups embarking on a logistical foray should leave a distinct lithic by-product signature in the archaeological record of late-stage bifacial reduction and maintenance, particularly of non-local material acquired during the trip. Sellet (1999:254) suggests that processing sites (logistical sites), as opposed to camps, will reflect debitage consistent with expedient tool production. It is likely that local material will be used for the expedient tools. Few, if any, cores will be present and only extremely exhausted bifacial implements will be discarded. Tool stone should consist of a mix of non-local and local materials, with non-local stone reserved for formal artifacts such as projectile points and scrapers. Local stone, if available, will be used to supplement the tool kit depending upon the types of activities occurring at any one logistical location. Features will be scarce. Logistical sites will typically be single-episode, short-term occupations of an area.

Two additional scenarios of lithic composition are suggested based on the distance of tool stone quarries from a site (Figure 32). Experimental research (Amick 1999b; Amick and Mauldin 1989; Bradley and Stanford 1987; Odell 1989) has demonstrated that certain attributes of debitage such as size and platform preparation, can be fairly accurately determined and related to the type of reduction that was involved with the parent piece. The average size of raw material in an assemblage should decrease, along with the amount of cortex on the dorsal surface, as the distance from the source increases. Alternatively, platform preparation and dorsal scar count should increase. Single item nodules (only one piece of a specific material) should increase, and multiple item nodules (several pieces of a specific material) should decrease. In contrast, as the distance from a lithic source decreases, the average size of the tools and debitage should increase, along with the amount of cortex. Platform preparation and dorsal scar count in the assemblage will decrease. The number of single item nodules should decrease, and the number of multiple item nodules will increase.

Factors Influencing Tool Stone Composition	**Size**	**Platform Preparation**	**Nodule Composition**	**Cortex**	**Dorsal Scar Count**
- Distance to raw material source - Length in the tool kit Increases	↓	↑	**Single Item** ↑ **Multiple Item** ↓	↓	↑
- Distance to Raw Material Source - Length in the tool kit Decreases	↑	↓	**Single Item** ↓ **Multiple Item** ↑	↑	↓

Figure 32. Model of lithic assemblage composition according to the location of a raw material source, and the duration of a lithic piece in the tool kit.

As mentioned previously, tool stone composition and the spatial distribution of cultural remains at the Frazier site are two of the most intriguing aspects of the site. The spatial distribution of remains correlates with Sellet's (1999:15) first method for understanding the organization of a lithic system as it identifies specific on-site activities at Frazier. Assemblage level analysis of the debitage and tools will further illuminate the types of events that occurred at the site. The examination of raw material utilization, and the use of *chaîne opératoires*/nodule analysis is used to answer Sellet's second question of how to reconstruct the transported Paleoindian tool kit at the Frazier site. Is the Frazier site a residential or logistical occurrence on the landscape? What type of lithic technology was used and how does it relate to raw material? Is biface production, tool maintenance, or expedient tool production more prevalent? At what point along the use-life trajectory are the tools from Frazier? Are specific activities such as initial dismemberment, hide processing, butchery, tool maintenance, or core reduction occurring in separate locations at the site? Are distinct areas of separate raw material concentrations apparent? These are some of the questions that will be answered by using an ecological approach for the Frazier lithic analysis.

It should be noted that analysis of these Frazier data and subsequent comparison of these data with other data sets is only the first step in developing a general tneory regarding Paleoindian behavior and environmental constraints. A masterful book recently compiled by Binford (2001b) gathered thousands of data sets for hunter-gatherer groups, and from these generated numerous cases of pattern recognition believed to represent cultural variability. The next step, as Binford (2001b:362-464) suggests, is to use the patterns to explain or make inferences about the cultural variability, or why certain choices were made. It is actually this portion of the scientific process, the so-called third-order inferences, that are considered "theory" or "the conceptual tool of explanation" (Binford 2001b:4). Only a section of the last chapter, "Regional Paleoindian Comparisons", is actually concerned with building a theory or theories to explain the behavioral variability among Paleoindians on the Northern Plains and Rocky Mountain Front Range.

Methods

The initial stages of the attribute-based, assemblage level analysis involved simply removing the materials from the original paper bags. Debitage was not washed, in order to preserve any traces of protein residue that may be useful for future study. Collected debitage was then sorted according to level provenience within a particular 5-x-5 ft unit and then separated into raw material types based on macroscopic traits of color, inclusions, and texture. Each piece of debitage was then analyzed and then placed in plastic bags with acid free tags designating the provenience of the materials and an associated Denver Museum of Nature and Science accession number (A1558.14-A1558.1015).

Debitage was examined for attributes indicative of debris/shatter (specimens exhibiting an irregular or cubical shape and lacking "classic" flake characteristics such as platforms or dorsal and ventral surfaces). Debris/shatter was weighed with an electronic scale and three dimensional measurements of maximum length, width and thickness were recorded. Often debris/shatter is disregarded as an analytical unit even though it can be helpful in the identification of individual nodules of material in the site area, and is indicative of the type of reduction used on a specific piece. Brief descriptions of debitage attributes selected for identification during analysis are provided below, with the attribute code indicated in parentheses. A more detailed list of codes utilized for the lithic analysis is provided in Appendix B.

Debitage not separated into the debris/shatter category is further divided into pot lids/spalls (PO), proximal (PR), distal (DS), lateral (LT), medial (ME), and complete (CO) portions. Pot lids or spalls are characterized by a general cone-shaped appearance with the wider facet retaining the original surface of the flake (either ventral or dorsal) and the tip of the cone representing the termination of the spall. Spalls occur due to contraction and expansion of stone, typically due to extreme heat or cold, and lack any evidence of human striking force. Proximal flakes are defined as debitage exhibiting proximal end characteristics such as platforms and bulbs of percussion, while the distal end reveals either a flat break, such as a step or snap break (Whittaker 1994), hinge fractures, or a recent break associated with excavator or archival events. Distal flakes are defined as flakes without a proximal end but retaining both lateral margins, as well as the presence of a clear flake termination. Lateral flakes are defined as flakes with no proximal end and the presence of only one lateral margin. Medial flakes are defined as flakes without a proximal or distal end and retaining both lateral margins. In other words, a medial flake represents the mid-section of a single flake. Complete flakes are debitage with intact proximal, distal and lateral margins. When possible, flake break type was recorded for all specimens. For example, if a flake is coded as a proximal flake the flake termination type is still indicated even though it is not a complete flake.

Size characteristics of debitage can provide an indication of various tool production behavior (e.g., Amick et al. 1988; Ahler 1989; Andrefsky 1998; Crabtree

1972; Odell 1989; Shott 1994). Debitage size characteristics have been used to discriminate between biface production and core reduction. Flake specimens are therefore subjected to maximum three-dimensional size measurements (length, width, thickness). Size measurements of broken flakes (proximal, distal, medial, lateral) can be misleading in terms of lithic technology, although general trends in the broken debitage assemblage can be gained through recording maximum length, width, and weight of these specimens. These trends can be compared to the observed patterns in the overall assemblage.

In addition to basic metric information, the following measurements are recorded for all complete flakes. Length was measured as the maximum distance from the proximal to distal end (Figure 33). Flake width was recorded at maximum width along a line perpendicular to the maximum length line (Figure 33). Flake thickness is the maximum distance from the dorsal side to the ventral side of the flake, perpendicular to the flake length line at the mid-point of the flake (Figure 34). Thickness was recorded at maximum bulb thickness (Figure 34). Bulb size in relation to other size characteristics

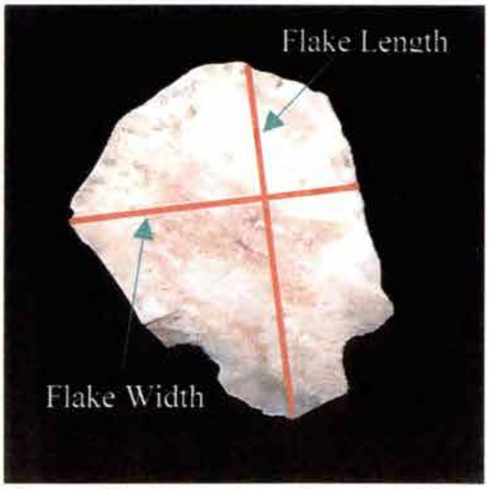


Figure 33. Flake length and width measurement location.

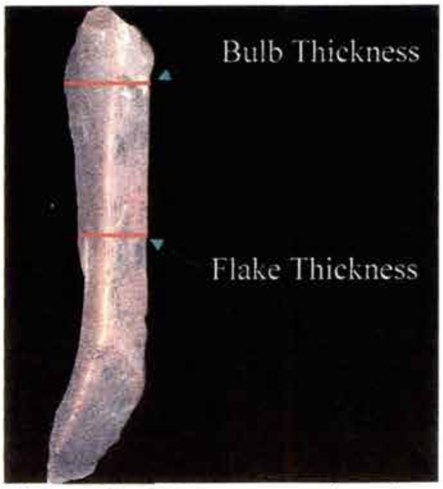


Figure 34. Measurement location for bulb and flake thickness.

can be used to determine the type of technology (hard hammer, soft hammer, pressure) used to detach a flake (Andrefsky 1998:116-117; Cotterell and Kamminga 1987, 1990; Crabtree 1972). Each flake was then weighed to the nearest .1 g using an electronic scale. Flakes weighing less than .1 g are noted on the original data forms, but are listed as weighing .1 g in the computer database for purposes of compiling weight data.

Platform width and thickness was measured for all complete and proximal flake specimens exhibiting an intact platform (Figure 35). The width of a platform is defined as the distance across the striking platform from lateral margin to lateral margin. Platform thickness is recorded as the greatest distance on the platform from the dorsal to the ventral surface following a line perpendicular to the platform width (Figure 35).

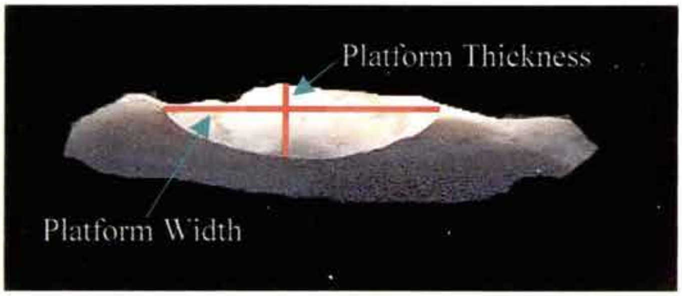


Figure 35. Platform width and thickness measurements.

Attribute traits of platform preparation are based on an analysis of morphological traits that include platform types modeled after Andrefsky's (1998:92-93) four scale variables of cortical (CR), flat (FL), complex (CP), and abraded (AB). In addition, platform preparation was recorded following Frison and Bradley (1980:27-30) categories for unprepared and prepared platforms. These include unprepared plain (UP), unprepared dihedral (UD), unprepared polyhedral (UY), prepared faceted (PF), prepared reduced (PR), and prepared ground (PG). The prepared categories can be combined in instances when more than one type of preparation is evident. For instance, if a platform has evidence of grinding and reducing it would be coded as a prepared reduced and ground platform (PRG). The full spectrum of platform preparation codes can be found in the Lithic Code Definition Sheet (Appendix B). Other variables recorded include the type of flake termination [feathered (FD), stepped (SD), hinged (HD), and plunging or overshoot (PG)], the amount of cortex, and the number of flake scars present on the dorsal surface of complete flakes using Andrefsky's "four-rank" scale (1998:102-107). Dorsal flake scar direction is also noted as it is an attribute that can differentiate between flakes removed from standardized blade cores versus flakes removed from blocky cores. Uni-directional dorsal flake scars are associated with standardized blade production (coded as a 1), while multi-directional dorsal flake scars relate to general flake removal (coded as a 2).

Evidence of heat treatment (1 for presence, 0 for absence), edge modification (1 for presence, 0 for absence), isolated platforms (Frison and Bradley 1980:31)(1 for presence, 0 for absence), calcium carbonate occurence (1=dorsal, 2=ventral), calcium carbonate percentage, blade attributes (1 for presence, 0 for absence), and worn dorsal surfaces (1 for presence, 0 for absence) are recorded. Any additional comments for individual specimens such as the presence of a platform hinge or information included on the original paper bags will be noted in the comment section of the database.

These debitage traits will be correlated with the metric measurements to run queries on the Frazier debitage population. Population analysis states that tool production results in a variety of debitage forms, and the morphological variability in the debitage assemblage is more revealing than one in which reduction sequences are inferred from the analysis of a single flake (Andrefsky 1998:109). By recording metric attributes on each complete platform flake, trends in the overall debitage population can be more reliably discerned (e.g., Prentiss 1998).

Tool Analysis Methodology

The main focus of the current research is to analyze the previously undescribed Frazier site debitage. However, utilized flakes and other tool fragments were identified during the debitage analysis. Although some of the tool assemblage has been discussed in earlier investigations (Irwin and Wormington 1970; Wormington 1984), in-depth analysis regarding metric attributes, material types, and provenience information was not provided. A re-analysis of the Frazier lithic tool assemblage was therefore undertaken. Because the current research is concerned mainly with the debitage assemblage, the tool analysis is comparatively general.

One-hundred and sixty-one tools were identified during the original excavations and assigned Denver Museum of Nature and Science accession numbers (A1992.2-A1992.187). A few A1992 accession numbers correspond to bone tools and lithic specimens that did not appear to be tools. Ten lithic specimens originally recorded as tools were determined to be debitage or non-cultural pieces during the current research. Additionally, 67 tools were recognized in the debitage collection and were assigned accession numbers beginning with the A1558 prefix. Combining both samples brings the total number of lithic tools in the Frazier collection to 219. Individual tools were separated and curated in the same fashion as the debitage sample.

Lithic specimens identified as tools were assigned numerical codes according to their overall morphology and/or production stage. Eight major element categories were delineated and recorded as projectile point (1), early-stage biface (2), late-stage biface (3), core (4), edge-modified flake (5), retouched flake (6), formal uniface (7), and graver (8) (Appendix B). These categories are intended only to describe the general morphology of the tool rather than imply function of the implement. When possible, the portion remaining of each specimen was recorded. Portion was determined using the criteria and codes as presented in the debitage analysis methodology. Identifying the portion of a biface or core can be problematic. Flake tools and scrapers, on the other hand, often retain elements of the original flake such as a platform or bulb of percussion. In these cases the portion of a tool exhibiting a platform that has broken through the mid-section would be recorded as proximal (PR).

Modified and retouched flakes were further divided into morphological categories based on the placement of assumed use-wear or retouch on the implement. For instance, edge-modified flake tool sub-categories include modification confined to one lateral margin (5.1), to both lateral margins (5.2), to both laterals and the distal margin (5.3), to the distal margin (5.4), and to only one lateral and the distal margin (5.5). The same sub-categories are assigned to the retouched flake sample (6.1, 6.2, etc.) (see Appendix B).

Metric attributes for the entire Frazier tool assemblage were recorded according to the previously defined debitage methodology. Maximum length, width, and thickness were obtained for all implements and complete length and width was recorded for specimens that were intact. Each implement was then weighed to the nearest .1 gram using an electronic scale. Additionally, all platformed specimens were subjected to attribute and metric analysis as described in the debitage methodology. A full explanation of codes pertaining to the Frazier lithic tool assemblage is provided in Appendix B.

The Frazier Site Lithic Assemblage

A total of 1,161 lithic artifacts were recovered from the Frazier site excavations, including: 942 pieces of unmodified debitage, 4 cores, 159 flake tools, 37 (two pieces refit) formal unifaces, 11 formal bifaces, and 8 projectile points. Individual lithic categories are described in detail in the following sections.

Lithic Raw Material

The Frazier lithic sample was initially separated into groups based on macroscopic traits such as color, inclusions, translucency, banding, and texture. Ninety-eight different categories of fine-grained stone (chert, chalcedony, jasper, agate, etc.) were identified along with 64 types of quartzite and orthoquartzites (Appendix B:Table 1). Three types of petrified wood are also identified. These categories were devised with the intention of aiding in lithic refits and minimum nodule analysis. Each material type, when appropriate in size, was further identified as to raw material source based on macroscopic comparison with stone obtained from the actual quarry site (Figure 36). Once recognized as a particular material, the specimen(s) were then subjected to short and long wave ultraviolet light in order to bring out additional distinguishing qualities that either supported or refuted the macroscopic observations (Ambler 1999; Hofman et al. 1991).

Comparative specimens of lithic materials were used to identify the tool stone represented in the Frazier sample. The 165 lithic types identified in the assemblage fall into seven major groups including Flattop chert or chalcedony, Hartville Uplift siliceous

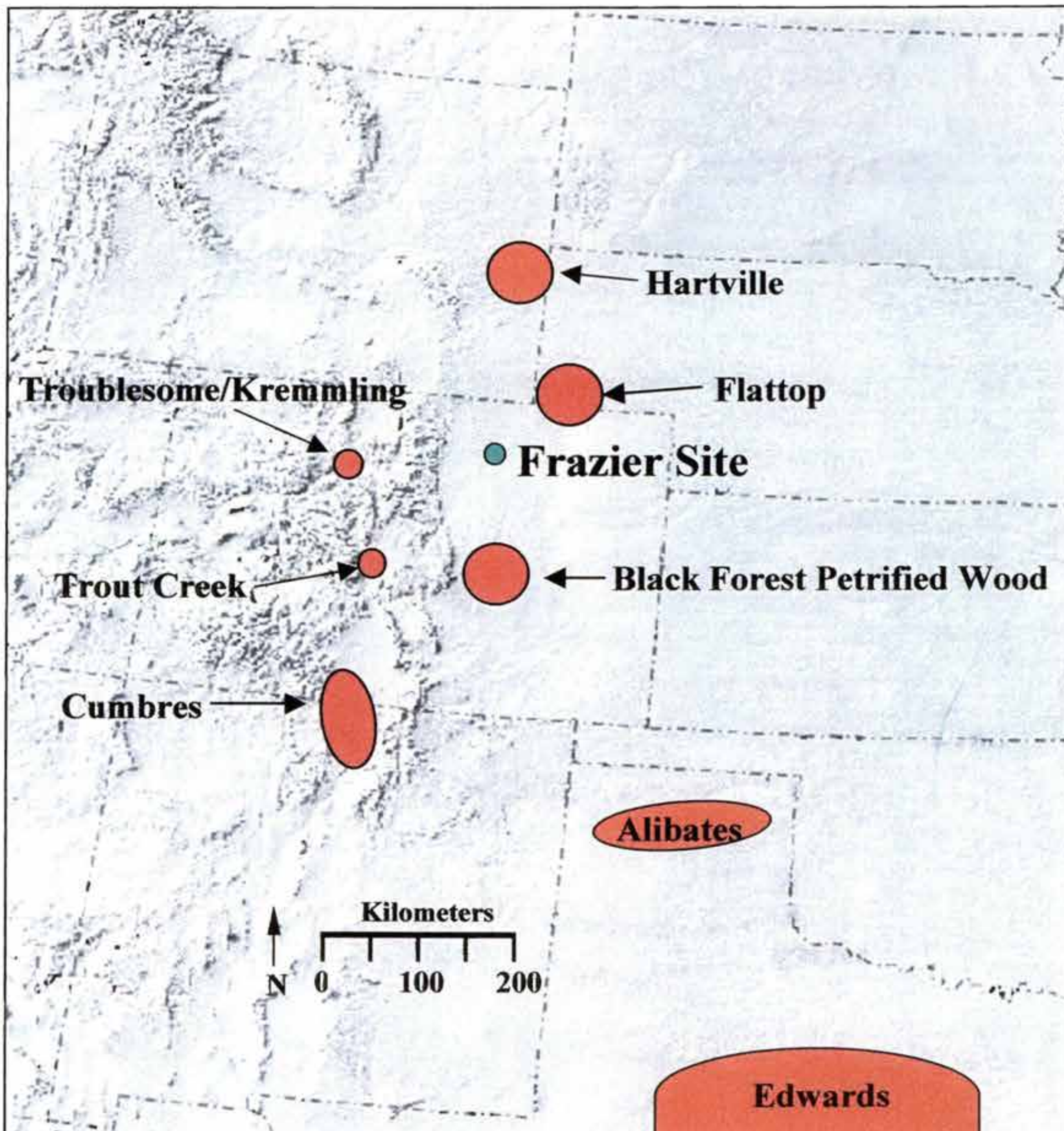


Figure 36. Primary lithic source areas discussed in the text in the Plains and Rocky Mountain regions (map adapted from http://www.nationalgeographic.com/mapmachine).

materials, Alibates agatized dolomite, petrified wood, Morrison Quartzite, unknown chert, and unknown quartzite (Appendix B). Some of the unidentified lithic materials are similar in macroscopic characteristics to such types as Knife River flint, Kremmling chert, Trout Creek jasper, Black Forest silicified wood, Windy Ridge quartzite, and Edwards chert. Unfortunately, macroscopic and ultraviolet light fluorescence could not absolutely confirm these identifications. Additional research such as x-ray fluorescence or spectroscopy of these materials is needed to determine the exact source. The seven identified material categories are discussed separately, although interpretations based on material type will be examined later in this chapter.

One of the most intriguing aspects of the Frazier lithic material distribution is the presence of Alibates, which originates in the central Texas panhandle roughly 525 km southeast of the site. Macroscopically, Alibates in the Frazier sample is generally the typical purple to red and white banded variety, however, a few cream and tan banded specimens are present. These materials correspond well with comparative samples of Alibates under ultraviolet light.

The Hartville Uplift is a Paleozoic and Mesozoic outcrop located approximately 220 km north of the site in east-central Wyoming. High-quality cherts and quartzite/orthoquartzite are known to originate throughout the uplift (Frison 1982a; Miller 1991; Reher 1991). Material identified as Hartville Uplift in the Frazier collection is generally of the brown to dark brown dendritic chert variety, although various hues such as orange, pink, and gray with black spots were also noted. Hartville Uplift materials are frequently associated with Paleoindian assemblages within central and eastern Wyoming (Frison 1974; Frison and Stanford 1982a), the eastern Colorado Plains (Ambler 1999), and southeast Montana (Frison 1991).

The Flattop chalcedony quarry is located approximately 100 km northeast of the Frazier site near Sterling, Colorado. Flattop is an Oligocene material, represented in the Frazier collection by a translucent white to blue-pink material with mottled light white spots. Other materials in the Frazier collection that are identified as Flattop range from orange, pink, cream, and gray with mottled white spots. Flattop material is a part of the Chadron formation, that also is distributed in Nebraska and South Dakota (Ahler 1977:134; Holen 1991). It is likely that at least some of the unidentified chert specimens are from the Flattop quarry, but the full range of this material is not yet adequate enough to conclusively identify these materials.

Quartzite represents the largest category of material in the Frazier assemblage. A large portion of the quartzite sample is a yellow and gray medium-grained material that resembles Morrison Formation quartzite. This material outcrops throughout Wyoming, New Mexico, and Colorado (Jodry 1999:97; Miller 1991, Figure 12.1; Reher 1991), including along the South Platte River in the vicinity of the Frazier site. The remaining quartzite in the collection is placed in the unidentified quartzite category. Colors range from gray, red, blue-gray, green, and dark green-brown (Appendix B). These materials may also derive from local Morrison Formation outcrops, although a few gray orthoquartzite specimens, including the only non-chert projectile point in the assemblage, may be Spanish Diggings associated with the Hartville Uplift (Miller 1991).

Petrified wood in the Frazier collection is of three main varieties including yellow and brown banded, dark brown and black banded, and orange, red and yellow-brown banded. Only one specimen, a projectile point, represents the dark brown and black type that may be Black Forest silicified palm wood associated with Dawson Formation deposits located approximately 70 km southwest of the site (Jodry 1999:88). The remaining petrified wood in the sample is known to originate along the South Platte River in the general vicinity of the Frazier site (personal communication, Lou Klein 6/1999).

The majority of the unidentified chert materials are likely derived from locally available Madison formation Mississippian chert sources. These materials range in color and texture from white, white and brown-black banded, translucent orange-pink, purple, tan, gray, dark green, brown and mottled combinations. It is possible that some of these materials may be sourced as knowledge of the variability in regional lithic resources is better understood. Recent studies such as Black's (2000:132-147) illustrate how relatively little is known or compiled concerning raw material sources in the Colorado region.

<u>Debitage</u>

Because flaked stone tools are subjected to a series of cumulative processes ending eventually with the loss or discard of the object, it has been suggested that lithic reduction should be viewed as a continuum (Boldurian and Cotter 1999; Bradley 1982; Sellet 1999). Although stone tool by-products at a site are the culmination of the reduction continuum (*chaînes opértaire*), debitage analysis requires a "splitting" or hierarchical approach using monothetic (single attribute) or polythetic (multiple attributes) typologies (Andrefsky 1998:65). After recording monothetic or polythetic data, a hierarchical approach divides an assemblage into such categories as core reduction or biface reduction (Mauldin and Amick 1989), hard hammer or soft hammer (Crabtree

1972; Hayden and Hutchings 1989), and primary/secondary/tertiary categories (Boldurian and Cotter 1999; Frison and Bradley 1980; Bradley 1982). The typology employed with the Frazier assemblage combines a monothetic and a polythetic approach, the majority of the analysis is monothetic (platform type, length, width, thickness, scar count, cortex amount, etc.), although a polythetic method is utilized for the "flake type" variable.

Analysis of debitage, both experimental and archaeological, has illustrated that particular morphological attributes can be effective in understanding general lithic reduction sequences according to variability or patterns in flaked stone assemblages (Amick 1999a; Amick and Mauldin 1989; Bradley 1982; Bradley and Frison 1987, 1996; Frison and Bradley 1980; Ingbar et al. 1989; Magne 1989; Prentiss and Romanski 1989; Whittaker 1994). In order to gain an accurate picture of debitage trends, comparison of the Frazier debitage sample to experimental data is employed.

The link between debitage attributes and their connotations with regard to lithic technology is not as clear as would be hoped. Amick et al. (1989:1) note that "experimental data cannot be used directly to interpret archaeological data," but can provide "a method for improving descriptions of the archaeological record in terms which are relevant to....theoretical questions." If consistent flake characteristics are produced during experimental lithic reduction, then correct identification of those attributes can be used to understand the prehistoric lithic technology utilized at a site. Unfortunately, experimental lithic studies have illustrated that biface thinning/late stage reduction flake traits are sometimes produced during hard hammer, early stage reduction, and vise-versa (Mauldin and Amick 1989; Patterson 1982; Patterson and Solberger 1978). Furthermore, the identification of flake attributes during analysis is prone to researcher variability (Andrefsky 1998:62, 110-135; Boldurian and Cotter 1999:38; Gnaden and Holdaway 2000). Ingbar et al.'s statement (1989:117) that "your biface thinning flake may be our core platform preparation flake" highlights the problem of intra-analyst variability in comparative analyses. It is also important to remember that the composition of cultural material recovered from the archaeological record is biased prior to analysis, depending on the areas chosen for excavation and by excavation strategy.

Experimental lithic reduction has, however, correlated certain attributes such as size, dorsal cortex and scar count, and relative size of bulb of force, to lithic technology (Amick and Mauldin 1989; Burnett et al. 2000; Ingbar et al. 1989; Mauldin and Amick 1989; Odell 1989). These attributes are the most useful when two or more of the variables are cross-correlated, for instance, plotting the relationship of size and cortex amount (Andrefsky 1998:126; Baumler and Downum 1989; Magne 1989:16; Mauldin and Amick 1989:65; Whittaker 1994:276). By cross-correlating size, an objective measurement, and ordinal-scale methods for recording attributes such as cortex amount, researcher bias is greatly diminished (see Andrefsky 1998:103-104; Mauldin and Amick 1989:67-88). Assemblage-level patterns within morphological flake classes can be useful when they are corroborated by independent means such as the cross-correlation analysis described above (Prentiss 1998).

Based on the previous discussion, it becomes apparent that the following interpretations of Frazier lithic material is useful only for addressing baseline issues regarding the overall composition of the assemblage. Therefore, typological assumptions such as "hard hammer vs. soft hammer" are not the focus of the current research.

Alternatively, attempted reconstruction of lithic technology at the Frazier site is based on general trends that can be correlated with experimental archaeological assemblages.

Table 2 summarizes the Frazier debitage assemblage by material type and debitage portion. It has been suggested that the type of lithic reduction used at a site can be reconstructed by examining the percentages of complete, proximal, and shatter debitage portions (Sullivan and Rozen 1985). Observations of core reduction in Sullivan and Rozen's (1985) experiment illustrated that core reduction produced mainly complete flakes and shatter, whereas late stage tool production produced a higher percentage of proximal, medial, and distal flake fragments. The data presented in Table 2 illustrates that proximal, medial, and distal flakes in the Frazier assemblage comprise more than half (n=617 or 65.9%) of the total collection. Complete flakes and shatter represent only 28.1% (n=263) of the sample. Therefore, according to Sullivan and Rozen (1985), this

Table 2. Cross-tabulation of Debitage from the Frazier Site by Material Type and Flake Portion.

Material Type	Complete	Proximal	Mid-section	Distal	Lateral	Shatter	Pot-lids	TOTALS			
								TW*	%	n	%
Alibates	32	25	18	45	7	1	0	50.0	2.2	128	13.6
Flattop	4	0	1	3	1	1	0	6.6	0.3	12	1.3
Hartville	49	25	10	28	3	1	0	25.1	1.1	117	12.4
Misc. Chert	53	48	42	61	9	4	2	143.5	6.4	219	23.3
Petrified Wood	13	7	5	9	2	3	0	55.1	2.5	39	4.1
Quartzite	74	77	84	128	28	34	2	1976.0	87.6	427	45.3
TOTAL	**225**	**184**	**160**	**274**	**50**	**44**	**5**	**2256.3**	**100**	**942**	**100**
%	**23.9**	**19.5**	**17.0**	**29.1**	**5.3**	**4.7**	**.5**				

TW* = Total weight in grams.

simple separation of flakes by degree of completeness indicates that late stage tool production and maintenance was the primary activity at the Frazier site.

Although Prentiss and Romanski (1989) agree that Sullivan and Rozen's (1985) observations were repeatable under experimental conditions, they caution that taphonomic processes such as trampling can alter the frequency of flake portions (see also McBrearty et al. 1998). Mauldin and Amick (1989:84) suggest that utilizing flake portions as indicators of reduction stage should be seriously questioned. Experimental reduction of cobbles by the researchers found that variables such as the type and size of percussion tool used and the original cobble morphology greatly influence the type of flake portions produced during reduction (Mauldin and Amick 1989). Flake size of the Frazier debitage sample is recorded according to a system devised by Mauldin and Amick (1989:72) where the maximum dimension of a specimen is used to assign the piece into one of six ordinal categories. Flakes less than 1 cm in maximum dimension are assigned to Size Class 1, flakes between 1 and 2 cm are Size Class 2, flakes between 2 and 3 cm are Size Class 3, flakes between 3 and 4 cm are Size Class 4, flakes between 4 and 5 cm are Size Class 5, and flakes greater than five cm in any one dimension are Size Class 6.

Before cross-correlating size and other debitage attributes, an initial overview of the Frazier debitage size is warranted. Maximum dimension of the Frazier lithic sample was recorded regardless of platform orientation, similar to an experimental study employed by Patterson (1990). Patterson plotted flake size distributions at semilog scale for one bifacial reduction experiment, two experiments of primary reduction with "platformed" cores, and one archaeological assemblage from 41WH19, an archaic site in

Wharton County, Texas (Patterson et al. 1987). The Frazier debitage is substituted for the Archaic site sample used in Patterson et al.'s experiment for Figure 37. Initially apparent is the great discrepancy between Patterson's primary core reduction assemblage and the bifacial reduction experiment. Figure 37 demonstrates that the Frazier assemblage most closely represents Patterson's bifacial reduction experiments in that the majority of flakes are between 10 and 30 mm in maximum length (Size Classes 1 and 3), although similarities with the primary reduction experiments is also evident.

Size can be used in conjunction with other variables to recognize patterns associated with core or bifacial reduction (Magne 1989:16). Figure 38 presents a line graph describing the relationship between size class and morphological attributes of

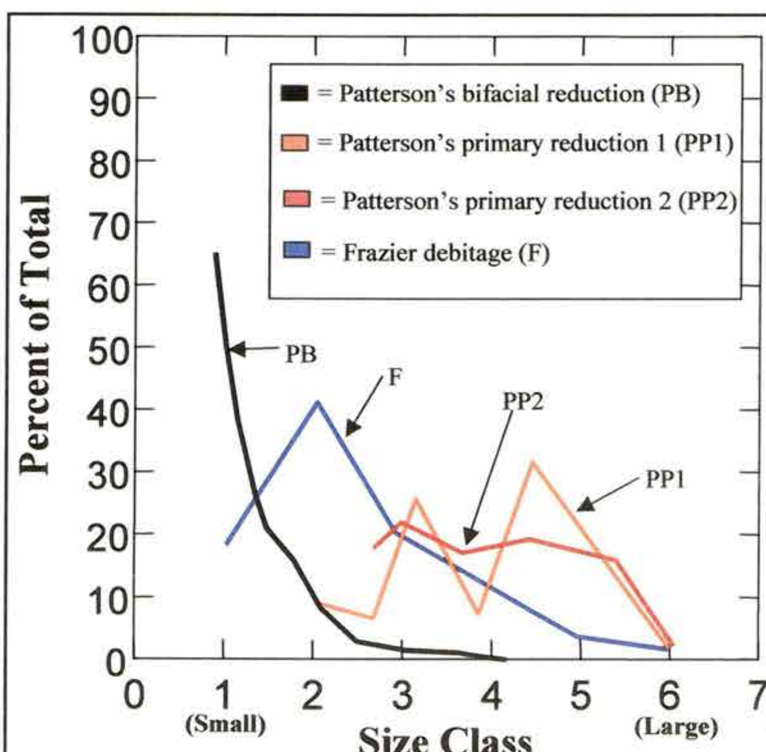


Figure 37. The distribution of the Frazier debitage sample and Patterson's (1990) bifacial and primary reduction experiments.

platforms as described by Andrefsky (1998:92-94). It is evident that prepared platforms (complex and abraded) are more often associated with flakes in the smaller size class (10-30 mm in maximum length) whereas cortical platforms are correlated with the larger size class (40-60+ mm in maximum length). Flat platforms are associated with all size classes fairly evenly, although the majority of flakes fall between 20-40 mm in maximum length. Flat platforms are typically associated with core reduction or non-bifacial tool production (Andrefsky 1998:94). Cortical platforms are typical of early stage reduction. Complex and abraded platforms, respectively, exhibit surfaces that have been prepared either by striking small flakes from the edge of the platform or grinding (Andrefsky 1998:92-96).

Table 3 presents the distribution of platform types by size class according to

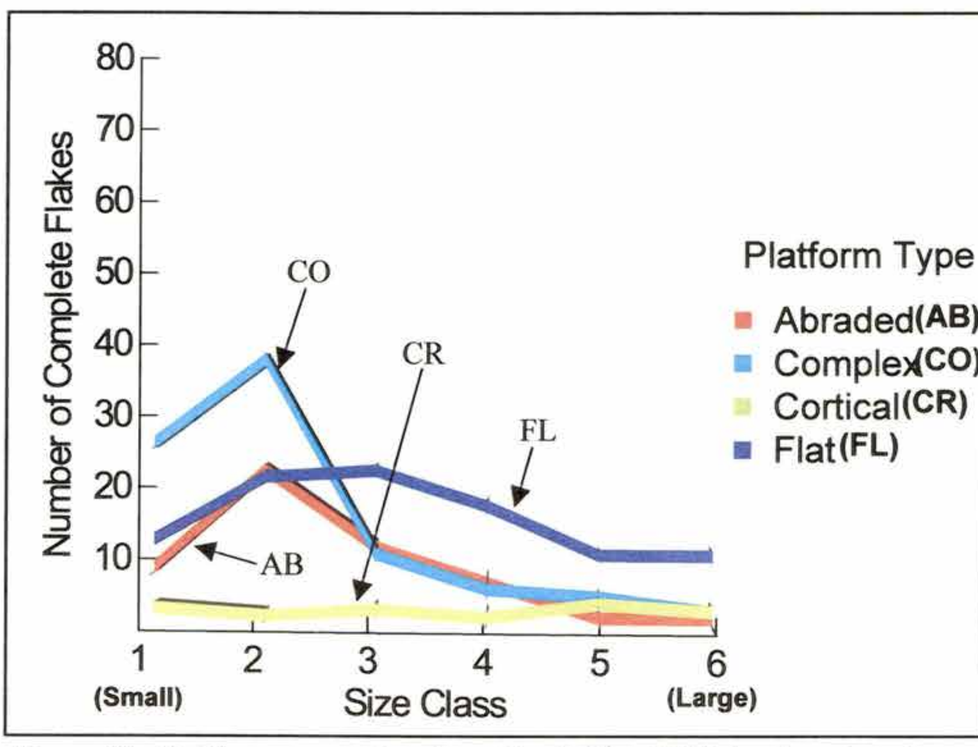


Figure 38. Platform preparation type (Andrefsky 1998) by size class for complete flakes.

Frison and Bradley's (1980:27-30) methods. Platform types are divided into prepared platforms (faceted, reduced, ground and combinations of these three types) and unprepared platforms (see "Methods" section, this chapter). The distribution of striking platform type conforms fairly well to the pattern described in Figure 38 using Andrefsky's (1998) nominal scale method. The percentages in Table 3 indicate a general trend in the debitage assemblage for small debitage (Size Classes 1 through 3) to be associated with prepared platforms and larger debitage (Size Classes 4 through 6) to correlate with unprepared platforms. These Table 3 data (52.9% prepared, 47.1% unprepared) illustrate that of the platformed flake assemblage, prepared and unprepared platforms are equally distributed. It should also be noted that of the prepared platform types, reduced platforms are the most prevalent type (n=72 or 61.0%). This observation will be explored in more detail later in this chapter.

Experimental research has illustrated that the quantity of cortex on the dorsal surface of lithic material (debitage and tools) is a good indicator of lithic reduction stage (Mauldin and Amick 1989:73; Tomka 1989:141). Cortex is described as the weathered or chemically altered exterior portion of a cobble. The common assumption is that the exterior portion of a cobble is the first to be removed during the reduction process. Therefore, the more cortex present on the dorsal surface of a flake, the more likely the flake was produced during early stage reduction (Plastino 1994:99; Zier et al. 1988). Cortex amount in the Frazier assemblage was measured using Andrefsky's (1998:103-104) four-rank ordinal scale (see "Methods", this chapter). A code of 0 equals no cortex,

Table 3. Platform Type by Size Class for Complete Flakes.

Platform Type		Size Class 1	2	3	4	5	6	Total	%
Prepared	Faceted	1	3	1	0	0	1	**6**	**2.7**
	Faceted/Ground	0	3	2	1	0	0	**6**	**2.7**
	Faceted/Reduced	0	1	0	0	0	0	**1**	**0.4**
	Faceted Reduced/Ground	0	0	1	0	0	0	**1**	**0.4**
	Ground	4	19	8	3	0	0	**34**	**15.3**
	Reduced	24	25	4	1	1	0	**55**	**24.7**
	Reduced/Ground	4	7	1	2	1	0	**15**	**6.7**
Total Prepared		**33**	**58**	**17**	**7**	**2**	**1**	**118**	**52.9**
Prepared %		**71.7**	**68.2**	**40.5**	**28.0**	**14.3**	**9.1**		
Unprepared	Dihedral	4	7	3	3	0	0	**17**	**7.6**
	Plain	6	15	21	15	11	10	**78**	**35.0**
	Polyhedral	3	5	1	0	1	0	**10**	**4.5**
Total Unprepared		**13**	**27**	**25**	**18**	**12**	**10**	**105**	**47.1**
Unprepared %		**28.3**	**31.8**	**59.5**	**72.0**	**85.7**	**90.9**		
TOTALS		**46**	**85**	**42**	**25**	**14**	**11**	**223**	**100.0**

a code of 1 represents 1 to 50 percent cortex, a code of 2 equals 51 to 99 percent cortex, and a code of 3 represents a completely cortical dorsal surface.

Mauldin and Amick (1989:72-73) have found that cross-correlating the amount of dorsal cortex with debitage size is a more reliable indicator of reduction stage than relying on the percentage of cortex in the assemblage. Figures 39 through 41 illustrate the distribution of flakes according to the amount of cortex on debitage produced during

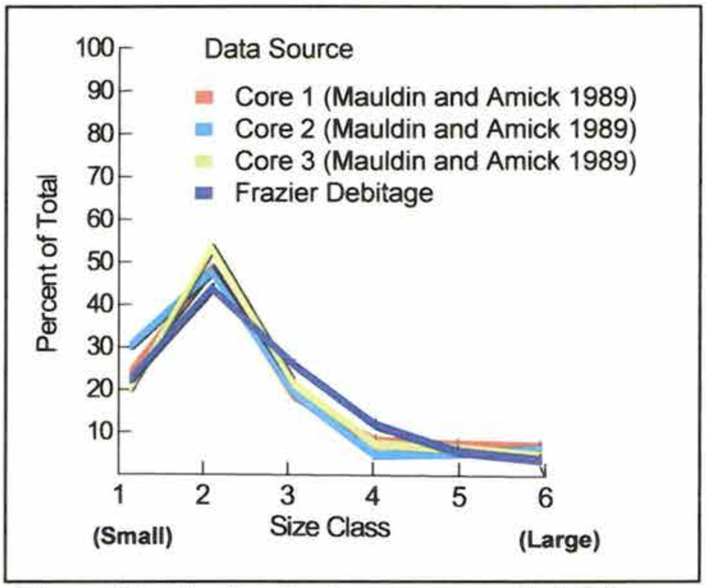


Figure 39. The distribution of non-cortical flakes from the Frazier site and experimental data.

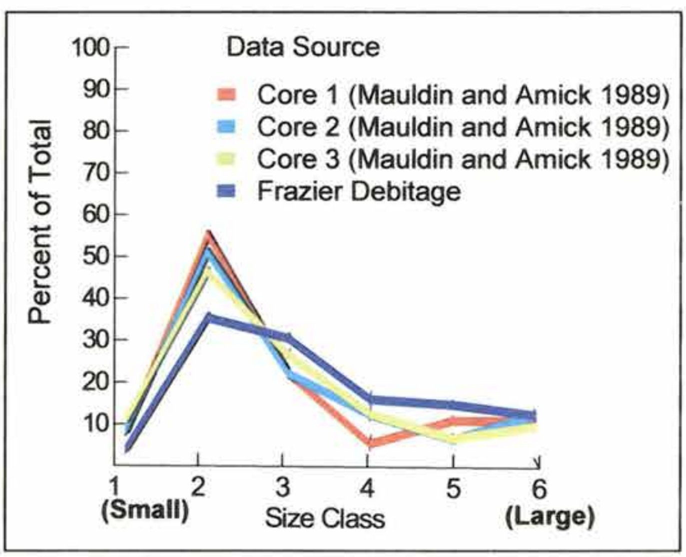


Figure 40. The distribution of partially cortical flakes from the Frazier site and experimental data.

Mauldin and Amick's (1989) three experimental bifacial core reductions and flakes in the Frazier assemblage. It is readily apparent that the Frazier non-cortical debitage (Figure 39) and flakes retaining 1-50% of cortex on the surface (Figure 40) reflect a pattern very similar to that described by the experimental bifacial reduction specimens. These data suggest a predominance of bifacial core reduction in the Frazier assemblage. However, the pattern observed for debitage with 51-100% cortex (Figure 41) is markedly different from that of Mauldin and Amick's bifacial core reduction experiments. The Frazier cortical debitage peaks at a larger size grade than the experimental flakes. The cores used in the experiment were flattened nodules. Larger, spherical nodules tend to produce larger flakes with more

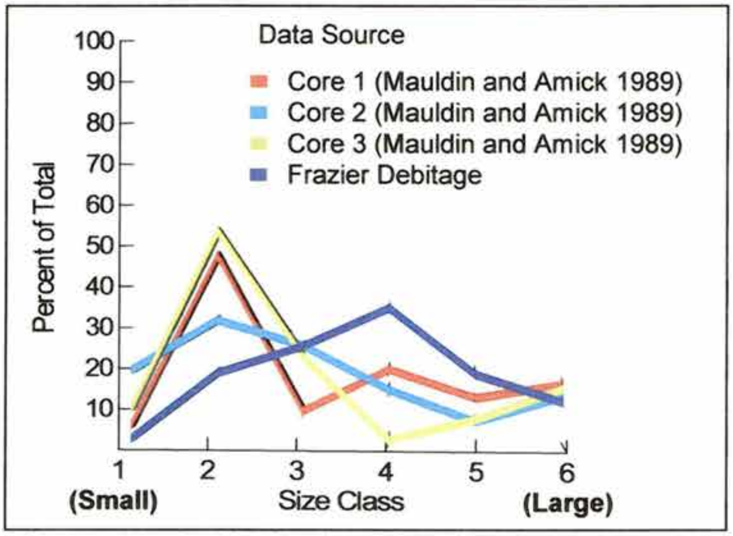


Figure 41. The distribution of cortical flakes from the Frazier site and experimental data.

cortex, and the use of such cobbles may be responsible for the deviation within the 50-100% sample.

Alternatively, the discrepancy noted in Figure 41 may reveal that additional types of reduction were occurring at the site, specifically non-bifacial core reduction.

Experimental core reductions by Mauldin and Amick (1989:73-76) and Odell (1989:178) suggest that the relationship between scar count and size class is weak and highly variable. However, bifacial core reduction by Mauldin and Amick (1989:75) revealed that correlating dorsal scar counts with cortex percentage is an effective way to identify stages of lithic reduction. Figure 42 presents the distribution of dorsal scar counts by cortex categories for Mauldin and Amick's original bifacial reduction experiment, and Figure 43 illustrates the same variables using the lithic sample recovered from the Frazier site. Both distributions are similar in that flakes with two or more dorsal flake scars lack cortex (70% or greater of the cases) and flakes with zero or one dorsal flake scar retain a cortical surface in approximately 50% of the cases. These data suggest that bifacial reduction of nodules was practiced at the Frazier site.

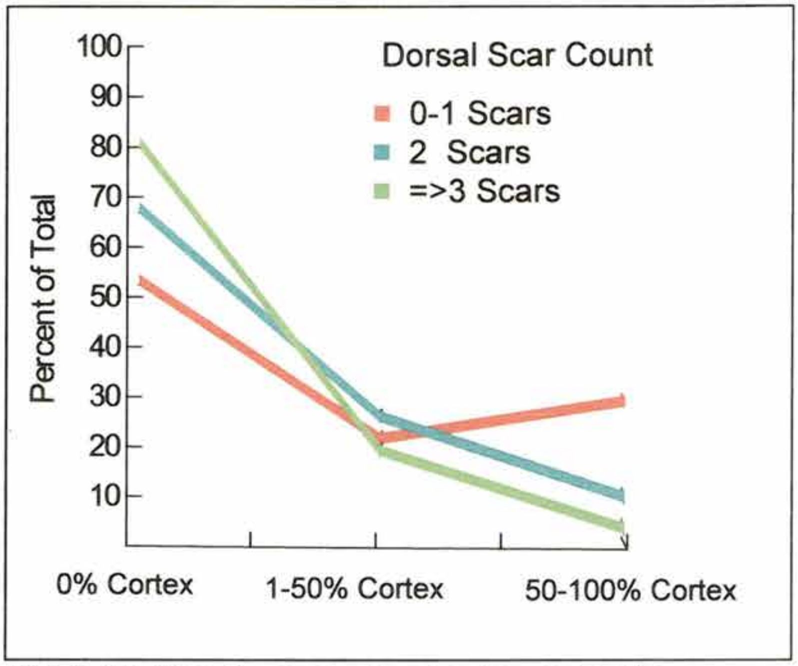


Figure 42. Dorsal scar count and cortex amount for experimental bifacial reduction (Maudlin and Amick 1989)

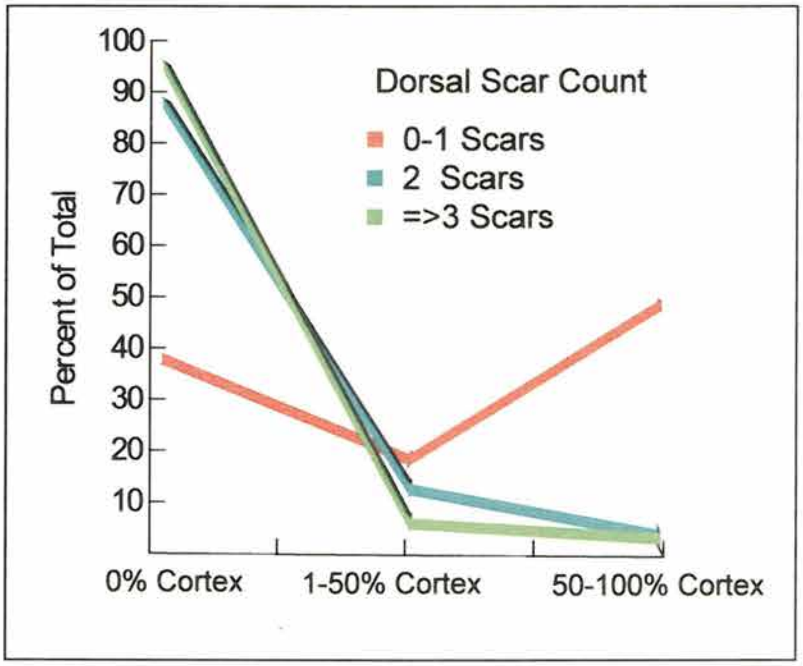


Figure 43. Dorsal scar count and cortex amount for the Frazier debitage sample.

A subjective assessment of flake type was recorded for the Frazier site lithic assemblage. The categories are based on types defined by Frison and Bradley (1980:24-27) for the Hanson site assemblage and utilized also for the Agate Basin sample (Bradley 1982:183-185). Five types of flakes were identified in the Frazier assemblage, normal, discoidal, standardized, biface thinning, and retouch/trimming. Table 4 illustrates the distribution of flake types according to platform preparation. Initially, it is apparent that the entire range of platform preparation techniques (unprepared to complex) exists in the assemblage. A closer examination of these data indicate that biface thinning/trimming flakes comprise a large percentage of the prepared platform assemblage (n=155, 76.0%). In contrast, normal flakes represent the majority of flakes in the unprepared platform category (n=134 or 69.8%). Previous discussion of platform types according to size grade for complete flakes (Table 3) illustrated that reduced platforms are the most common type of flake preparation. Data provided in Table 4 incorporates all platformed flakes (complete and proximal). These data also demonstrate the prevalence of reduced platforms in the assemblage. A total of 129 instances of reduced platforms (97 reduced, 25 reduced and ground, 2 faceted, and 5 faceted and reduced) are present in the Frazier assemblage, comprising 63.2% of the total prepared platform sample. This observation is interesting as Frison and Bradley (1982:184-185) noted a higher percentage of reduced platforms in the Agate Basin level than in the Folsom level at the Agate Basin site. Tony Baker and Bob Patterson (personal communication 12/15/00) also noted a high number of reduced platforms in the Frazier sample as compared to other Folsom assemblages they have observed. Figure 44 provides a sample of the Frazier debitage assemblage showing some reduced platforms.

Table 4. The Distribution of Flake Types by Platform Type.

Platform Type		Flake Type				Total	%
		Normal	Disc.	Stan.	Biface		
Prepared	Faceted	0	4	1	8	13	**3.3**
	Faceted/Ground	4	1	1	9	15	**3.8**
	Faceted/Reduced	0	0	0	5	5	**1.3**
	Faceted Reduced/Ground	0	0	0	2	2	**0.5**
	Ground	9	6	1	31	47	**11.9**
	Reduced	10	4	2	81	97	**24.5**
	Reduced/Ground	2	3	1	19	25	**6.3**
Total Prepared		**25**	**18**	**6**	**155**	**204**	**51.5**
Prepared %		**12.3**	**8.8**	**2.9**	**76.0**		
Unprepared	Dihedral	20	10	0	7	37	**9.3**
	Plain	90	20	1	10	121	**30.5**
	Polyhedral	24	2	0	8	34	**8.6**
Total Unprepared		**134**	**32**	**1**	**25**	**192**	**48.5**
Unprepared %		**69.8**	**16.7**	**0.5**	**13.0**		
TOTALS		**159**	**50**	**7**	**180**	**396**	

These patterns suggest that a technological platform preparation difference exists between Folsom and Agate Basin groups. Specifically, Agate Basin groups appear to rely more upon platform reduction whereas Folsom groups apply more faceting preparation. It is acknowledged that the implied differences between these two groups is based on a small sample size and additional information regarding Agate Basin lithic technology needs to be gathered from other sites.

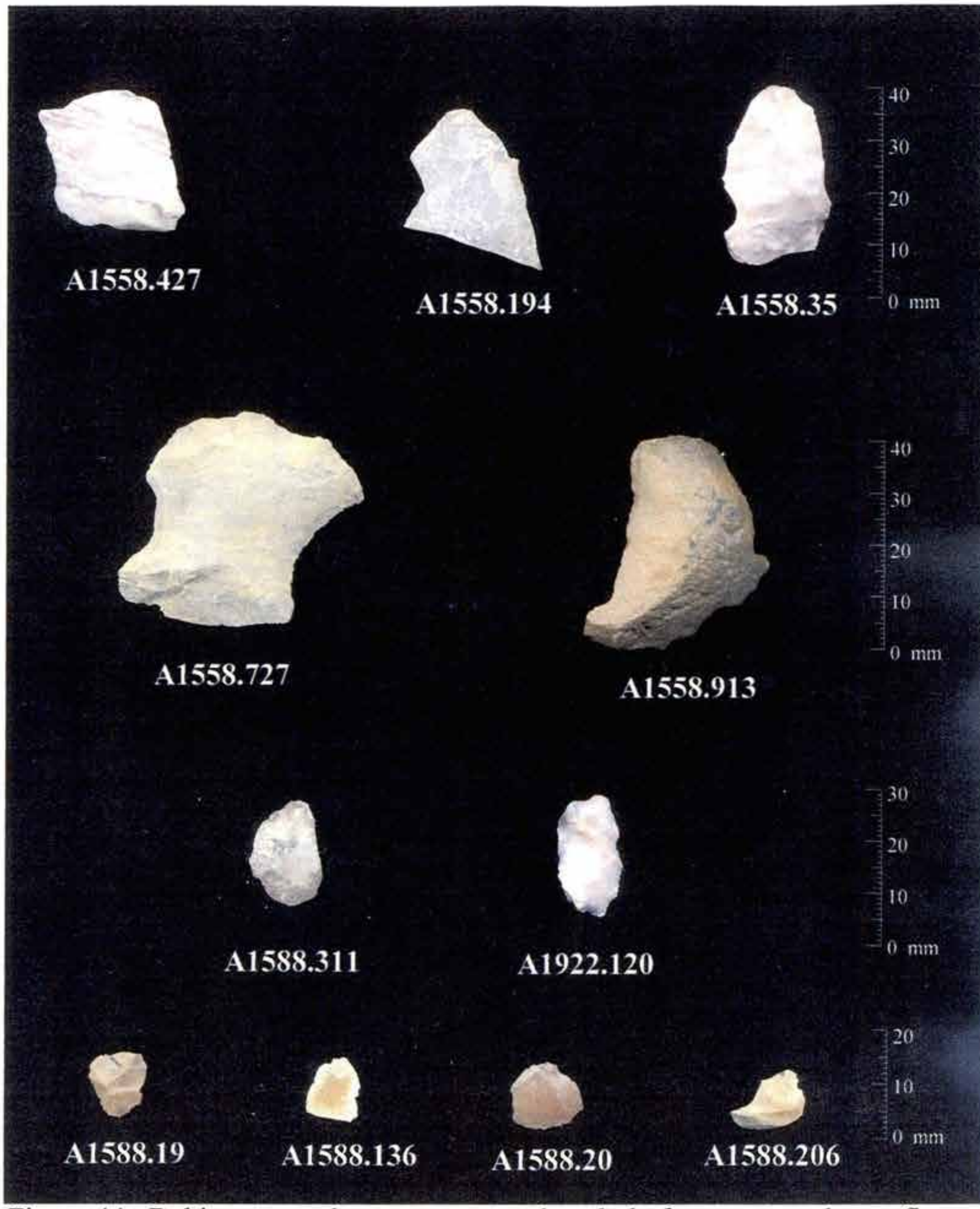


Figure 44. Debitage sample: upper row, reduced platforms; second row, flat platforms; third row, reduced platforms on retouch flakes; bottom row, pressure flakes.

An additional approach used in lithic analysis is the load application typology, or hard-hammer versus soft-hammer distinction. Researchers have distinguished between flakes produced by either hard or soft-hammer techniques on the basis of morphological attributes such as bulb size or platform lipping (Cotterell and Kamminga 1987, 1990; Frison 1968:149). Experimental replication by Patterson and Sollberger (1978), however, found that a typical attribute, platform lipping, is not a good indicator of hammer technique. In contrast, the relative size of the bulb of force on a flake has been shown to indicate load application type, particularly identifying flakes produced by hard-hammer techniques (Andrefsky 1998:115-117; Cotterell and Kamminga 1987:686).

Bulb size was measured in the Frazier assemblage by comparing maximum flake thickness at the bulb of force with flake thickness at the mid-point of the flake. Obviously, bulb size is determined only for flakes retaining a platform. The difference between the two measurements is used to calculate a relative bulb thickness. Table 5 presents the distribution of bulb thickness by flake type. Admittedly, one runs the risk of circular reasoning by comparing bulb thickness to flake type as many of the characteristics used to determine flake type (bulb thickness, platform preparation, flake thickness, etc.) include the attribute selected for assessment (bulb thickness). However, as these Table 5 data illustrate, a statistically significant difference exists between the bulb size of biface thinning and normal flakes in the Frazier assemblage. An analysis conducted by Andrefsky (1998:116-117) illustrated a significant difference between relative bulb size of flakes experimentally produced with hard-hammer implements and those produced with soft-hammer implements. Comparison of these Frazier data with Andrefsky's study indicates that biface thinning flakes were most likely produced using soft-hammer, rather than hard-hammer, implements.

Table 5. Mean Bulb Thickness of Biface Thinning and Normal Flakes.

Flake Type	n	Mean	Standard Deviation
Biface Thinning	177	0.133	0.523
Normal	158	1.134	2.436

Pooled variance t = -5.330, degrees of freedom = 333; probability = 0.000 (95% confidence interval)

Debitage Discussion: Several topics are of concern when using experimental data to reconstruct lithic technology (Ingbar et al. 1989:118). Ingbar et al. (1989) indicate that when comparing experimental data with an assemblage recovered from the archaeological record, constants must be isolated in both experimental and archaeological realms. If constants are found in experimental data, researchers must be careful not to transfer the "constants" to the archaeological record as the assemblage is a palimpsest of prehistoric "experiments" influenced by taphonomic processes (Ingbar et al. 1989:118). If the Frazier debitage assemblage were compared only to Sullivan and Rozen's (1985) portion experiments, the interpretation would be that late stage reduction at the site was the dominant activity. In contrast, if Patterson's (1990) or Mauldin and Amick's (1989) size data are employed, it appears that late stage and early stage reduction occurred. These are examples of how multiple experiments and examination of more than one variable are important in order to understand lithic reduction technology at a site. Focusing on one experiment or variable may lead to a different interpretation than if utilizing another experiment or variable.

Another potential risk inherent in correlating experimental debitage data with the archaeological record is that prehistoric groups often used the large flakes as tools (Magne 1989:17). If the debitage is analyzed as a separate lithic entity from the tool sample, a bias towards small debitage will likely be present. Incorporation of the tool analysis, especially specimens retaining flake characteristics (flake tools and scrapers), is therefore important in order to understand the full range of lithic technology practiced at a site. It is acknowledged, however, that some of the tools produced on a site are likely transported with the prehistoric group, rendering "true," or "actual," reconstruction of lithic technology almost impossible. Nonetheless, general data patterns in the lithic assemblage should give a fairly clear indication of lithic technology at the site, regardless of transported or recycled lithic specimens. The use of *chaînes opértaire* and nodule analysis in the latter portion of this chapter will aid in the interpretation of the entire Frazier lithic sample, including the transported and recycled lithic pieces.

In regard to the debitage analysis, these data suggest that two types of lithic reduction occurred at the Frazier site. Prepared platforms and the large percentage of small debitage suggest that bifacial reduction or late stage reduction was a major activity, while the occurrence of unprepared platforms implies that early stage reduction was also undertaken at the Frazier site. Comparison of the debitage sample with experimental data shows an affinity for patterns similar to bifacial core reduction, although evidence of trends comparable to early reduction are also apparent. Of the platformed flake sample, 51.5% of the flakes exhibit prepared platforms and 48.5% are unprepared (Table 4). Normal flakes (40.2%) and biface thinning flakes (45.5%) comprise approximately half of the platformed sample (Table 4). I interpret these overall data to reflect roughly equal amounts of early and late stage reduction activities. It is likely that material type greatly influences this distribution, but analysis of the tool sample is provided before considering material type differences.

Tool Analysis

Lithic specimens identified as tools were assigned numerical codes according to a subjective assessment of their overall morphology. Eight major element categories were delineated and recorded; projectile point (1), early-stage biface (2), late-stage biface (3), core (4), edge-modified flake (5), retouched flake (6), and formal uniface (7) (see Appendix B for explanations of these categories). Individual tool specimens were examined both macroscopically and microscopically using a 7x to 45x stereomicroscope. Table 6 presents the distribution of lithic tools identified in the Frazier assemblage by material type. It is readily apparent that, regardless of material type, flake tools are the dominant type of tool present in the Frazier assemblage (n=159, 72.6%). Formal unifaces (scrapers) are considered to be flake tools because they are manufactured on flake blanks retaining a dorsal and ventral surface. Combining formal unifaces with edge modified

Table 6. Morphological Tool Type Distribution According to Material Type.

Material Type	Hafted Biface	Unhafted Biface	Core	E. M. Flake Tool*	Ret. Flake Tool*	Formal Uniface (Scraper)			Total
						Side	Dis-lat	Distal	
Alibates	0	2	0	12	3	0	5	1	25
Flattop	0	0	1	7	5	1	1	0	15
Hartville	6	3	0	8	7	6	10	1	37
Misc. Chert	0	1	1	19	3	3	1	2	32
Pet. Wood	1	1	1	4	2	0	0	0	9
Quartzite	1	4	1	69	20	4	2	0	101
Total	**8**	**11**	**4**	**119**	**40**	**14**	**19**	**4**	**219**
						37 (16.9%)			
Row %	**3.7**	**5.0**	**1.8**	**54.4**	**18.3**	**6.4**	**8.7**	**1.8**	**100.0**

*E.M. = edge modified; Ret. = retouched

and retouched flake tools brings the total of tools produced on flake blanks to 196 or 89% of the total tool assemblage. In stark contrast, formal bifaces, including projectile points, comprise only 9.1% (n = 20) of the entire tool assemblage. The remainder of the sample consists of four cores representing only 1.8% of the total. Individual lithic tool categories are discussed in detail in the following section.

Modified Cobbles-Cores

Four cores were recovered from the site (Figure 45). Three of these are multi-directional cores of locally available material consisting of petrified wood (Cat. No. A1992.89), Morrison formation quartzite (Cat. No. A1922.98), and miscellaneous chert (Cat. No. A1922.94). The remaining core (Cat. No. A1922.99) is identified as Flattop chalcedony and is a uni-directional core.

Measurements for the core sample are provided in Table 7 along with Andrefsky's (1998) maximum linear dimension (MLD). The MLD is derived by multiplying the maximum dimension with the weight of the core. This measurement is included because cores, by their very nature, are highly variable in shape. Therefore, dimensions such as length and width are difficult to define.

Table 7. Measurements and Weight for Modified Cobbles

Material Type	Cat. No. (A1992)	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Weight (g)	MLD
Flattop	.99	80.1	45.1	27.3	70.6	5655
Morrison Quartzite	.98	80.5	42.2	19.2	89.1	7173
Misc. Chert	.94	57.2	40.0	18.8	34.6	1979
Petrified Wood	.88	79.3	54.3	34.5	153.3	12156

Initial core size is known to influence the type of reduction technology utilized by prehistoric people (Dibble 1991; Kuhn 1992; Mauldin and Amick 1989). It stands to reason that large cobbles can be used to produce large tools and small cobbles will create smaller tools. Therefore, the type of reduction strategy practiced is highly dependent on

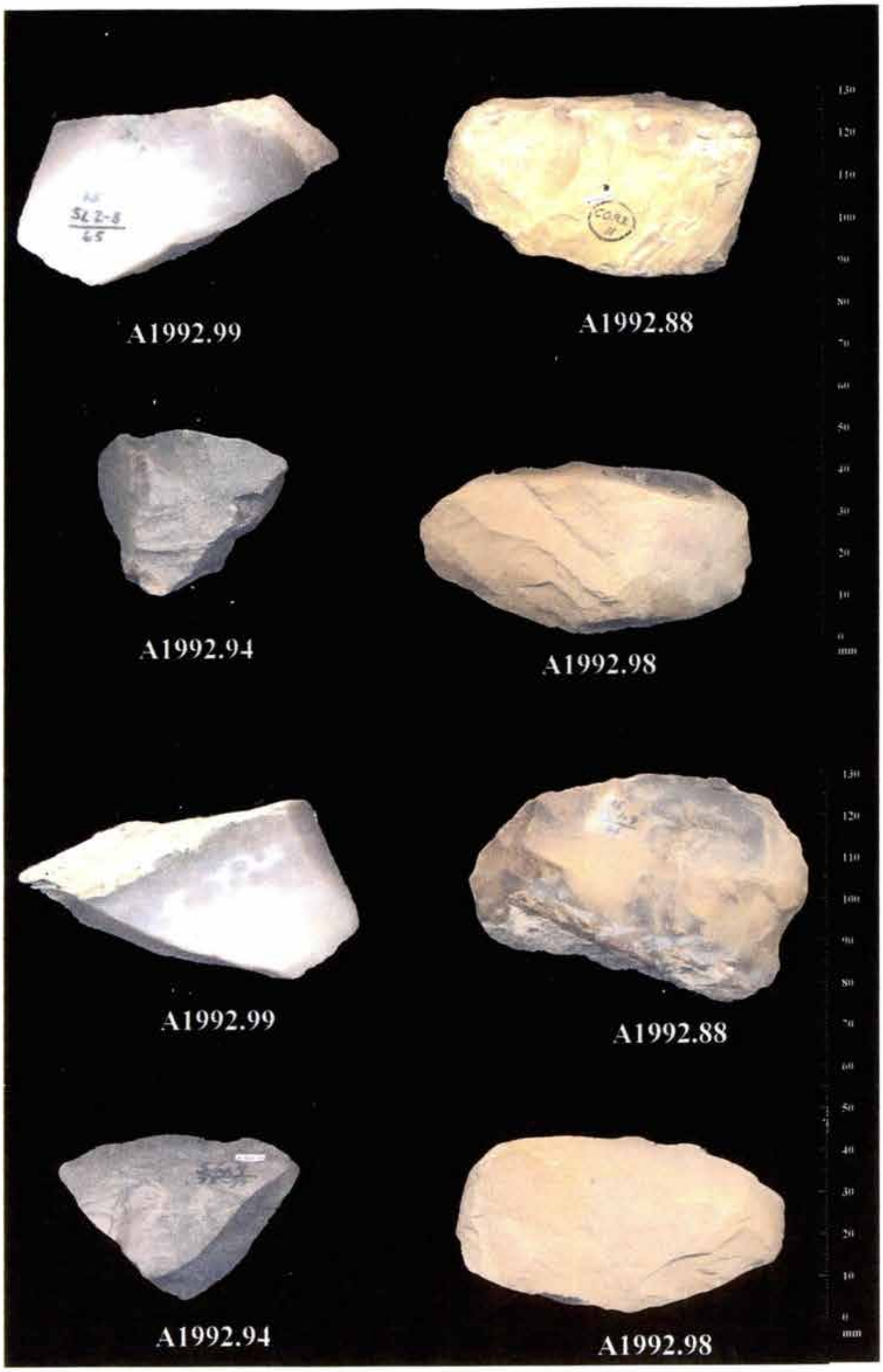


Figure 45. Cores from the Frazier site (catalog numbers provided below artifacts).

raw material composition and availability. Researchers have proposed that hunter-gatherers shift technology to fit the type of raw material blanks located in their foraging range (Fish 1981; Goodyear 1993; Kuhn 1995; Shott 1989).

The Frazier core data suggests that locally available cobbles were reduced on or nearby the site to produce usable flakes, likely for bison butchering activities. Debitage analysis indicated that the majority of the flake assemblage is comprised of locally available material such as quartzite and petrified wood. Three of the four cores in the lithic assemblage are of these materials.

Formal Bifaces

Bifaces are defined as lithic specimens exhibiting evidence of extensive flake removal across both facets of a piece along one or more margins. The biface facets join to form a single edge from which flakes are removed. As flakes are removed from the specimen, the edge becomes more symmetrical and thin. Bifaces are manifested in various shapes and sizes and were utilized for numerous tasks including cores, blanks or performs, projectile points, and cutting or chopping tools. A distinction is usually made between hafted and unhafted bifaces based on the morphological characteristics of individual specimens (Andrefsky 1998:172). Hafted bifaces were formed to fit into a haft or handle and are typically called projectile points, arrow heads, or darts. In contrast, unhafted bifaces are tools that were hand-held. Although each category is described and analyzed as a separate group, the distinction is not meant to imply they were used for only one activity (see Kelly 1988).

Nineteen bifacially worked specimens, 11 unhafted (Figure 46) and 8 hafted (Figure 47 through 49), are present in the Frazier collection. It should be noted that

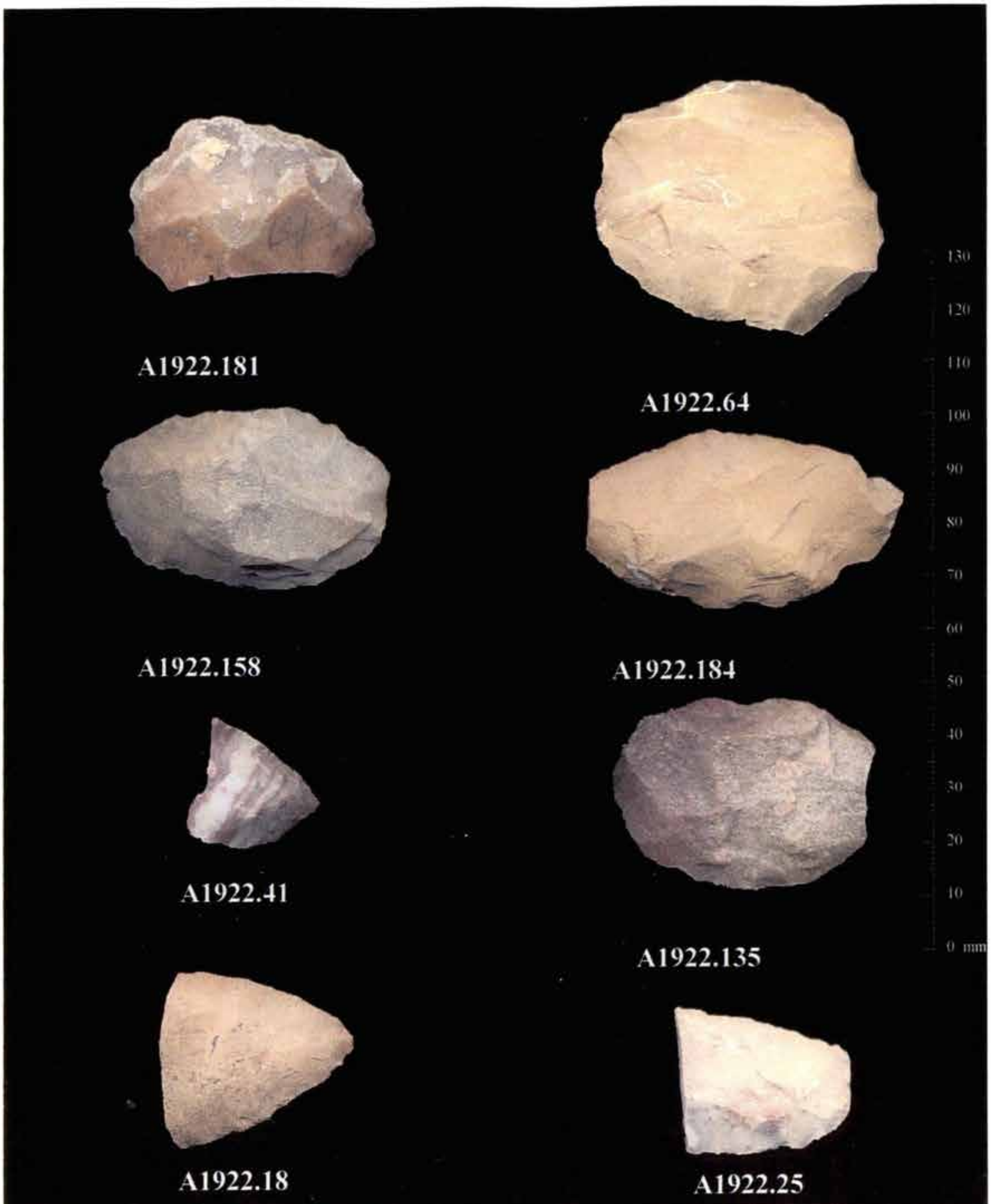


Figure 46. Unhafted bifaces from the Frazier Site (catalog numbers provided below artifacts.

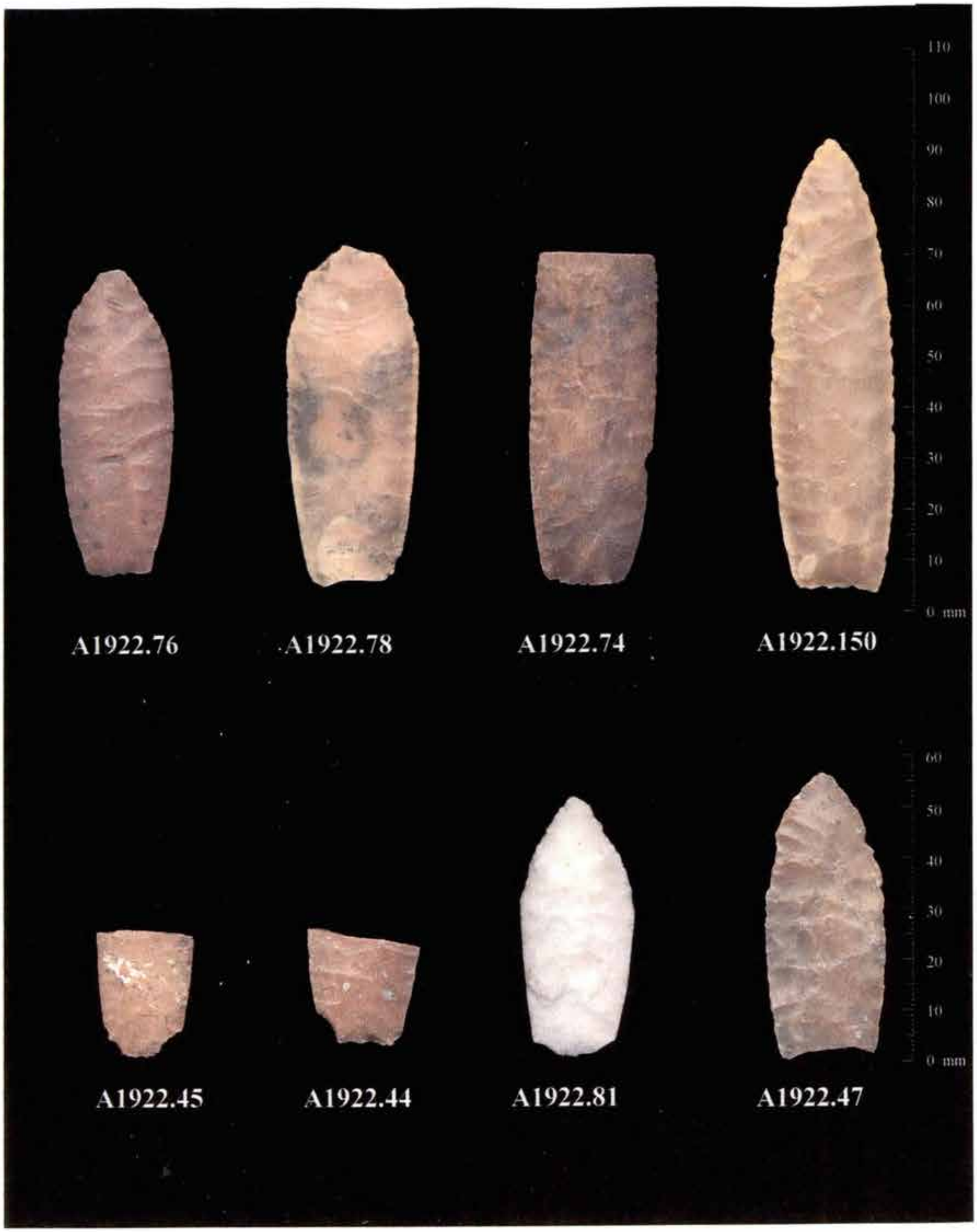


Figure 47. Hafted bifaces (projectile points) from the Frazier Site (catalog numbers provided below artifacts).

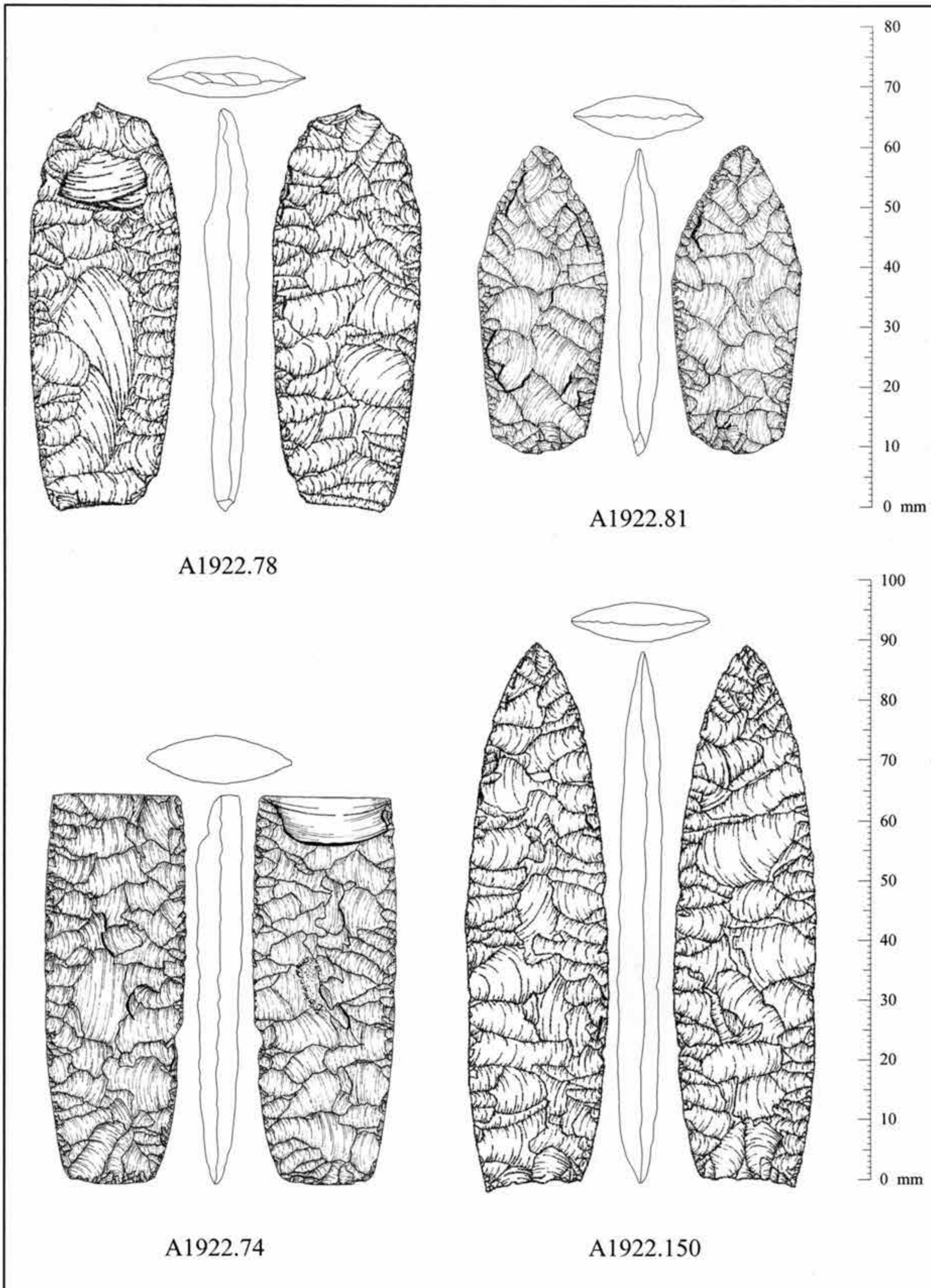


Figure 48. Projectile point illustrations (catalog numbers below artifacts).

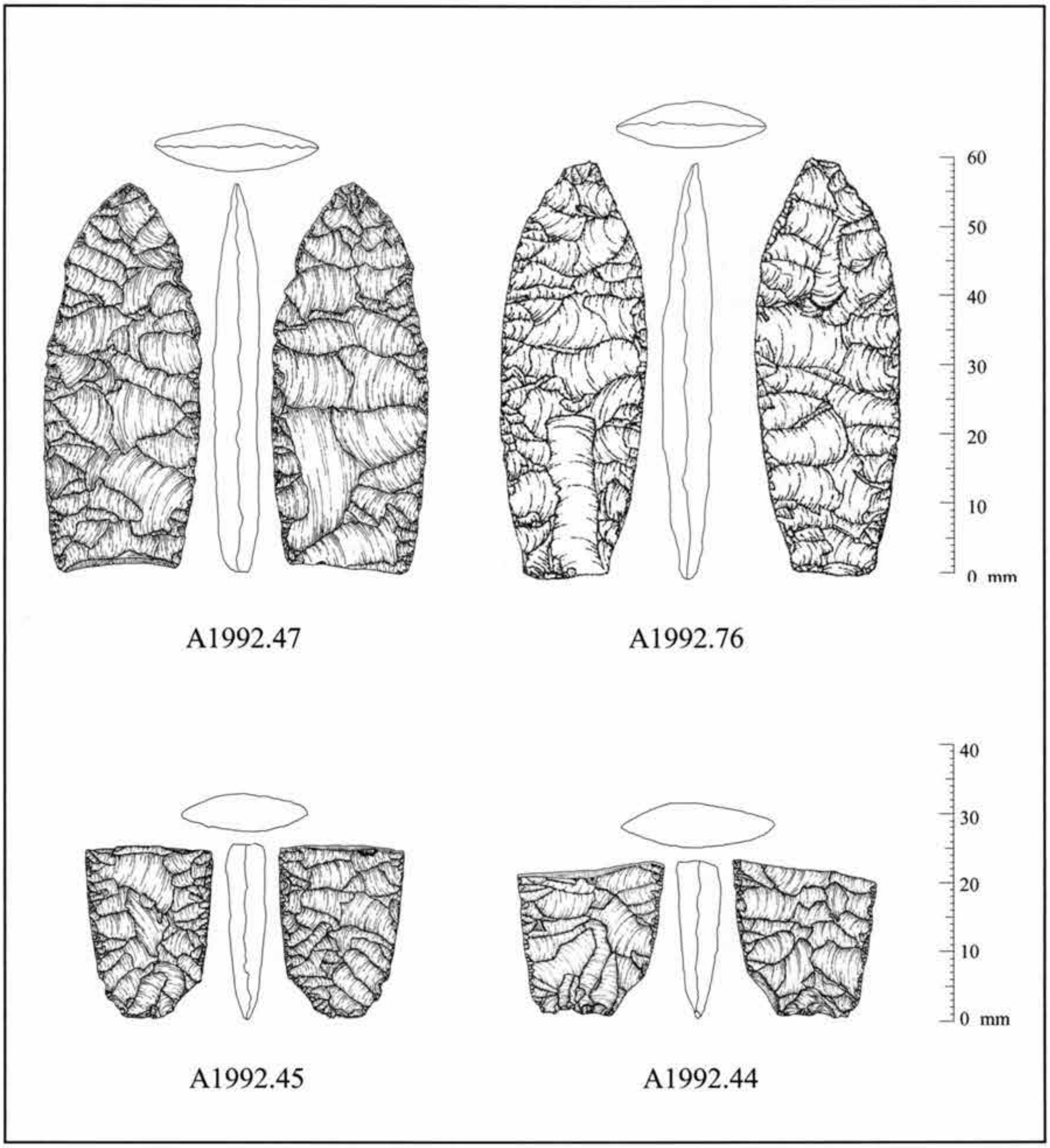


Figure 49. Projectile point illustrations (catalog numbers below artifacts).

Wormington (1984:13) reported 10 hafted bifaces (projectile points) during the original excavation, while the current study identifies only eight. The discrepancy between these numbers is due to at least one specimen (A1922.25), and possibly two (A1922.18), that are coded as unhafted bifaces/performs in this study. These pieces are too thick and wide to be projectile points, and neither specimen exhibits a flaking pattern resembling a finished Agate Basin point. The distribution of bifaces according to material type and corresponding select metric attributes is presented in Table 8. Regardless of morphological biface type, specimens of Hartville material are more prevalent (42.1%) than the remainder of the biface sample. The Alibates bifaces are small fragments; one appears to be a portion of the lateral margin of a projectile point, and the other is a lateral portion of an unhafted biface (Figure 46:Cat No. A1558.41). However, they are both placed in the unhafted biface category as the lateral margin cannot be unequivocally identified as belonging to a hafted point. Quartzite bifaces comprise 26.4% of the biface sample, while petrified wood and miscellaneous chert represent the remainder of the specimens.

Table 8. The Distribution of Hafted and Unhafted Bifaces According to Material Type and Select Metric Attributes.

Material Type	Hafted Biface			Unhafted Biface			TOTAL	
	Count	Mean Length*	Mean Weight*	Count	Mean Length*	Mean Weight*	Count	Percent
Alibates	0	-	-	2**	18.1	1.9	**2**	10.5
Flattop	0	-	-	0	-	-	**0**	0.0
Hartville	6	53.5**	10.3	3	43.4	18.3	**9**	42.1
Misc. Chert	0	-	-	1	34.0	8.7	**2**	10.5
Pet. Wood	1	65.6**	16.9	1	52.4	37.2	**2**	10.5
Quartzite	1	51.2	9.3	4	59.9	29.2	**5**	26.4
Total	**8**	**54.7**	**11.0**	**11**	**47.1**	**21.1**	**19**	**100.0**

* Length presented in millimeters, weight in grams.

** Biface fragments or incomplete pieces.

Unhafted Bifaces: The Frazier site unhafted biface sample is characterized by generally round to oval-shaped specimens (Figure 46). Researchers typically order bifaces by reduction stage or sequence (Callahan 1979; Frison and Bradley 1980; Whittaker 1994). Individual stages correspond to different phases of biface manufacture. Stages are delineated according to the degree of thinning that the specimen exhibits. A thick biface that is marginally worked and has an asymmetrical edge is in an earlier stage in the reduction process. In contrast, a specimen that is extremely thin and has a symmetrical edge in profile is placed into a later stage of production. Width and thickness measurements are often used to determine the corresponding stage of the biface (Andrefsky 1998:180; Callahan 1979). Width-to-thickness ratios are also utilized to determine biface stage. Table 9 provides width, thickness, width-to-thickness ratios, and biface stage for the unhafted biface sample.

Table 9. Unhafted Biface Measurements According to Material Type and Stage.

Catalog Number	Material Type	Maximum Width	Maximum Thickness	Width/ Thickness	Stage
1922.181	Hartville	34.7	15.1	2.29	1
1922.179	Hartville	26.5	10.7	2.48	1
1922.158	Quartzite	34.1	16.1	2.12	1
1922.64	Petrified Wood	49.3	11.8	4.17	2
1922.102	Quartzite	62.1	10.2	6.08	2
1922.135	Quartzite	36.2	10.5	3.45	2
1922.184	Quartzite	33.7	8.8	3.83	2
1922.41	Alibates	22.3	7.4	3.01	3
1922.18	Hartville	32.8	6.9	4.75	3 or 4
1552.76	Alibates	7.2	6.1	1.18	3 or 4
1922.25	Misc. Chert	27.8	5.7	4.88	3 or 4

Whittaker's (1994) stage methodology is employed for description of the Frazier biface sample. Width-to-thickness ratios should increase and edge angles should decrease as the reduction stage increases. For instance, according to Whittaker (1994), a Stage 3 biface should have a width-to-thickness ratio of 4.0 or greater and an edge angle between 25 to 45 degrees. A Stage 1 biface, on the other hand, should have a width-to-thickness ratio of approximately 2.0 and an edge angle between 50 and 80 degrees. However, width-to-thickness ratios and edge angles serve as general indicators for biface stage. Often, biface fragments can produce misleading width-to-thickness ratios. Therefore, it is important to visually inspect other attributes of a biface before placing an implement into a stage.

The majority of the Frazier unhafted bifaces fall into Stage 1 or 2 categories. Stage 1 specimens are considered to be in the initial stages of reduction, whereas Stage 2 specimens are defined by Whittaker (1994:156) as early preforms. Five of seven (71.4%) Stage 1 and 2 bifaces are of locally available quartzite and petrified wood. The remaining two specimens are of Hartville chert. Two specimens, one Hartville chert and one unidentified chert, exhibit characteristics typical of Agate Basin projectile point performs (Figure 46). One Alibates piece has a hinge break along one margin, indicating that it represents a small portion of a larger biface that was likely a preform. An additional piece of Alibates appears to be the lateral margin of a point. These specimens are placed in Stage 3 or 4 categories based on Whittaker's (1994:159) description of the biface reduction sequence.

Many of the early stage bifaces (1 and 2) are of locally available material and are fairly uniform in shape and size. Stage 1 and 2 bifaces of non-local material such as

Hartville are also similar in morphology. Root (1992:297) determined that Paleoindian groups at the Knife River Flint Quarries in North Dakota mainly produced Stage 2 bifaces. Stage 3 and 4 bifaces were manufactured at workshop locations away from the quarry area. Perhaps Root's (1992) observation is reflected in the Frazier biface composition. Local material appears to have been reduced initially at or nearby the site and only minimally reduced further before discard. The presence of Stage 1 non-local Hartville specimens suggests that the quarry was visited more recently than other non-local biface implements of Alibates. Stage 3 bifaces of Hartville chert indicate that production of late stage specimens occurred away from the quarry source, specifically, at the Frazier site.

These unhafted biface observations indicate that Alibates debitage is more indicative of late-stage reduction, Hartville and Flattop is affiliated with both late-stage and early stage, and local quartzite and petrified wood is representative of early stage reduction.

It should be noted that ultra-thin bifaces (width-to-thickness ratios of 15:1) typically associated with Folsom Paleoindian groups (Bradley 1991; Frison 1982c; Jodry 1999; Root et. al. 1999) are not evident in the Frazier assemblage. This type of biface was also absent from the Agate Basin levels at the Agate Basin site (Frison and Stanford 1982b:122-123). This trend lends support to the hypothesis that ultra-thin bifaces are specific to the older Folsom groups.

Hafted Bifaces: Finished bifaces, or projectile points, fall into Whittaker's Stage 4 (1994:159) of the biface reduction continuum. Eight Agate Basin points or point fragments are present in the Frazier assemblage (Figures 47 through 49). Four of the points are complete, three are base fragments and one lacks a base. Measurements for the points are provided in Table 10. All but one of the specimens (A1922.150) exhibits evidence of resharpening, confined to the tip or the base of the point. Snap and hinge fractures are noted on the broken fragments and generally occur near the base, although specimen A1922.74 is broken closer to the presumed mid-section of the point.

Reworking of Agate Basin projectile points has been observed by Frison and Stanford (1982b:80-81). Resharpening of the Frazier points is confined mainly at the tip of the specimens (Figures 48 and 49). Resharpening of Agate Basin points from the Agate Basin site was typically performed with "an apparent disregard for the excellence of the technology expressed originally" (Frison and Stanford 1982b:80), and the reworked tips of the Frazier points also exhibit this pattern. Reworking of the base is apparent on four of the eight specimens (A1922.78, A1922.81, A1922.44, A1922.45). The type of resharpening corresponds to a technology observed in the type site collection wherein small, burin-like flakes were either purposefully or accidentally driven off one or both corners as the result of back pressure from the foreshaft (Frison and Stanford 1982b:81, Figures 2.51e, 2.52c, 2.55d, and 2.56a). Additionally, specimen A1922.45 was reworked to produce a small notch in one corner.

Flake scars are generally collateral, extending from the lateral margins to or near the mid-section of the point. Small pressure flakes along the lateral margins are evident and the points are bi-plano in cross-section. Grinding of the blade edges is present beginning at the base of the specimens, and extends generally up to the maximum point of blade width. Similar to the trend noted on the Agate Basin site specimens (Frison and Stanford 1982b:81), basal grinding is not present on the Frazier specimens.

An impact flake scar is present on specimen A1922.78 (Figure 48). The base of this specimen exhibits a snap break, similar to that observed on specimens from the Agate Basin site (Frison and Stanford 1982b:105-106). Experimental hafting and use of Agate Basin points indicates that this type of break is the result of back pressure as the base of the point is driven against the foreshaft (Frison and Stanford 1982b:105-106). Specimen A1922.76 was broken at the base and refit during the 1967 excavation season (See "History of Excavation", Chapter 2). A long flake scar is evident through the mid-section of one face of the point. The scar proceeds over the break and the collateral flake scars on this face of the point, indicating that the flake was removed prior to the basal break and at the last stage of point production. Agogino (1970) reported the presence of intentional fluting on roughly 6% of Agate Basin points, and the flake scar observed on the Frazier specimen appears to represent an intentional "flute."

Bradley (1982:202) compiled measurements and indices for Agate Basin points recovered from the Agate Basin site to illustrate the morphological variability of the specimens. Complete or nearly complete Frazier points were analyzed in a similar manner, and the results are provided in Table 10. Furthermore, indices for Agate Basin points are provided in Table 11 according to the method utilized in Bradley's (1982:202) research. The sample size of the Frazier points is very small compared to the assemblage of points recovered from the Agate Basin site, but the measurements and indices fall within the variability reported. Obviously, reworking of specimens has contributed greatly to the observed irregularity within the sample.

Table 10. Measurements of the Frazier Site Projectile Points.

Catalog Number	Raw Material	Reworking	Total Length (mm)	Blade Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Stem Length (mm)+
A1922.150	Hartville	Tip	89.7	42.3	24.3	7.1	47.4
A1922.76	Hartville	Overall	60.2	25.6	20.2	7.5	34.6
A1922.81	Quartzite	Tip	51.2	22.7	21.9	6.9	28.5
A1922.78	Hartville	Tip	66.9*	25.7	25.4	6.9	41.2
A1922.74	P. Wood	None	65.6*	-	24.6	7.9	38.8
A1922.47	Hartville	Tip	57.0	28.8	23.3	6.4	-
A1922.45	Hartville	Base	-	-	18.6*	5.8*	-
A1922.44	Hartville	None	-	-	21.5*	6.6*	-

*Incomplete measurement
+ Extent of edge grinding

Table 11. Metric Indices of the Frazier Site Projectile Points.

Catalog Number	<u>Maximum Length</u> Maximum Width	<u>Blade Length</u> Maximum Width	<u>Maximum Width</u> Blade Thickness	<u>Blade</u> Stem Length
A1922.150	3.69	1.74	3.42	0.89
A1922.76	2.98	1.26	2.69	0.74
A1922.81	2.34	1.04	3.17	0.80
A1922.78	2.63	1.01	3.68	0.62

Reworking of the Frazier Agate Basin points is suggested by major differences in flake scar patterns and cross-section thickness. Reshaping of the points is evident on six of eight specimens (75.0%). Of these, four (66.6%) are complete or nearly complete with reworked tips, one is a reworked base fragment, and one is entirely reworked.

Flake Tools

Flake tools are nonbifacial implements that exhibit characteristics of debitage such as a platform, dorsal and ventral surfaces, or proximal and distal ends. The most important identifying feature of these tools is the presence of a ventral and dorsal surface.

Tools with more than two surfaces (ventral and dorsal) are not considered as flake tools. Flake tools are considered to represent expedient implements that do not exhibit evidence of extensive edge retouch. This distinction serves to separate flake tools from formal tools like scrapers that also have flake characteristics.

Edge-modified Flakes: Of the flake tool sample (n = 159), 74.8% are edge modified tools (Figure 50). Edge modified flake tools are flakes that have not been deliberately modified by flaking or resharpening, but exhibit modification along a margin only as the result of being used as a cutting or scraping implement. Edge angle on flake tools is typically between 35 and 55 degrees and has been suggested to indicate use in butchering activities such as skinning or muscle stripping of large animals (Frison and Stanford 1982b:112). It is acknowledged that edge modified flake tools, by their nature, are difficult to identify using macroscopic techniques. Furthermore, use wear typically associated with edge modified tools can be produced by natural taphonomic processes such as trampling, or by geological agents (Akoshima and Frison 1996; Binford 1981; McBrearty et al. 1998). Edge modified flake tool counts are probably somewhat inflated in regard to the actual number of flakes utilized by the Frazier site inhabitants. Nonetheless, counts and descriptions of edge modified flake tools are offered here and are considered to represent a close, overall approximation of the number of flake tools actually used.

The location of edge alteration on the flake was recorded for each tool (see "Methods", this chapter). Of the 119 edge-modified flake tools, the majority (n=86, or 72.3%) exhibit use wear on only one or both lateral margins. Table 12 provides the location of identified modification for the edge modified flake tool sample. The edge

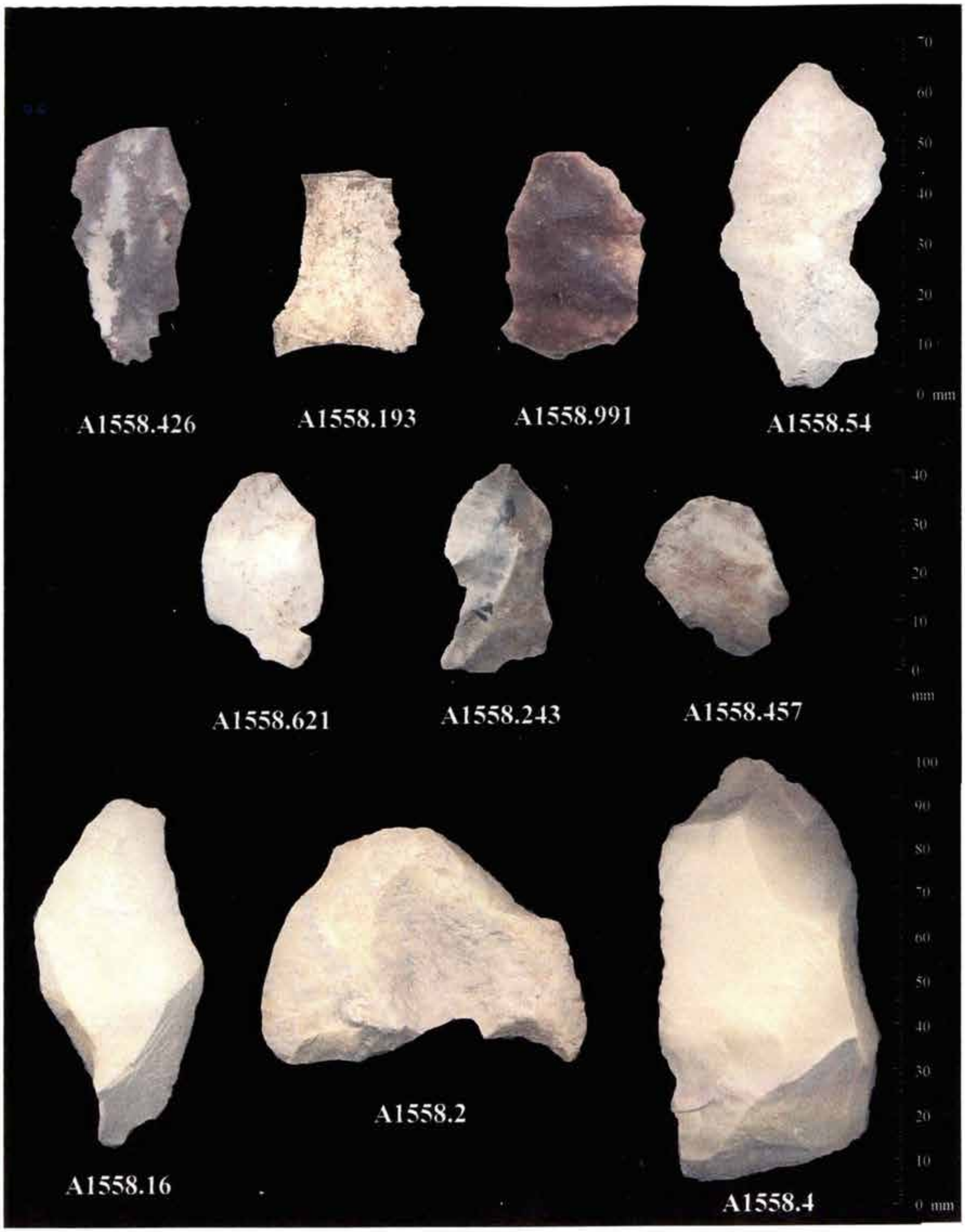


Figure 50. Edge modified flake tools (catalog numbers provided below artifacts).

Table 12. Use wear Modification Orientation for Flake Tools.

Modification Orientation	n	%
One lateral margin	55	46.2
Both lateral margins	31	26.1
Both laterals and the distal margin	22	18.5
Distal margin	8	6.7
One lateral and the distal margin	3	2.5
TOTAL	**119**	**100.0**

modified flake tool sample consists of 46 complete specimens, with the remainder identified as fragments. Measurements and standard deviation for the complete flake tools are provided in Table 13.

Table 13. Measurements for Complete Modified Flake Tools.

	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Weight (g)
Number of Cases	46	46	46	46
Minimum	20.1	11.2	1.5	0.5
Maximum	94.0	59.3	15.5	73.1
Mean	**47.6**	**31.9**	**6.3**	**13.1**
Standard Deviation	19.9	12.1	4.2	15.7

Edge modification is typically confined to the lateral margins of flakes (n=86 or 72.2%). The high standard deviations for length and width suggest that flake tools vary greatly in size, but tend to be longer than wide. The lower standard deviation for maximum thickness suggests that flake thickness is generally within a similar range. Weight is also highly variable according to the high standard deviation. The wide range of size variability noted for the sample suggests that flakes were struck from a blank and utilized without regard for general size parameters. Because the specimens are typically longer than wide, it is no surprise that the lateral margins are exploited more frequently for use.

Retouched Flakes: Retouched flake tools comprise 18.3% of the total tool assemblage (Figure 51). This category of tool is defined as possessing a margin exhibiting flake scars removed for the purpose of creating a more usable working edge or as the result of resharpening episodes. A retouched flake tool has a series of patterned flake scars (generally more than 5) that are equal to or greater than 7.0 mm in maximum length removed from at least a single margin. Flake tools with patterned flake scars under 7.0 mm in maximum length are recorded as edge modified flake tools. Edge angle on retouched flakes is similar to that of edge modified flakes (35 - 55 degrees).

The location of retouch on the flake was recorded for each tool (see "Methods", this chapter). Of the 40 retouched flake tools, the majority (n=31, or 77.5%) exhibit retouch along one or both lateral margins. Location of retouch for the retouched flake sample is provided in Table 14. The retouched flake tool sample consists of 11 complete specimens; the remainder are fragments. Measurements and standard deviation for the complete flake tools are provided in Table 15.

As with the edge modified flakes, the retouched flake sample is generally longer than wide. Standard deviations for length, width, and weight are also high, indicating a large amount of size variability. However, mean measurements for retouched flakes are larger than for edge modified flakes. These data suggest that larger, thicker flakes were chosen for reworking, likely because they possess more surface area to shape and resharpen after use.

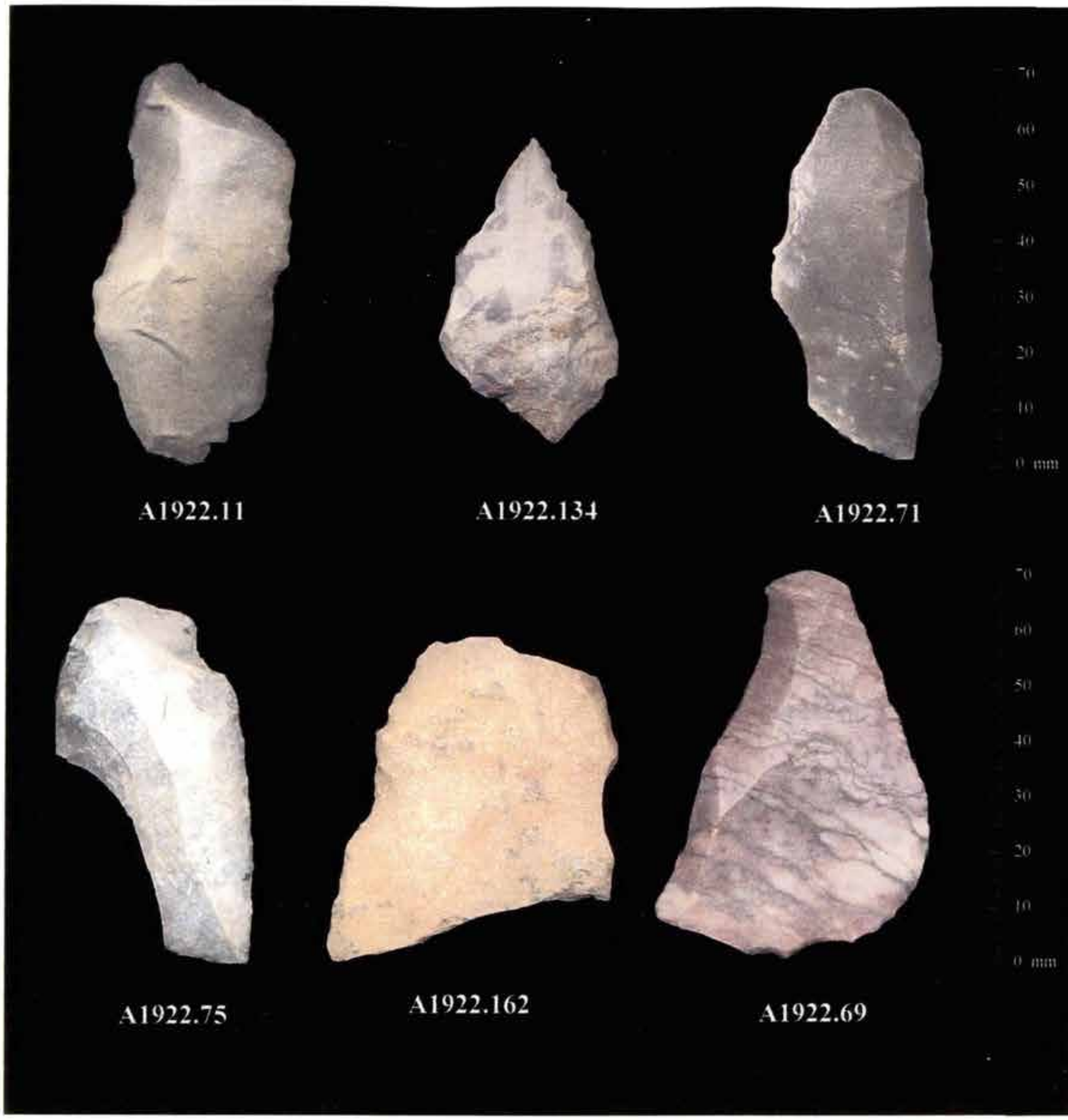


Figure 51. Retouched flake tools (catalog numbers provided below artifacts).

Table 14. Location of Retouch on Retouched Flake Tools.

Modification Orientation	n	%
One lateral margin	22	55.0
Both lateral margins	9	22.5
Both laterals and the distal margin	6	15.0
Distal margin	3	7.5
One lateral and the distal margin	0	0.0
TOTAL	**40**	**100.0**

Table 15. Measurements and Standard Deviation for Complete Retouched Flakes.

	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Weight (g)
Number of Cases	11	11	11	11
Minimum	10.4	4.6	2.2	0.1
Maximum	75.5	58.4	20.3	46.1
Mean	**56.3**	**39.7**	**10.1**	**22.9**
Standard Deviation	18.8	16.6	5.4	12.2

Flake Tool Discussion and Conclusion

The flake tool assemblage is comprised of generally elongated flakes with use-wear or retouch typically confined to the lateral margins. The variable nature of flake size suggests that flakes were randomly chosen as tools, although retouched tools are somewhat larger than edge modified tools. The distribution of the platformed flake tool assemblage by material type is provided in Table 16. These data indicate that flakes of non-local material exhibit prepared platforms more often than flake tools of local material. This observation suggests that more care was taken to control the type and size of the flakes produced with non-local material. Conservation of non-local, high-quality material such as Alibates would be advantageous, especially for highly mobile Paleoindian groups. Calculated, long-term planning for the production of usable flakes

Table 16. Platform Preparation for Flake Tools by Material Type.

Material Type	Prepared Platform		Unprepared Platform		Total
	n	%	n	%	
Flattop	7	87.5	1	12.5	8
Hartville	6	100.0	0	0.0	6
Alibates	8	100.0	0	0.0	8
Petrified Wood	1	50.0	1	50.0	2
Misc. Chert	9	90.0	1	10.0	10
Quartzite	19	38.0	31	62.0	50
TOTAL	50		34		84

for daily activities is reflected in the high percentage of non-local flake tools exhibiting prepared platforms.

Formal Unifaces

Formal unifaces, typically given the functional term scrapers, represent 16.9% (n = 37) of the Frazier tool assemblage. Formal unifaces are differentiated from retouched flakes by a steep angle (65-90 degrees) on the working edge. Three sub-categories of unifaces were identified in the Frazier sample, side scrapers, distal-lateral scrapers, and end scrapers.

Side-Scrapers: Fourteen of the 37 unifaces (37.8%) are identified as side scrapers (Figure 52). Side scrapers exhibit intentional modification in the form of retouched flakes along one or both lateral margins of a flake. Working edge angle on side scrapers is typically slightly lower (60-75 degrees) than noted for end scrapers (75-90 degrees). The working edge or edges on the Frazier side scrapers are characteristically straight to convex. Side scrapers are believed to represent hand held scraping implements rather than hafted tools based on the decrease in edge angle and overall morphology (Boldurian and Cotter 1999:41). Specimen A1992.185 is unique in that it exhibits a small, graver tip at the distal edge of the flake. The dorsal surface of the tool is heavily patinated and is typical of patination observed on other lithic tools and debitage from the Frazier site.

Distal-Lateral and Distal (End) Scrapers: Nineteen (51.4%) of the formal unifaces are identified as distal-lateral scrapers and 4 (10.8%) are end scrapers (Figure 53). Both distal-lateral and end scrapers are characterized by high working edge angles

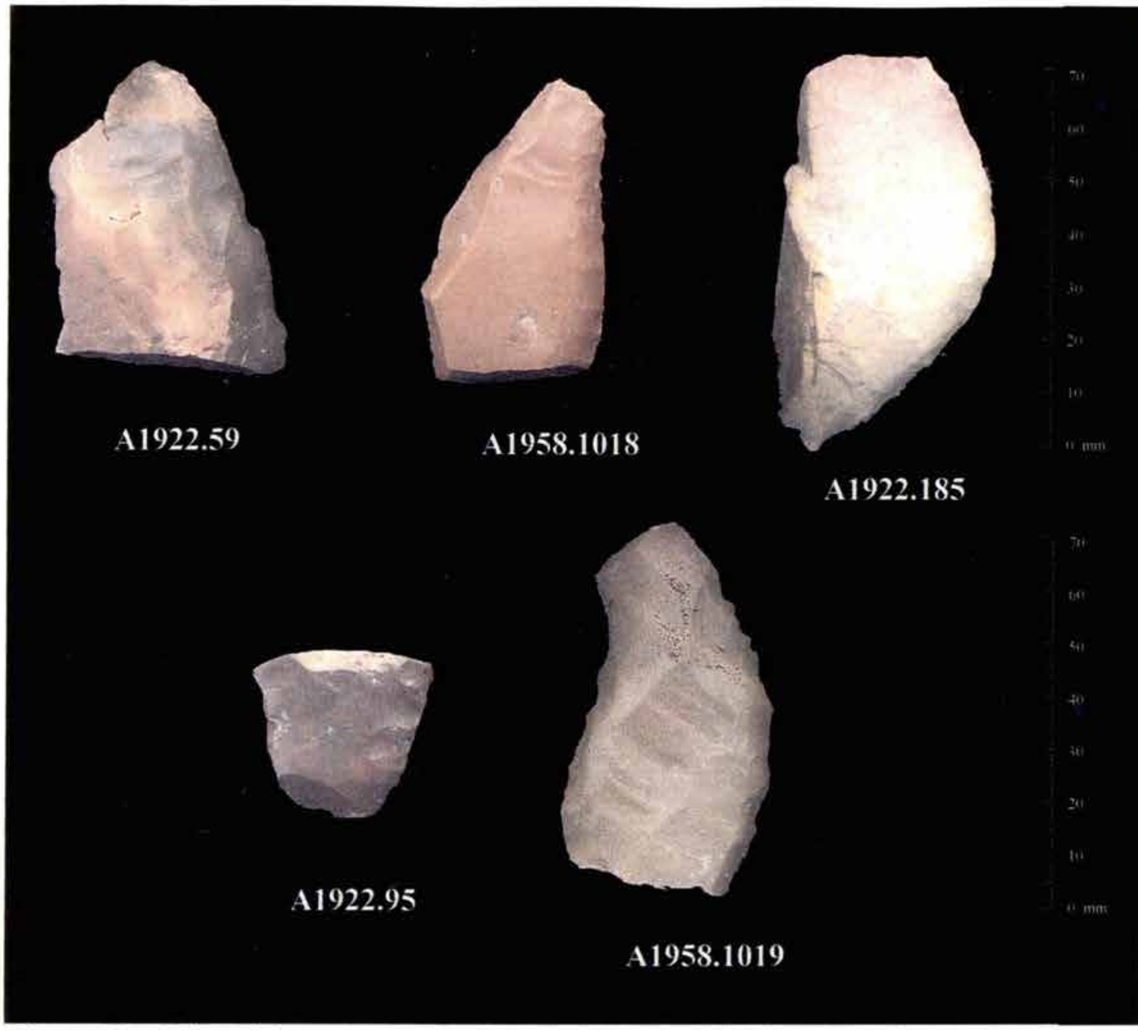


Figure 52. Select side scrapers (catalog numbers provided below artifacts).

(75-90 degrees), convex distal margins, and straight lateral margins. The proximal portion of these specimens is typically narrower than the distal margin. Distal-lateral specimens are differentiated from end scrapers in that they exhibit modification or retouch along one or both lateral margins as well as the distal margin. However, both tool classes display the heaviest amount of use-wear and retouch along the distal margin. Lateral margin edge modification believed to be either the result of use or intentional edge preparation for hafting (Boldurian and Cotter 1999:41; Rule and Evans 1985) is recurrently noted on end scrapers in Paleoindian assemblages. Distal-lateral specimens

Figure 53. Select end scrapers and distal-lateral scrapers (catalog numbers provided below artifacts).

may represent hafted end scrapers rather than a separate tool class. Based on the similarities in overall morphology and presumed use, distal-lateral and end scrapers are combined into a single tool class (end scrapers) for the remainder of this discussion. Combining the two unifacial tool types brings the total number of end scrapers to 23 or 62.2% of the Frazier uniface sample.

Formal Uniface Discussion and Conclusion: Table 17 provides the distribution of complete side scrapers according to mean measurements. Discussion of material type utilization within the formal uniface class is presented later in this chapter, however a few general patterns are noteworthy between the side scraper and end scraper categories. Mean measurements provided in Tables 17 and 18 indicate that end scrapers are generally smaller than side scrapers. Although the sample size is small for side scrapers,

Table 17. Mean Measurements and Mean Weight for Complete Side Scrapers.

	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Weight (g)
Number of Cases	4	4	4	4
Minimum	54.5	33.6	8.9	12.5
Maximum	82.5	54.2	14.3	52.7
Mean	**69.2**	**41.9**	**10.9**	**31.5**
Standard Deviation	12.6	8.7	2.5	17.7

Table 18. Mean Measurements and Mean Weight for Complete End Scrapers.

	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Weight (g)
Number of Cases	12	12	12	12
Minimum	25.9	20.2	5.6	3.8
Maximum	102.6	58.0	10.9	94.3
Mean	**43.7**	**32.5**	**8.2**	**16.9**
Standard Deviation	20.7	9.3	1.6	24.7

broken side scrapers appear to be much larger than end scrapers. End scrapers are thought to be manufactured at quarry sites and transported in the Paleoindian tool kit (Ahler 1994; Sellet 1999:91). Side scrapers, on the other hand, are typically believed to represent hand-held tools. Although it is generally assumed that end scrapers are hafted and side scrapers are not, Jodry (1999:241) notes that the use of hafted end scrapers is "arguably auxillary" among Protohistoric tribes. However, hafted end scrapers have been identified at archaeological sites, and most researchers believe that these tools were often hafted (Ahler 1994; Brink 1978; Frison 1968; Rule and Evans 1985; Sellet 1999). End scrapers are typically associated with hide-working activities, especially during the production of buckskin (Jodry 1999:238-248).

Gravers

Gravers

Twenty-two gravers were identified in the Frazier assemblage (Figure 54). Gravers are typical components of Paleoindian assemblages and were present in the Agate Basin collection (Frison and Stanford 1982b:113-115). Gravers exhibit one or several formed and worked edge protrusions along the margin of a flake or tool. Gravers are thought to be associated with carving or incising of bone, wood, or hide (Crabtree 1972). Table 19 illustrates that gravers were generally manufactured from flake tools or scrapers. A few of these items are double and triple gravers that exhibit multiple protrusions with associated use-wear (see Figure 4.17:A1922.82, A1922.132, A1922.163, A1922.187).

Mean measurement data and mean weight for the graver sample are provided in Table 20. Gravers in Paleoindian assemblages are often formed on bifacial thinning flakes (Boldurian and Cotter 1999:41; Frison and Stanford 1982b:114-115; Sellet 1999:91). However, they were also noted on larger scraper specimens (Frison and Stanford 1982b:115) in the Agate Basin collection. The majority (16 of 18 or 89.9%) of the Frazier gravers retaining a proximal end are produced on scrapers or flake tools that

Table 19. Graver Distribution According to Tool Type and Raw Material.

Material Type	Biface	E. M.* Flake Tool	Ret.* Flake Tool	Side Scraper	End Scraper	Total
Flattop	0	0	0	0	2	2
Hartville	0	2	1	3	1	7
Alibates	1	1	0	0	1	3
Misc. Chert	0	2	1	0	1	4
Quartzite	0	8	0	1	1	10
TOTAL	1	9	3	5	4	26

* E. M. = Edge Modified, Ret. = Retouched

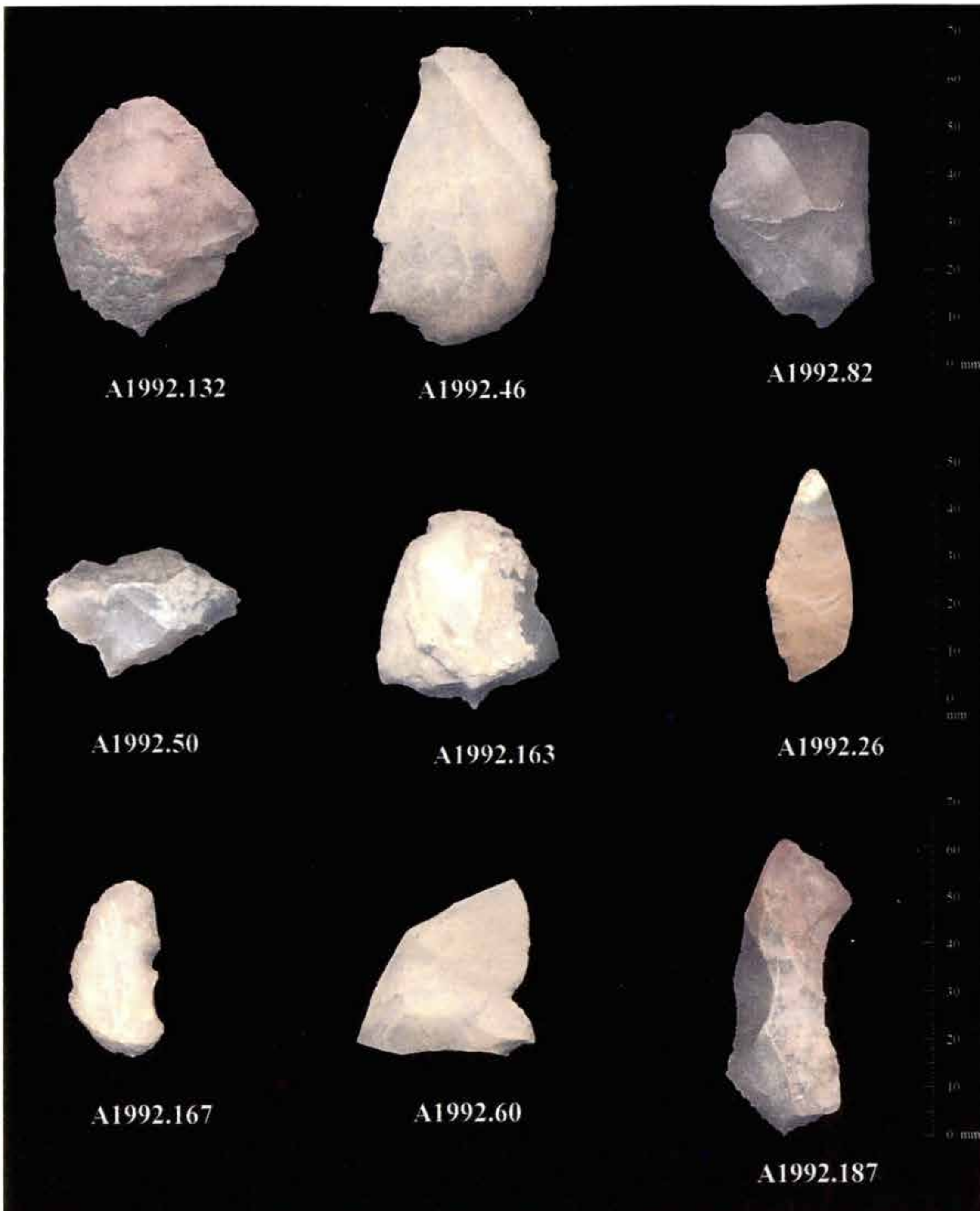


Figure 54. Select tools with graver tips and notches (catalog numbers provided below artifacts).

Table 20. Mean Measurements and Mean Weight for Gravers.

	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Weight (g)
Number of Cases	13	13	13	13
Minimum	25.9	19.0	2.1	1.8
Maximum	76.4	40.6	18.2	38.1
Mean	**46.4**	**31.1**	**8.0**	**12.2**
Standard Deviation	14.9	8.0	4.5	9.8

are coded as normal flakes. Measurements further indicate that the graver implements are relatively thick, averaging 8 mm in thickness.

The observed distribution may be a function of material type utilization, or the type of activities being undertaken with the implements. A larger graver would withstand heavy pressure related to hide processing, whereas a graver produced from a small, thin bifacial thinning flake would break more easily. Smaller graver tips might be more suitable for incising bone or wood. The occurrence of incised bone or wood artifacts from Agate Basin occupations is minimal. A few worked bone artifacts are noted in the Agate Basin site collections (Frison and Craig 1982:172) and a small number of worked bone fragments were originally noted by Marie Wormington during the 1960s excavations at the Frazier site. However, a greater percentage of carved items is reported in Folsom assemblages (Frison and Bradley 1980; Frison and Craig 1982:162-171; Roberts 1935). The Frazier gravers were produced mainly on larger implements (88.9%) and only a few worked bone items were recovered during excavation. These patterns suggest that Agate Basin groups did not participate in bone carving activity as often as Folsom groups, or that worked bone items of Agate Basin affiliation were transported from the site area. On the other hand, the lack of carved bone may reflect the short-term, bison kill-butchery function of the site.

Notched Tools

Twelve notched tools are in the Frazier assemblage (Figure 54). Numerous other tools possessing a shallow notch were noted during the analysis. However, small notches can be formed from post-depositional processes such as trampling (Keeley 1980:27). For this reason, items coded as notches had to exhibit distinctive microscopic edge-wear and a notch depth of at least 7.0 mm before being identified as notched tools. As noted in the graver discussion, notched tools are often found on tools possessing a graver tip or tips (see Figure 4.17:A1922.60, A1922.82, A1922.163).

The frequencies of notched tools according to material type are provided in Table 21. It is apparent that the majority (66.6%) of notched tools are of quartzite. These data may indicate that notched tools were produced expediently at the site for butchering activities. Furthermore, only three of the notched tools are manufactured on retouched or formal implements. The remaining nine specimens exhibit only edge modification, further suggesting the notched tools represent expediently produced tools.

Table 21. The Frequency of Notched Tools According to Tool Type and Raw Material.

Material Type	E. M.* Flake Tool	Ret.* Flake Tool	End Scraper	Total
Flattop	1	0	0	1
Hartville	0	0	1	1
Alibates	0	0	1	1
Misc. Chert	1	0	0	1
Quartzite	6	1	1	8
TOTAL	**8**	**1**	**2**	**12**

E. M.* = Edge Modified, Ret. = Retouched

Metric data for complete notched tools indicate that they are generally long, thin implements (Table 22). In contrast to the graver sample, notched tools in the Frazier assemblage are manufactured mainly from elongated, non-formal tools such as utilized flakes rather than retouched or formal tools.

Table 22. Mean Measurements and Mean Weight for Complete Notched Tools.

	Maximum Length (mm)	Maximum Width (mm)	Maximum Thickness (mm)	Weight (g)
Number of Cases	6	6	6	6
Minimum	41.3	21.9	3.6	3.1
Maximum	89.6	42.0	11.0	43.3
Mean	**57.4**	**35.0**	**6.0**	**14.6**
Standard Deviation	19.1	7.0	3.0	14.9

Radial Break Tools

A few tool lithic tools may have been radially fractured (Frison and Bradley 1980; Hofman et al. 1990; Root et al. 1999; Wilmsen and Roberts 1984:99-100) at the Frazier site. Additionally, four debitage specimens exhibited qualities indicative of a radial fracture. Unfortunately, all specimens with radial fracture characteristics were recovered from the surface and therefore the observed break patterns may be related to postoccupational processes rather than intentional cultural modification.

Shaft Abrader

A single ground stone item of sandstone is believed to represent a shaft abrader (Figure 55). The provenience of the artifact is written on the artifact itself, and it appears to read "N10", although field notes indicate that this unit was not excavated. Portions of the major surfaces are exfoliating, rendering the written provenience unreadable in places. Although these types of implements are assumed to be projectile abraders used for smoothing a wood shaft, the possibility exists that they were used for some other purpose.

Figure 55. Sandstone "shaft abrader" (A1922.48) from the Frazier site.

The abrader is 43 mm in maximum length, 38 mm in width and 15.9 mm thick. Both facets are abraded, and a groove is present on either side. The grooves range in diameter from 10.1 mm to 8.9 mm and are approximately 3.2 mm deep. A sandstone abrader with numerous angled grooves was recovered from the Agate Basin site, Hell Gap level (Frison 1982b:138). Two sandstone shaft abraders were recovered from the

Jurgens site with groove diameters of 12-13 mm, slightly larger than the Frazier specimen (Wheat 1979:95, 132-133). Grooved sandstone pieces presumed to be shaft abraders were found on the surface of the Claypool site with groove diameters between 7.5 and 15 mm (Dick and Mountain 1960:228-230, 233). The diameter of the grooves on both the Frazier and Jurgens specimens indicates that the shaft would be only 10-13 mm thick. This is much too small for the type of projectile point recovered from the sites to be hafted without the use of a foreshaft. It has been suggested that the projectile points were hafted into a foreshaft of larger size, and the foreshaft was connected to the main shaft (Boldurian and Cotter 1999: 94-105; Frison and Stanford 1982:105-106). If indeed these ground stone implements are shaft abraders, then it would appear that the points were placed into a foreshaft or socket of some type.

Lithic Assemblage and Raw Material Discussion

Analysis of the Frazier lithic assemblage is perhaps most enlightening through the examination of raw material composition. The tool and debitage samples are thus combined into a single database with selected variables. A simple predictive model was outlined earlier in this chapter regarding raw material and lithic assemblage composition (Figure 32). It was hypothesized that as the distance to a raw material source increases, and the longer a lithic specimen is in the tool kit, the general size of a particular material will decrease. The opposite should hold true as the distance to the raw material source decreases (see Figure 32). Mean maximum length and mean maximum weight according to material type is provided in Table 23. Quartzite (n=529, 45.5%) and chert/chalcedony/petrified wood (n= 632, 54.5%) comprise roughly equal proportions of the assemblage. Of the materials that could be identified (see Raw Material Type section,

Table 22. Mean Maximum Length and Weight by Material Type.

Material Type	Distance to Source (km)	Mean Maximum Length	Mean Maximum Weight	n	%
Flattop chalcedony	100	23.39	3.72	**27**	**2.3**
Hartville Uplift chert	220	18.21	2.12	**154**	**13.3**
Alibates dolomite	525	18.26	1.14	**153**	**13.2**
Petrified wood	30-70	23.12	7.15	**48**	**4.1**
Morrison Formation quartzite	30-70	32.44	7.97	**343**	**29.5**
Misc. chert	?	18.44	1.70	**251**	**21.6**
Misc. quartzite	?	29.83	5.79	**186**	**16.0**
TOTAL				**1161**	**100.0**

this chapter), it is interesting to note that Alibates comprises 13.2% of the assemblage and 25.3% (153 of 632) of the high-quality materials. In contrast, Flattop Chalcedony represents only 2.3% of the total assemblage and 4.3% (27 of 632) of the high-quality materials. Miscellaneous chert and quartzite comprise 21.6% and 16.0% of the sample.

The distribution of mean maximum weight and length illustrates differences in the assemblage that appear to correlate with material type. Intuitively, highly mobile hunter-gatherers would have attempted to minimize the amount of stone material that was transported on forays. Therefore, patterns of raw material use that reflect this "minimization" should be observed in lithic assemblages recovered from Paleoindian sites. Typically, the amount of raw material in an assemblage decreases as the distance from the source increases. However, utilization of the site area as a residential location or as a kill site, and the availability of raw material, can vary this logical, assumed pattern (see Amick 1999b; Frison 1991:160; Ingbar 1992:187-188). Archaeological assemblages suggest that Paleoindians tend to exploit non-local high-quality material when traveling in regions with limited raw material sources or areas where quarry locations are unknown

(Andrefsky 1994; Amick 1996; Bamforth 1985; Hofman 1992). Non-local materials are often associated with formal or retouched tools, whereas local poor-quality material was utilized for expedient tools (Amick 1999b:169-187; Bamforth 1985:254). These observations are reflected in the Frazier lithic assemblage.

Non-local materials in the Frazier collection are represented by Alibates dolomite (~525 km) and Hartville chert (~220 km), although sources/or outcrops of Hartville chert may be located closer to the site. Excluding the miscellaneous chert category that likely consists of both local and non-local cherts, Alibates dolomite and Hartville chert comprise the smallest amount of material in the assemblage by mean weight and length (Table 22, Figure 56, and Figure 57). Alibates dolomite and Hartville chert represent almost 50% (n=307) of the high quality material sample by count. In contrast, local material such as Flattop chalcedony, petrified wood and quartzite correspond to the highest amount of material in the sample according to mean weight. Flattop chalcedony is a high-quality local material that is only represented by 27 individual artifacts or 4.3% of the high-quality materials. A higher percentage of Flattop material in the Frazier assemblage is predicted due to the quality and availability of the stone. These data trends are further explored by examining lithic variables such as platform preparation and tool composition according to material type.

Platform Preparation

Platform preparation such as grinding or faceting is thought to reflect the amount of time or energy invested in tool production (Andrefsky 1998:92). Others have noted that platform preparation simply increases the reliability of the knapper to produce an intended flake type (Whittaker 1994:140). Platform preparation intensifies as the stage of

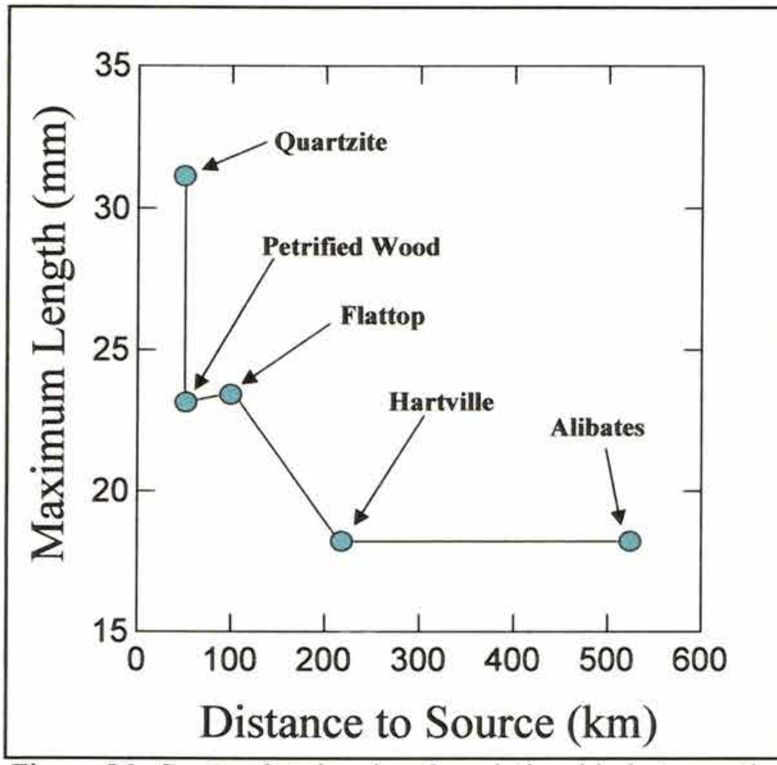


Figure 56. Scatterplot showing the relationship between the distance to raw material source and length.

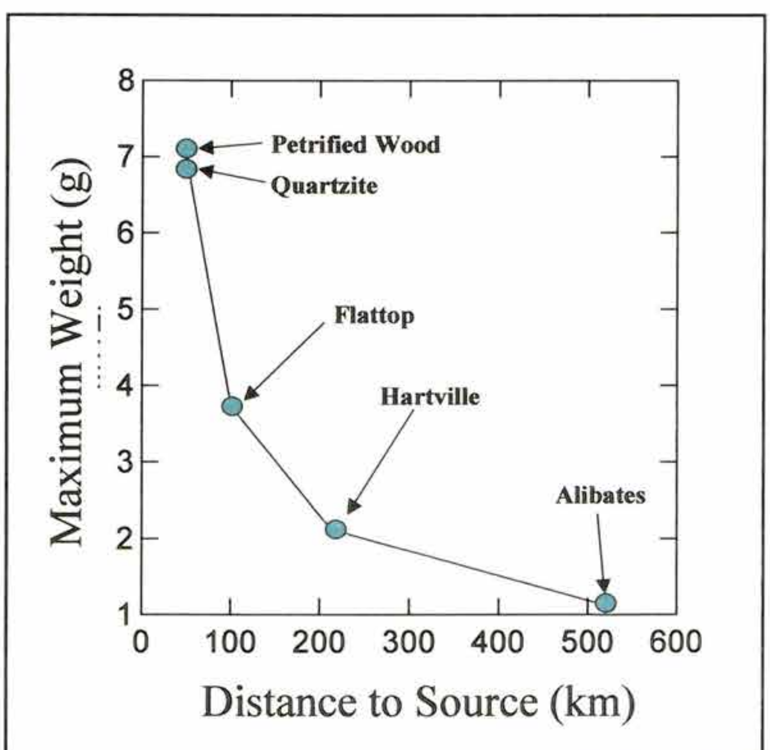


Figure 57. Scatterplot showing the relationship between the distance to raw material source and weight.

lithic production increases from the original cobble to a tool (Gilreath 1984). Preparation of the platform is expected to intensify in daily situations for Paleoindians when limited amounts of material are available in a particular foraging area. In order to compensate for such a situation, Paleoindian groups would likely have conserved any high quality stone they possessed, thus increasing the amount of platform preparation when flaking this material. Conserving stone material would force a knapper to use a reliable flake reduction sequence, thus enhacing the long-term use-life of a cobble by "setting up" platforms for future anticipated tool needs. It is expected then, as the distance from a raw material source increases, platform preparation should increase (see Figure 32).

The Frazier platform assemblage distribution is provided in Table 24 and Figure 58. High quality non-local cherts and chalcedonies represent the highest percentage of platform preparation (72.7% to 92.4%), whereas local quartzite and petrified wood exhibit the lowest percentage of preparation (22.2% to 22.7%). Miscellaneous chert is represented roughly equally between prepared and unprepared platforms, likely reflecting a material type composition of both local and nonlocal materials.

Of the high quality materials, Alibates exhibits the highest percentage of platform preparation (92.4%). Platforms of Hartville materials were prepared in 84.4% of the cases, and 72.7% of the Flattop specimens are prepared. This decreasing trend of platform preparation follows the expected scenario of Paleoindian raw material utilization. As the distance from a stone quarry to the Frazier site increases, the amount of platform preparation exhibited on that material increases. Additionally, if a raw material is a high-quality stone such as Alibates, platform preparation would likely increase in order to maximize the number of potentially useable flakes from a nodule.

Table 24. Platform Preparation Type by Material Type.

Material Type	Platform Preparation Type							TOTAL
	Faceted	Reduced	Ground	Combination	Prepared Percent	Unprepared	Unprepared Percent	
Flattop	2	5	5	13	**72.7**	5	**27.3**	**33**
Hartville	3	37	11	14	**84.4**	12	**15.6**	**77**
Alibates	4	21	14	22	**92.4**	5	**7.6**	**66**
Petrified Wood	2	1	0	2	**22.7**	17	**77.3**	**22**
Quartzite	3	17	13	12	**22.2**	158	**77.8**	**203**
Misc. Chert	5	26	11	18	**59.4**	41	**40.6**	**101**
TOTAL	**19**	**107**	**54**	**81**	**52.3**	**238**	**47.7**	**499**

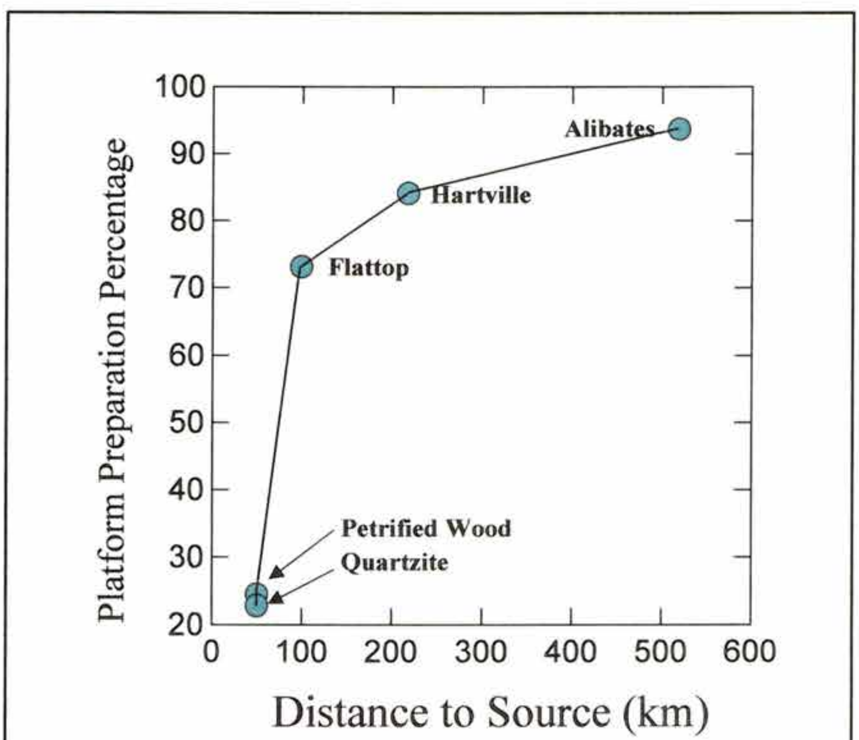


Figure 58. Scatterplot showing the percent of prepared platforms according to material type and distance to stone source.

Local materials such as quartzite and petrified wood are not expected to display significant amounts of platform preparation because quartzite is readily available in the area and is a low quality stone. In contrast to local quartzite, the remaining local material, petrified wood, exhibits a low percentage of platform preparation. The lack of platform preparation noted on the petrified wood sample indicates that although it is a high quality material, it is from a local source.

<u>Cortex and Dorsal Flake Scars</u>

Cortex amount and dorsal flake scar counts are provided in Tables 24 and 25, and Figures 59 and 60 for the Frazier assemblage. The amount of cortex on a lithic specimen is predicted to decrease, and the number of dorsal flake scars is expected to increase as a nodule is subjected to reduction. These Table 25 and 26 data and the scatterplots provided in Figures 59 and 60 indicate a trend for non-local, high quality material to exhibit lower amounts of cortex, and an increased percentages of dorsal flake scars. Local materials of both low (quartzite) and high (petrified wood) quality material retain a cortical surface and a low number of dorsal flake scars in a greater number of cases. These data correspond with the observed pattern for the platform preparation sample. Specifically, Alibates dolomite in the assemblage exhibits the maximum percentage of platform preparation (92.4%), the highest percentage without cortex (98.5%), and the greatest percentage of specimens with three or more dorsal flake scars (65.4%). In contrast, the quartzite specimens have the lowest percentage of platform preparation (22.4%), a greater percentage with cortex (31.7%), and the lowest percentage of flakes with three or more dorsal flake scars (38.5%).

Table 25. Cortical Surface Amounts and Percentages by Material Type.

Material Type	Cortical Surface Amount 0 = No Cortex, 1 = 1 to 49%, 2 = 50 to 99%, 3 = 100%								Total
	0		1		2		3		
	n	%	n	%	n	%	n	%	
Flattop	72	92.3	4	5.1	1	1.3	1	1.3	78
Hartville	136	97.8	2	1.4	1	0.7	0	0.7	139
Alibates	132	98.5	2	1.5	0	0.0	0	0.0	134
Petrified Wood	29	65.9	7	15.9	6	13.6	2	4.5	44
Quartzite	327	68.3	77	16.1	54	11.3	21	4.4	479
Misc. Chert	162	92.0	10	5.7	3	1.7	1	.6	176
Total	**858**	**81.7**	**102**	**9.7**	**65**	**6.2**	**25**	**2.4**	**1050**

Table 26. Dorsal Scar Counts and Percentages by Material Type.

Material Type	Dorsal Scar Count 0 = No Scars, 1 = One Scar, 2 = Two Scars, 3 = Three or More Scars								Total
	0		1		2		3		
	n	%	n	%	n	%	n	%	
Flattop	1	1.4	1	1.4	28	39.4	41	57.7	71
Hartville	0	0.0	5	3.9	44	34.1	80	62.0	129
Alibates	1	0.8	1	0.8	42	33.1	83	65.4	127
Petrified Wood	2	5.4	5	13.5	15	40.5	15	40.5	37
Quartzite	16	3.7	74	17.1	177	40.8	167	38.5	434
Misc. Chert	1	0.6	15	9.6	49	31.2	92	58.6	157
Total	**21**	**2.2**	**101**	**10.6**	**355**	**37.2**	**478**	**50.1**	**955**

These data substantiate the proposed model of Paleoindian material utilization discussed in Chapter 2 (see Figure 32). The quarry source for Alibates is located the greatest distance from the Frazier site, whereas quartzite is abundant locally along the South Platte River. Tables 25 and 26 data reveal that Alibates has been extensively subjected to later stage reduction episodes associated with prolonging the use-life of these nodules. In contrast, variables recorded for the quartzite sample indicate that this material correlates with expedient, early stage reduction strategies not concerned with future use-life of this stone. Additionally, the Hartville Uplift and Flattop quarries are located the second and third greatest distances, respectively, from the Frazier site. As

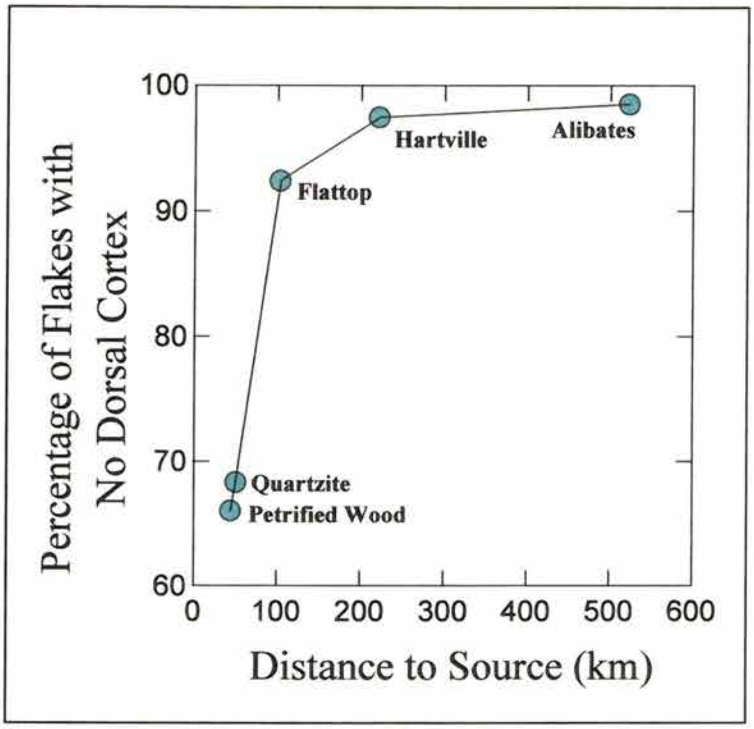


Figure 59. Scatterplot showing the relationship between specimens without dorsal cortex, material type, and the distance to the stone source.

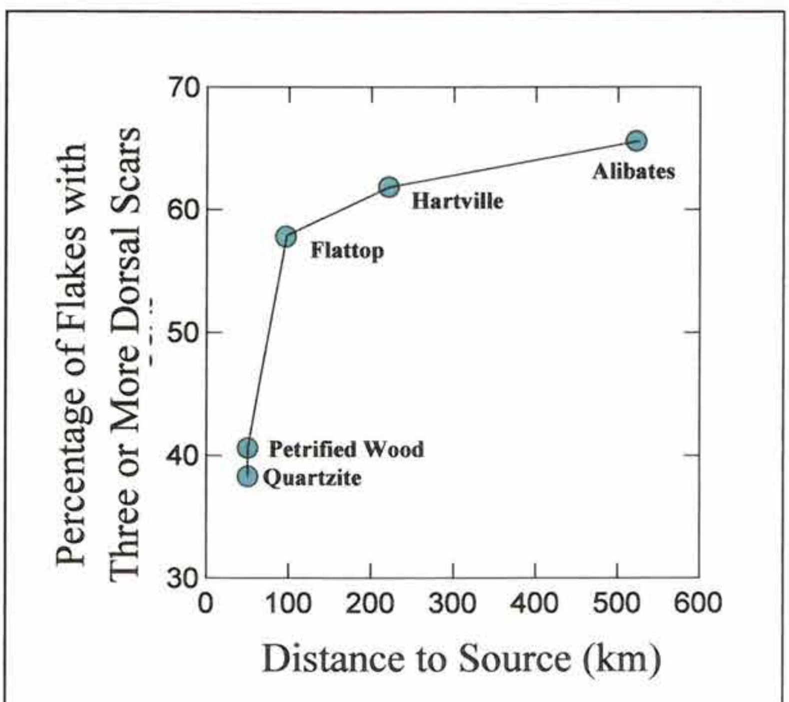


Figure 60. Scatterplot showing the relationship between specimens with three or more flake scars, material type, and the distance to the stone source.

the distance from these quarries to the Frazier site decreases, the specimens exhibit a lower percentage of variables associated with anticipated use-life and later stages of reduction (decreasing platform preparation, increasing cortex, and decreasing dorsal flake scars).

Tool Composition

In order to further explore the relationship between material type and Agate Basin lithic strategies, the Frazier tool assemblage is examined. Three major tool categories along with their corresponding material types, counts, and mean weight distributions are provided in Table 27. The biface category consists of formal bifaces other than projectile points, the flake tool category is produced by combining utilized flakes and retouched flakes, and the formal uniface category is comprised of end scraper and side scraper specimens.

Table 27. Counts and Mean Weights for Selected Functional Tool Categories According to Material Type.

Material Type	Biface		Flake Tool		Formal Uniface (End Scrapers)		(Side Scrapers)		Total
	Count	Mean Weight*	Count	Mean Weight*	Count	Mean Weight *	Count	Mean Weight *	
Alibates	2	1.9	15	4.6	8	7.2	0	-	25
Flattop	0	-	12	5.6	2	13.1	0	-	14
Hartville	3	12.4	15	3.4	9	9.1	4	11.7	31
Misc. Chert	2	8.7	22	4.0	3	16.6	5	10.7	32
Pet. Wood	1	37.2	6	13.5	0	-	0	-	7
Quartzite	4	22.5	89	15.8	2	55.8	4	24.0	99
Total	**12**		**159**		**24**		**13**		**207**

*Mean weight expressed in grams.

With the exception of flake tools, Alibates accounts for the lowest mean weights in the combined Frazier tool assemblage, while petrified wood and quartzite represent the highest mean weights. The Alibates biface specimens are small fragments, one appears to be a small lateral margin from a projectile point and the remaining piece is believed to have snapped off a larger bifacial core. Because the biface sample is fairly small, and the flake tool sample largely represents tools produced for expedient use rather than tools intended to stay in the Paleoindian tool kit for long durations, the focus of the remainder of this section will be on the unifacial tool category.

Of the end scraper category, Alibates dolomite and Hartville chert represent the greatest quantity (n=17, 73.9%) of materials. Since end scrapers are thought to be a portion of the Paleoindian tool kit (see "Formal Uniface Discussion and Conclusion", this chapter), it is not surprising that non-local materials such as Alibates dolomite and Hartville chert are heavily represented in this particular tool class. The mean weight and general morphology of these specimens are characteristic of tools that are exhausted of any future use-life. Therefore, these implements were discarded after use at the Frazier site. The end scrapers of local materials, such as quartzite, have a much larger mass than those of non-local materials. This suggests that these implements were produced as expedient tools to assist with typical end scraper activities such as hide processing. In utilizing local, low-quality material such as quartzite for these activities, Agate Basin hunter-gatherers could thereby reduce the amount of high quality material used for butchering and processing bison. Only two end scrapers of Flattop chalcedony are present in the assemblage, and their specific role in the Agate Basin tool procurement and utilization cycles will be discussed in the conclusion of this chapter.

In contrast to the end scraper sample, miscellaneous chert and quartzite comprise the majority of the side scrapers (n=9, 69.2%). The miscellaneous chert sample may reflect a combination of local and nonlocal materials, but the quartzite sample is entirely of local origin. As side scrapers are not believed to be a component of the Paleoindian tool kit, it is not unexpected that local materials and heavier implements represent the majority of this tool class.

Variability and Assemblage Quantification: TIE, MNT, and MNA

Archaeologists have traditionally described artifact assemblages according to quantities of artifact types. Often, counts can misrepresent the original assemblage composition. Drawing on models from ceramic and faunal analysts (Baxter and Cool 1996; Orton 1993), Portnoy (1987) and Shott (2000) devised systems for quantification that attempt to more accurately reflect the variation within a lithic assemblage. Shott (2000) used the minimum number of intact tools (MNT) and the tool information equivalents (TIE) as alternatives to a traditional assemblage count. Minimum nodule analysis (MNA) is another non-traditional approach used to quantify lithic assemblages (Larson and Kornfeld 1997; Sellet 1999). These three quantification methods are used to further examine the Frazier lithic sample.

MNT and TIE

The entire Frazier assemblage was divided into portions such as proximal, distal and medial. For purposes of this study, all portions coded as lateral fragments were combined with the medial segments. MNIT (minimum number of intact tools), or MNT (Shott 2000), is derived simply by taking the number of complete specimens and adding the highest number of fragment portions. For example, of the 37 formal unifaces in the Frazier collection, 16 are intact or complete, two are proximal, 10 are medial and nine are distal portions. To calculate the MNT for formal unifaces, the number of complete specimens (n=16) is added to the next highest quantity of fragments. Therefore, the MNT for the Frazier formal uniface sample is 26 specimens. Table 28 provides MNT's for the Frazier assemblage, with the exception of cores due to the general absence of this tool type.

Shott (2000:728-729) used experimental data (Cattelain and Perpere 1993) to determine calculations for the TIE (tool information equivalent). Cattelain and Perpere's (1993) experimental work involved 100 projectile points that were shot at animal targets. The points were then recovered and counts of broken, lost, and complete specimens were used to derive the ETE (estimated tool equivalent) and TIE according to Orton and Tyers's (1990) model. In-depth discussion of the formula for deriving ETE and TIE is not warranted here, as it is described in detail in Shott's (2000) article. TIE outcome is provided in Table 28, and the calculations used to figure TIE are located in Appendix B. In contrast to MNT, TIE for the Frazier formal uniface sample is slightly larger at 28 specimens.

Table 28. Total Amount of Lithic Artifacts, MNT, and TIE.*

Artifact Type	n	MNT	TIE
Debitage	942	499	702
Projectile Points	8	5.3	7
Bifaces	11	10	8.5
Formal Unifaces	37	26	28
Edge Modified Flake	119	79	90
Retouch Flake	40	23	29
Total	1158	641.4	867

* MNT = minimum number of tools; TIE = tool information equivalent

As illustrated by these Table 28 data, TIE is generally larger than MNT. Shott (2000:729) observed this relationship when utilizing Cattelain and Perpere's experimental data. In fact, TIE typically overestimated the actual known quantity of artifacts and MNT underestimated the number (Shott 2000:279). TIE measures also fluctuated according to the descriptive categories for portions. In a test case using Combe Sauniere data, Shott noted that finer divisions of tool portion actually increased the reliability of the measurement (Shott 2000). However, the Frazier sample was analyzed at the basic level of proximal, medial, distal, and lateral portions, thus limiting the level of analysis. Incorporating refits would alter the results only slightly, and therefore are not presented. These data are provided as a heuristic tool and the TIE and MNT values do not reflect exact quantities of artifacts in the assemblage. These data simply provide another vantage point for understanding the variability within the lithic assemblage and that interpretations are dependent on how a sample is quantified.

Minimum Nodule Analysis (MNA)

Another analytical tool utilized to quantify archaeological assemblages is minimum nodule analysis or MNA (Kelly 1985; Larson and Kornfeld 1997; Sellet 1999). Although MNA is discussed briefly in the "Analytical Approach" section of this chapter, a brief synopsis of the technique is provided. MNA categorizes all lithic pieces (cores, debitage, tools) into nodules based on similarities of macroscopic raw material traits. Therefore, each nodule is presumed to represent the by-products of only one piece of raw material that was transported into the site (Sellet 1999:42). Obviously, the separation of nodules based on macroscopic traits alone is subject to observer bias and, furthermore, the color of a single cobble may vary substantially within any one specimen (Simpson 1996). Many of the Frazier specimens, however, manifest as very distinctive colors and textures, thus lending themselves to this approach. The limitations of MNA are recognized, nevertheless, it is used as an additional tool for recreating Agate Basin lithic utilization and the ensuing quantification of the assemblage for the Frazier site sample.

According to Larson and Kornfeld (1995), nodules are divided into two categories, single item nodules (SIN) and multiple item nodules (MIN). A SIN can represent a single flake or a tool, whereas a MIN symbolizes more than one flake or tool. Lithic activities are then inferred based on the composition of nodule types (SIN and MIN). Table 28 provides an outline of Larson and Kornfeld's (1995) nodule types and their predicted corresponding lithic activities. For instance, a tool SIN likely represents a specimen that was produced off-site and discarded at the site without any maintenance (i.e., the lack of debitage). Based on these inferences, the Frazier assemblage is examined according to SIN and MIN composition.

A total of 157 nodules, of which 122 are MIN and 35 are SIN, are present in the Frazier collection. Fifty-two (32.7%) of the nodules are quartzite, while the remaining 107 (67.3%) nodules are comprised of chert, chalcedony, and petrified wood. Table 29 provides the distribution of nodule type according to raw material. The majority of the Frazier sample is comprised of MIN (77.7%), whereas only 22.3% of the sample is SIN. Several initial inferences regarding material type utilization at the Frazier site can be generated from these data.

According to Sellet (1999:45), when a SIN is a tool it likely represents a specimen manufactured off-site and transported to the site. Most (66.7-100%) of the SIN for high-quality non-local materials (i.e., Flattop, Hartville, Alibates) are comprised of tools. In contrast, locally-available material such as miscellaneous chert (likely local cherts) and quartzite is represented by lower SIN tool percentages (33.3-55.6).

Table 28. Nodule types and inferred lithic activities, after Larson and Kornfeld (1995) and Sellet (1999).

	Single Item Nodule (SIN)		Multiple Item Nodule (MIN)	
Content	Tool	Flake	Debitage Only	Debitage and Tool (s)
Inferred Lithic Activities	No on-site maintenance Curated tool	On-site maintenance/ resharpening of curated item	On-site production of transported items	On-site production or maintenance, use, and discard
Scheduling Activities	On-site use and discard	Tool maintenance (tool transported)	Tool production (tool transported)	Tool production (expedient use of tools)

Table 29. The Distribution of MIN and SIN According to Material Type and Artifact Class.

Raw Material	MIN		SIN					TOTAL	
	n	%	Deb n	Deb. %	Tool n	Tool %	Total SIN %	n	%
Flattop	7	87.5	0	0.0	1	100	12.5	**8**	**5.1**
Hartville	26	89.7	0	0.0	3	100	10.3	**29**	**18.5**
Alibates	11	78.6	1	33.3	2	66.7	21.4	**14**	**8.9**
Petrified Wood	3	100	0	0.0	0	0.0	0.0	**3**	**1.9**
Misc. Chert	34	64.2	12	63.2	7	36.8	34.6	**53**	**33.8**
Total Chert/ Petrified Wood	**81**	**76.7**	**13**	**50.0**	**13**	**50.0**	**23.3**	**107**	
Quartzite (Total)	**41**	**84.6**	**4**	**44.4**	**5**	**55.6**	**15.4**	**50**	**31.8**
TOTAL	**122**	**77.7**	**17**	**48.6**	**18**	**51.4**	**22.3**	**157**	**100.0**

This pattern of material use is expected as the non-local materials have been in the tool use-cycle for much longer than local materials. Therefore, the non-local tools likely represent either broken or exhausted pieces that were discarded at the site. Although the sample is small, examination of the tool SIN supports this hypothesis. Five of the seven (71.4%) non-local SIN tools are formal unifaces that are less than 40 mm in maximum dimension and weigh 10 g or less. These specimens were probably discarded because they had become too small for hafting. In contrast, 11 (81.8%) of the 13 local SIN tools are flake tools greater than 40 mm in maximum dimension and weigh more than 10 g.

Seventeen cases of debitage SIN were noted in the Frazier assemblage. These may represent a variety of lithic situations than are not as clear-cut as the tool SIN. A debitage SIN could be related to a larger nodule not recovered from the chosen excavated area or, if the debitage SIN is large enough, the SIN may be a transported blank that was introduced to the site and never manufactured into a tool or tools (Sellet 1999:46). Although interpretations of debitage SIN are potentially misleading, it is noteworthy that only a single debitage SIN is present in the non-local materials (Alibates). It is possible that this specimen belongs to a transported core or tool that has been removed from the site or that the nodule has not yet been recovered from the site. The fact that 94.1% (n=16) of the debitage SIN are of local cherts and quartzites suggests either "testing" of local cobbles for possible tool production or, more likely, large flake blanks intended for use as tools but discarded at the site because they were not needed. Thirteen of the 16 local debitage SIN are large flakes (greater than 50 mm in maximum dimension and weighing more than 10 g), indicating that the latter conclusion is more probable.

MIN are thought to represent on-site maintenance or manufacture of a tool (Sellet 1999:46). Additionally, Sellet (1999:46) suggests that if the MIN includes a tool or tools, it likely indicates expedient manufacture and use of the tool. In contrast, MIN comprised of only debitage likely indicates production of a tool or tools that were transported from the site. On the surface this simple dichotomy seems obvious, but the amount and size of debitage in a nodule, compared with the number of tools is also a good indicator of expedient manufacture. For example, if a MIN consists of one tool and three flakes, it is more likely that this tool was resharpened and then discarded, but probably not manufactured at the site. If, however, a MIN consists of one tool and 10 large flakes, it is more probable that the tool was expediently manufactured on-site or nearby. Furthermore, it is suggested that if a nodule consists of multiple tools (two or more) but less than 10 pieces of debitage, these tools either represent curated tools that were being maintained until discard on-site, or the product of a single cobble being reduced. If a nodule is comprised of two or more tools and more than 10 pieces of large size debitage, these tools were also possibly manufactured on-site or are highly curated items that were extensively reworked. Again, the overall size or mass of the associated debitage should determine the associated lithic strategy utilized for the nodule. The arbitrary number of 10 pieces of debitage is only used as an example of how to test the predicted outcome.

Figures 62 and 63 illustrate MIN composition by material type according to mean maximum length and mean weight. These figures represent MIN of only debitage or tools. For example, a single nodule could be comprised of 20 pieces of debitage, but no corresponding tool was identified. The mean weight of the debitage sample is plotted as the red bar in the figures. In cases where the MIN consists of tools (at least two by MIN definition), the mean weight is provided as the blue bar.

The figures illustrate that quartzite tool MIN are much greater in mass (approximately 36.0 g) than the other materials. This pattern indicates that the tools were produced in the general vicinity of the site, utilized on-site, and then discarded. This conclusion is supported because debitage of this material was not recovered from the site.

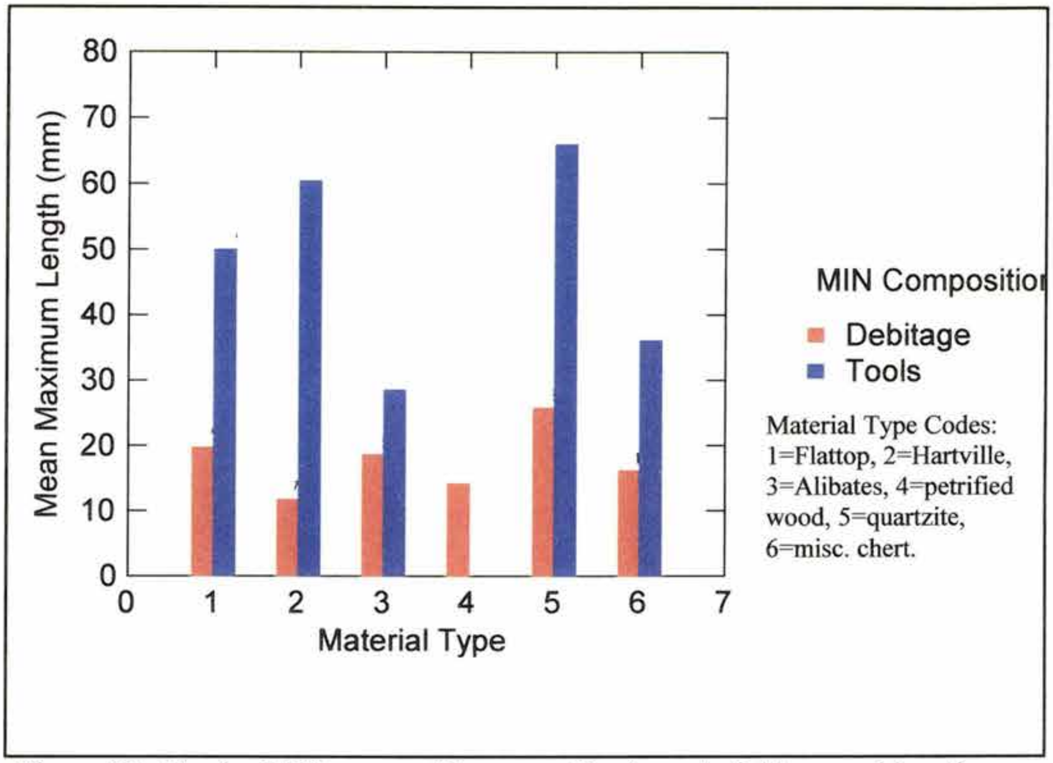


Figure 62. Frazier MIN composition according to material type and length.

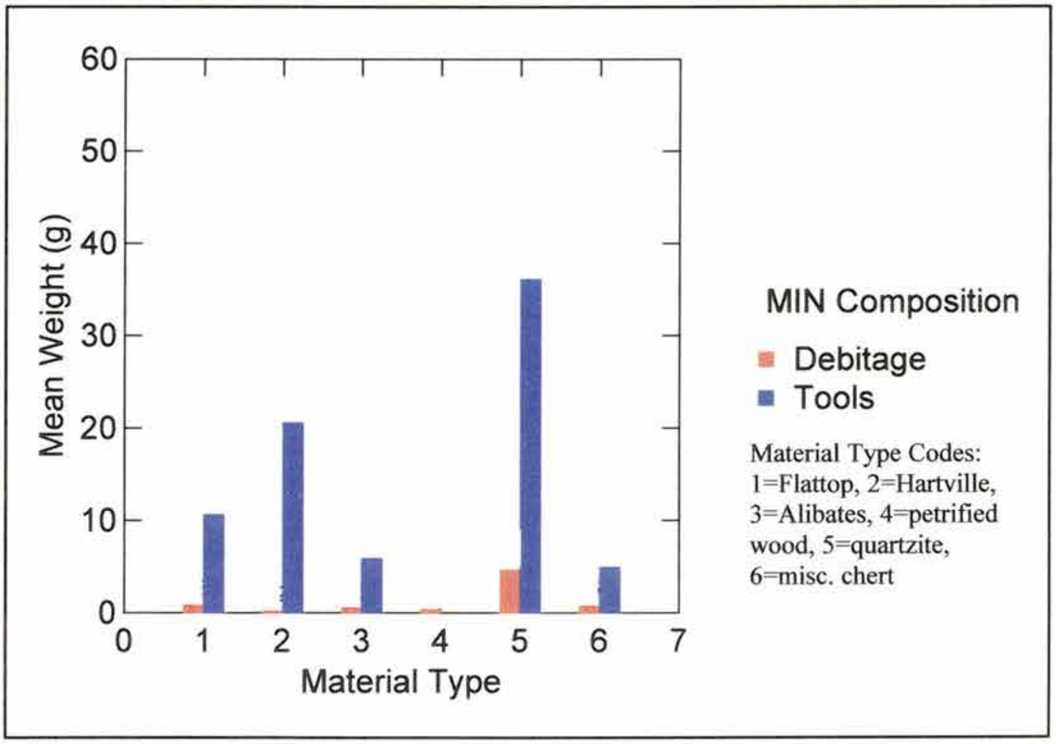


Figure 63. MIN composition according to material type and mean weight.

It is likely that these tools were not produced or maintained while at the Frazier locality. The debitage MIN are also greater in mass than the other materials. These observations suggest that quartzite nodules were reduced on-site, then the tool or tools produced were transported with the Paleoindian group.

The distributions of mean weight for the remaining material types are distinctly different from the quartzite sample. Hartville, Flattop, Alibates and miscellaneous chert tool MIN are represented by smaller mean weights (approximately 5.0 to 20.0 g). This dichotomy may indicate several different lithic material-use scenarios. First, it may represent tools that were produced elsewhere and were highly curated specimens. The small mean weight of these tools indicates that they had reached the limit of their functionality as a tool, and, therefore were discarded at the site. Second, the tools were produced in the local vicinity, carried to the site in an already reduced state, and then discarded. The first hypothesized situation is more likely for the non-local materials such as Alibates, whereas the second scenario is a better possibility for explaining the miscellaneous chert distribution.

The debitage MIN generally reflect a similar model of material utilization. Debitage MIN of quartzite is larger than debitage MIN of the cryptocrystalline materials. The large size of debitage MIN for the quartzite sample may signify the production of tools on-site (cobble reduction) that were subsequently removed when the group resumed traveling. The small size of debitage MIN for the remaining materials suggests these materials represent curated tools that were resharpened on-site and remained in the tool-kit.

A more detailed examination of MIN may reveal other patterns of material utilization that reflect lithic technology strategies employed by the Frazier Paleoindians. The distribution of MIN mean weights for debitage and tools according to nodule composition is provided in Figures 64 and 65. Mean debitage and tool weights of petrified wood and quartzite nodules are significantly larger than the other materials. Furthermore, non-local materials (i.e., Flattop, Hartville, Alibates) are generally much smaller in size for both debitage and tools. Miscellaneous chert is most similar in weight distribution with the non-local materials.

It was earlier suggested that the size and amount of debitage associated with a tool or tools in a nodule could assist in determining where a nodule was in the use-life cycle of the tool kit. It was suggested that a nodule comprised of only one tool and less than 10 pieces of small debitage likely represents a curated tool that was resharpened on-site. Debitage mean weights for MIN consisting of a single tool (red bars in Figure 64) are consistently smaller (=< 1.0 g) for non-local materials. In contrast, the quartzite debitage for this MIN category are larger (> 5.0 g), and no MIN of this type are present in the petrified wood sample. Miscellaneous chert debitage is slightly larger than non-local materials, suggesting that miscellaneous chert in the Frazier sample consists of a higher quantity of local material. The mass of the quartzite debitage suggests that this category does not represent curated items. Rather, this category probably corresponds to larger

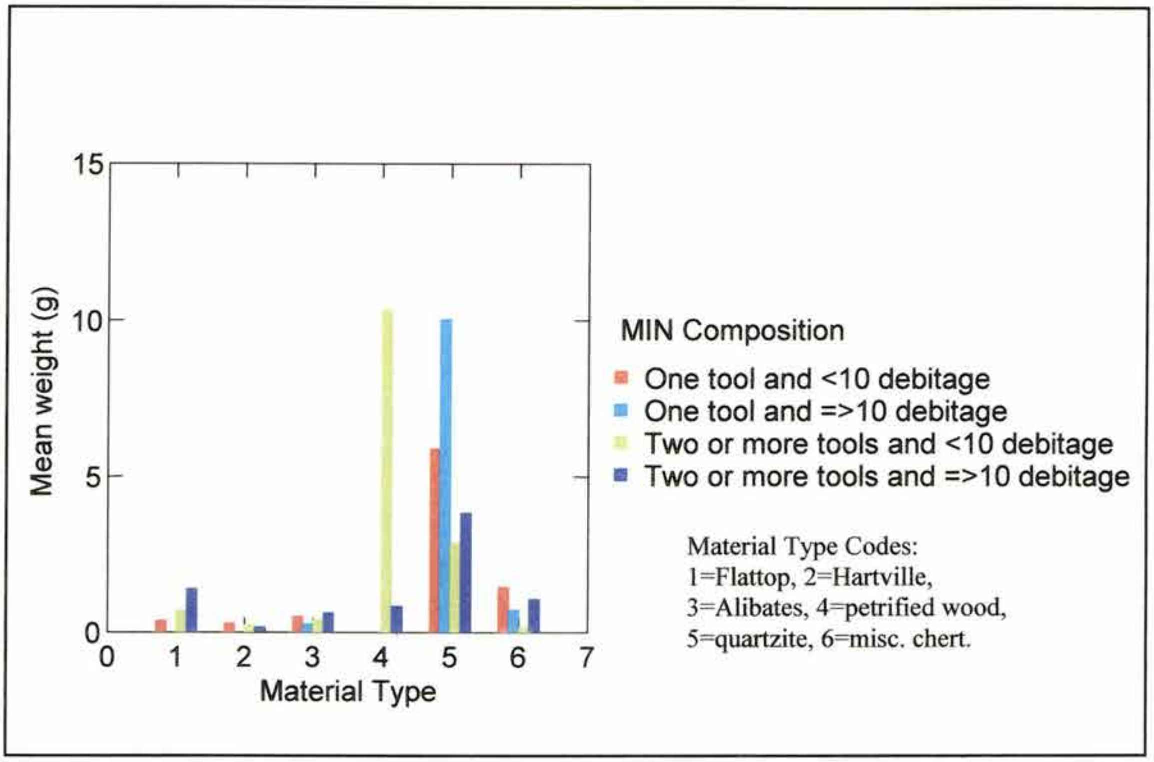


Figure 64. MIN composition for debitage according to nodule organization, material type, and mean weight.

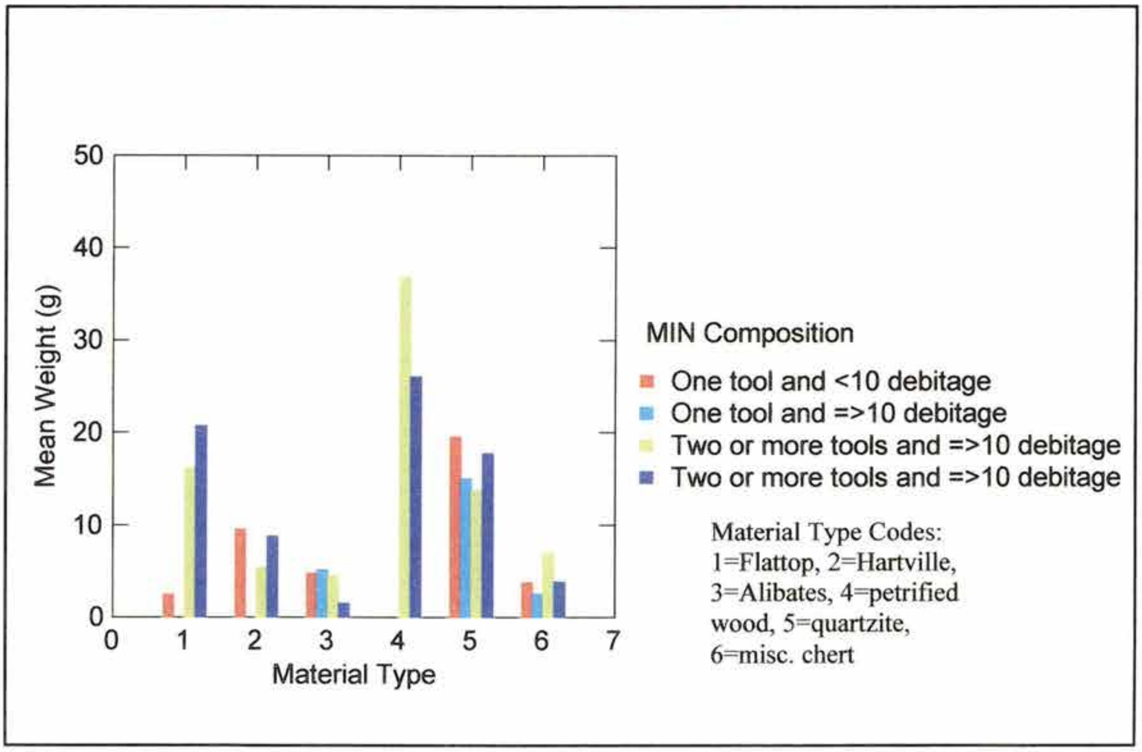


Figure 65. MIN composition for tools according to nodule organization, material type, and mean weight.

cobbles that were reduced on-site to produce a single tool.

The MIN category comprised of one tool and more than 10 pieces of debitage is represented in Figures 64 and 65 by the light blue bar. This nodule type is more apt to characterize expedient production of tools, especially if the debitage sample is large. This type of nodule is only present in three material type groups, quartzite, miscellaneous chert, and Alibates. The quartzite debitage mean weight (Figure 64) is overwhelmingly greater than either miscellaneous chert or Alibates for this nodule type. These data indicate that quartzite MIN for this nodule class were expediently produced on-site or in the nearby vicinity. Although this nodule type is thought to represent expedient manufacture, the very small nature of the debitage sample for Alibates and miscellaneous chert suggests a different scenario. It is inferred that these tools are highly curated tools that were extensively re-worked on-site before discard. Mean weight for the tools of this nodule type also reflect the pattern displayed for debitage, supporting the inference that the tools were in a reduced, highly curated stage in the tool kit.

Nodules consisting of two or more tools and less than 10 pieces of debitage are represented by the yellow bars in Figures 64 and 65. These tools should consist of either curated tools or are the product of a single reduction of a cobble. The petrified wood sample obviously contains the heaviest pieces of debitage within this nodule class. The quartzite sample is also heavier than the remaining material types. This skewed distribution suggests that locally available petrified wood and quartzite was reduced on-site to produce only a few (<10) useable flakes. In contrast, debitage for this nodule class comprised of non-local materials is fairly small, indicating that these tools were re-sharpened on-site.

The distribution of nodules containing two or more tools and 10 or more pieces of debitage are provided in Figures 63 and 64 as the dark blue bars. With the exception of petrified wood, a similar distribution to the previous nodule category (two or more tools and <10 pieces of debitage) is observed. Debitage related with the nodules of petrified wood consisting of more than two tools is fairly small. However, the distribution of tool mean weight in Figure 63 illustrates that petrified wood tools in this nodule class are much larger than the other material types. These data indicate that these particular nodules represent tools that were initially reduced in the nearby vicinity and brought to the site. The production of smaller flakes likely reflects resharpening of these tools during the inhabitants stay. Debitage size of non-local materials for this nodule class appears to reflect maintenance of tools, rather than expedient production.

Of note is the distribution of mean weight for the four nodule categories of tools. For all nodule types, the petrified wood and quartzite samples contain the largest tools, whereas non-local materials consist of smaller tools. However, an interesting distribution is noted for non-local material tools. Flattop chalcedony is generally greater in weight than Hartville and Alibates. This is especially apparent for the nodule categories including two or more tools. This pattern may reflect the fact that the Flattop quarry is located closer to the Frazier site than the other two material types. Additionally, it suggests that Flattop material has not been in the tool kit of the Frazier Paleoindians for as long as Hartville or Alibates. This inference is further extended to the Hartville and Alibates distributions. It appears that Hartville tools are slightly larger than Alibates, implying that Alibates tools have been in the tool kit for a longer duration than Hartville tools of any nodule type.

Comparison of these data to raw count by collapsed material type, TIE, and MNT percentages are provided in Table 30. It is apparent that percentages of raw count, TIE, and MNT are almost identical between the two material type groups. In contrast, MNA percentages suggest that a greater quantity of high-quality stone nodules (68.2%) were introduced and discarded at the site. The MNA percentages indicate that perhaps a different strategy of raw material exploitation occurred at the Frazier site, specifically that high-quality materials were utilized for activities more often than suggested by the TIE, MNT and raw count percentages. The close similarity between raw count, TIE, and MNT percentages is interesting because these data are produced using the entire assemblage. However, an examination of TIE and MNT found that differences in counts by material class (debitage, unifaces, etc.) differed substantially from raw count. Therefore, it is suggested here that TIE and MNT are more useful indicators for variation among separate lithic categories, rather than the total assemblage. MNA, on the other hand, indicates a slightly different scenario of material utilization at the Frazier site. In this particular case, MNA appears to be a useful application for gaining multiple viewpoints of prehistoric lithic technology.

Table 30. Raw Count, MNT, TIE, and MNA for the Frazier Lithic Sample by Collapsed Material Type.

Raw Material	Raw Count		MNT		TIE		MNA	
	n	%	n	%	n	%	n	%
Chert/ Petrified Wood	647	55.7	383	58.1	485	55.8	107	68.2
Quartzite	514	44.3	276	41.9	384	44.2	50	31.8
TOTAL	1161		659		869		157	

Material Type Utilization and Mobility

Using the *chaînes opèrtaire* approach, the Frazier debitage and tools are viewed as a single snapshot of a lithic assemblage along a continuum of use. The pieces found during excavations represent specimens that were either discarded or lost. In the "Analytical Approach" section of this chapter, several attributes are selected that are believed to coordinate with the amount of time a piece of stone has been used by a group (Figure 32). Lithic debitage and tool data regarding these attributes that was presented in the previous sections of this chapter serve to illustrate several key points regarding mobility patterns and stone utilization behavior of Agate Basin hunter-gatherers that occupied the Frazier site.

First, it is obvious that the Frazier group or groups used stone material (Alibates) from great distances (~ 525 km) and attributes such as size, platform preparation, cortex, and scar count, indicate that Alibates had been in the tool kit for a greater amount of time than any other material at the site. On the other extreme quartzite and petrified wood debitage and tools are larger than any other materials, these stones are available within 30 km of the site. Quartzite and petrified wood specimens also exhibit higher percentages of cortex, and lower amounts of platform preparation and dorsal flake scars than the other materials (see Figures 58 through 60).

MNA analysis indicates that Alibates and Hartville materials have a greater number of SIN and a smaller number of MIN, whereas quartzite and petrified wood exhibit the opposite (small number of SIN, greater number of MIN). According to the model presented in Figure 32, the observed patterns of raw material use indicate that Alibates is in a much later stage in the use life continuum than any of the other materials.

Data concerning the Hartville specimens illustrates that they have been in the tool kit for a shorter amount of time than the Alibates pieces, but significantly longer than Flattop, quartzite, and petrified wood (see Figures 58 through 64).

In the entire lithic assemblage, Flattop specimens are consistently represented by variables suggestive of a shorter duration in the Frazier occupants tool kit than the other high-quality materials such as Hartville and Alibates. These variables include a smaller percentage of platform preparation and dorsal scar counts, and a slightly higher percentage of cortex. Furthermore, only two formal tools typically associated with Paleoindian tool kits, end scrapers, are comprised of Flattop chalcedony. The Flattop quarry source is located approximately 113 km northeast of the Frazier site. This material could be considered either a local or non-local source depending on the arbitrary cutoff used in determining this designation. Given that the Flattop quarry is much closer than either the Alibates or Hartville source areas, why is only a small portion of the assemblage comprised of Flattop? It is suggested that many of the Flattop specimens were transported from the site with the Agate Basin group. The Frazier group may have recently acquired Flattop chalcedony to replenish their tool kits. The variables selected for analyses indicate that Alibates and Hartville specimens have been in the tool kit for longer periods of time than Flattop, quartzite, and petrified wood. Flattop specimens fall generally between Alibates/Hartville and quartzite/petrified wood (Figures 56 through 60), or closer to quartzite/petrified wood (Figure 56) according to the variables of size, platform preparation, cortex, and scar count.

Alibates and Hartville exhibit qualities of being in a depleted state in the Frazier assemblage. Of the formal tools, Alibates comprises only end scrapers and small biface fragments. Hartville represents the majority of the projectile points, bifaces, and a large portion of the end scrapers. Projectile points or bifaces of Flattop chalcedony are not present in the assemblage. Furthermore, Flattop represents only 2.3% (N=27) of the entire Frazier assemblage, but yet a significantly higher amount of mean mass than either Alibates or Hartville.

These observations support the notion that the Frazier Agate Basin group or groups used and subsequently discarded the Alibates and Hartville implements before moving on to another location. They likely carried this scenario out, it is postulated, because they had recently replenished their tool kits with locally-available, high-quality Flattop chalcedony and miscellaneous cherts. Use of local quartzite and petrified wood for required butchery activities at the site hindered the need to use the Flattop specimens. The small, depleted nature of the Alibates dolomite and Hartville chert bifaces, along with the highly curated re-use identified on the Hartville projectile points (see Figures 47 through 49), further supports that these materials had been in the tool kit for a longer duration than Flattop, quartzite, and petrified wood specimens.

A scenario of mobility for the Frazier group can be postulated based on these data. It appears that the group visited or acquired (trade, secondary contexts) material from the Alibates quarry before moving north to the Hartville Uplift area. After leaving the Hartville Uplift, the group moved southeast toward the Flattop quarry before arriving at the Frazier site. Because the selected variables and the MNA analysis (Figures 56 through 64) show similar relationships for all the material types, it appears that the stone assemblage represents a single trajectory of use-life. In other words, these data indicate that a single group moving about the landscape, procuring stone as needed or in anticipation of future use, is responsible for the Frazier site assemblage.

CHAPTER 4

Spatial Distribution

Spatial distribution of lithic artifacts provides additional insight into behavior patterns at the Frazier site. Unfortunately, vertical provenience of artifacts was only recorded on original plan maps in 63% (n=78) of the 124 units. The original site datum cannot currently be identified and actual elevations extrapolated. Consequently, the following spatial distribution discussion is focused on horizontal locations of cultural remains.

Spatial patterns were identified by generating density contours in the main grid block, piece plotting surface artifacts, and examining the original maps recorded during the 1965 - 1967 excavations. Density contours and plot maps were produced using the Surfer (version 6.0, Keckler 1997) program. Artifact counts are grouped by 5-x-5 ft excavation units.

The density contours of debitage illustrate four main concentrations of materials within the main grid block (Figure 66). The major areas of debitage are located in the southern, western, and northern portion of Locality 3. A less dense concentration of debitage is noted in the eastern portion of Locality 3. Little to no debitage is situated in Locality 1. Patterns that deviate from the overall debitage contours were not observed for differing size grades or flake types (biface thinning, normal, discoidal, etc.).

The distribution of chipped stone tools follows the observed debitage distribution pattern (Figure 67). The largest concentration of tools is located in Locality 3. Examination of the original field map produced during the excavations reveals the distribution of individual tool specimens (Figure 68). Similar to the density contour produced from the current database, the amount of tools drops off dramatically in the eastern section of the grid,

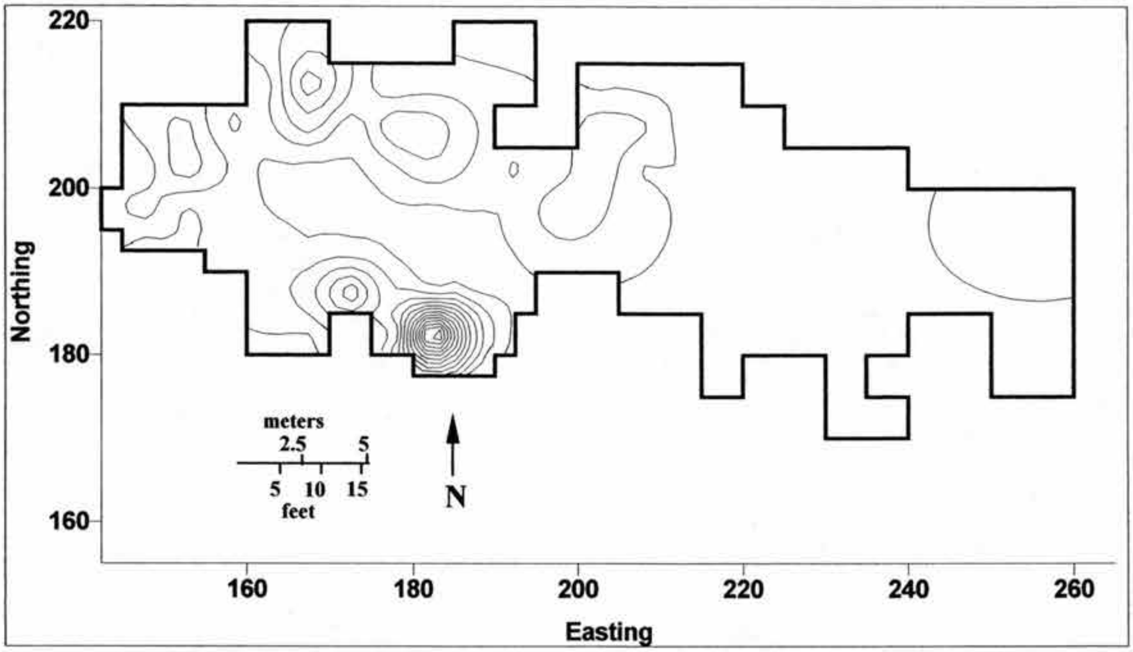


Figure 66. The distribution of debitage in the main grid block.

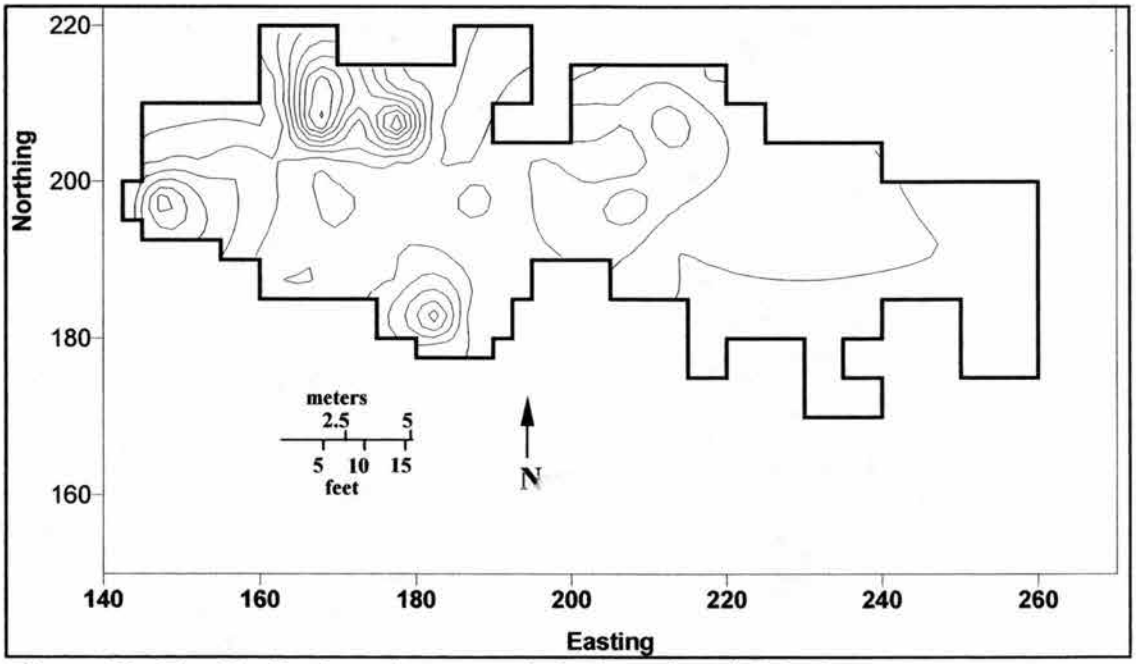


Figure 67. The distribution of stone tools in the main grid block.

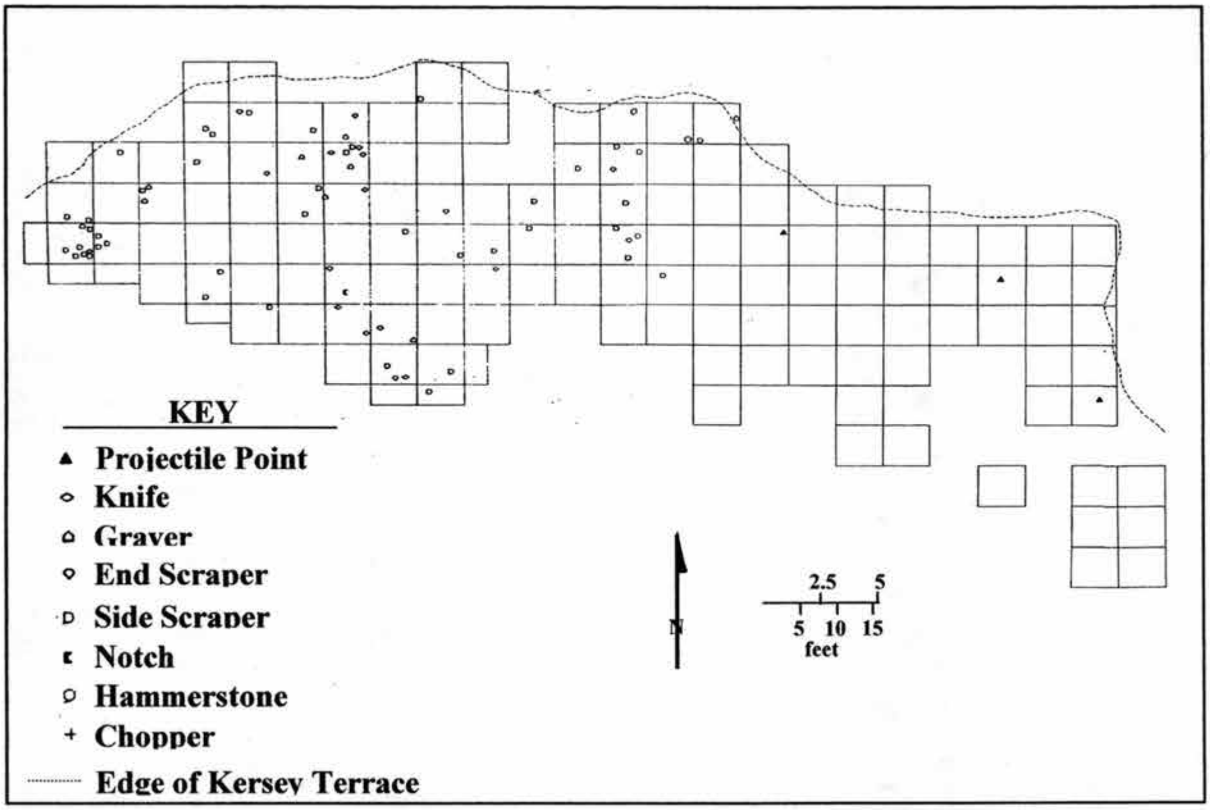


Figure 68. The distribution of tools in the Main Grid block, modified from original maps.

although a few scrapers, two hammerstones, and a chopper were noted in this section. The tool distributions and proposed associated activity areas will be discussed in more detail later in this chapter.

Forty-six refits were identified during analysis (Figure 69). Refits represent actual lithic specimens (debitage and tools) that could be joined during analysis. For example, a single line in Figure 69 could represent a piece of debitage that conjoins with a tool. A full list of refits is provided in Appendix B. Refits correlate dramatically with the previously noted concentrations of lithic materials (Figure 64 and 65). It is noteworthy that refit specimens are apparent between and within the lithic concentrations. Taphonomic processes have likely contributed to the lithic distributions and refitting scenarios presented. Therefore, additional research was conducted to examine possible areas of human activity.

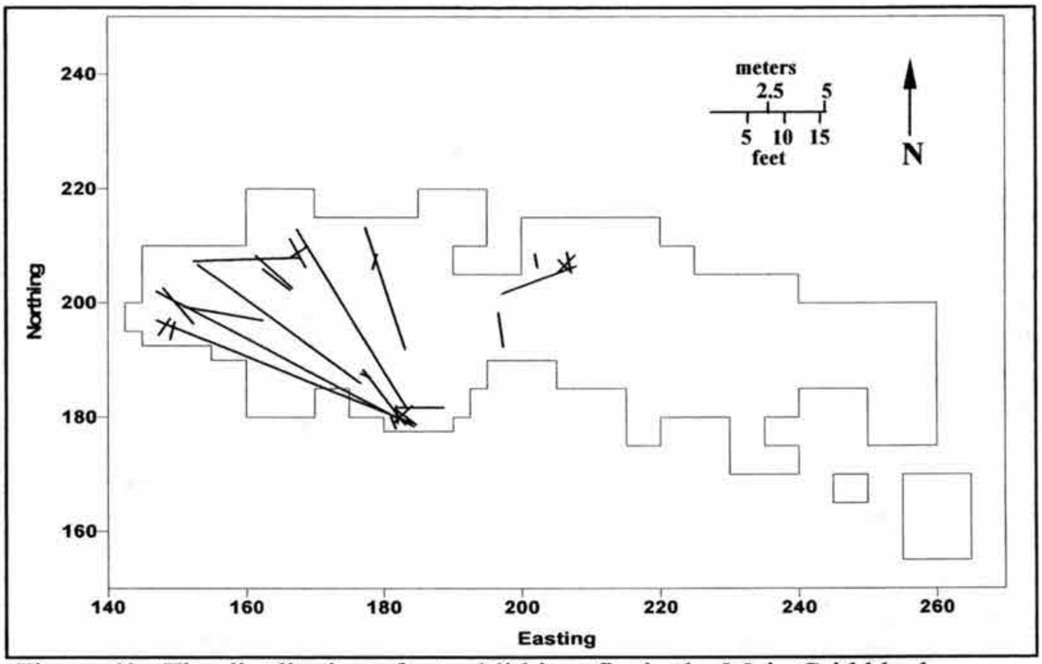


Figure 69. The distribution of actual lithic refits in the Main Grid block.

Individual unit plan views from the Frazier excavations indicate areas of charcoal concentrations and burned bone. It became apparent that a large area of charcoal was present in the central portion of the western half of the main grid block (Figure 70). Furthermore, burned bone was identified in units surrounding this concentration. These data suggest that the charcoal area represents the scattered remains of a hearth and both lithic reduction activities and food processing were taking place around this activity locus. Lithic distributions and refits further support this hypothesis (Figure 66 through 69).

Examination of original plan views found that red and yellow ochre was noted in a few units. The red ochre fragments also correlate around the proposed hearth activity area (Figure 70). Red residue that appears to be ochre was present on a few specimens in the Frazier collection (Figure 71).

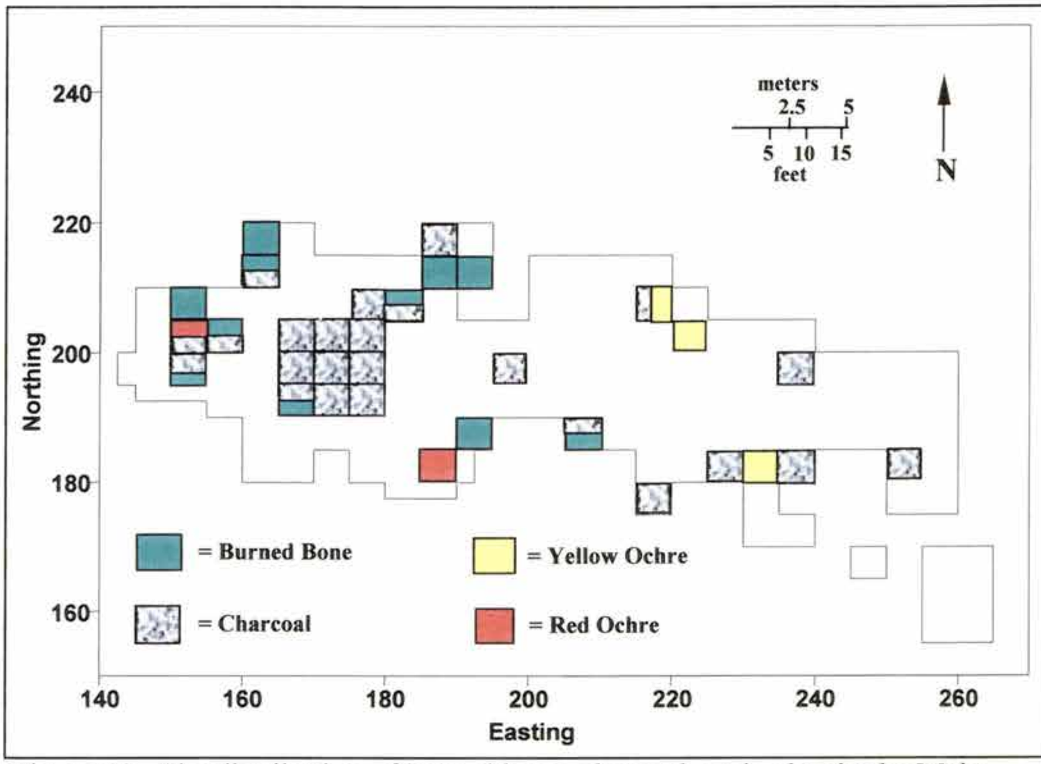


Figure 70. The distribution of burned bone, charcoal, and ochre in the Main Grid block.

The hypothesized hearth area was initially suggested by the author in paper and poster presentations during the 2000 and 2001 school year (Slessman 2000; 2001). The acquisition of some missing field notes from the 1967 season and color slides that Mr. Frazier possessed from the 1967 excavations confirmed the presence of a hearth. Of specific interest to the proposed hearth area was a single slide of Units F34, F35, G34, and G35 (195N-205N to 185E-195E). A clearly distinct circular, basin-shaped, black soil stain is visible in the photo (Figure 72). The majority of the stain is located in units F35 and G35. Additionally, an ashy-gray lens is noted along the eastern edge of the

Figure 71. Quartzite "blade" with red residue.

Figure 72. Photo of a feature at the Frazier site.

feature in the profile of unit F34 and in the east profile wall of F35 and the south wall of E35.

Examination of Robert Bradley's (1967:82-83) field notes found that this feature was identified during excavation. He called the feature a "pit" and states later in his notes that "rodent activity is growing by the minute" during excavation of the feature (Bradley 1967:91). A soil sample was obtained by Bill Biggs and a composite map was drawn of the feature, however, no evidence of the soil or map is found currently at the Denver Museum of Nature and Science. A sketch map of the feature outline and profile is found in Bradley's field notes and is provided in Figure 73. The location of

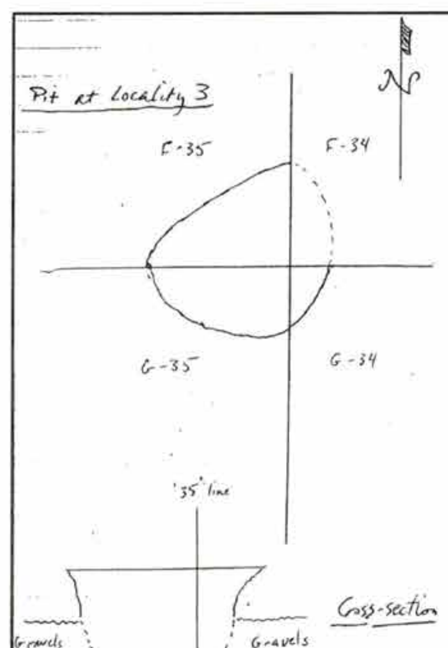


Figure 73. Sketch map of the feature (Bradley 1967:82).

this feature is plotted in Figure 74 along with the previously proposed hearth area, charcoal and burned bone.

Although the proposed hearth area is approximately 5-6 meters (10 ft.) further west of the feature in the notes and slide, it is still a close estimate. The proposed hearth area and newly acquired data provide a unique opportunity to test archaeological interpretations that are founded on the use of archival material. A few people who visited or worked at the site recollected a possible hearth or pit, but none could provide a reliable recollection of its location. Through careful examination of plan maps and analysis of the lithic data, a hypothesis was generated that a hearth was located in the western portion of the main grid, near or within the camp/processing area. This hypothesis was proven true after acquiring the slides from Mr. Frazier.

The previous discussion of archaeological hypothesis testing has further implications

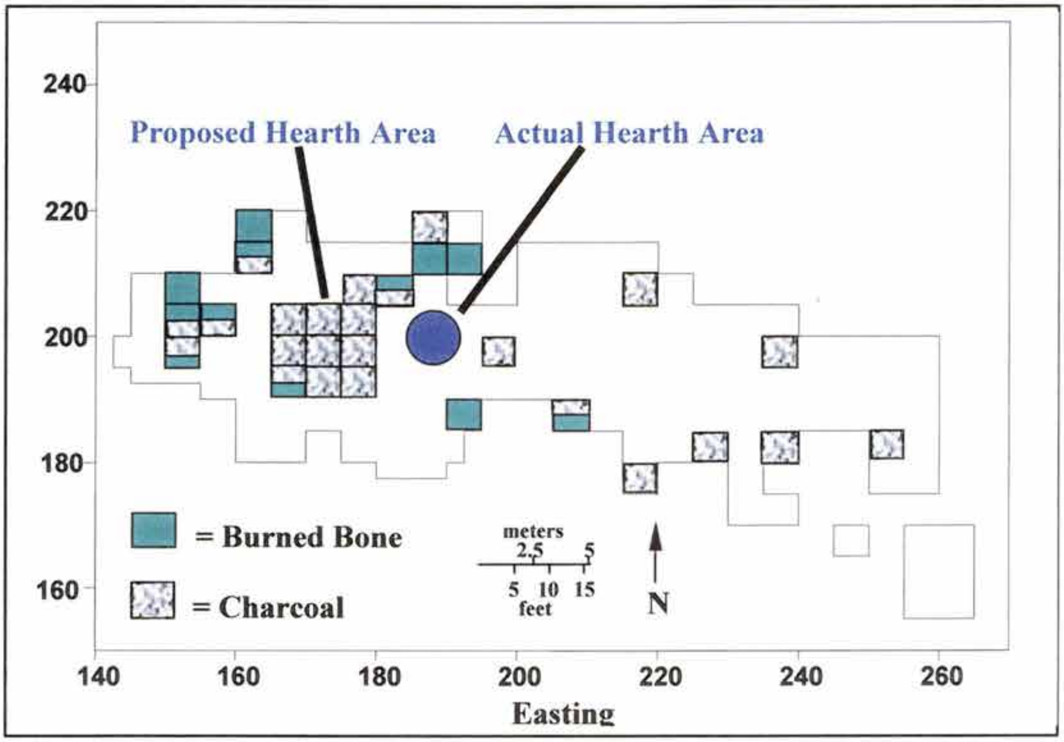


Figure 74. Map showing the location of the proposed hearth, actual hearth, burned bone, and charcoal.

for other archaeologists working with limited data sets or in a confined area of excavation. Jodry and Stanford (1992:154-155) recognized five major concentrations of lithic debris, burned lithics, and calcined bone at the Stewart's Cattle Guard Site. These areas were interpreted to represent hearths that, due to the poor preservation of microstratigraphy, were obliterated. Frison (1978) also suggested the presence and location of hearths at the Hanson site by the occurrence of burned bone and oxidized soil. Other Paleoindian sites that retained hearths had features that are generally small and shallow (Frison 1982). Because Paleoindian hearths are not often found in the archaeological record, discoveries such as the Frazier hearth are highly informative and reassuring.

Projectile points were located in a cut bank of an old arroyo just north of the edge of the terrace. A point base was recovered from the main grid block during the 1967 excavation that refit with a tip discovered on the surface by Frank Frazier in 1965. Although one of the points cannot be associated with any points in the current collection, two points [A1922.81 (Unit K21) and A1922.?? (Unit G28)] were found within the grid block in the same area (Appendix A: Figures A4 and A5). The prevalence of points in the eastern portion of the site and the general lack of tools or debitage, suggests the kill site was in this area.

The distribution of cultural materials at the Frazier site suggest that two major activities; initial kill and butchery, and processing, occurred in three functionally associated areas. Refits between projectile point fragments from surface contexts and the excavation grid block support the hypothesis that the initial kill and butchery of bison occurred in the eastern segment of the main grid block (Figure 75). Projectile points were not recovered from any other portion of the site. Furthermore, hammerstones and a chopper were noted near this area (Figure 68) during the excavations, although these implements are not present

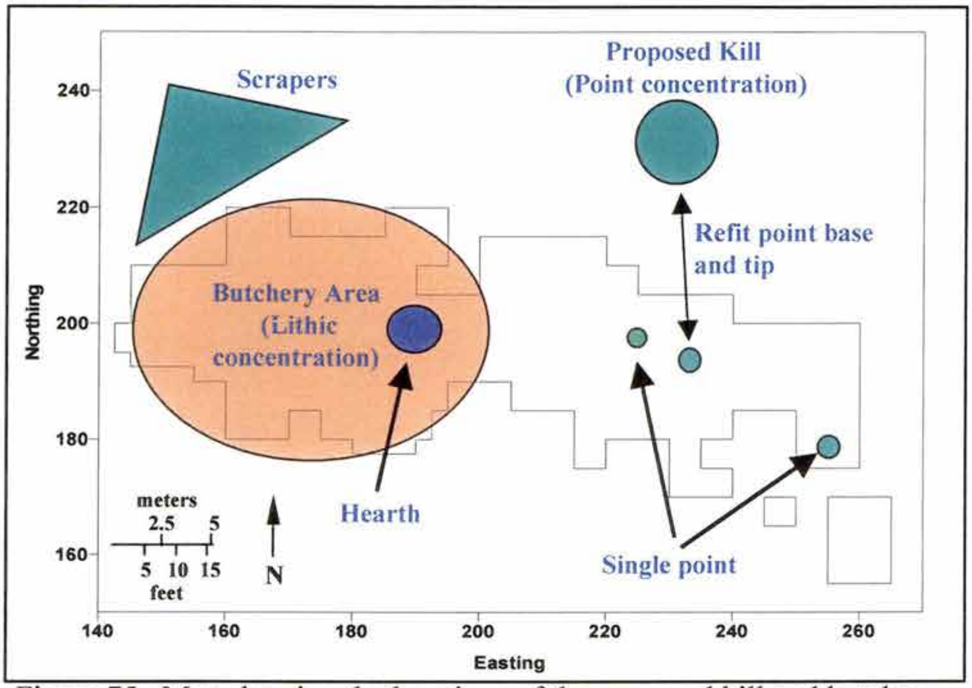


Figure 75. Map showing the locations of the proposed kill and butchery areas.

in the current collection. These large quartzite implements could have been used during the initial dismemberment of the bison for breaking and separating bone elements. Hammerstones used for breaking bison bone were also noted in the kill/initial butchery area at Stewart's Cattle Guard (Jodry 1999:302).

The concentration of lithic debris and tools in the western portion of the site suggests that processing of the bison occurred here. Scrapers, flake tools, and gravers were recovered mainly from Locality 3, coinciding with the distribution of debitage. Furthermore, a large amount of scrapers were collected from the surface of the site, eroding out into a drainage from the northwestern section of the grid (Figure 75). It is suggested that these areas represent the processing, hide working, and camp area of the site.

Another proposed activity area, Locality 2, was not extensively excavated. However, surface collection in this area produced a high number of scrapers, and test pits produced bone, debitage, and scraping tools (Bradley 1967; Frank Frazier, personal communication 5/20/01). Based on these observations, it is likely that Locality 2 represents another specialized processing area.

Material Type Distribution

The spatial distribution of lithic artifacts according to material type is provided in Figures 76 through 84. A map produced during the original excavations reveals three distinct clusters of alibates in the western half of the main grid (Figure 76). Petrified wood artifacts are situated in a small concentration near the center of the main grid (Figure 77). Quartzite distribution is fairly evenly dispersed within the western half of the main grid, however, the greatest number of quartzite artifacts are noted in the far southwest corner of the main grid (Figure 78).

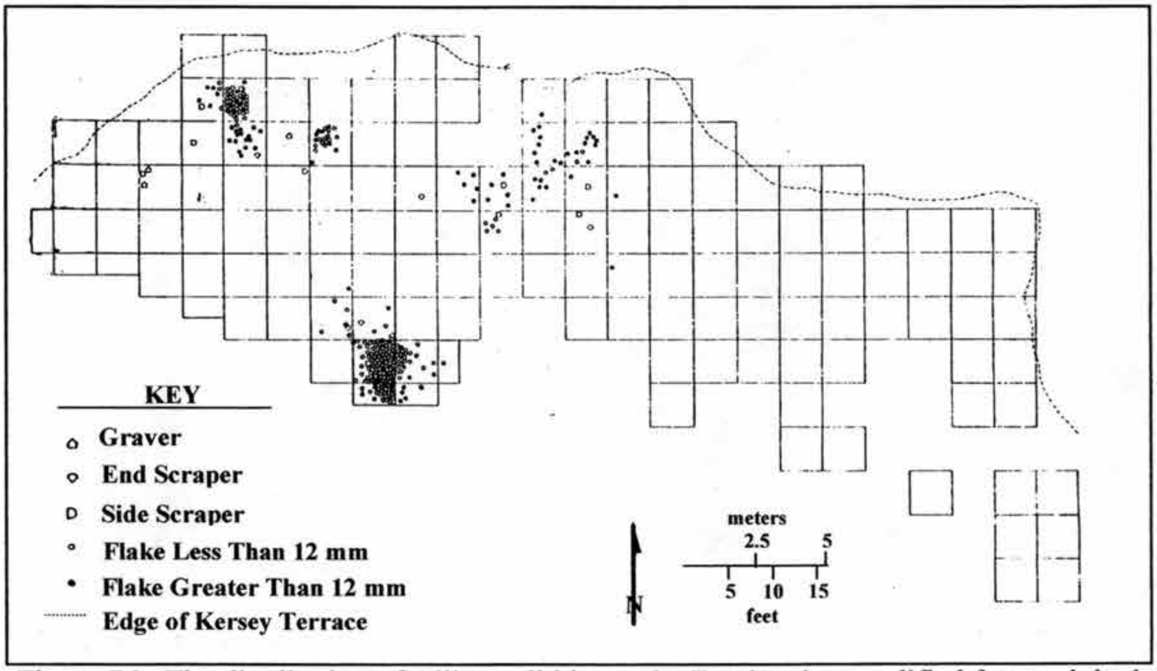


Figure 76. The distribution of Alibates lithics at the Frazier site, modified from original maps.

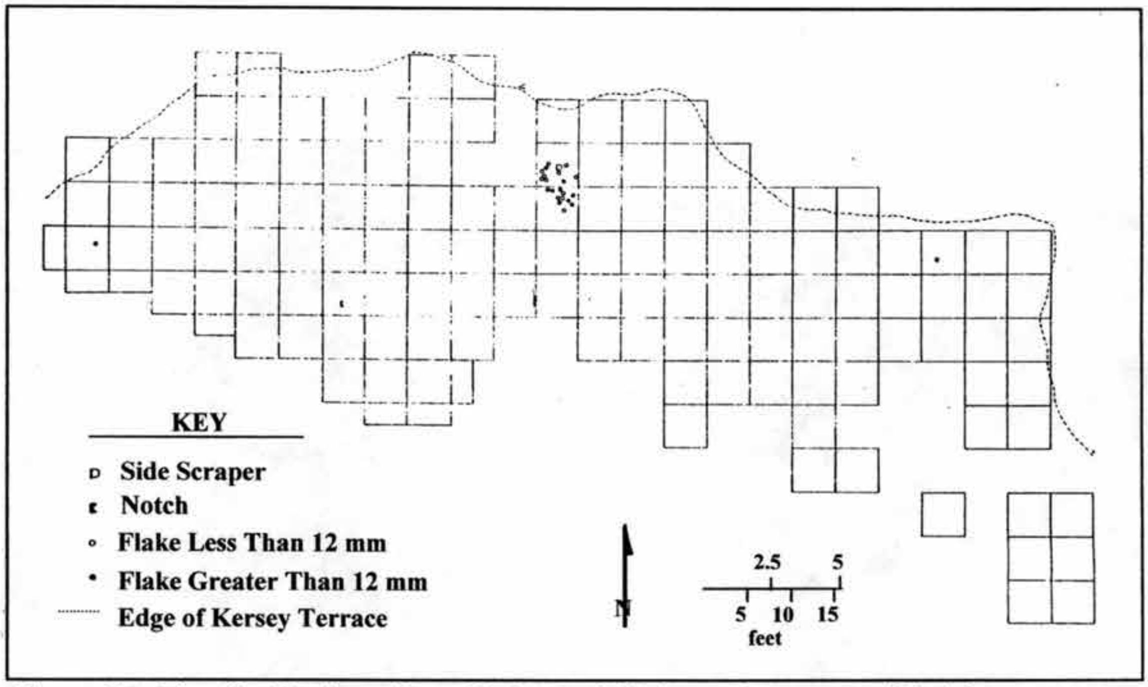


Figure 77. The distribution of Petrified Wood lithic specimens, modified from original maps.

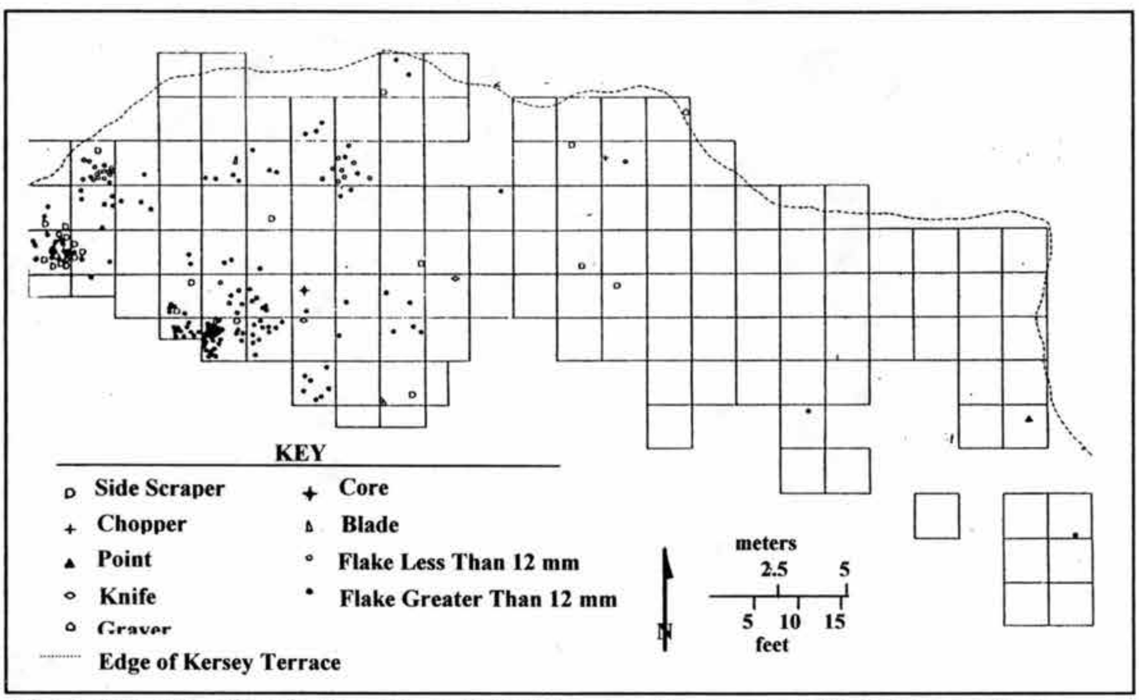


Figure 78. The distribution of quartzite lithic specimens, modified from original map.

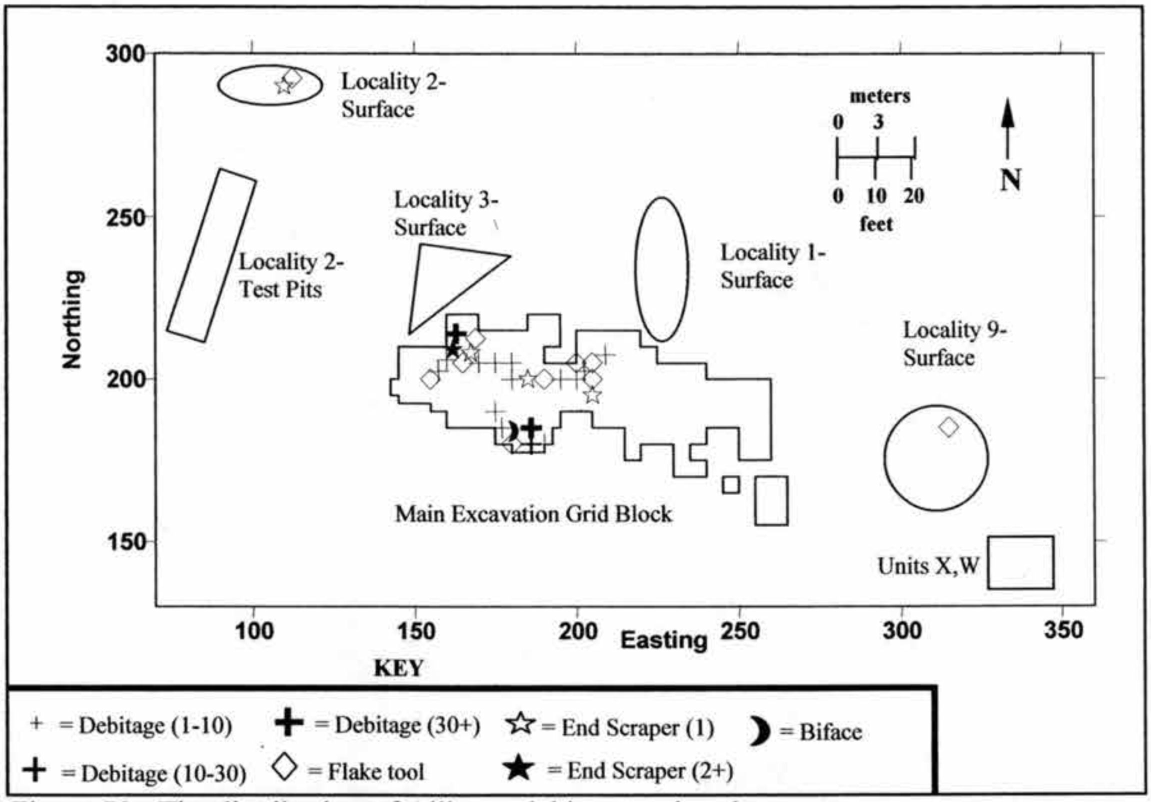


Figure 79. The distribution of Alibates debitage and tools.

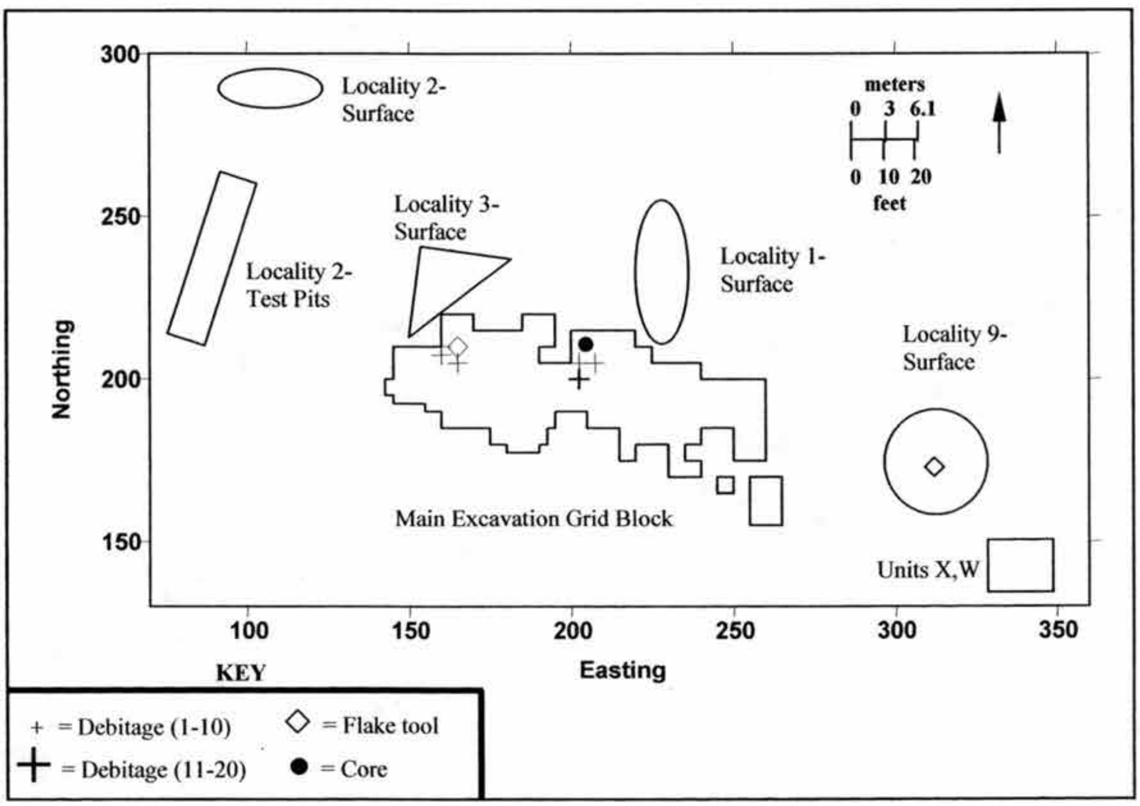


Figure 80. The distribution of petrified wood debitage and tools.

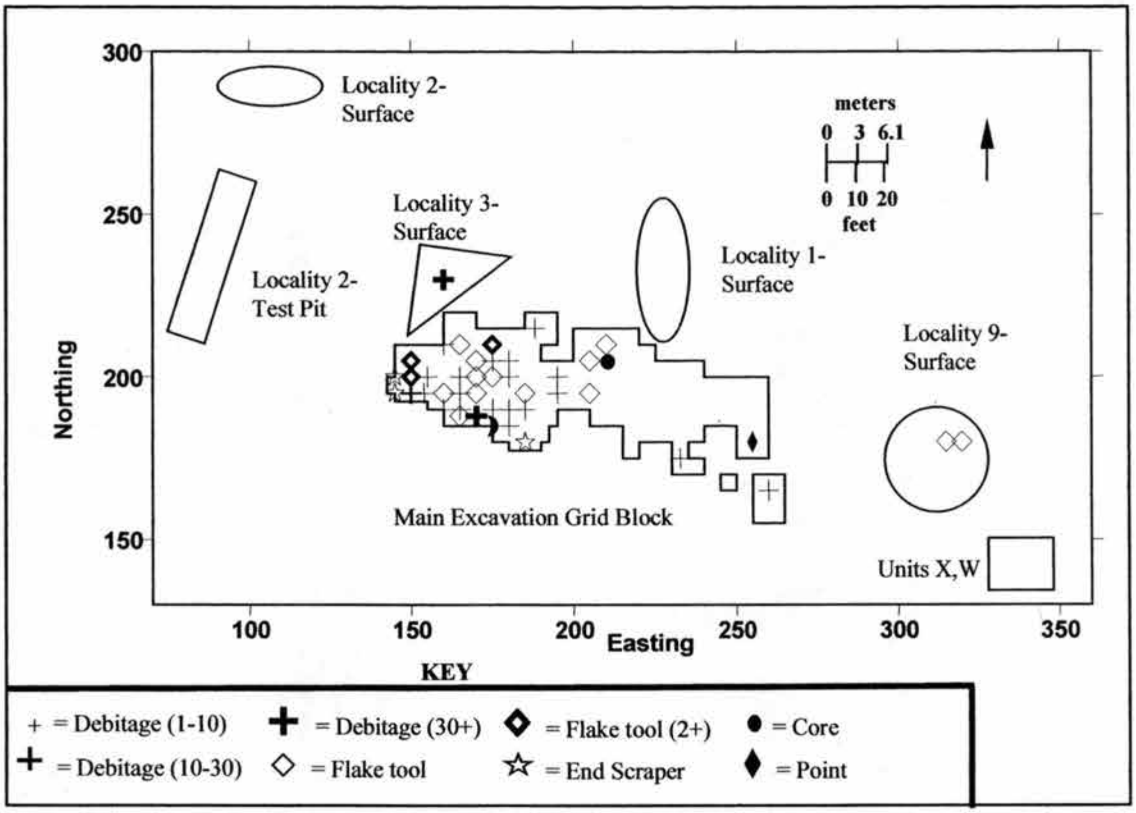


Figure 81. The distribution of quartzite debitage and tools.

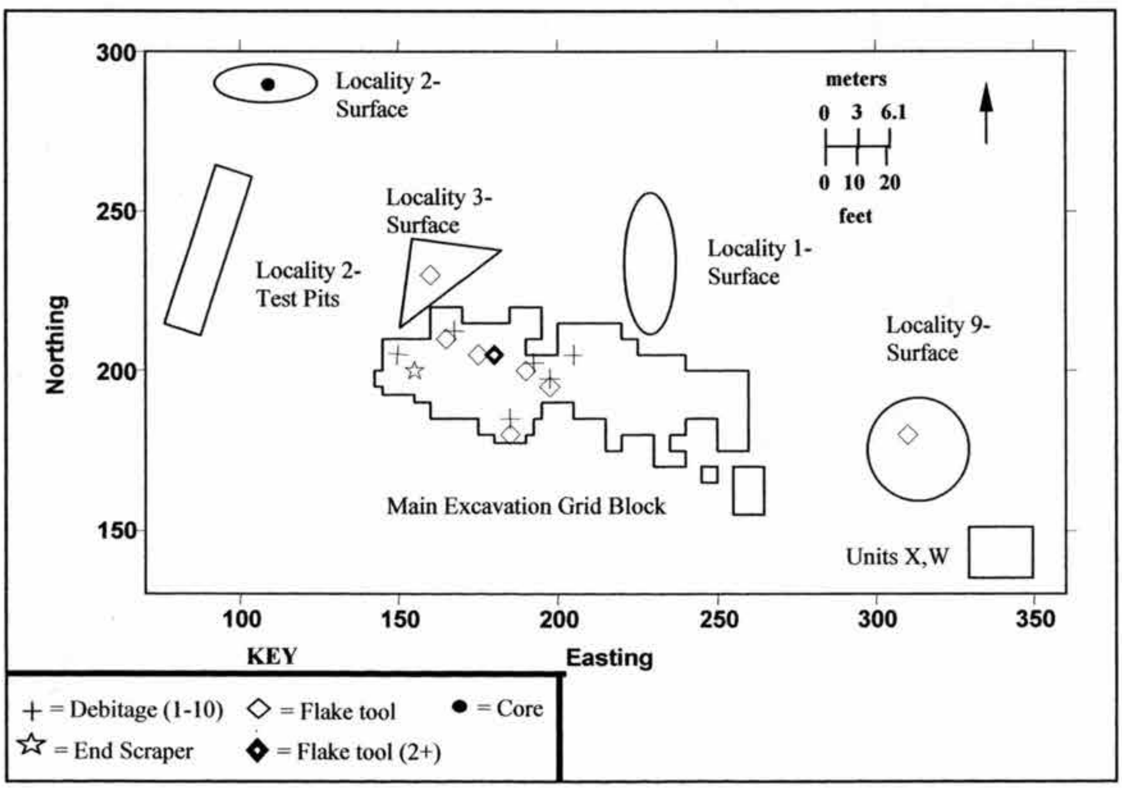


Figure 82. The distribution of Flattop chalcedony debitage and tools.

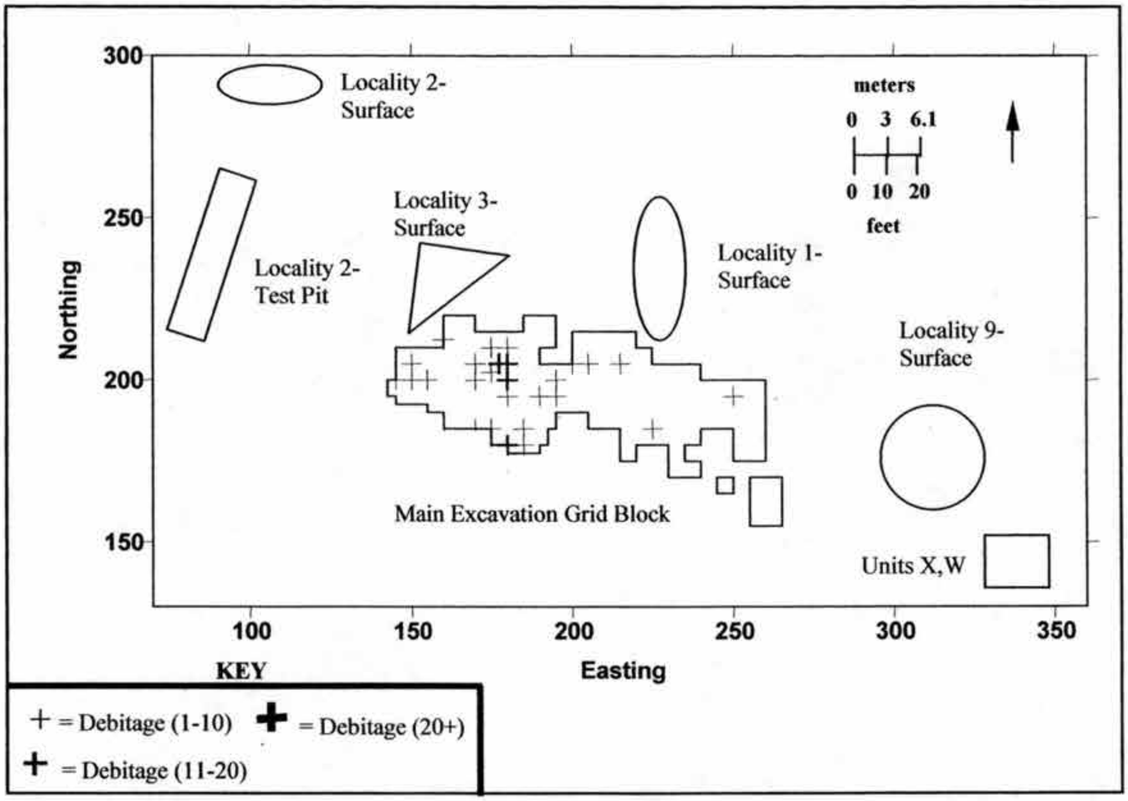


Figure 83. The distribution of Hartville chert debitage.

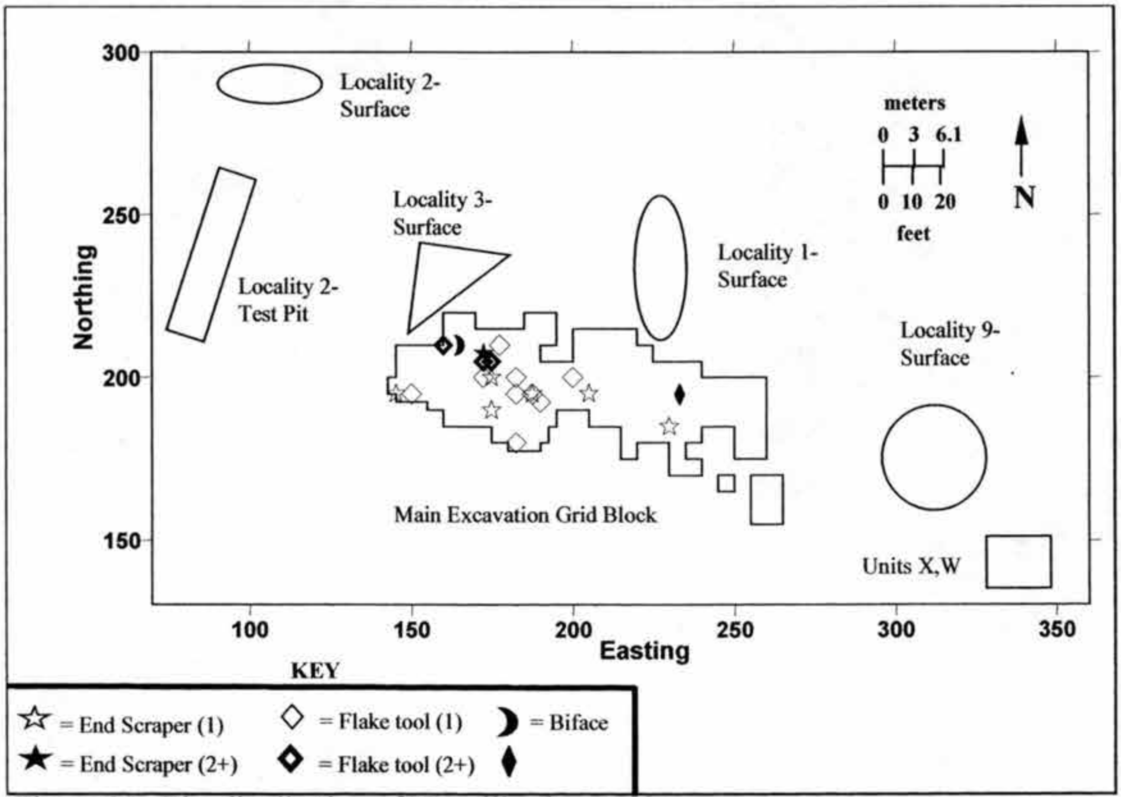


Figure 84. The distribution of Hartville chert tools.

Maps generated using the current Frazier database both reinforce and contradict some of the patterns noted on the original maps. Some material types, particularly Hartville Uplift chert and Flattop chalcedony stone, were not identified during the original excavation as knowledge of these sources was not available. The original spatial distribution maps identify only the "classic" red-purple-white banded Alibates materials, whereas the recently generated map utilizes other types of Alibates (gray-blue banded, etc.). The addition of the other Alibates and petrified wood materials produced distributions similar to, but different from, the original maps (Figures 79 through 82).

The Alibates distribution is basically the same as that identified during the excavation (Figure 76 and 79). Petrified wood distribution is similar, but an additional concentration is present west of the previously identified cluster (Figures 77 and 80). The distribution of quartzite materials also reflects a pattern comparable to that observed on the original map (Figures 78 and 81). Hartville Uplift and Flattop material distributions mimic the overall lithic distributions and the heaviest concentrations overlap with concentrations of Alibates (Figures 82 through 84).

Raw material distribution at the Frazier site does not appear to suggest that specific types of stone were utilized in certain areas. Stone material from the north (Hartville) and stone from the south (Alibates) is distributed fairly equally throughout the site. In fact, the separate raw materials basically follow the overall pattern observed for the total lithic assemblage. Perhaps the only major difference noted between the use of raw material in a specific area is the quartzite specimens. Quartzite is predominantly located in the far western and southwestern portion of the main grid block, whereas Alibates, Hartville, and Flattop materials are, if at all, only present in minimal amounts in this area. This pattern may indicate that this portion of the site was delineated for the reduction of local, lower-quality tool stone.

Raw material such as Alibates and Hartville can be sourced to specific geographical locations on the landscape. Researchers have often associated people originating from an area with their respective tool stone sources (Hofman 1994; Jodry 1999:308; Stanford 1999). For instance, at the Frazier site it is assumed that a group or groups moved north from the Alibates source (northern Texas Panhandle) and brought Alibates materials. Likewise, a group or groups may have moved south from the Hartville source (east-central Wyoming) and transported Hartville materials. It is also possible that the Frazier assemblage represents the remains of a single group that moved from the Alibates source north to the Hartville source and then camped at the Frazier site. Stone could also be transported through trade or during travels by individuals for mates or other resources (Gould 1978; MacDonald 1999; Meltzer 1989). Although no specific areas of individual material types are noted in the spatial distribution at the Frazier site, the presence of exotic tool stone suggests several scenarios regarding material type procurement and group mobility.

One possible scenario is that two or more groups moved from material sources such as Alibates, Hartville, or Flattop and upon arrival at the Frazier site exchanged materials for activities involving bison butchery and maintenance of tools. Another possibility is that a single group procured and transported all the materials over the course of many weeks/months and carried the materials to the site. Additionally, the raw material remains at the Frazier site could be the result of a combination of both scenarios. One group moving south from the Hartville area, another traveling from the northeast with Flattop materials, and still another group may have worked their way north from the Alibates area. In this situation, three groups could be involved in the bison kill.

Hofman (1994:352) suggested that Paleoindian aggregations on the Plains may be evident in the archaeological record through examination of several variables, including raw material composition of an assemblage. The previous discussion of raw material distribution at the Frazier site indicates several possible scenarios concerning the demographics of the site occupants. The presence of tool stone material from great distances to the north and south of the site suggests that either a single mobile group or multiple contemporary groups occupied the site. Although the lithic assemblage data indicates that Frazier was a single event, single group occupation, the possibility of a group aggregation is still worthwhile as an alternate scenario.

According to Hofman (1994:354), separate concentrations of sourced raw material and/or refitting of lithics between activity areas located around features may indicate a group aggregation. No distinct concentrations of raw material were noted in the Frazier spatial distribution, with the exception of local quartzite materials. Refitting patterns indicate that materials were reduced or maintained around the hearth, presumably concurrently during a single event. The small number of artifacts, particularly projectile points, compared to other possible aggregation sites such as Lindenmeier, lithic refit data, and tool stone composition, suggest that Frazier could represent two small groups aggregating. A small aggregation, while technically may not be considered an aggregation at all, is still a valid scenario of organized hunting on the Plains. In fact, Hofman (1994:349) points out that Paleoindian aggregations may not have been large, concentrated aggregations similar to Late Prehistoric types described in ethnohistoric accounts. Based on the raw material sources identified at

Frazier, and the apparent single episode occupation suggested by the refits, the Frazier site represents one of many possible aggregation types within the pool of currently excavated Paleoindian sites. However, the lithic data trajectory provided in the "Lithic Assemblage and Raw Material Discussion" section of this chapter suggests that the Frazier material represents the remains of a single group.

Chapter 5

SUMMARY AND CONCLUSIONS

Inferences regarding Agate Basin behavior at the Frazier site are based on attributes of lithic specimens and their spatial distribution. The focus of the current research to this point has been on site-specific behavior, particularly lithic technology, raw material utilization, and delineating activity areas. The next logical step in this research is to apply the Frazier data on a regional scale. First, however, I will summarize the Frazier data and analysis.

Frazier Site Lithic Technology and Raw Material Utilization

Examination of the Frazier debitage sample indicates that two main types of lithic technology are represented: (1) initial or early-stage reduction of local materials such as quartzite and petrified wood; and (2) late-stage reduction and maintenance of non-local materials like Alibates dolomite and Hartville chert. These inferences are repeatedly supported in debitage variables such as platform preparation, size, cortex, and dorsal scar count.

The lithic tool sample also reflects the two general patterns observed in the debitage data. Large, expedient flake tools and cores are comprised mainly of local quartzite and petrified wood. Bifaces of these materials are large and thick, and only a few are formal tools. Formal tools believed to represent pieces typical of the Paleoindian tool-kit (end scrapers and projectile points) are almost entirely comprised of non-local Alibates dolomite and Hartville cherts. These implements are generally heavily reworked (projectile points), or in an exhausted state (bifaces and biface fragments).

The Frazier site lithic assemblage reflects qualities most similar to those expected for a logistical/short-term camp (see Figure 31). Expedient tool production and maintenance are the major types of lithic activities that occurred. Analysis of the entire assemblage using a traditional attribute approach concerned with size, platform preparation, cortex amount, and dorsal scar count indicates that Alibates dolomite had been in the tool kit for the longest period of time before discard at the site (see Figure 32). Hartville chert, Flattop chalcedony, miscellaneous chert, local quartzite, and petrified wood follow the Alibates dolomite sample in regard to length in the tool kit. MNA analysis supports this general interpretation of raw material use, although MNA percentages indicate that high-quality, non-local materials were used more often than suggested by the traditional approach. The combination of variables selected for the analysis, including the MNA results, indicate that the Frazier lithic assemblage is the result of a single group moving across the landscape that encountered and killed a group of approximately 45 bison.

The spatial distribution of cultural items indicates that animals were killed and initially dismembered in the eastern portion (Locality 1) of the site. Further processing of the animals occurred in the western portion of the site (Locality 3) around a feature presumed to represent a hearth. Analysis of the faunal collection found that the archaeofauna is most similar to a kill locale at which carcasses were rendered into butchered transport units (Borresen 2002:76). The Frazier Agate Basin groups not only butchered and processed bison, but it appears that they exploited metacarpals for fat because the bison were generally fat depleted at the early winter/late spring kill (Borresen 2002:84-87).

Agate Basin Behavior at the Frazier Site: A Regional Perspective

A recent compilation of Paleoindian data by Hill (2001a; 2001b) hypothesizes that there may be differences between the stone tool technology and basic organizational aspects of Paleoindian behavior along various dimensions. Early Paleoindians (Clovis), according to the model (Hill 2001b:C-2), utilized exotic tool stones and carried curated, multifunctional toolkits. In contrast, Late Paleoindians (Folsom to Plano) used local tool stone and an expedient tool technology with special-activity toolkits. Overall, the Frazier site appears to reflect Late Paleoindian characteristics, although the presence of Alibates dolomite indicates the use of exotic (distance >500 km) tool stone.

The exhausted state of the Alibates dolomite sample (small biface fragments, end scrapers, and debitage) indicates that tools/and or blanks of Alibates dolomite were transported for a long duration and distance. The Hartville chert sample represents a non-local source material (ca. 225 km) that also exhibits qualities (re-worked projectile points, small bifaces, scrapers, and debitage) suggesting that tools/nodules were carried for an extensive time, but not as long as the Alibates dolomite sample. It was earlier suggested that points and scrapers represent the curated Paleoindian toolkit. Points of non-local material comprised 75% (n=6) of the point sample, and 62.2% (n=23) of the scraper sample consists of non-local/exotic material. A large percentage (38.5%, n=10) of tools with gravers are of non-local/exotic stone. Together, these data indicate that the Frazier group used exotic and non-local stone as tools, and the material was transported for great distances as curated, multifunctional items (gravers/scrapers). This pattern of stone use resembles the type suggested for Early Paleoindians by Hill.

It should be noted that examination of the local stone (quartzite, Flattop chalcedony, petrified wood; =< 100 km) sample indicates that these materials represent 67.3% (n=107) of tools associated with expedient processing activities (flake tools). Local stone was also used for special activities; 46.2% (n=12) of the graver sample is comprised of local material. A small portion of the point (n=2, 25%) and scraper (n=8, 12.6%) sample is comprised of local stone. The reliance on local stone for expedient activities and the presence of specialized tools of local stone is similar to the predicted pattern for late Paleoindian groups. Stone tool technological organization at the Frazier site therefore reflects both an Early and Late Paleoindian pattern.

The Frazier site is most similar to Late Paleoindian site structure. Late Paleoindian sites exhibit a site structure with function-specific activity areas and well-defined hearths (Frison and Stanford 1982; Hill 2001b:C2; Jodry 1999). Clearly, the Frazier site lithic distribution exhibits a function-specific area around the hearth where butchery and processing of bison occurred. Scrapers, generally associated with hide processing and skinning, are located in a tightly confined area. Initial dismemberment of the animals appears to have transpired in a separate portion of the site (Locality 1). The photo of the hearth shows a very well-defined, dark black, deep basin and not a shallow, ephemeral feature. At Stewart's Cattle Guard, Agate Basin – Folsom, and Agate Basin-Hell Gap, similar patterns of initial dismemberment, processing, hide work, and lithic manufacture localities are present (Frison and Stanford 1982: Figures 2.17, 2.40, 2.43; 2.81; Jodry 1999:262-294).

Social organization reflected in the archaeological record of Paleoindian sites suggests to Hill that Early Paleoindians were generally dispersed year-round. Late

Paleoindians, on the other hand, fluctuated between aggregating and dispersing throughout the year. The current information gleaned from the Frazier analysis indicates that the Frazier inhabitants likely consisted of a single mobile group, although the possibility of an aggregation of more than one group at the site exists. Without discarding either scenario, the Frazier site resembles both a Late and Early Paleoindian organization of mobility according to Hill's (2001b:C-2) model.

Division of labor in Paleoindian assemblages is thought to be reflected in lithic debitage and tool distributions (Jodry 1999:242-243). End scrapers are believed to have been used by females for tanning hides, whereas men are thought to have focused their attention on manufacturing and maintaining tools. According to ethnohistorical accounts, men kill and dismember the animals into manageable portions. Women traditionally process the meat for cooking or drying (Amick 1999:171-173; Jodry 1999:235-248). While one must use extreme caution in thrusting a uniformitarian view of bison processing from the Historic to the Paleoindian periods, these accounts of sexual division of labor may be reflected in the Frazier lithic distribution. Scrapers and other cutting and scraping implements were recovered from Localities 2 and 3. Large, dismembering implements are derived mainly from Locality 1 near the proposed kill location. Small, resharpening debitage and tool manufacturing flakes are found throughout Locality 3, but not Locality 2. While considerable overlap of activities occurs in Locality 3, Locality 1 and Locality 2 appear to be specific activity areas that can be related to division of labor.

According to these patterns, social organization in the form of mobility and division of labor at the Frazier site is most similar to other Late Paleoindian sites on the northern Plains. For example, at the Hell Gap site (Level 2e) it was determined that separate concentrations of scrapers, tools, and tool production areas are present (Sellet 1999:136-137). The focus of scrapers in a single portion of the Frazier site can be interpreted as a female work area, while the tool production locale can be considered an activity area produced by men.

Characteristics of Agate Basin behavior at the Frazier site are similar to both Late and Early Paleoindian patterns as suggested by Hill (2001b). Hill recognizes that many of his suggested "patterns" of Paleoindian organizational schemes are conjectural and require further investigation. The Frazier data illuminate some of the proposed ideas. It was found that the Frazier site mainly resembles characteristics of Late Paleoindian sites according to site structure (well-defined hearths, function-specific activity areas, and well-defined site structure). Stone tool technology is a mixture of both Early and Late Paleoindian site organization. The most prominent occurrence is the use of exotic tool stone at Frazier, a feature typical of Early Paleoindian sites. A mixture of expedient and curated tools is recorded, associating these variables with both the Early and Late Paleoindian periods. Social organization data at the Frazier site are more speculative than are the other characteristics described above, although general patterns indicate a closer relationship to the Late Paleoindian period.

Regional Paleoindian Comparisons

The lithic and faunal assemblage from the Frazier site is compared with other Paleoindian sites to search for patterns that will enhance our understanding of Paleoindian lifeways. A list of Paleoindian bison kill-butchery sites and select lithic and faunal attributes are provided in Table 32. The table combines variables utilized by Hill (2001a), Hofman (1999), and Jodry (1999), with the addition of a few variables selected by the author.

Before discussing any patterns observed in these data, an explanation of how much of these data were gathered is required. As noted above, many of the numbers were generated using existing data sets. During the course of checking data, however, it became apparent that different numbers were being cited for the same, or what was perceived to be the same, assemblage. To begin with, Jodry (1999:244) cited a total of 86 retouched tools from the Agate Basin component at the Agate Basin site. In contrast, Hill (2001a:112) noted that only 81 tools exist in the Agate Basin collection if only specimens recovered during the University of Wyoming 1979-82 excavations are counted. This data set is believed to be a more valid representation of the Agate Basin component as it does not include surface and other non-bonebed artifacts. The data used by Hill are based on Cary Craig's thesis (1983). In Table 32 of the current volume, I have provided numbers using both Craig's (1983) data and those reported for the entire Agate Basin assemblage by Frison and Stanford (1982). Area II Folsom component numbers are also derived from the site monograph (Frison and Stanford 1982). Three

Table 32. Selected Data for Several Paleoindian Sites.

Site	MNI	Sea[1]	Deb	Tool	Ret. Tool	E.S.	E.S. %[2]	Point (total)	Points[3]	Points[4]	Area m^2	Carcass Dispersion[5]
Frazier	50	LW ESP	942	219	79	23	29.0	8	3	37.5	220	4.4
Agate Basin, AB (Craig 1983)	53	LW ESP	1374	81	67	20	29.8	46	13	28.3	123	2.3
Agate Basin, AB (Frison &Stanford 1982)	75	LW	4000	101	86	26	30.0	133	50	37.6	1447	19.3
Agate Basin, FO Area II	11	LW ESP	18755	89	44	13	29.5	12	0	0.0	186	16.9
Agate Basin, HG	16	LW ESP	1086	19	6	1	16.7	7	0	0	35	2.2
Hell Gap, Lev. 3-6	3	?	551	51	37	7	18.9	10	?	?	~145	48.3
Hell Gap, Lev. 2-2e	3	WIN	1324	80	69	9	27	9	2?	22.2	~200	66.7
Hell Gap, Lev. 1	4	WIN ESP	901	74	53	12	22.6	6	?	?	~200	50.0
Mill Iron bonebed	29	LSP ESU	2	6	2	0	0.0	12	8	66.7	>140	4.8
Mill Iron (total)	34	LSP ESU	1573	136	86	11	12.8	28	?	?	155	7.5
Mill Iron (camp)	34	LSP ESU	8	60	40	8	20.0	31	11	35.5	256	7.5
Cattle Guard	49	LSU EF	17367	1194	157	69	44.0	211	87	41.2	1434	29.2
Olsen-Chubbuck	190	LSU EF	3	7	5	3	60.0	27	19	70.4	78	0.4
Cooper, upper kill	29	LSU EF	46	5	5	0	0.0	13	5	38.5	24	0.8
Cooper, middle kill	35	LSU EF	29	49	2	0	0.0	7	6	85.7	22	.75
Cooper, lower kill	5	LSU EF	20	27	0	0	0.0	7	2	28.6	48	2.4
Cooper, combined	78	LSU EF	122	7	5	0	0.0	27	13	48.1	94	1.2
Horner I	158	LF EW	1173	132	106	41	38.7	62	39	62.9	778	15.2
Horner II	65	LF EW	63	11	9	6	66.7	21	13	61.9	130	2.0
Casper	75	LF/ EW	308	5	4	1	25.0	60	16	26.7	551	7.3
Jurgens I	~22	LF EW	1421	273	88	33	37.5	11	2	18.1	112	~5.09
Jurgens II	~4	?	488	131	52	31	56.4	20	10	50.0	52	~13.0
Frasca, I	63	EW	16	1	0	0	0.0	8	4	50.0	28	0.4
Jones-Miller	150	LF	11500 ?	80	11?	1?	9.0?	105?	32?	30.4?	~312	2.08
Jones-Miller	150	LW ESP	11500 ?	62	11?	1?	9.0?	105?	32?	30.4?	~208	1.4

Table 32 . Selected Data for Paleoindian Sites, Continued.

Site	MNI	Sea[1]	Deb	Tool	Ret. Tool	E.S.	E.S. %[2]	Point (total)	Points[3]	Points[4]	Area m^2	Carcass Dispersion[5]
Carter Kerr-McGee, I	47	W	3	7	6	0	0.0	17	5	28.3	123	2.3
Carter Kerr-McGee, II	<5?	W	1267	7	3	1	33.3	8	1	12.5	70	14.0
Carter Kerr-McGee III	<5?	W	1288	8	7	1	14.3	1	0	0.0	50	10.0
Claypool	?	?	~4000	170	93	49	52.7	172	39	22.7	~400	?
Rattlesnake Pass	2	?	6	2	2	0	0.0	1	0	0	60	0.03
Adobe	0	?	3	5	3	0	0.0	1	0	0	0	0

1 = Season of occupation, based on maxillary dentition of bison. LW= late winter, LF = late fall, LSP= late spring, LSU= late summer, EW= early winter, W = winter, EF= early fall, ESU= early summer, ESP= early spring.
2 = End scraper attrition rate, based on percentage of retouched tools (Jodry 1999:244).
3 = Complete points.
4 = Percentage of complete points compared to total number of points
5 = One bison per *n* m^2.
Note: after Hill 2001a:Table 3.16; Hofman 1999:Table 1; and Jodry 1999:Table 33
References for Sites: Agate Basin (Craig 1983; Hill 2001a; Frison and Stanford 1982); Hell Gap (Sellet 1999; Rapson and Niven 2002, in prep.); Mill Iron (Bradley and Frison 1996:Tables 4.1 and 4.2; Francis and Larson 1996:Tables 6.2 and 6.3;); Cattle Guard (Jodry 1999); Olsen-Chubbuck (Wheat 1972); Cooper (Bement 1999); Horner I and II (Bradley and Frison 1987; Frison 1987; Todd 1987b); Casper (Frison 1974); Jurgens (Hill and Hill 2002; Wheat 1979); Frasca (Fulgham and Stanford 1982); Jones-Miller (Stanford 1999); Carter Kerr-McGee (Frison 1984); Claypool (Bradley and Stanford 1987; Dick and Mountain 1960; Jason Labelle, personal communication 2/8/02); Rattlesnake (Smith and McNees 1990); Adobe (Hofman and Ingbar 1988).

separate numbers are cited for the Mill Iron site according to data compiled by Hill (2001a:112), Francis and Larson (1996:92-92), and Bradley and Frison (1996:52-53). Hill used artifacts and MNI counts from the Mill Iron bonebed only, whereas the counts from Frison reflect a selected group of artifacts from the entire site. Refits between the camp, the bonebed, and the ground surface, and the similarity of the artifacts, indicated to Bradley and Frison (1996:43) that the assemblage is related. Francis and Larson (1996:87) provide the full count of all artifacts recovered from the 1985-88 excavations except for 1986 waterscreen materials. MNI remains the same for the Frison and Francis and Larson data, while it is slightly less for the Hill data.

Lithic counts for the Jurgens site were obtained from Wheat's (1979) memoir in the tables provided for individual areas. MNI was extrapolated by taking the number of astragili reported for each area, dividing by two and adding any "articulated" leg bone numbers. Admittedly, these numbers may be over- or under-estimated, but without knowing the element sides they are provided as an approximation. Olsen-Chubbuck data also correspond to numbers cited by Wheat (1972).

The Stewart's Cattle Guard numbers are derived from Jodry (1999). Horner I and II counts are based on Bradley and Frison (1987), Frison (1987), and Todd (1987b). Casper data are found in Frison (1974). Counts for the Frasca site are based on numbers provided by Fulgham and Stanford (1981). Data for the Jones-Miller site are split into two components as defined by Stanford (1999) for the spring and fall kills. The Claypool data were synthesized from Dick and Mountain (1960) and Bradley and Stanford (1987) by Jason Labelle (personal communication, 2/8/02).

Data for the Hell Gap site are based on those provided by Sellet (1999:206-207, 215). Through refitting and a detailed examination of site stratigraphy, Sellet (1999:112-118) determined that separate components are present at the Hell Gap site. The Hell Gap, main level, is a conglomeration of Levels 3, 4, 5, and 6. Level 2 in the main grid block represents the Agate Basin level, and Level 2e in the east block is the Folsom occupation. The Folsom-Goshen component is associated with Level 1 in both the main and east grid block. Sellet's (1999) lithic data, by level, are utilized for the information in Table 32. MNI and seasonality for the Hell Gap site, and their corresponding components are provided by Rapson and Niven (2002). Sellet's (1999) Levels 2 and 2e are combined in Rapson and Niven's faunal analysis because conjoined specimens link the two areas. I have therefore joined Sellet's (1999) lithic counts for Levels 2 and 2e in the Table 32 data.

Cooper site information is based on data provided by Bement (1999). Four separate data sets for the Cooper site in Table 32 reflect the Upper kill, Middle kill, Lower kill, and combined numbers of all three levels. Frison's (1984) article on the Carter-Kerr/McGee site is utilized for the lithic and faunal data presented in Table 32. Sterile deposits between four main components were identified during excavation at the site. Only three of these components, the Cody-Alberta, the Agate-Basin/Hell Gap, and the Folsom, are used for Table 32. Data for the Rattlesnake Pass site are located in Smith and McNees (1999), and information for the Adobe site is based on Hofman and Ingbar's (1988) article.

The numbers for retouched tools are determined by adding the number of scrapers, knives, gravers, and retouched flakes. Tool counts were determined by totaling all tools with the exception of ground or battered stone tools such as manos, hammerstones, and cores. End scraper percentage is based on the number of end scrapers compared to retouched tools (Jodry 1999:243-244). Season of occupation was determined from studies of mandibular dentition of bison (Frison 1991:267-288). For site reports or articles that did not include seasonality, the information was gathered from other sources (Frazier, [Todd et al. n.d.]; Olsen-Chubbuck [Frison 1991:281]; Jurgens [Hill and Hill 2002]). Counts of Alibates within an assemblage were determined from tables presented in the corresponding site reports or articles.

It has been suggested by Hofman (1999:124-128) that the percentage of complete points compared with the number of animal carcasses per unit area relates to the recovery of points that can be re-used. The percentage of complete points at the Frazier site (37.5%) is relatively high, although the carcass dispersion number of 4.4 indicates that bison were not as dense as some of the other bonebeds presented in Table 32 [see Agate Basin-Agate Basin, Olsen-Chubbuck, Cooper (combined), Horner II, Mill Iron (bonebed), Jones-Miller, Frasca (I), and Carter/Kerr-McGee (I)]. It is suggested though, that the Frazier carcass dispersion number would dramatically decrease if only the butchery/kill area was used to calculate the ratio. It is not possible, however, to accurately determine what exactly this area would encompass as the kill area is believed to be located on the terrace slope. Nevertheless, the percentage of complete points, the large number of flake tools, and the somewhat dense nature of the bone indicates that the site is indeed an actual kill location and that the inhabitants had relatively unrestricted access, both vertically and horizontally, to the carcasses. The low number of points found at the site is believed to be a function of the unrestricted access to carcasses. Additionally, during the process of intensive butchery (Borresen 2002:76) many of the potentially re-useable points could have been recovered.

Jodry (1999:243) has suggested that end scraper attrition will be greater during the late summer-fall months as Paleoindian groups increase buckskin production for the winter. End scrapers would be used repeatedly and resharpened during buckskin production, thereby increasing the number of these implements that were discarded at a site. End scraper percentage should be higher for fall to early winter sites, whereas the percentage will be low for spring and summer sites. An initial test of this hypothesis was conducted by Jodry (1999:244) in comparing the Folsom-age sites of Cattle Guard, Agate Basin (Folsom level), and Mill Iron. These data are supplemented with information from other Paleoindian sites, including the Frazier sample, and are provided in Table 32. It is readily apparent that the end scraper percentage for winter-spring Paleoindian assemblages reflects a similar pattern of low attrition (30.0% or lower) as reported by Jodry (1999:244) for Folsom winter-spring occupations. Sites with fall to early winter occupations, on the other hand, have high end scraper attrition rates (35% or higher).

The Casper site data do not conform to the pattern observed for the other late fall-early winter sites, probably because only the kill location was excavated. The lack of end scrapers reported at Casper, Frasca, Olsen-Chubbuck, and Cooper would appear to reveal the function of these sites as kill areas and the fact that only the bonebeds were excavated. Three sites, Jurgens II, Claypool, and Hell Gap (Lev. 3-6), did not yield seasonality data. Based on the end scraper attrition data, it appears that these sites fall comfortably within a late fall to early winter occupation. Complete data for the Jones-Miller collection are not available at this time and therefore no analogy can be made concerning this site. The data in Table 32 reinforce Jodry's hypothesis of increased end scraper attrition rates for Paleoindian groups in the fall to early winter, and also support the season of mortality for the Frazier bison suggested by Todd et al. (n.d.). Table 33 provides a collapsed version of Table 32 with added variables, sorted by inferred site type. The debitage/tool ratio at a site has been suggested to be low for kill/butchery occupations and high for tool production and maintenance sites (Hofman et al. 1990:237). It might also be that debitage/tool ratios will be high for sites where heavy amounts of processing or butchery occurred, as tools would continually need resharpening, a process

Table 33. Collapsed Data for Select Paleoindian Sites*.

Site	Site Type	Birth Pulse	Cultural Affiliation	Deb/Tool	MNI/ Tool	Al**	Al%**
Frazier	Kill-butchery	.6 - .9	Agate Basin	4.3	0.2	153	13.2
Agate Basin, Total	Kill- butchery	.6 - .9	Agate Basin	**39.6**	0.7	0	0.0
Agate Basin, AB	Kill-butchery	.7 - .8	Agate Basin	**16.96**	0.7	0	0.0
Agate Basin, FO Area II	Kill- butchery	.9	Folsom	**210.73**	0.1	0	0.0
Agate Basin, HG	Kill-butchery	.6 - .9	Hell Gap	**57.16**	0.4	0	0.0
Hell Gap, Lev. 6	Kill- butchery	?	Hell Gap	**10.8**	0.1	0	0.0
Hell Gap, Lev. 2-2e	Kill-butchery	?	Folsom-Agate Basin	**15.38**	0.4	0	0.0
Hell Gap, Lev. 1	Kill-butchery	?	Folsom-Goshen	**12.18**	0.5	0	0.0
Mill Iron bonebed	Kill	.1	Goshen	0.33	**4.8**	0	0.0
Mill Iron (total)	Kill-butchery	.1	Goshen	**11.57**	0.3	0	0.0
Mill Iron (camp)	Kill- butchery	.1	Goshen	0.18	0.1	0	0.0
Cattle Guard	Kill-butchery	.3 - .4	Folsom	**14.55**	0.0	116	0.6
Olsen-Chubbuck	Kill	.3 - .5	Cody-Alberta	0.43	**27.1**	6	16.2
Cooper, upper kill	Kill	.3	Folsom	9.2	**5.8**	54	84.4
Cooper, middle kill	Kill	.3	Folsom	**24.5**	**14.5**	10	17.9
Cooper, lower kill	Kill	.3	Folsom	0.0	0.0	3	8.8
Cooper, combined	Kill	.3	Folsom	**17.4**	**11.1**	67	42.9
Horner I	Kill- butchery	?	Cody-Alberta	8.89	1.2	1	0.
Horner II	Kill	?	Cody-Alberta	5.73	**5.9**	1	0.
Casper	Kill	?	Hell Gap	**61.6**	**15.0**	0	0.0
Jurgens I	Kill- butchery	.4 - .6	Cody	5.21	0.1	0	0.0
Jurgens II	Kill- butchery	?	Cody	3.73	0.0	2	0.3
Jurgens III	Kill- butchery	.4 - .6	Cody	2.39	0.7	2	1.1
Frasca, I	Kill	?	Cody	**16.0**	**63.0**	0	0.0
Jones-Miller	Kill- butchery	?	Hell Gap	1.9	1.9	?	
Jones-Miller	Kill- butchery	?	Hell Gap	2.4	2.4	?	
Carter Kerr-McGee, I	Kill- butchery	?	Cody-Alberta	6.7	**6.7**	0	0.0
Carter Kerr-McGee, II	Kill- butchery	?	Hell Gap-Agate Basin	0.71	0.71	0	0.0
Carter Kerr-McGee III	Kill- butchery	?	Folsom	0.62	0.62	0	0.0
Claypool	Kill- butchery	?	Cody	**23.53**	0.0	0	0.0
Rattlesnake Pass	Kill- butchery	?	Folsom	3.0	1.0	0	0.0
Adobe	Hunting overlook	?	Folsom	0.6	0.0	0	0.0
Lindenmeier	Camp	?	Folsom	?	?	**1**	**0.3**

* References for site information are the same as Table 32 with the addition of information regarding the Coffin Lindenmeier collection (Ambler 1999:90-91).

** Alibates dolomite count and percent in relation to entire assemblage.

that would produce high numbers of debitage. Most of this debitage, however, would be small and was probably not recovered during excavation at many of the tabulated sites. Nonetheless, examination of the debitage/tool ratios in Table 33 indicate high ratios (over 10, highlighted in Table 33) for the Agate Basin site (all components), Casper, Cattle Guard, Claypool, Frasca, Hell Gap (all components), and Cooper (all kills). These sites represent a mixture of both kill and kill/processing sites. Two known kill sites, the Mill Iron bonebed and Olsen-Chubbuck, have low debitage/tool ratios along with the Frazier, Horner I and II, Jurgens, Carter/Kerr-McGee (Hell Gap-Agate Basin and Folsom components), Rattlesnake, and Adobe sites.

While it is tempting to correlate the observed ratios with site function (kill, kill/butchery, tool production and maintenance), it becomes apparent that many factors are influencing these relationships. Debitage was often ignored and not collected at many of these sites, and screening of excavated deposits did not always occur (see Chapter 2). More controlled excavations and water screening at sites like Stewart's Cattle Guard (Jodry 1999) consistently reveal much larger quantities of debitage than at other sites. With these observations in mind, it is evident that any patterns noted in Table 33 for debitage/tool ratios should be regarded with caution.

Another factor that may be influencing the observed debitage/tool ratios is site location and duration of occupation. If a site is located in a strategic place on the landscape, it is likely to have been occupied on a repeated basis. Reoccupation of Agate Basin and Hell Gap has been suggested by the presence of diagnostic projectile points spanning the Paleoindian period (Frison and Stanford 1982; Sellet 1999). Groups re-occupying a site would undoubtedly have utilized exposed lithic material that was discarded by previous groups. Recycling of lithic material could alter debitage/tool ratios by increasing debitage counts if tools were resharpened, or decreasing tool numbers if tools were transported from the site. Distance of a site to raw material sources, both of low and high quality, could also influence the debitage/tool ratios (see Amick 1999; Bamforth 1986; Pokotylo and Hanks 1989).

Perhaps a more revealing trend is noted in the MNI/tool ratio provided in Table 33. A high ratio (4.0 or above – bold print in Table 33) indicates a larger number of animals and a small number of tools, while a low ratio indicates a prevalence of tools and a small number of animals. Kill sites, such as Casper, Cooper (except the lower kill), Frasca, Olsen-Chubbuck, Horner II, and the Mill Iron bonebed, all have MNI/tool ratios over four. The remaining sites are described as kill/butchery or camp/processing sites. A single site, Carter/Kerr-McGee I has a ratio above 4.0 and is both a kill and butchery location. These Table 33 data distribution suggest that a valid distinction between kill sites and butchery/processing sites exists when comparing MNI/tool ratios.

The previously mentioned problems with the debitage/tool ratios also apply to the MNI/tool ratios, although some of the concerns are greatly decreased by using only tools for this particular ratio. Tools are found more often than debitage during excavation, especially at sites at which deposits were not screened. Even a quick examination of the Frazier assemblage illustrates how the lithic material is skewed toward larger, expedient flake tools and formal tools. Just as appendicular portions of faunal specimens attracted more attention during many excavations, so to did the collection of tools. Tools may therefore be a more reliable variable for examining trends in extant Paleoindian assemblages. It should be noted, however, that bone tools were not included in the current analysis. Bone tools may have been utilized instead of lithic tools, especially if a group was attempting to conserve tool stone for future forays. Bone tool counts could change the observed patterns of both the debitage/tool and MNI/tool ratios.

Recycling of lithic material and distance to raw material sources could be influencing the MNI/tool ratios in the same manner as the debitage/tool ratios. MNI counts are also suspect for many sites, as bone elements can be subjected to a myriad of agents such as carnivore activity, fluvial and colluvial movement, and weathering (Todd 1987a, 1987b; Todd and Rapson 1999). MNI could therefore be artificially high or low, depending on how long a carcass is exposed to any of these taphonomic processes.

One additional variable, Alibates count and percentage, is of interest. Alibates is a readily identifiable type of stone (see "Lithic Raw Material", Chapter 3). The quarry source for Alibates is located in the northern Texas Panhandle, and therefore patterns of Alibates transport can be extrapolated based on how far away this material is found from the quarry. Figure 85 depicts the location of Alibates outcrops and several Paleoindian sites with Alibates lithic material in their assemblages. Although the percentage of Alibates in the Horner assemblage is low (0.1%), the presence of this stone indicates that Alibates was transported great distances (~1000 km). The Cooper site assemblage has a high percentage of Alibates (42.9%). This is not surprising as the Alibates quarry is roughly 150 km away. Alibates was recovered at the Zapata, Linger, Cattle Guard, Olsen-Chubbuck, Allen, Frazier, and Jurgens sites in Colorado. Cattle Guard is located

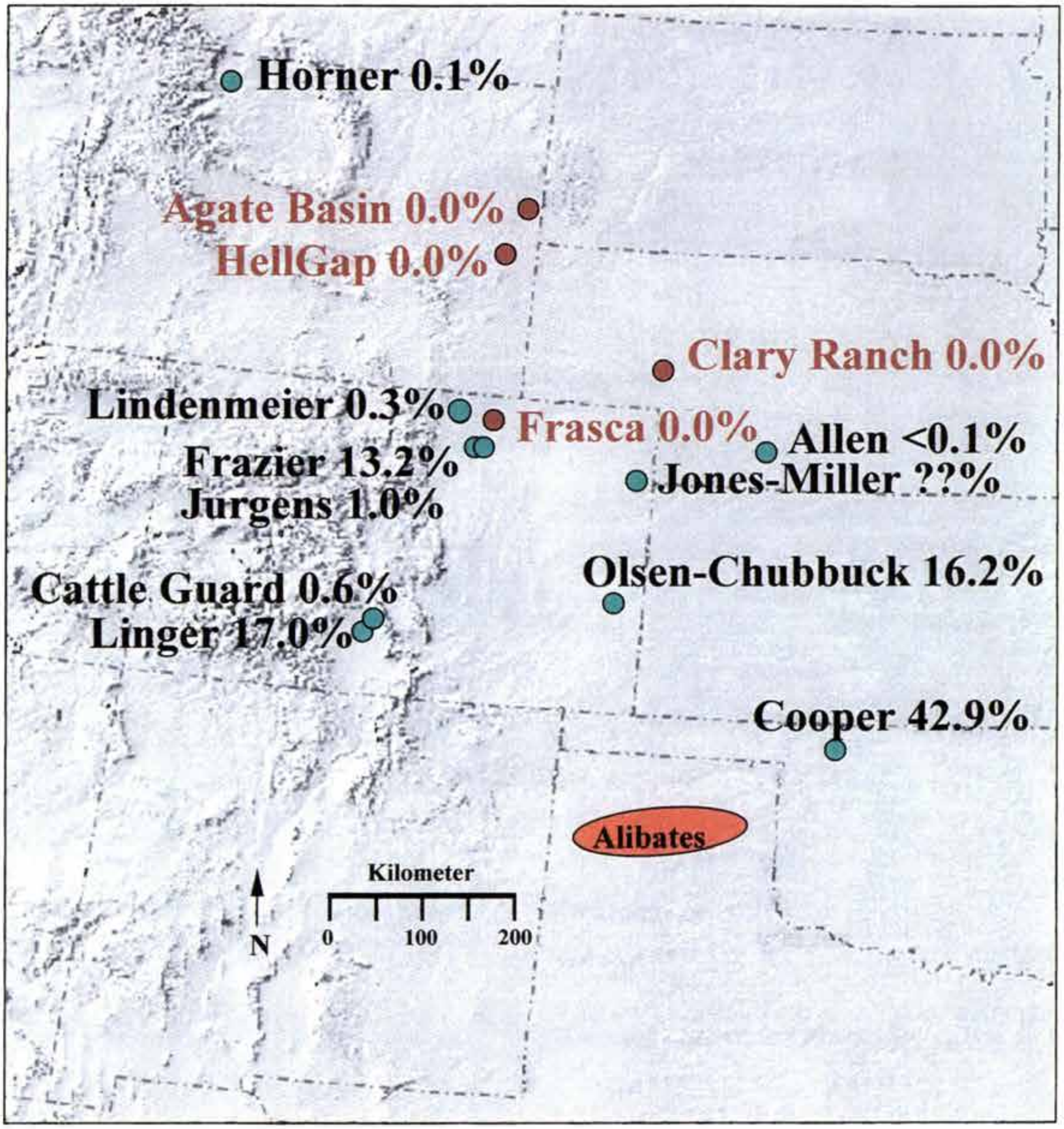


Figure 85. Map showing the location of the Alibates dolomite quarry area and the percentage of Alibates in various Paleoindian site assemblages (map adapted from http://www.nationalgeographic.com/mapmachine).

approximately 400 km from the quarry source, and Olsen-Chubbuck is roughly 275 km away. Alibates comprises 16.2% of the Olsen-Chubbuck assemblage, but is represented by only six pieces. Although not included in the Table 33 data, a single projectile point of Alibates dolomite is identified in the Allen site assemblage and two point fragments and a tool are noted at Red Smoke (Bamforth 2002:81; Knudson 2002:102-111). The Zapata and Linger lithic assemblage is small, but Alibates dolomite comprises 46.0% and 26.0% of the samples, respectively (Jodry 1999:128). Cattle Guard, on the other hand, has 116 pieces of Alibates but these specimens comprise only 0.6% of the entire lithic sample. A few pieces (0.3%) of Alibates have been identified in the Lindenmeirer collection, but a detailed raw material analysis of the sample has not yet been possible (Ambler 1999:90; Gantt 2002).

The Frazier site Alibates sample includes 153 pieces (13.2%). The Frazier site is roughly 525 km from the Alibates source. Jodry (1999:124-130) discusses the use of exotic tool stone, particularly Edwards and Alibates, on the Plains and Rocky Mountain region. She suggests the San Luis Valley, where Zapata, Linger, and Cattle Guard are located, is the northwestern limit for assemblages that contain at least 20% Alibates (Jodry 1999:128). The Frazier site, while falling below the 20% cut-off, still represents a fairly large sample of Alibates at a great distance from the source. The only other sites that contain Alibates at a northern latitude that is the same or higher than the Frazier site exhibit much lower quantities (1.0% or less). The northern extent for large quantities of Alibates should therefore probably be extended to include the South Platte River.

Although general trends are observable in seasonality/end scraper attrition rates and MNI/tool ratios, it should be noted that these data are presented with a certain amount of reluctance. Field techniques, site location, occupation length, distance to raw material, recycling of tool stone, and utilization of bone tools were all discussed as possible variables that can alter intra- and inter-regional patterns of the archaeological record. More data from extant Paleoindian collections have become available within the last 5 years than ever before. New information regarding previously undescribed or poorly documented sites, such as the Hell Gap and Frazier sites, is important for a large-scale approach to understanding Paleoindian behavior. The numbers generated from each individual site may not be true indicators of just how many implements or waste flakes were produced, or how many carcasses were butchered during any single occupation. General patterns within these data, however, may give us a better idea of how Paleoindian groups interacted with their environment with regard to subsistence and technology. It is hoped that these data, and some of the generated patterns, will stimulate more questions concerning the interpretation of the archaeological record at Paleoindian sites.

Lithic Assemblage Comparison: The Frazier, Hell Gap, and Agate Basin Sites

Comparison of the lithic assemblages from the Frazier site, the Agate Basin, Agate Basin (AB) component, and the Hell Gap, Agate Basin (HG) component collections are warranted as these three collections represent the major Agate Basin occupations on the Northwestern Plains. Data for AB and the HG are derived from Craig (1983:Appendix G), Hill (2001:Tables 3.14 and 3.15), and Sellet (1999:Tables 10, 16, and 17).

Table 34 provides lithic data sets for the three sites according to local and non-local material. Geological maps of Wyoming and Colorado were used to differentiate between local and non-local stone sources, particularly regarding the Mississippian/Pennsylvanian (MP) sources near Hell Gap and Agate Basin (Cook 2000; Tweto 1979). The MP sources are considered to be local (<100km) to both the Hell Gap and Agate Basin sites according to the geological map. The Frazier assemblage consists

Table 34. Artifact Types and Counts According to Raw Material Source for Agate Basin Components

Site	Artifact Type	Raw Material Source				Total
		Local =<100 km		Non-local >100km		
		n	%[1]	n	%[1]	n
Frazier	Debitage	685	72.7	257	27.3	942
	Tools	130	73.6	66	33.7	196
	Biface	6	54.5	5	45.5	11
	Point	2	25.0	6	75.0	8
	TOTAL**	**823**	**71.1**	**334**	**28.9**	**1157**
Agate Basin*	Debitage	1341	97.6	33	2.4	1374
	Tool	71	87.7	10	10.2	81
	Biface	12	92.3	1	7.7	13
	Point	25	53.2	22	46.8	47
	TOTAL	**1449**	**95.6**	**66**	**4.4**	**1515**
Hell Gap*	**All Material*****		**Local*****		**Non-local*****	
	Debitage	825				
	Tool	213				
	Biface	5				
	Point	4	n	%[1]	n	%[1]
	TOTAL	**1047**	**1039**	**99.9**	**8**	**0.8%**

* Agate Basin data from Craig 1983:Appendix G as provided in Hill 2001:Tables 3.14 and 3.15 for only the Agate Basin component. Hell Gap data from Sellet 1999:Tables 10, 16, and 17 for only the Agate Basin component.

** The Frazier graver sample is not included in the totals as graver tips are located on various type of tools (i.e., scrapers, bifaces, flake tools, etc.).

*** Hell Gap data is provided according to the entire assemblage (all raw material), and general local and non-local categories because artifact data presented in Sellet 1999:Tables 10, 16, and 17 are not split out according to raw material.

[1] row percentage

of a higher percentage (28.9%) of non-local (>100km) tool stone than either the AB (4.4%) or the HG (0.8%) collections. Stone from local (<100km) sources (<100km) sources comprise 71.1% of the Frazier assemblage, and nearly all (95.6% and 99.2%) of the AB and HG samples. Several factors are likely contributing to these patterns and an examination of individual artifact types and material sources may provide insight.

Nearly half (n=21 or 45.7%) of the AB projectile points are of an exotic stone (knife river flint) that outcrops nearly 500 km northeast of the site in southwestern North

Dakota, the remaining points are from local sources (Craig 1983:Appendix G; Root and Emerson 1994). None of the Frazier or Hell Gap points are of exotic stone, but 75.0% of the Frazier points are of non-local Hartville Uplift chert. Because exotic stone is found in the Frazier assemblage, it is suggested that the lack of exotic projectile points simply indicates that the toolkit is in a different stage of use-life than the AB sample – points of exotic stone had either been used, lost, or discarded prior to the Frazier kill or they were transported from the kill in anticipation of future use. The fact that exotic tool stone is present at both the AB and the Frazier site indicates, at the very least, that Agate Basin groups were directly procuring or secondarily acquiring (trade) tool stone from great distances.

Maintenance tools (flake tools) and debitage comprise roughly 73.0% of the Frazier local stone assemblage and 93.2% of the AB collection. Bifaces of local stone represent 54.5% of the Frazier sample and 92.3% of the AB assemblage. Debitage from HG and AB indicate that biface manufacture was the dominant activity (Frison and Stanford 1982b:122; Sellet 1999:211-212, 237, 253-254). Although some biface manufacture occurred at Frazier, it was not as prevalent at HG and AB, and it appears to be associated with early stage biface reduction. It is no surprise, then, that bifaces of local stone dominate the AB sample but only comprise half of the Frazier collection. Local stone debitage at the Frazier site is the result of expedient tool manufacture of these materials, the remaining 27.0% of the debitage is generally comprised of small nonlocal and exotic stone; presumably the result of maintenance/resharpening activities.

These Table 34 data are examined using a model suggested by Amick (1999b:182) for Folsom assemblage variation and tool stone use. Table 35 provides a collapsed version of data found in Table 34 that highlights assemblage composition variables used for Amick's (1999b) model. The AB assemblage is similar to scenarios suggested for a location with abundant local stone and both frequent and minimal weaponry production because local (53.2%) and nonlocal stone (46.8%) is used for weaponry but local stone (87.7%) is used for maintenance tools (Amick 1999b:182, Figure 2). A similar percentage (52.8/47.2) of local and non-local weaponry was noted for the Lindenmeier site in northern Colorado, but maintenance tools consist of more non-local (59.1%) material than the observed percentage (12.3%) at AB (Amick 1999b:177). Data provided for the Hanson site (Amick 1999b:176) is also similar to the AB data as non-local stone comprises a significant amount of the AB weaponry. This similarity indicates that, in addition to bison butchery and lithic maintenance (flake tool production, resharpening, etc.), weapon production was only one of many activities to occur at AB. This interpretation is consistent with the interpretation of the AB site (Agate Basin component only) as a bison kill-butchery locality at which the production of bifacial lithic tools for anticipated future needs was a major activity (Hill 2001a; Frison and Bradley 1982:122).

Table 35. Tool Stone Composition for Select Paleoindian Sites.

Site	Tool Stone Type	Weaponry		Other	
		n	%	n	%
Frazier	Local	2	25.0	130	66.3
	Non-local	6	75.0	66	33.7
Agate Basin	Local	25	53.2	71	87.7
	Non-local	22	46.8	10	12.3
Lindenmeier	Local	230	52.8	740	40.9
	Non-local	206	47.2	1070	59.1
Hanson	Local	9	20.9	434	78.9
	Non-local	34	79.1	116	21.1

Tools of local stone comprise 73.6% of the Frazier assemblage, and 75.0% of the projectile points are of non-local stone. This pattern of stone use is similar to that observed for sites located in areas with abundant tool stone, but where weaponry manufacture was minimal (Amick 1999b:182). One of these sites is the Hanson site located in northern Wyoming. Data provided in Table 35 indicates a distribution of local/non-local stone use similar to that observed for the Frazier assemblage. According to Amick's (1999b:182) model, this scenario indicates that the functional orientation of the site is residential and that weaponry production was not the focus of activities. This interpretation is generally consistent with the suggestion that the Frazier site represents a bison kill-butchery locality but one at which the production of weapons or other tools for future needs was not a focus.

Core/biface ratios have been suggested to reflect either high or low mobility for prehistoric groups (Bamforth 2000; Parry and Kelly 1987). Table 36 provides core/biface ratios for the Frazier, AB, and HG sites. According to the model, a low core/biface ratio like that observed for the Frazier site (0.36) suggests high mobility while a higher core/biface ratio for HG (0.80) indicates a more sedentary occupation (Bamforth 2000). The AB ratio is 1.67 according to the data provided by Bamforth (2000:277); a high ratio indicating low mobility. These data are in line with the suggestion that both AB and HG represent camp sites at which biface manufacture was a dominant activity, and these locales were used recurrently. In contrast, the Frazier site represents a single-event, bison kill-butchery locale that was only used for a short amount of time. Biface manufacture was not a dominant activity and at the time of occupation the Frazier group was more mobile than those at AB and HG.

Table 36. Core/Biface Ratios for Select Agate Basin Components

Site	Core	Biface	Ratio
Frazier	4	11	0.36
Agate Basin*	25	15	1.67
Hell Gap**	4	5	0.80

* From Bamforth 2000:Table 2 for the entire Agate Basin site, Agate Basin component.
** From Sellet 1999:Table 14 for the Hell Gap, Agate Basin level (Lev. 2e).

Although it is tempting to strictly relate core/biface ratios to mobility, Bamforth (2000:286-287) indicates that other factors influence these relationships. In the case of these sites, the core/biface ratios appear to reflect the length of occupation/reuse of the locations, and the type of lithic technology practiced, more than group mobility.

The Frazier Site: What Next?

The research described here has served to greatly enhance our knowledge of the Frazier site excavations, the lithic assemblage, and the spatial distribution of lithic debitage and tools. A kill area, corresponding to Wormington's (1984) Locality 3 east, is postulated based on the presence of projectile points, tool and debitage distrubution, soil stratigraphy, and bone distribution. Locality 3 west appears to be the camp and processing area. A few scattered units east of Locality 3, and on the other side of an arroyo in Locality 2 produced bone, debitage, and stone tools, indicating that other areas of butchery may remain intact. A few surficial artifacts were recovered from Localities 4 and 5. Reestablishing the grid system would be possible as black tarp was placed within excavated units before the site was backfilled. During recent visits to the site, exposed tarp edges have been noted. Investigations in Locality 2 and within the remaining portion of Locality 3 would be beneficial for recreating more site activity patterns. Testing of the other Localities (4 and 5) might also expose additional subsurface accumulations of debris.

The vertical distribution of the extant lithic and faunal collection from the Frazier site is nearly impossible to reconstruct. A single projectile point re-fit serves as the only evidence for identifying the site as a single Agate Basin component. The effects of postoccupational processes on the distribution of cultural remains are difficult to assess given the existing records. Setting a permanent site datum for vertical control would help to determine the extent of taphonomic disturbance and may serve to establish if the site is a single component or event.

To fully understand Paleoindian behavior at the Frazier site, it is important to determine what the environment was like during its occupation. The archaeological record is a small, constantly changing picture of how Paleoindian groups adapted to the environment. Unfortunately, excavation techniques at the site do not permit a detailed examination of the paleoenvironment. Soil analysis indicates that the area was wet, and the site is located on the edge of a South Platte River terrace. Perhaps more information concerning the paleoenvironment may be gleaned from further investigations at the site. Analysis of fossil gastropods, plant pollen, phytoliths, and macrobotanical remains would serve to develop an accurate paleoeological reconstruction.

Radiocarbon dates from the site place the occupation between 9650 ± 130 and 9550 ± 130 B.P. (Hayes and Haas 1974). The dates are derived from soil samples at the base of a soil horizon above a paleosol. Examination of the field records and maps indicates that the occupation is associated with the paleosol. Radiocarbon dating of faunal remains from the site may prove to return more reliable dates for the Frazier site assemblage.

Due to the excavation techniques, it is highly likely that cultural material is located in the backdirt used to fill the grid blocks. Re-investigation of the Frazier site could yield valuable information concerning lithic technology through the use of screens and water screening techniques. Microdebitage, if present, would be recovered and could potentially alter the currently hypothesized scenario of lithic technology for the Frazier site inhabitants.

Lewis Binford (1991) suggested that "There is Always More We Need to Know". The intent of his statement was to urge archaeologists to examine variability within the archaeological record on a global scale, using ecology and technology as "baselines" for developing associated theories. Before we can begin to tackle the variability between Paleoindian sites and compare the observations with other hunter-gatherer groups throughout the world, we must first attempt to describe accurately and analyze the archaeological record of excavated and yet-to-be excavated sites. One hopes that data and analyses presented in this document will add to our understanding of one of the many excavated Paleoindian sites for which scant records are available. Once data "gaps," such as paleoenvironmental information, lithic technology, faunal utilization, and activity patterning, are filled in for all the known Paleoindian sites, we will be at least one step closer to understanding the variability among Paleoindian groups.

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APPENDIX A

HISTORY OF EXCAVATIONS

Received from Frank Frazier, as a loan 15, artifacts found on the surface of the Frazier site, Weld County, Colorado

2 complete 1 essentia ly complete and two fragmentary Agate Basin points

2 side scrapers

3 end scrapers

1 blade

2 cores

2 core fragments

Assorted debitage

H. M. Wormington
H. M. Wormington
Curator of Archaeology

See attached sheets for outline drawings

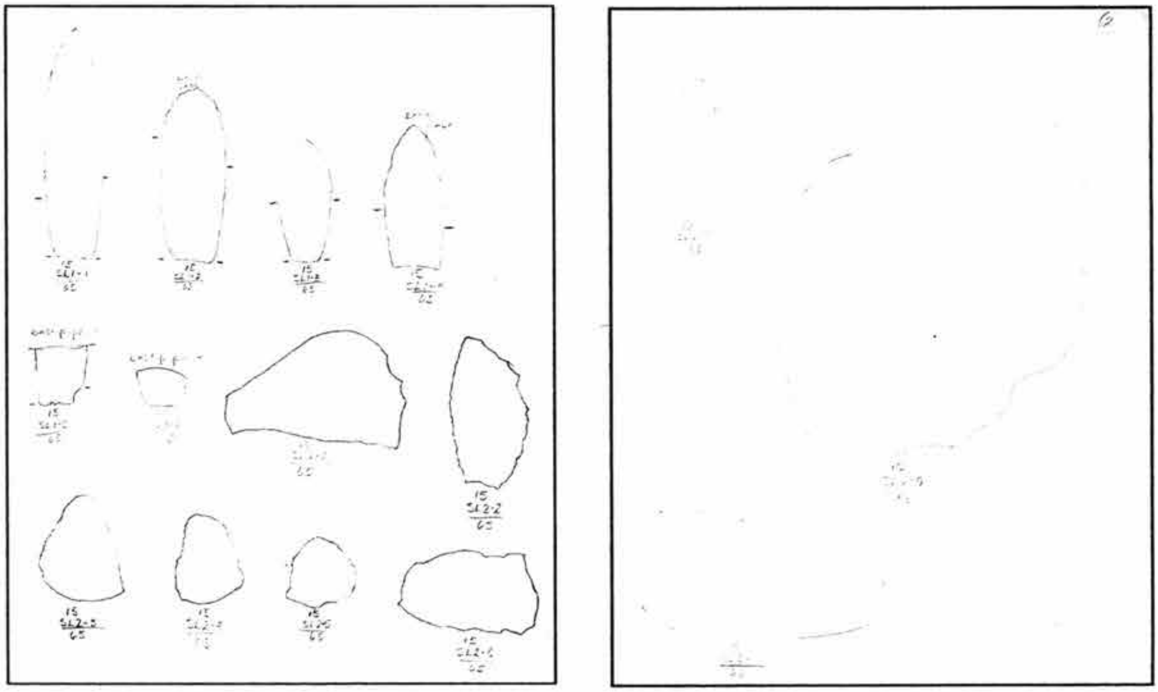

Figure A1. Letter from H. M. Wormington and the Denver Museum acknowledging acquisition of artifacts from Frank Frazier (above). Outline sketches of artifacts from Frank (below left and right).

Figure A2. Excavation in progress, 1966 (photo courtesy of Frank Frazier).

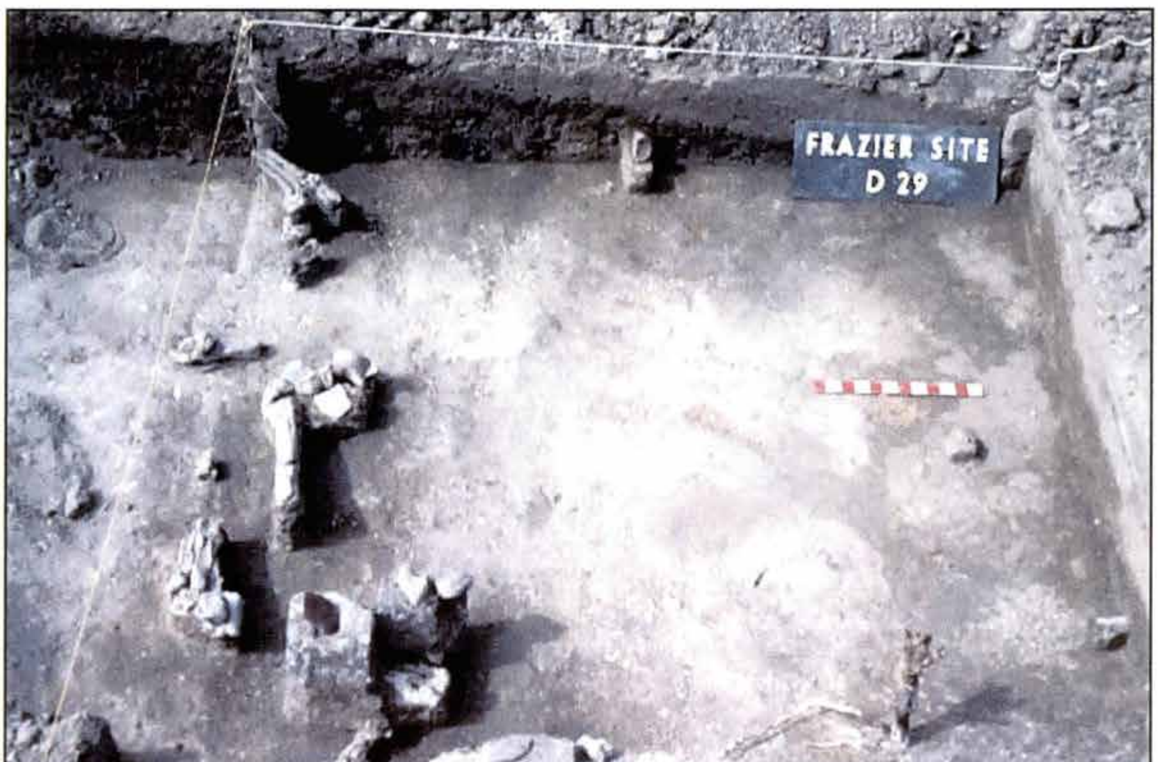

Figure A3. Excavation in progress looking north, Unit D29 (photo courtesy of Frank Frazier).

Figure A4. Excavation in progress showing "in situ" quartzite projectile point (A1922.81) and associated bone, Unit K21 (photo courtesy of Frank Frazier)

Figure A5. Excavation in progress showing projectile point (A1922.??) and associated bone, Units G27-28 (photo courtesy of Frank Frazier).

Figure A6. Excavation in progress, Unit F37 (photo courtesy of Frank Frazier).

Figure A7. Site overview, Localities 1 and 3 excavation in progress, 1967. Wooden post marks datum (photo courtesy of Frank Frazier).

Figure A8. Overview of Locality 2 test pits, looking west (photo courtesy of Frank Frazier).

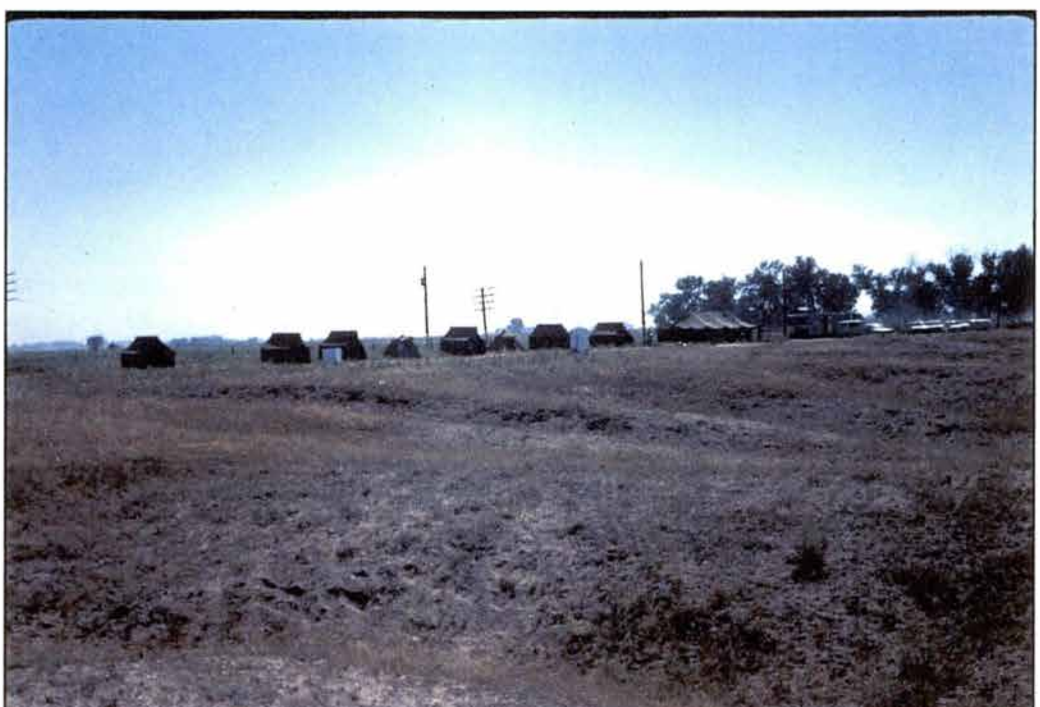

Figure A9. Site overview looking south-southwest from the edge of the Kersey Terrace (photo courtesy of Frank Frazier).

Figure A10. Crew camp overview looking west. Large "laboratory" tent in far background near VW bus (photo courtesy of Frank Frazier).

Figure A11. H. Marie Wormington at the Frazier site with Dog #1 (photo courtesy of Frank Frazier).

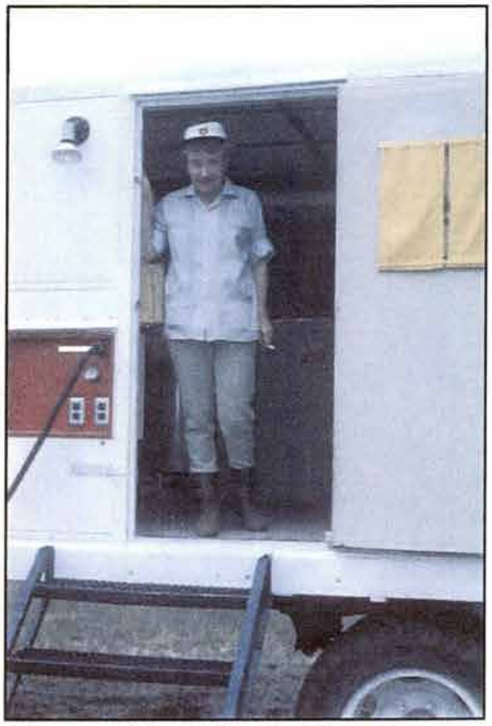

Figure A12. H. Marie Wormington in the Air National Guard Trailer (photo courtesy of Frank Frazier).

Figure A13. Air National Guardsmen and Frazier crew setting up tents, 1966 (photo courtesy of Frank Frazier).

Figure A14. Air National Guard equipment arriving at the Frazier Site, 1966 (photo courtesy of Frank Frazier).

Figure A15. David Abrams excavating (photo courtesy of Frank Frazier).

Figure A16. David Acton encasing a mandible in a plaster cast (photo courtesy of Frank Frazier).

Figure A17. Barbara Luedtke (?) filling out unit forms (photo courtesy of Frank Frazier).

Figure A18. Susan Grant excavating Unit D36 (photo courtesy of Frank Frazier).

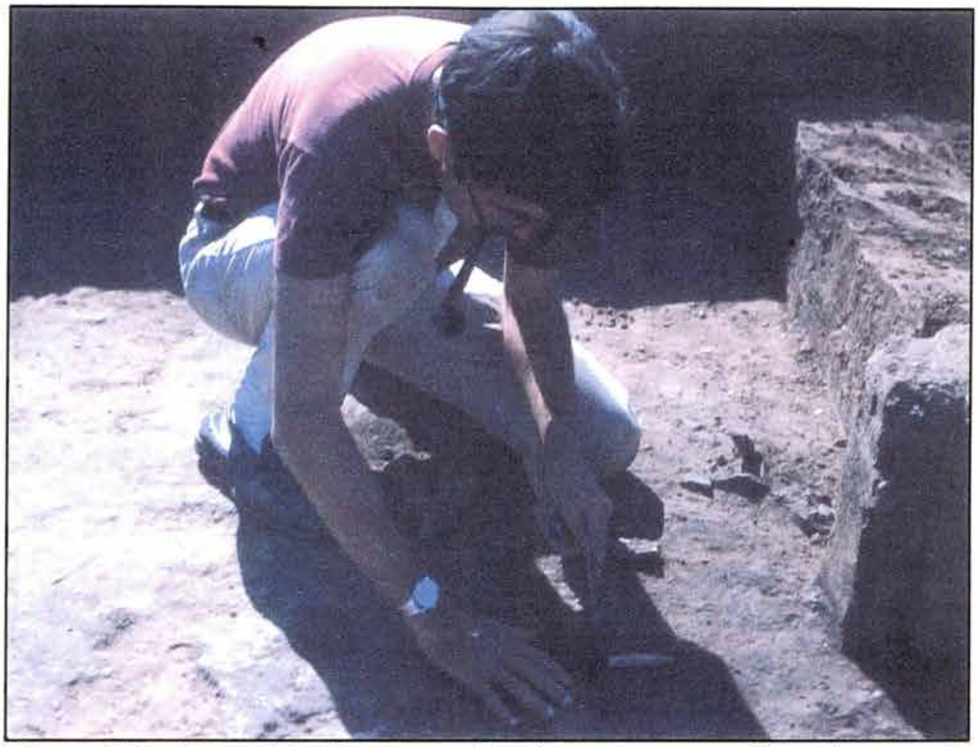

Figure A19. Robert Bradley excavating (photo courtesy of Frank Frazier).

Figure A20. Susan Grant (photo courtesy of Frank Frazier).

Figure A21. Steven Ayotte (photo courtesy of Frank Frazier).

Figure A22. Bill Biggs at the transit (photo courtesy of Frank Frazier).

Figure A23. Bill Biggs (photo courtesy of Frank Frazier).

Figure A24. David Acton (photo courtesy of Frank Frazier).

Figure A25. Faroy Simnacher (photo courtesy of Frank Frazier).


Figure A26. Site overview, Localities 1 and 3, backfilling in progress (photo courtesy of Frank Frazier).

APPENDIX B

LITHIC DATA

Table B1. Macroscopic Description of Raw Material

Chert/Chalcedony

1. Light white and gray banded with a few small, bright white and black inclusions.
2. Dark orange-light brown with small black/brown inclusions.
3. Dark brown/green with white and black inclusions.
4. Light to dark orange with white bands and black inclusions.
5. Light brown with light purple-red banding.
6. Dark purple and white, mottled with a few small black inclusions (Chalcedony).

7.1 Purple-red with dark purple bands and small purple speckles.
7.2 Purple-red and white banded.
7.3 Dark purple-red and white banded with darker purple "veins".

8. Light gray/white/blue mottled.
9. Light tan/gray/brown with light brown-orange banding.
10. Red and black with white inclusions and banding.
12. Dark red-orange and white mottled with a few white inclusions.
13. Dark green-brown with yellow-brown banding.
14. Dark brown-red with light yellow-white specks.
15. Light orange with a few scattered white inclusions.

16.1 Light to dark orange with small red-brown and white inclusions.
16.2 Light to dark orange and gray with small dark blue mottles and white mottles.

17. Light orange and tan-white.
18. Dark to light brown yellow with white and black inclusions.
19. Tan to grayish pink with dark gray mottles.
20. Light gray to yellowish gray with blue and black specks.
21. White-pinkish gray and brown mottled with a few small black inclusions.
22. Dark brown-orange with a few white streaks.
23. Dark green-brown with small black-blue speckles.
24. Gray and white-gray mottled with small black-blue speckles.
25. Solid light to dark purple with white inclusions.
26. Brown-red with mottled white bands and specks.
27. Bright orange with blue "dendritic" mottles.
28. Light orange-pink with gray mottled spots and small blue speckles.
29. Light brown-white with small red-brown specks. "cinnamon chert"
30. Gray-blue with sparse gold-brown specks.
31. Light tan-white with white veins and inclusions. (Chalcedony)
32. Light brown with white veins and inclusions. (Chalcedony)
33. Dark blue and white-gray with mottled blue speckles.
34. Pink-brown with white banding and sparse blue specks.
35. Dark red-gray with a few white inclusions.
36. White with red and blue inclusions.
37. Yellow-gray-tan with small blue specks
38. Orange-yellow with blue specks
39. Light pink-white.
40. Light gray and purple banded with small amounts of dark purple.

41. Light gray-white.
42. Dark brown-green-gray with white veins (Chalcedony)
43. Peach-orange-gray with small blue-black inclusions.
44. Gray-light gray with small white-cream mottles.
45. Green-brown with small white and blue flecks.
46. Dark to light gray banded with a sparse small blue specks.
47. Dark red-purple.
48. Light to dark gray with a few small blue specks.
49. Cream/light tan to dark gray with white inclusions.
50. Dark orange-yellow-gray.
51. White-tan with small red-brown inclusions.
52. Yellow-white (Chalcedony)
53. Gray, cream-orange mottled
54. White with brown veins
55. Yellow-gray with dark gray inclusions.
56. Dark gray-black and light gray banded.
57. Light brown-gray banded with white inclusions.
58. Bright orange and pink mottled with small blue speckles.
59. Dark brown with small black inclusions.
60. White with small brown-yellow specks.
61. Light pink to dark purple with small gray specks.
62. Dark gray-blue.
63. White-gray.
64. Dark gray with white veins.
65. Orange-brown and dark red banded.
66. Dark gray and light blue.
67. Light gray.
68. Light orange, light brown, and dark brown mottled.
69. Dark to light brown with white veins.
70. Light gray and light orange mottled with small black-blue specks.
71. Dark gray with light gray veins.
72. Light gray pink with white inclusions. (Chalcedony)
73. Dark green-brown and black banded. (Petrified Wood?)
74. Light gray with white and blue mottled specks.
75. Dark brown-red.
76. Orange to light brown with blue and white mottled specks.
77. Gray-white. (Chalcedony)
78. Dark red-purple and light pink banded.
79. Yellow, green, maroon, orange with blue speckles.
80. Dark brown and gray with light gray and blue inclusions.
81. Gray and blue banded.
82. Bright orange and white with sparse blue specks.
83. Cream and orange-brown banded.
84. Whitish-gray mottled. (Chalcedony)
85. Tan and orange mottled.
86. Dark green-brown granitic.

87. Light red with white inclusions.
88. Light gray-cream with light purple banding.
89. Dark brown to light brown with blue dendritic veins.
90. Dark red-brown with white veins.
91. Light green-brown with white mottles and blue specks.
92. Orange with blue specks.
93. Yellowish-orange with white inclusions and blue dentrites.
94. Very dark purplish-brown and white banded "amber". (Chalcedony)
95. Dark greenish-brown and light gray with white inclusions.
96. Light brown, "caramel", dark brown, red, and light gray mottled.
97. Yellowish-brown. (Chalcedony)
98. Brown, dark green and light yellow banded.

Quartzite (Coarse-grained unless otherwise noted)

1. Light gray.
2. Gray and yellow-orange mottled.
3. Light yellow and orange.
5. Dark gray with sparse light yellow mottles.
6. Dark pink and purple. (Heated)
7. Dark red.
8. Light gray-white.
9. Amber to light brown. (orthoquartzite)
10. Gray-pink.
11. White to light gray. (orthoquartzite)
12. Light green-brown.
13. Light gray-blue.
14. Pink-gray.
15. Dark green-brown.
16. Bright orange-brown.
17. Dark purple and light gray-pink. (Heated)
18. Light brown and tan. (orthoquartzite)
19. Brown and dark orange with light gray bands.
20. Dark red with black mottles.
21. Light gray to dark gray.
22. Light gray-blue to white (silver).
23. Light red-pink. (orthoquartzite)
24. Light brown-orange.
25. Dark green-gray.
26. Tan.
27. Very dark gray.
28. Greenish-gray and light yellow-brown mottled.
29. Light gray to gray.
30. White to gray. (orthoquartzite)
31. Light gray to pink.
32. Light yellow-gray.

33. Dark greenish-gray. (orthoquartzite)
34. Gray-red with mottled spots of light pink.
35. Amber mottled with light gray spots.
36. Gray with orange-brown bands.
37. Light to dark gray with blue spots.
38. Light gray to gray with mottled white spots. (orthoquartzite)
39. Light brown and gray.
40. Dark red to purple with orange spots.
41. Light to dark red and pink.
42.
43. Gray-blue to light gray.
44. Dark gray to light gray and green mottled.
45. Tan to light yellow-gray banded.
46. Gray and red mottled.
47. Dark gray and greenish-yellow.
48. Light gray-blue and yellow mottled.
49. Light red to dark red, orange and gray mottled.
50. Dark red-brown.
51. Red and pink banded.
52. White quartz.
53. Light gray to pink sandstone.
54. Gray and purple mottled.
55. Dark gray-green with blue-gray mottles.
56. Light gray-red.
57. Dark orange and dark gray mottled.
58. Light yellow-gray with gray mottles.
59. Purple, red and pink mottled.
60. Dark gray-blue and light gray mottled.
61. Light pink-gray and gray banded.
62. Brown and gray with white spots.
63. Light yellow-brown with gray bands.
64. Light gray and orange-brown. (orthoquartzite)

Petrified Wood

201. Yellow and dark gray-green banded.
202. Yellow with purple and orange bands.

Table B2. Debitage Codes and Data

F	Number Assigned by Museum for Collection Control
N	Northing (Based on grid block designations set-up by Slessman)
E	Easting (based on grid block designations set-up by Slessman)
LO	Locality (based on original locality designations by Wormington)
UT	Unit letter (based on original designations by Wormington)
UN	Unit number (based on original designations by Wormington)
FL	Flake number designated in field
MI	Minimum Depth
MX	Maximum Depth
CT	Catalog/Accession Number
MT	Material Type
MT2	Material Type (collapsed into one of seven categories)
EL	Element
	SH = Debris/Shatter
	CO = Complete Flake
	PR = Proximal
	MI= Mid-portion
	LT = Lateral
	DS = Distal
ML	Maximum Length
MW	Maximum Width
MT	Maximum Thickness
CL	Complete Length
CW	Complete Width
WT	Weight
BT	Bulb Thickness
PW	Platform Width
PT	Platform Thickness
FT	Flake Type
	DS = Discoidal
	BT = Biface Thinning
	NO = Normal
	RT = Retouch
	ST = Standardized
PT1	Platform Type (Frison and Bradley 1980:27-30)
	UP = Unprepared plain
	UD = Unprepared dihedral
	UY = Unprepared polyhedral
	PF = Prepared faceted
	PR = Prepared reduced
	PG = Prepared ground
	PFR = Prepared faceted and reduced

Debitage Codes and Data (continued)

PT1 (continued)		PFG = Prepared faceted and ground
		PRG = Prepared reduced and ground
		PFRG = Prepared reduced, ground, and faceted
PT2	Platform Type (Andrefsky 1989:94-96)	
		CR = Cortical
		FL = Flat
		CP = Complex
		AB = Abraded
FR	Flake Termination	
		FD = Feathered
		SD = Stepped
		HD = Hinged
		PG = Overshot/plunging
COR	Cortex	
		0 = no cortex
		1 = >0%, less than or equal to 50%
		2 = >50%, less than 100%
		3 = completely cortical
SC	Number of Dorsal Flake Scars	
		0 = no scars (cortical surface)
		1 = single flake scar
		2 = two flake scars
		3 = three or more flake scars
SCD	Dorsal Scar Direction	
		1 = Uni-directional
		2 = Multi-directional
HT	Heat altered	
		0 = Absence
		1 = Presence
CA	Calcium Carbonate	
		1 = Ventral
		2 = Dorsal
		3 = Ventral and Dorsal
PA	Patinated	
		0 = Absence
		1 = Presence
WD	Worn Dorsal Surface	
		0 = Absence
		1 = Presence
COMMENTS	General Comments – Refit information, excavator notes, etc.	

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
77	110	350	1	X	2			2.9	641	119.0	5	DS	26.8	18.6	3.5			1.7				NO			HD	0	2	1	0	0	0	0	
90	230	185		TP	1	54			811	102.0	5	CO	58.1	45.4	9.8	46.1	55.7	25.3	10.0	26.2	10.0	NO	UP	FL	PG	1	3	1	0	0	0	0	
90	230	185		TP	1	53			812	102.0	5	MI	37.2	35.0	6.1			7.8				NO			HD	0	3	1	0	0	0	0	PLATFORM HIN
90	230	185		TP	1	41			813	102.0	5	CO	58.5	41.5	9.2	40.0	58.4	22.0	6.7	18.3	6.4	NO	UP	CR	PG	1	2	1	0	0	0	0	
90	230	185		TP	1	61			814	102.0	5	PR	32.5	30.0	8.5			7.7	5.1	12.8	4.1	NO	UY	CP	HD	0	3	1	0	0	0	0	
90	230	185		TP	1				815	102.0	5	CO	50.5	45.3	12.0	43.5	48.5	27.9	7.0	18.6	6.0	NO	UP	FL	PG	2	2	1	0	2	0	0	
90	230	185		TP	1	48			816	102.0	5	MI	43.9	38.4	8.5			9.8				NO			SD	2	1	1	0	0	0	0	
90	230	185		TP	1				817	102.0	5	DS	33.1	32.4	8.0			8.4				NO			HD	0	2	1	0	0	0	0	
90	230	185		TP	1	55			818	102.0	5	DS	44.7	23.9	9.0			7.3				NO			HD	0	3	2	0	0	0	0	PLATFORM HIN
90	230	185		TP	1	52			819	102.0	5	MI	32.7	29.3	7.7			7.6				NO			HD	0	3	1	0	0	0	0	PLATFORM HIN
90	230	185		TP	1	66			820	102.0	5	PR	39.9	39.2	6.8			7.5	3.9	10.6	3.6	NO	UD	CP	HD	0	3	1	0	0	0	0	
90	230	185		TP	1	47			821	102.0	5	DS	35.5	26.1	3.9			4.1				NO			HD	0	3	1	0	0	0	0	RADIAL BREAK
90	230	185		TP	1	62			822	102.0	5	MI	25.6	24.8	9.3			5.0				NO			HD	1	2	1	0	0	0	0	
90	230	185		TP	1	60			824	102.0	5	SH	37.6	13.3	10.8			4.5								2			0	0	0	0	
90	230	185		TP	1	46			825	102.0	5	CO	31.9	22.2	4.1	29.4	24.9	2.3	3.3	8.6	3.3	BT	PG	AB	PG	0	3	2	0	0	0	0	
90	230	185		TP	1	86			826	102.0	5	DS	26.5	18.0	3.2			1.4				NO			FD				0	1	0	0	PLATFORM HIN
90	230	185		TP	1	89			827	102.0	5	PR	18.7	17.7	3.4			1.1	2.4	10.9	2.3	NO	PG	AB	HD	0	3	1	0	0	0	0	
90	230	185		TP	1	63			828	102.0	5	MI	25.8	19.6	3.8			2.4				NO			HD	0	3	1	0	0	0	0	PLATFORM HIN
90	230	185		TP	1				829	102.0	5	PR	27.4	26.9	3.5			3.3	2.3	8.3	2.3	NO	UY	CP	HD	0	2	1	0	1	0	0	
90	230	185		TP	1				830	102.0	5	PR	29.2	18.5	6.1			2.8	7.1	10.1	6.4	NO	UP	FL	HD	0	1	1	0	0	0	0	
90	230	185		TP	1	58			831	102.0	5	LT	23.6	16.4	4.1			1.2							SD				0	0	0	0	RADIAL BREAK
90	230	185		TP	1	87			832	102.0	5	MI	28.9	23.5	5.6			5.2				NO			HD	0	2	1	0	0	0	0	PLATFORM HIN
90	230	185		TP	1	44			833	102.0	5	PR	20.9	15.6	2.7			1.0	1.1	4.9	1.0	BT	PR	CP	SD	0	3	1	0	0	0	0	
90	230	185		TP	1	59			834	102.0	5	MI	16.4	12.8	6.7			1.8							SD	0	3	1	0	0	0	0	
90	230	185		TP	1	56			835	102.0	5	LT	15.8	15.3	2.2			0.6							SD				0	0	0	0	
90	230	185		TP	1	50			836	102.0	5	CO	29.4	13.2	6.6	29.4	13.2	2.3	7.4	12.1	7.4	NO	UP	FL	HD	0	2	1	0	0	0	0	
90	230	185		TP	1				837	102.0	5	MI	36.7	16.3	5.5			3.4							SD				0	1	0	0	
90	230	185		TP	1	82			838	102.0	5	PR	41.2	26.5	5.0	26.5	41.2	6.1	3.6	11.2	3.5	NO	UY	CP	HD	0	2	1	0	0	0	0	
90	230	185		TP	1				839	102.0	5	MI	33.0	22.9	3.5			2.0				NO			HD	0	2	1	0	0	0	0	
90	230	185		TP	1				840	102.0	5	PR	27.7	18.0	5.2			2.2	3.3	13.6	3.0	NO	UY	CP	HD	0	2	1	0	1	0	0	
90	230	185		TP	1				841	102.0	5	MI	30.1	19.4	4.7			1.9							HD				0	3	0	0	
90	230	185		TP	1				842	102.0	5	PR	17.1	14.4	1.8			0.6	1.5	2.5	1.1	BT	PR	CP	SD	0	2	1	0	0	0	0	
90	230	185		TP	1	72			843	102.0	5	LT	11.1	7.9	1.6			0.1							SD				0	2	0	0	
90	230	185		TP	1				844	102.0	5	SH	24.7	17.9	5.4			1.9								2			0	0	0	0	
90	230	185		TP	1				845	102.0	5	CO	24.6	15.4	4.4	15.1	24.5	1.3	2.9	10.6	2.5	NO	UP	FL	PG	0	2	1	0	1	0	0	
90	230	185		TP	1	67			846	102.0	5	SH	18.9	18.2	5.4			1.2								2			0	0	0	0	
90	230	185		TP	1	51			847	102.0	5	SH	12.3	10.1	4.3			0.3								0			0	0	0	0	
90	230	185		TP	1	83			848	102.0	5	DS	29.9	14.1	2.4			0.9							FD	0	2	1	0	0	0	0	
90	230	185		TP	1				849	102.0	5	DS	14.6	12.1	3.0			0.3							PG				0	1	0	0	
90	230	185		TP	1				850	102.0	5	MI	13.7	11.1	1.9			0.3							SD	0			0	0	0	0	
90	230	185		TP	1				851	102.0	5	PR	10.6	13.9	2.6			0.4	2.4	7.7	2.4	BT	PG	AB	HD	0	2	1	0	0	0	0	
90	230	185		TP	1	69			852	102.0	5	MI	9.9	11.9	2.1			0.2							SD	0	2	1	0	0	0	0	PLATFORM HIN
90	230	185		TP	1	84			853	102.0	5	DS	20.3	16.2	1.7			0.4							FD	0			0	0	0	0	
90	230	185		TP	1	65			854	102.0	5	DS	25.5	16.4	3.6			1.1							FD	0	3	1	0	0	0	0	PLATFORM HIN
90	230	185		TP	1	64			855	132.0	5	DS	63.6	39.8	13.8			26.1				NO			PG	2	1	1	0	0	0	0	PLATFORM HIN
90	230	185		TP	1				856	132.0	5	DS	35.1	26.7	3.6			2.8				DS			PG	0	3	1	0	0	0	0	PLATFORM HIN
90	230	185		TP	1	41			857	123.0	5	MI	16.3	12.0	4.1			0.8				NO			HD	0	3	1	0	0	0	0	
90	230	185		TP	1	85			858	127.0	5	DS	35.9	25.9	9.3			5.2				NO			PG	0	3	1	0	0	0	0	
90	230	185		TP	1	77			859	127.0	5	MI	29.5	14.4	2.5			1.2				NO			SD	0	2	1	0	0	0	0	
90	230	185		TP	1				860	127.0	5	DS	28.3	18.0	5.6			2.8				NO			SD	0	2	1	0	0	0	0	PLATFORM HIN
90	230	185		TP	1				861	124.0	5	SH	40.2	16.7	14.9			9.2								1			0	0	0	0	
90	230	185		TP	1				862	68.0	6	DS	8.8	7.4	1.1			0.1				RT			FD	0	2	1	0	0	0	0	PLATFORM HIN
90	230	185		TP	1	68			863	38.0	2	DS	11.6	8.4	1.1			0.1				RT			FD	0	2	1	0	0	0	0	PLATFORM HIN

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
54	165	260	1	M	20				397	118.0	5	PR	12.9	10.5	2.4			0.4							SD				0	0	0	0	SPLIT PLATFO
58	175	230	1	K	26				401	102.0	5	SH	24.2	21.7	7.8			3.2							HD	2	2	1	0	0	0	0	
44	175	185	3	K	35				336	1.0	6	PR	25.0	21.6	1.8			1.1	3.3	10.6	3.1	BT	PR	CP	HD	0	3	1	0	0	0	0	
44	175	185	3	K	35				338	6.0	6	CO	11.3	7.1	2.1	11.3	7.1	0.2	1.4	3.2	1.3	RT	PG	AB	FD	0	2	1	0	0	0	0	CHECK REFITS
44	175	185	3	K	35				340	81.0	6	DS	18.1	12.6	3.1			0.6				ST			FD	0	3	2	0	0	0	0	MINI PIECE E
75	175	180	3	K	36				595	40.0	3	PR	22.0	18.2	1.7			0.7	1.2	6.6	1.2	BT	PG	AB	HD	0	3	1	0	0	0	0	REFITS?
75	175	180	3	K	36				596	40.0	3	LT	16.4	14.4	1.8			0.3							SD				0	0	0	0	REFITS?
75	175	180	3	K	36				597	40.0	3	DS	17.6	11.3	1.3			0.1				BT			FD	0	3	1	0	2	0	0	REFITS?
75	175	180	3	K	36				598	40.0	3	DS	9.6	9.1	1.6			0.1							SD				0	0	0	0	REFITS?
75	175	180	3	K	36				599	40.0	3	PR	6.9	6.3	0.9	6.9	6.3	0.1	1.3	2.1	1.1	RT	UY	FL	SD	0	2	1	0	2	0	0	REFITS?
75	175	180	3	K	36				600	40.0	3	DS	13.7	6.2	1.2			0.1				RT			FD	0	2	1	0	2	0	0	REFITS?
75	175	180	3	K	36				601	40.0	3	DS	6.5	6.5	1.0			0.1				RT			FD	0	3	1	0	0	0	0	REFITS?
75	175	180	3	K	36				602	40.0	3	MI	8.7	4.6	1.1			0.1				RT			SD	0	3	1	0	0	0	0	REFITS?
75	175	180	3	K	36				603	40.0	3	DS	6.5	5.8	0.7			0.1				RT			FD	0	3	1	0	0	0	0	REFITS?
75	175	180	3	K	36				604	3.0	2	CO	12.8	11.2	3.4	11.2	12.8	0.4	1.4	3.6	1.4	RT	PR	CP	PG	0	3	2	0	0	0	0	REFITS?
75	175	180	3	K	36				605	76.0	2	DS	12.7	12.5	1.7			0.2							PG	0	3	1	0	0	0	0	PLATFORM HIN
75	175	180	3	K	36				606	3.0	2	PR	12.4	9.5	0.9			0.1	0.6	3.7	0.5	BT	PR	CP	HD	0	3	1	0	0	0	0	REFITS?
75	175	180	3	K	36				607	3.0	2	CO	12.9	8.2	1.5	12.9	8.2	0.2	1.1	2.7	1.0	RT	PR	CP	PG	0	3	1	0	0	0	0	REFITS?
75	175	180	3	K	36				608	3.0	2	CO	13.4	8.2	1.7	13.4	8.2	0.1	1.4	3.4	1.3	RT	PR	CP	PG	0	3	1	0	1	0	0	
75	175	180	3	K	36				609	3.0	2	CO	10.3	7.7	1.2	10.3	7.7	0.1	1.5	2.1	1.0	RT	PR	CP	PG	0			0	1	0	0	
75	175	180	3	K	36				610	76.0	2	CO	10.4	6.6	1.0	10.4	6.6	0.1	1.0	3.4	0.9	RT	PR	CP	PG	0	3	1	0	1	0	0	
75	175	180	3	K	36				611	3.0	2	CO	9.4	5.1	0.8	9.4	5.1	0.1	0.8	1.9	0.7	RT	UY	CP	FD	0	2	1	0	0	0	0	
75	175	180	3	K	36				612	61.0	6	DS	20.1	14.1	3.8			0.7							FD	0	2	1	1	2	1	0	
75	175	180	3	K	36				613	7.3	3	MI	17.1	16.5	1.6			0.4				BT			SD	0	3	1	0	1	1	0	
75	175	180	3	K	36				614	7.3	3	DS	12.8	11.7	0.9			0.1				RT			FD	0	3	2	0	0	0	0	PLATFORM HIN
75	175	180	3	K	36				615	7.3	3	PR	5.7	5.0	0.9			0.1				RT			SD				0	3	0	0	CACO3 PLATFO
75	175	180	3	K	36				616	7.3	3	SH	20.2	12.2	5.2			1.0							SD	0			1	0	0	0	HEAT SPALL
75	175	180	3	K	36				617	41.0	6	MI	34.6	23.8	2.9			2.3				NO			SD	0	2	1	0	2	0	0	PLATFORM HIN
75	175	180	3	K	36				618	41.0	6	CO	13.7	15.4	5.4	15.4	13.7	0.8	1.9	8.7	1.4	NO	UP	FL	SD	1	1	1	0	2	0	0	
75	175	180	3	K	36				619	41.0	6	CO	19.4	15.1	4.1	15.1	19.4	0.8	1.6	7.3	1.3	NO	UD	CP	SD	0	2	1	0	0	0	0	
75	175	180	3	K	36				620	81.0	6	DS	21.7	15.3	3.1			0.7							FD	0	3	1	0	2	1	0	
75	175	180	3	K	36				622	56.0	3	DS	21.0	12.4	6.0			0.7				NO			PG	1	1	1	0	1	0	0	PLATFORM HIN
75	175	180	3	K	36				623	105.0	5	DS	14.4	9.1	1.0			0.1							HD				0	0	0	0	
75	175	180	3	K	36				624	113.0	5	DS	9.0	6.2	0.9			0.1				RT			PG	0	2	1	0	0	0	0	PLATFORM HIN
79	180	190	3	J	34				645	40.0	3	DS	25.0	15.2	2.5			0.5							SD				0	1	0	0	SCRAPER REFI
40	180	185	3	J	35				302	7.3	3	DS	28.5	30.2	2.6			2.4				BT			FD	0	3	2	0	0	1	0	GENERAL BONE
40	180	185	3	J	35				303	7.3	3	DS	20.0	10.1	1.4			0.2				BT			FD	0	2	2	0	0	0	0	GENERAL BONE
40	180	185	3	J	35				304	7.3	3	DS	22.1	14.4	2.1			0.6				BT			FD	0	3	1	0	0	0	0	GENERAL BONE
40	180	185	3	J	35				305	7.3	3	PR	15.4	13.5	1.8			0.3	1.9	4.4	1.7	BT	UY	CP	SD	0	2	1	0	0	0	0	GENERAL BONE
40	180	185	3	J	35				306	7.3	3	PR	18.0	15.5	2.2			0.5	2.9	5.1	2.0	BT	PR	CP	SD	0	3	1	0	0	0	0	GENERAL BONE
40	180	185	3	J	35				307	7.3	3	CO	24.3	18.9	1.8	24.3	18.9	0.6	1.9	3.7	1.5	BT	PG	AB	FD	0	3	2	0	1	0	0	GENERAL BONE
40	180	185	3	J	35				308	7.3	3	DS	12.1	8.6	1.2			0.1							FD				0	1	0	0	GENERAL BONE
40	180	185	3	J	35				309	7.3	3	PR	10.4	5.8	1.4			0.1	1.1	2.8	1.3	RT	PR	CP	SD	0	3	2	0	0	0	0	GENERAL BONE
40	180	185	3	J	35				310	39.0	6	DS	28.6	15.1	1.8			0.8							FD	0	3	1	0	0	0	0	GENERAL BONE
40	180	185	3	J	35				311	40.0	3	CO	20.4	15.1	1.9	20.4	15.1	0.4	1.4	2.6	1.3	BT	PG	AB	FD	0	3	1	0	1	0	0	GENERAL BONE
40	180	185	3	J	35				312	40.0	3	MI	32.8	16.0	1.9			1.1				BT			HD	0	3	1	0	0	1	0	GENERAL BONE
40	180	185	3	J	35				313	40.0	3	PR	16.4	12.3	1.9			0.3				BT			SD	0	3	1	0	0	0	0	SPLIT PLATFO
40	180	185	3	J	35				314	40.0	3	CO	11.2	8.4	1.3	11.2	8.4	0.1	1.1	2.5	0.9	RT	PR	CP	FD	0	3	1	0	0	0	0	GENERAL BONE
40	180	185	3	J	35				315	40.0	3	DS	8.1	7.0	1.6			0.1				RT			FD	0	2	1	0	0	0	0	PLATFORM HIN
40	180	185	3	J	35				316	40.0	3	DS	9.6	5.4	1.3			0.1				RT			FD	0	3	1	0	1	0	0	PLATFORM HIN
40	180	185	3	J	35				317	40.0	3	CO	9.9	9.2	1.3	9.2	9.9	0.1	0.9	2.3	0.9	RT	PR	CP	FD	0			0	1	0	0	GENERAL BONE
40	180	185	3	J	35				318	1.0	6	PR	22.8	19.5	2.4			0.8	2.2	4.7	1.6	BT	PRG	CP	SD	0	3	2	0	0		0	GENERAL BONE
40	180	185	3	J	35				319	1.0	6	CO	19.7	14.5	3.5	14.5	19.7	0.5	3.4	9.4	3.0	DS	UP	FL	SD	0	3	1	0	1	0	0	GENERAL BONE

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
40	180	185	3	J	35				320	1.0	6	CO	12.1	13.6	1.9	12.1	13.6	0.2	1.7	8.4	1.6	BT	PG	AB	FD	0	2	1	0	0	0	0	GENERAL BONE
40	180	185	3	J	35				321	1.0	6	DS	17.4	10.6	1.5			0.1				BT			FD	0	3	1	0	0	0	0	2 PIECES REF
40	180	185	3	J	35				322	6.0	6	CO	10.6	6.6	1.4	10.6	6.6	0.1	1.0	3.0	1.0	RT	PG	AB	FD	0	2	1	0	0	0	0	GENERAL BONE
40	180	185	3	J	35				323	27.0	2	CO	9.7	9.2	0.8	9.7	9.2	0.1	1.1	2.9	0.9	RT	PR	CP	FD	0	3	2	0	0	0	0	GENERAL BONE
40	180	185	3	J	35				324	12.0	3	CO	14.0	8.9	2.0	14.0	8.9	0.1	1.5	3.5	1.3	BT	PR	CP	FD	0	3	1	0	1	0	0	GENERAL BONE
40	180	185	3	J	35				325	41.0	6	PR	12.8	8.4	1.7			0.1	1.8	4.4	1.3	NO	UY	CP	HD	0	2	1	0	0	0	0	GENERAL BONE
40	180	185	3	J	35				326	41.0	6	LT	11.4	6.5	1.4			0.1							SD				0	0	0	0	GENERAL BONE
40	180	185	3	J	35				327	106.0	5	MI	19.3	13.2	3.6			0.9				NO			SD	0	2	1	0	0	0	0	GENERAL BONE
40	180	185	3	J	35				327	41.0	6	LT	17.4	15.0	2.2			0.3				NO			HD	0			0	0	0	0	GENERAL BONE
40	180	185	3	J	35				328	116.0	5	SH	17.5	15.8	3.4			1.0								0			0	1	0	0	GENERAL BONE
59	180	180	3	J	36	19		2.74	404	43.0	6	MI	16.7	16.4	1.6			0.3				BT			HD	0	2	1	0	0	0	0	
59	180	180	3	J	36	17		2.82	405	43.0	6	MI	16.1	11.2	1.2			0.1							SD	0	3	2	0	0	0	0	
59	180	180	3	J	36	11		2.9	406	58.0	6	PR	18.5	15.6	2.0	15.6	18.5	0.5	1.4	5.9	1.3	BT	PF	CP	HD	0	3	1	1	0	0	0	
59	180	180	3	J	36	137		2.68	407	27.0	2	CO	12.5	9.6	1.1	12.5	9.6	0.1	1.0	4.7	0.8	RT	PR	CP	FD	0	3	1	0	0	0	0	CHECK POINT
59	180	180	3	J	36	27		2.73	409	1.0	6	DS	9.9	9.2	1.0			0.1							FD	0	3	1	0	2	0	0	
59	180	180	3	J	36	120		2.89	410	1.0	6	MI	13.4	7.7	1.4			0.1							SD	0	3	1	0	0	0	0	
59	180	180	3	J	36	12		2.9	411	1.0	6	PR	11.3	7.0	1.6			0.1	1.8	5.6	1.8		UD	CP	SD	0	1	1	0	0	0	0	
59	180	180	3	J	36	133		2.48	412	1.0	6	DS	9.9	6.7	1.5			0.1							FD	0	3	1	0	1	0	0	
59	180	180	3	J	36	45		2.8	413	30.0	6	DS	8.2	6.2	1.2			0.1							FD	0	3	1	0	0	0	0	
59	180	180	3	J	36	5		2.87	414	51.0	6	CO	9.1	6.4	1.4	6.4	9.1	0.1	0.8	3.3	0.7	RT	PR	CP	FD	0	3	2	0	0	0	0	REFITS?
59	180	180	3	J	36				415	52.0	6	DS	9.8	8.6	2.2			0.1							HD	0	2	1	0	0	0	1	PLATFORM HIN
59	180	180	3	J	36	115		2.74	416	53.0	3	PR	24.6	23.0	1.9			0.9	1.6	3.5	1.2	BT	PR	CP	SD	0	3	2	0	1	0	0	GRAVER?
59	180	180	3	J	36				417	54.0	6	CO	23.5	13.0	5.2	13.0	23.5	0.9	4.0	10.9	3.4	NO	UP	FL	FD	0	1	1	0	0	0	0	ref w/.418
59	180	180	3	J	36				418	54.0	6	CO	19.6	12.3	2.6	12.3	19.6	0.7	2.8	11.3	2.5	NO	UP	FL	FD	0	1	1	0	0	0	0	ref w/.417
59	180	180	3	J	36	49			419	112.0	5	PR	25.2	19.0	3.5	20.1	21.4	1.2	2.2	12.4	1.9	ST	UP	FL	SD	0	3	2	0	0	0	0	
59	180	180	3	J	36	4			420	119.0	5	DS	21.6	17.2	4.8			1.4				NO			PG	1	3	1	0	0	0	0	
72	180	180	3	J	36	166		2.72	471	7.3	3	DS	29.7	17.6	2.4			0.8				BT			FD	0	3	2	0	0	1	0	
72	180	180	3	J	36	161		2.9	472	7.3	3	PR	30.1	18.1	3.9			2.2	3.7	6.0	3.2	DS			HD	0	3	1	0	2	1	0	ref w/.302
72	180	180	3	J	36	63		2.78	473	7.3	3	LT	30.2	18.3	2.8			1.5							SD	0	2	1	0	0	1	0	
72	180	180	3	J	36	121		2.75	474	7.3	3	LT	18.9	16.5	3.1			0.4							SD	0			0	2	0	0	
72	180	180	3	J	36	158		2.89	475	7.3	3	DS	19.3	17.3	2.8			0.8							FD	0	3	1	0	2	0	0	PLATFORM HIN
72	180	180	3	J	36	11		2.9	476	7.3	3	CO	22.0	11.5	2.0			0.3	1.9	4.2	1.5	BT	PR	CP	FD	0	3	2	0	0	0	0	
72	180	180	3	J	36	43		2.92	479	61.0	6	PR	21.3	20.0	3.1			1.1	2.7	8.0	2.4	NO	UY	CP	HD	0	2	1	1	0	1	0	
72	180	180	3	J	36	54		2.73	480	56.0	3	DS	17.3	15.5	3.3			0.7							FD				1	1	0	0	
72	180	180	3	J	36	116		2.76	481	56.0	3	DS	25.8	16.0	6.3			1.7				NO			FD	0	2	1	1	0	0	0	PLATFORM HIN
72	180	180	3	J	36	23		2.75	482	56.0	3	MI	20.1	15.6	2.8			0.7							SD				1	0	0	0	PLATFORM HIN
72	180	180	3	J	36	10		2.9	483	7.3	3	PR	7.3	3.9	0.4			0.1				RT			SD	0	3	2	0	0	0	0	SPLIT PLATFO
72	180	180	3	J	36	56		2.84	484	19.0	6	CO	21.4	12.3	2.7			0.4	1.6	3.9	1.5	NO	PR	CP	PG	0	1	1	1	1	0	0	
72	180	180	3	J	36	3		3.12	486	1.0	6	SH	34.6	14.8	9.7			3.2								2			0	0	0	0	
72	180	180	3	J	36	95		2.78	487	41.0	6	DS	22.8	18.3	3.2			0.7				NO			FD	0	2	1	1	0	0	0	
72	180	180	3	J	36	70		2.78	488	41.0	6	LT	19.1	10.0	2.6			0.2							SD				1	0	0	0	
72	180	180	3	J	36	33		2.82	489	1.0	6	DS	25.5	16.5	5.3			1.0				NO			PG				1	1	0	0	
72	180	180	3	J	36	21		2.8	490	41.0	6	CO	17.6	13.7	1.7	12.5	17.6	0.2	1.2	4.7	1.1	NO	PR	CP	HD	0	2	1	0	0	0	0	
72	180	180	3	J	36	16		2.92	491	41.0	6	DS	47.0	20.8	9.2			5.3							FD	2	1	1	0	0	0	0	PLATFORM HIN
72	180	180	3	J	36	24		2.78	492	108.0	5	DS	15.4	12.8	3.2			0.5				NO			SD	0	2	1	0	0	0	0	
72	180	180	3	J	36	64		3.1	493	7.2	3	DS	12.7	9.8	0.9	9.8	12.7	0.1				DS			FD	0	3	1	0	2	0	0	CACO3 PLATFO
72	180	180	3	J	36	65		2.84	494	7.3	3	PR	13.8	13.1	1.4			0.1	1.0	5.5	1.4	NO	UP	FL	HD	0	2	1	0	2	0	0	
72	180	180	3	J	36	149		2.75	495	7.2	3	PR	18.9	12.5	2.2			0.4	2.0	9.0	1.7	DS			SD				0	1	0	0	CACO3 PLATFO
72	180	180	3	J	36	110		2.87	496	7.2	3	DS	11.8	9.0	1.0			0.1							FD				0	0	0	0	
72	180	180	3	J	36	147		2.76	497	7.2	3	DS	14.5	10.9	1.5			0.2							FD				0	0	0	0	
72	180	180	3	J	36	95		2.78	498	7.2	3	CO	11.1	9.4	0.9	11.1	9.4	0.1	0.8	3.4	0.8	RT	PRG	CP	FD	0	3	1	0	2	0	0	
72	180	180	3	J	36	20		2.78	499	7.3	3	CO	13.0	10.7	1.2	13.0	10.7	0.1	1.1	5.4	1.0	RT	PG	CP	PG	0	3	1	0	0	0	0	MINI-PIECE E
72	180	180	3	J	36	143		2.86	500	7.2	3	DS	7.5	7.3	0.8			0.1				RT			FD	0	2	1	0	1	0	0	

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
72	180	180	3	J	36	153		2.8	501	7.2	3	DS	9.1	7.8	2.0			0.1				RT			PG	0	3	2	0	0	0	0	CACO3 PLATFO
72	180	180	3	J	36	140		2.72	502	7.2	3	LT	11.3	4.7	1.0			0.1							SD				0	0	0	0	
72	180	180	3	J	36	38		2.84	503	7.2	3	DS	8.5	5.3	0.9			0.1				RT			FD	0	2	1	0	0	0	0	
72	180	180	3	J	36	126		2.91	504	7.2	3	DS	11.3	8.0	0.8			0.1							FD				0	0	0	0	
72	180	180	3	J	36	102		2.72	505	7.3	3	CO	10.8	6.9	1.7	6.9	1.7	0.1	0.7	3.0	0.6	RT	PG	CP	FD				0	1	0	0	
72	180	180	3	J	36	157		2.86	506	7.2	3	DS	10.9	8.4	0.8			0.1							FD				0	0	0	0	
72	180	180	3	J	36	144		2.89	507	7.2	3	PR	8.5	6.2	1.1			0.1	1.1	2.8	0.9	RT	PR	CP	SD	0	3	2	0	1	0	0	
72	180	180	3	J	36	165		2.97	508	7.2	3	DS	9.3	7.5	0.9			0.1							FD				0	0	0	0	
72	180	180	3	J	36	112		2.89	509	7.2	3	MI	6.6	7.0	0.9			0.1				RT			SD	0	2	1	0	3	0	0	PLATFORM HIN
72	180	180	3	J	36	155		2.82	510	7.2	3	DS	7.4	5.8	0.6			0.1				RT			FD	0	2	1	0	1	0	0	PLATFORM HIN
72	180	180	3	J	36	151		2.78	511	7.2	3	DS	7.1	5.4	0.8			0.1				RT			FD	0	2	1	0	1	0	0	PLATFORM HIN
72	180	180	3	J	36	156		2.85	512	7.2	3	MI	5.1	4.5	0.7			0.1				RT			SD				0	0	0	0	
72	180	180	3	J	36	104		2.87	513	7.2	3	CO	8.6	6.3	0.7	5.7	8.6	0.1	0.7	3.8	0.6	RT	PR	CP	FD	0	3	1	0	0	0	0	
72	180	180	3	J	36	39		2.79	514	7.2	3	CO	6.9	5.3	0.9	6.9	5.3	0.1	0.5	2.1	0.5	RT	PR	CP	PG	0	2	1	0	0	0	0	
72	180	180	3	J	36	114		3.01	515	7.3	3	DS	6.7	4.2	0.6			0.1				RT			FD	0	2	1	0	0	0	0	ref w/ .72?
72	180	180	3	J	36	101		2.8	516	51.0	6	DS	10.8	5.5	1.3			0.1				RT			FD	0	2	1	0	0	0	0	PLATFORM HIN
72	180	180	3	J	36	136		2.87	517	51.0	6	CO	7.7	6.8	1.1	6.8	7.7	0.1	0.9	2.4	0.8	RT	PRG	CP	PG	0	3	1	0	0	0	0	
72	180	180	3	J	36	141		2.73	518	40.0	3	MI	19.5	12.4	1.9			0.3				BT			HD	0	3	2	0	2	1	0	PLATFORM HIN
72	180	180	3	J	36	107		2.86	519	7.2	3	PR	8.2	7.2	0.7			0.1	0.7	3.8	0.7	RT	PRG	CP	FD	0	2	1	0	0	0	0	
72	180	180	3	J	36	99		2.9	520	76.0	2	PR	12.2	10.8	1.4			0.2				RT			PG	0	2	1	0	1	0	0	PLATFORM HIN
72	180	180	3	J	36	151		2.81	521	76.0	2	MI	6.9	5.6	0.5			0.1				RT			HD	0	2	1	0	0	0	0	PLATFORM HIN
72	180	180	3	J	36	71		2.68	522	27.0	2	PR	13.1	8.2	2.0			0.1	1.3	4.1	1.1	DS	UP	FL	HD	0	2	1	0	2	0	0	
72	180	180	3	J	36	48		2.92	523	27.0	2	PR	5.7	5.2	0.6			0.1	0.7	2.0	0.6	RT	PR	CP	SD	0	1	1	0	0	0	0	
72	180	180	3	J	36	164		2.93	524	26.0	3	PR	9.9	6.4	1.7			0.1	1.0	5.0	1.0				HD				0	1	0	0	CACO3 PLATFO
72	180	180	3	J	36	25		2.81	525	81.0	6	PR	13.7	7.3	1.7			0.1	0.7	2.2	0.8	RT	PR	FL	SD	0	3	1	0	0	0	0	REFITS?
72	180	180	3	J	36	61		2.87	526	81.0	6	DS	11.9	5.5	2.8			0.2							FD	0			0	1	0	0	REFITS?
72	180	180	3	J	36	7		2.83	527	81.0	6	DS	8.9	6.7	0.9			0.1				RT			FD	0	3	1	0	0	0	0	PLATFORM HIN
72	180	180	3	J	36	139		2.7	528	81.0	6	DS	8.4	8.6	0.8			0.1							FD	0	2	1	0	1	0	0	REFITS?
72	180	180	3	J	36	106		2.86	529	81.0	6	PR	8.3	5.2	0.7			0.1	0.7	2.0	0.6	RT	PR	CP	SD				0	1	0	0	REFITS?
72	180	180	3	J	36	43		2.92	530	40.0	3	MI	8.3	7.7	1.1			0.1							SD	0	2	1	0	1	0	0	REFITS?
72	180	180	3	J	36	117		2.8	531	81.0	6	PR	6.2	4.5	0.7			0.1	0.8	2.0	0.7	RT	PR	CP	SD	0	2	1	0	0	0	0	
72	180	180	3	J	36	18		2.82	532	81.0	6	CO	9.2	2.8	0.6	9.2	2.8	0.1	0.5	0.9	0.5	RT	PR	CP	FD	0	2	1	0	0	0	0	
72	180	180	3	J	36	94		2.78	533	41.0	6	MI	17.4	12.6	2.7			0.4							SD	0	3	1	0	0	0	0	
72	180	180	3	J	36	19		2.79	534	41.0	6	PR	12.7	10.4	1.9			0.2	2.8	9.1	2.7	BT	PFG	CP	HD	0	2	1	0	0	0	0	
72	180	180	3	J	36	97		2.8	535	41.0	6	PR	8.0	4.9	0.8			0.1	1.4	8.0	1.9		PF	CP	SD	0			0	0	0	0	ONLY PLATFOR
72	180	180	3	J	36	125		2.9	536	41.0	6	CO	8.2	6.0	1.3	8.2	6.0	0.1	0.9	2.5	0.8	RT	PR	CP	FD	0	3	1	0	0	0	0	
72	180	180	3	J	36	37		2.82	537	41.0	6	MI	14.1	6.7	1.7			0.1							SD				0	0	0	0	
72	180	180	3	J	36	60		2.89	538	41.0	6	DS	11.6	6.9	1.3			0.1				RT			FD	0	2	1	0	0	0	0	PLATFORM HIN
72	180	180	3	J	36	30		2.79	539	48.0	6	CO	12.8	5.9	1.0	12.8	5.9	0.1	0.6	2.1	0.5	RT	PG	AB	FD	0	2	1	0	0	0	0	
72	180	180	3	J	36	91		2.8	540	48.0	6	PR	10.3	7.2	1.4			0.1	0.9	3.7	1.0	RT	PR	CP	SD	0	3	1	0	0	0	0	
72	180	180	3	J	36	113		2.8	541	48.0	6	DS	4.7	4.4	1.7			0.1							SD				0	0	0	0	
72	180	180	3	J	36	152		2.79	542	1.0	6	LT	10.5	9.8	3.3			0.2							SD				0	0	0	0	
72	180	180	3	J	36	8		2.87	543	1.0	6	MI	16.2	10.6	2.6			0.2							SD				0	0	0	0	
72	180	180	3	J	36	32		2.76	544	1.0	6	DS	18.8	12.3	2.2			0.3							FD	0	3	1	0	0	0	0	PLATFORM HIN
72	180	180	3	J	36	150		2.76	545	1.0	6	CO	14.1	12.9	2.1			0.2	0.9	3.8	0.8	BT	PG	AB	FD	0	3	2	0	0	0	0	
72	180	180	3	J	36	98		2.82	546	1.0	6	DS	10.1	8.2	2.7			0.1							HD				0	1	0	0	
72	180	180	3	J	36	162		2.92	547	1.0	6	PO	14.4	10.8	1.6			0.1							SD				1	0	0	0	
72	180	180	3	J	36	15		2.89	548	1.0	6	MI	8.0	4.9	1.1			0.1							SD				1	0	0	0	
72	180	180	3	J	36	62		2.74	549	1.0	6	MI	8.0	6.0	1.7			0.1							SD				1	2	0	0	
72	180	180	3	J	36	164		2.93	550	1.0	6	MI	13.1	8.5	1.4			0.1				RT			SD	0	2	1	1	2	0	0	PLATFORM HIN
72	180	180	3	J	36	46		2.84	551	1.0	6	MI	12.0	8.9	1.5			0.1							SD				0	0	0	0	
72	180	180	3	J	36	92		2.85	552	1.0	6	MI	10.0	7.7	0.8			0.1							SD				0	0	0	0	
72	180	180	3	J	36	135		2.86	553	1.0	6	PR	7.3	5.6	1.0			0.1	1.1	2.9	1.0	RT	UP	FL	SD	0	2	1	0	1	0	0	

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
72	180	180	3	J	36	122		2.78	554	1.0	6	LT	4.5	4.5	0.6			0.1							SD				0	0	0	0	
72	180	180	3	J	36	26		2.83	555	1.0	6	DS	8.5	3.8	1.2			0.1				RT			FD	0	2	1	0	0	0	0	PLATFORM HIN
72	180	180	3	J	36	159		2.9	556	9.0	3	CO	11.2	7.4	0.8			0.1	1.2	1.9	1.1	RT	PR	CP	PG	0	3	2	0	1	0	0	
72	180	180	3	J	36	148		2.75	557	9.0	3	MI	11.7	10.1	1.5			0.1							SD				0	1	0	0	
72	180	180	3	J	36	41		2.67	558	9.0	3	MI	10.3	7.7	1.3			0.1							SD				0	0	0	0	
72	180	180	3	J	36	138		2.7	559	9.0	3	DS	13.5	8.9	1.4			0.2							PG				0	1	0	0	WASHED
72	180	180	3	J	36	123		2.78	560	9.0	3	PR	7.8	4.2	0.9			0.1	0.9	2.9	0.8	RT	PR	CP	SD	0			0	0	0	0	ref w/.559?
72	180	180	3	J	36	142		2.78	561	9.0	3	PR	9.7	6.7	1.3			0.1	1.1	2.1	1.0	RT	PG	AB	SD	0	2	1	0	0	0	0	
72	180	180	3	J	36	50		2.84	562	9.0	3	MI	12.4	11.5	2.1			0.2							SD				0	1	0	0	PLATFORM HIN
72	180	180	3	J	36	17		2.82	563	37.0	2	DS	8.9	5.6	0.7			0.1							FD	0	3	1	0	0	0	0	
72	180	180	3	J	36	72		3	564	16.2	2	DS	11.6	7.0	0.7			0.1				RT			FD	0	3	1	0	0	0	0	PLATFORM HIN
72	180	180	3	J	36	134		2.86	565	16.2	2	CO	14.9	10.1	2.1	14.9	10.1	0.2	1.2	3.7	1.0	DS	PR	CP	FD	0	3	1	0	2	0	0	
72	180	180	3	J	36	10		2.9	566	16.2	2	DS	7.5	4.5	1.1			0.1				RT			PG	0	3	1	0	0	0	0	SCRAPER REFI
72	180	180	3	J	36	100		2.95	567	16.2	2	CO	9.9	4.3	0.9			0.1				RT	PR	FL	FD	0	2	1	0	1	0	0	SPLIT PLATFO
72	180	180	3	J	36	58		2.87	568	16.2	2	CO	7.7	3.8	1.5	7.7	3.8	0.1	1.2	2.2	1.2	RT	UP	FL	FD	0	2	1	0	1	0	0	REFITS?
72	180	180	3	J	36	59		2.85	569	16.2	2	CO	6.8	5.6	1.9	6.8	5.6	0.1	0.8	1.5	0.7	RT	PR	CP	PG	0	3	1	0	0	0	0	REFITS?
72	180	180	3	J	36	29		2.75	570	16.2	2	PR	5.4	4.7	0.4			0.1	0.4	1.4	0.4	RT	PR	CP	HD	0	2	1	0	0	0	0	
72	180	180	3	J	36	124		2.81	571	62.0	6	DS	7.1	6.4	0.4			0.1				RT			PG	0	3	1	0	0	0	0	PLATFORM HIN
72	180	180	3	J	36	9		2.87	572	63.0	6	DS	11.1	8.4	2.6			0.2				NO			FD	1	2	1	1	0	0	0	
72	180	180	3	J	36	66		2.7	573	64.0	6	DS	17.4	12.9	3.2			0.5				NO			HD				0	1	0	0	
72	180	180	3	J	36	36		2.76	574	64.0	6	DS	12.1	7.1	1.0			0.1				RT			FD	0	3	1	0	2	0	0	PLATFORM HIN
72	180	180	3	J	36	34		2.84	575	64.0	6	MI	6.8	6.8	0.9			0.1							SD				0	1	0	0	
72	180	180	3	J	36	103		2.65	576	64.0	6	DS	7.4	5.1	0.5			0.1				RT			FD				0	1	0	0	
72	180	180	3	J	36	6		3	577	65.0	6	DS	10.3	7.9	1.9			0.1							PG	0	3	1	0	1	0	0	PLATFORM HIN
72	180	180	3	J	36	57		2.9	578	65.0	6	DS	9.1	7.3	2.5			0.1				RT			PG	0	3	1	0	1	0	0	PLATFORM HIN
72	180	180	3	J	36	111		2.88	579	65.0	6	CO	9.7	4.7	0.7	9.7	4.7	0.1	0.7	3.2	0.8	RT	PR	CP	FD	0	2	1	1	0	0	0	
72	180	180	3	J	36	105		2.86	580	9.0	6	MI	7.7	4.9	0.5			0.1				RT			SD	0	3	2	0	0	0	0	
72	180	180	3	J	36	130		2.78	581	67.0	6	CO	8.4	6.7	1.8	8.4	6.7	0.1	1.3	4.1	1.5	RT	PR	CP	FD	0	3	2	0	1	0	0	CACO3 PLATFO
72	180	180	3	J	36	53		2.89	582	111.0	5	LT	6.6	5.7	0.7			0.1							SD				0	0	0	0	
41	180	175	3	J	37		1.75	2.35	329	101.0	5	DS	28.7	11.2	3.5			1.2				NO			HD	1	2	1	0	0	0	0	
41	180	175	3	J	37		1.75	2.35	330	124.0	5	MI	21.7	10.0	1.8			0.3							SD				0	0	0	0	
42	180	175	3	J	37			2.35	331	120.0	5	LT	15.7	5.1	3.0			0.1							SD				1	0	0	0	
42	180	175	3	J	37			2.35	332	37.0	2	DS	7.1	2.9	0.5			0.1				RT			FD	0	2	1	0	0	0	0	PLATFORM HIN
42	180	175	3	J	37			2.35	333	27.0	2	DS	6.3	4.7	1.7			0.1				RT			FD	0	2	1	0	0	0	0	SPLIT PLATFO
43	180	165	3	J	39		POST	48/49	334	119.0	5	PR	53.4	31.3	8.1			18.2	10.3	11.3	7.0	NO	UD	FL	HD	1	1	1	0	0	0	0	6 PIECES REF
43	180	165	3	J	39		POST	48/49	335	42.0	6	MI	44.7	29.1	8.5			12.4				ST			SD	0	3	2	1	0	0	0	2 PIECES REF
70	180	160	3	J	40	2			464	148.0	5	DS	43.2	36.2	10.8	36.2	43.2	18.8				NO			HD	1	3	1	0	0	0	0	PLATFORM HIN
70	180	160	3	J	40				465	150.0	5	SH	40.0	36.0	16.4			13.2								2			0	0	0	0	3 PIECES REF
70	180	160	3	J	40				466	121.0	5	SH	44.9	37.1	16.9			29.1								2			0	0	0	0	
47	185	225	1	I	21		CARB		364	97.0	2	CO	13.7	13.0	0.7	13.0	13.7	0.1	1.2	4.6	1.1	BT	PR	CP	FD	0	3	1	0	0	0	0	CHECK POINT
47	185	225	1	I	21		CARB		365	97.0	2	CO	11.7	10.7	0.7	10.7	11.7	0.1	1.3	2.5	1.1	RT	PFR	CP	FD	0	3	2	0	0	0	0	CHECK POINT
36	185	185	3	I	35				256	37.0	2	CO	26.3	19.4	1.9	21.4	25.8	0.8	1.8	5.9	1.9	BT	PRG	CP	HD	0	2	1	0	0	0	0	
36	185	185	3	I	35				257	49.0	1	DS	24.7	17.2	2.6			0.7				BT			FD	0	3	1	0	0	0	0	
78	185	180	3	I	36				642	109.0	5	MI	19.1	15.4	1.9			0.7							SD	0			0	1	0	0	2 PIECES REF
78	185	180	3	I	36				643	7.3	3	MI	17.8	16.4	1.9			0.4							SD	0	3	1	0	3	0	0	PLATFORM HIN
78	185	180	3	I	36				644	7.2	3	CO	23.9	14.9	2.7	23.9	14.9	1.3	3.6	12.0	3.5	BT			FD		3	1	0	1	0	0	CACO3 PLATFO
82	185	175	3	I	37	12		2.84	653	16.2	2	DS	11.2	7.5	1.0			0.1				RT			FD	0	2	1	1	0	0	0	SPLIT PLATFO
82	185	175	3	I	37	15		2.8	654	7.2	3	LT	15.4	8.4	3.0			0.3							HD	0	3	2	0	0	0	0	ref w/.616?
82	185	175	3	I	37	3		2.8	655	25.0	6	MI	20.7	16.3	2.7			0.7							SD	0	2	1	1	0	0	0	
82	185	175	3	I	37	16		2.7	656	25.0	6	MI	12.5	7.8	1.0			0.1				RT			SD	0			1	0	0	0	PLATFORM HIN
82	185	175	3	I	37	12		2.4	657	56.0	3	DS	19.9	12.8	2.6			0.5							SD	0	2	1	1	0	1	0	2 PIECES REF
82	185	175	3	I	37	14		2.9	658	41.0	6	PR	13.6	12.4	1.6			0.3	2.3	6.9	2.2	NO	UP	FL	SD	0	1	0	0	1	0	0	
82	185	175	3	I	37	2		2.3	659	148.0	5	MI	24.9	18.0	4.1			1.9				NO			SD	2	1	0	0	0	0	0	

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
82	185	175	3	I	37	7		2.84	660	148.0	5	DS	21.2	14.0	3.8			0.8				NO			SD	0	2	1	0	0	0	0	
82	185	175	3	I	37	4		2.65	661	124.0	5	PR	23.5	16.8	1.7			0.6	2.1	10.7	1.6	DS	UP	FL	SD	0	3	1	0	0	0	0	
82	185	175	3	I	37	5		2.45	662	124.0	5	DS	13.0	6.7	2.5			0.1				RT			PG	0	3	1	0	0	0	0	
82	185	175	3	I	37	6		2.9	663	132.0	5	CO	40.2	32.8	9.5	32.8	40.2	8.9	4.0	12.0	3.5	NO	UY	CP	HD	1	2	1	0	0	0	0	
82	185	175	3	I	37	11		2.85	664	106.0	5	MI	14.9	13.3	3.0			0.4				ST			SD	0	3	2	0	0	0	0	PLATFORM HIN
37	185	170	3	I	38				258	105.0	5	CO	39.1	22.6	7.9	39.1	22.6	7.0	5.4	8.8	4.5	NO	UP	FL	HD	1	1	1	0	0	0	0	
37	185	170	3	I	38				259	105.0	5	PR	12.1	12.6	4.4			0.5	4.6	11.5	4.6	NO	UP	FL	HD	0	1	1	0	0	0	0	
37	185	170	3	I	38				260	105.0	5	DS	18.2	10.3	1.6			0.3							FD	0	3	1	0	0	0	0	
37	185	170	3	I	38				261	105.0	5	DS	22.6	11.0	2.3			0.4				NO			FD	0	2	1	0	0	0	0	
37	185	170	3	I	38				262	105.0	5	PR	15.2	9.8	2.0			0.2	1.0	2.7	1.0	BT	PR	CP	SD	0	3	1	0	0	0	0	
37	185	170	3	I	38				263	105.0	5	LT	11.5	10.0	1.8			0.1							SD				0	0	0	0	
37	185	170	3	I	38				264	105.0	5	MI	11.3	8.8	1.2			0.1							SD				0	0	0	0	
37	185	170	3	I	38				265	105.0	5	MI	9.2	8.5	1.2			0.1							SD				0	0	0	0	
37	185	170	3	I	38				266	105.0	5	CO	8.9	8.0	1.0	8.9	8.0	0.1	1.8	4.4	1.8	RT	UY	CP	FD	0	3	1	0	0	0	0	
37	185	170	3	I	38				267	105.0	5	DS	20.0	7.3	3.9			0.3							FD				0	1	0	0	
37	185	170	3	I	38				268	119.0	5	CO	36.7	32.5	3.8	36.7	32.5	4.8	5.0	16.8	5.7	DS	UP	FL	FD	0	2	1	0	0	0	0	
37	185	170	3	I	38				269	109.0	5	CO	28.2	19.4	6.6	28.2	19.4	3.9	6.8	14.2	7.1	NO	UP	FL	HD	0	2	1	0	0	0	0	
37	185	170	3	I	38				270	145.0	5	MI	20.8	17.3	7.3			3.1								1			0	0	0	0	
37	185	170	3	I	38				271	145.0	5	DS	13.0	10.3	2.9			0.3				NO			FD	0	2	1	0	0	0	0	
37	185	170	3	I	38				272	149.0	5	PR	20.9	11.0	2.6	11.0	20.9	0.6	2.1	6.1	1.5	NO	UD	CP	HD	0	1	1	0	0	0	0	
37	185	170	3	I	38				273	105.0	5	CO	24.6	18.8	2.9	24.6	18.8	1.2	4.1	10.3	4.0	NO	UP	FL	FD	0	2	1	0	0	0	0	
37	185	170	3	I	38				274	105.0	5	DS	13.8	7.4	2.1			0.2							HD				0	1	0	0	
37	185	170	3	I	38				275	38.0	2	CO	8.9	5.7	0.7	8.9	5.7	0.1	0.6	2.0	0.6	RT	PR	CP	FD	0	2	1	0	0	0	0	
37	185	170	3	I	38				276	28.0	6	PR	8.8	6.9	1.1			0.1	1.5	5.6	2.1	BT	PR	CP	SD	0	3	1	0	0	0	0	
38	185	170	3	I	38		1.74	2	277	108.0	5	DS	12.4	9.7	1.7			0.2							SD				0	0	0	0	
38	185	170	3	I	38		1.74	2	278	119.0	5	DS	22.4	14.2	3.9			0.9				NO			PG	0	2	1	0	0	0	0	
38	185	170	3	I	38		1.74	2	279	164.0	5	DS	28.6	18.5	3.6			1.9				NO			SD	1	2	1	0	0	0	0	
38	185	170	3	I	38		1.74	2	280	112.0	5	PR	29.6	20.1	5.6	19.7	29.7	3.2	5.5	14.5	5.8	NO	UY	CP	HD	0	2	1	0	0	0	0	
38	185	170	3	I	38		1.74	2	281	105.0	5	MI	37.9	21.2	5.1			4.6				NO			SD	0	1	1	0	0	0	0	
38	185	170	3	I	38		1.74	2	282	105.0	5	DS	24.4	19.7	5.4			1.7				ST			HD	0	3	2	0	0	0	0	
38	185	170	3	I	38		1.74	2	283	105.0	5	PR	13.1	11.6	2.6			0.3	1.9	4.3	1.7	NO	UP	FL	HD	0	2	1	0	0	0	0	
38	185	170	3	I	38		1.74	2	284	105.0	5	MI	13.7	7.6	4.1			0.3							SD	0			0	0	0	0	
38	185	170	3	I	38		1.74	2	285	105.0	5	DS	11.2	9.5	1.6			0.1				BT			FD	0	3	2	0	0	0	0	
38	185	170	3	I	38		1.74	2	286	109.0	5	PR	15.2	13.0	1.5			0.3	1.8	9.0	3.1	BT	PR	AB	SD	0	3	2	0	0	0	0	
38	185	170	3	I	38		1.74	2	287	132.0	5	DS	28.2	27.9	2.9			2.4				ST			SD	0	3	2	0	0	0	0	
38	185	170	3	I	38		1.74	2	288	119.0	5	DS	30.7	17.0	5.0			1.7				NO			SD	0	3	1	0	0	0	0	
38	185	170	3	I	38		1.74	2	289	119.0	5	SH	25.6	10.4	5.3			1.5								0			0	0	0	0	
38	185	170	3	I	38		1.74	2	290	112.0	5	DS	15.1	13.6	3.1			0.5				NO			SD	1	3	1	0	0	0	0	
38	185	170	3	I	38		1.74	2	291	112.0	5	LT	14.3	12.8	1.5			0.3							SD				0	0	0	0	
38	185	170	3	I	38		1.74	2	292	112.0	5	DS	7.1	6.2	1.5			0.1				NO			SD	0	2	1	0	0	0	0	
38	185	170	3	I	38		1.74	2	293	2.1	2	CO	9.8	5.5	1.2	9.8	5.5	0.1	0.6	2.4	0.6	RT	PR	CP	FD	0	3	2	0	0	0	0	
38	185	170	3	I	38		1.74	2	294	110.0	5	MI	9.2	8.0	1.2			0.1				BT			HD	0	2	1	0	0	0	0	
39	185	170	3	I	38				295	38.0	2	DS	17.6	17.4	2.1			0.4				BT			FD	0	3	2	0	0	1	0	GENERAL BONE
39	185	170	3	I	38				296	147.0	5	DS	47.9	40.3	8.0			17.2				NO			HD	0	3	1	0	0	0	0	GENERAL BONE
39	185	170	3	I	38				297	119.0	5	PR	30.5	26.9	3.8			2.6	2.9	7.1	2.7	BT	PRG	AB	SD	0	3	1	0	0	0	0	GENERAL BONE
39	185	170	3	I	38				298	119.0	5	DS	30.6	12.3	3.8			1.0				NO			HD				0	1	0	0	GENERAL BONE
39	185	170	3	I	38				299	113.0	5	DS	20.7	14.8	3.3			0.8				NO			FD	0	2	1	0	0	0	0	GENERAL BONE
39	185	170	3	I	38				300	105.0	5	PR	30.8	27.3	5.7			4.9	3.6	7.3	2.6	ST	PG	AB	SD	0	3	2	0	0	0	0	GENERAL BONE
39	185	170	3	I	38				301	145.0	5	MI	28.1	16.2	10.1			3.4								0			0	0	0	0	GENERAL BONE
73	185	160	3	I	40		N1/2		585	15.0	2	DS	10.7	9.2	1.2			0.1				RT			PG	0	3	2	0	0	0	0	PLATFORM HIN
73	185	160	3	I	40		N1/2		586	105.0	5	SH	35.2	30.9	13.7			10.8								2	1	0	0	0	0	0	
73	185	160	3	I	40		N1/2		587	105.0	5	DS	23.3	12.6	2.8			0.6				NO			FD	0	2	1	0	0	0	0	
73	185	160	3	I	40		N1/2		588	105.0	5	CO	31.7	13.0	2.4	31.7	13.0	1.0	2.2	4.9	1.8	BT	PRG	CP	HD	0	2	1	0	0	0	0	

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
73	185	160	3	I	40		N1/2		589	105.0	5	MI	18.9	11.6	3.4			0.7							SD				0	0	0	0	
73	185	160	3	I	40		N1/2		590	105.0	5	LT	10.9	9.5	2.7			0.2							SD				0	0	0	0	
73	185	160	3	I	40		N1/2		591	124.0	5	CO	26.4	19.4	4.4	26.4	19.4	1.4	4.8	14.7	4.6	NO	PG	AB	SD	0	2	1	0	0	0	0	
73	185	160	3	I	40		N1/2		592	119.0	5	SH	30.8	23.8	8.4			3.4								0			0	0	0	0	
73	185	160	3	I	40		N1/2		593	123.0	5	CO	31.5	20.7	2.9	28.4	20.7	1.2	1.9	5.4	1.8	NO	UD	CP	FD	0	2	1	0	0	0	0	
63	190	210	3	H	30				443	28.0	6	DS	34.6	24.9	5.7			2.6				NO			FD	0	3	1	0	1	0	0	
67	190	210	3	H	30				459	58.0	6	PR	23.1	13.6	2.9	13.6	23.1	0.8	2.1	6.2	1.8	BT	PRG	CP	HD	0	3	1	0	0	1	0	
66	190	185	3	H	35				458	102.0	5	MI	36.7	17.7	3.3			2.7				NO			SD	2	1	1	0	0	0	0	
32	190	180	3	H	36				244	102.0	5	DS	34.2	25.6	4.9			3.3				NO			HD	3	0	0	0	0	0	0	ref w/.17
64	190	175	3	H	37	20		2.88	444	7.2	3	PR	31.1	23.0	2.0			1.9	3.1	5.5	1.8	BT	PFRG	CP	SD	0	3	1	0	2	1	0	
64	190	175	3	H	37	8		2.68	445	120.0	5	DS	24.0	12.7	6.1			1.1				NO			SD	0	2	1	1	0	0	0	
88	190	170	3	H	38	7	2.23	2.79	699	132.0	5	CO	39.0	38.9	8.4	39.0	38.9	13.5	4.8	12.2	4.6	NO	UP	FL	PG	2	1	1	0	0	0	0	
88	190	170	3	H	38	22	2.23	2.79	700	105.0	5	SH	35.4	27.2	5.2			5.7											0	0	0	0	
88	190	170	3	H	38	21	2.23	2.79	701	132.0	5	MI	19.3	18.8	2.7			1.3				NO			SD	2	1	1	0	0	0	0	
88	190	170	3	H	38	23	2.23	2.79	702	105.0	5	DS	17.9	12.5	3.4			0.5				NO			PG	0	2	1	0	0	0	0	
88	190	170	3	H	38	6	2.23	2.79	703	119.0	5	DS	16.4	14.6	4.1			1.0								0			0	1	0	0	
88	190	170	3	H	38	8	2.23	2.79	704	102.0	5	DS	26.8	16.6	6.5			2.4								2			0	0	0	0	
33	190	165	3	H	39				245	163.0	5	DS	30.3	26.5	6.0			4.1				NO			SD	3	0	0	0	0	0	0	AGATE BASIN
49	190	165	3	H	39			2.64	368	163.0	5	DS	37.2	35.0	9.5			12.7								0			0	0	0	0	
55	190	165	3	H	39			2.57	398	105.0	5	DS	17.2	13.8	2.3			0.7				ST			FD	0	3	2	0	0	0	0	WASHED
57	190	165	3	H	39	4		2.67	400	132.0	5	MI	15.3	14.8	2.3			0.5				NO			SD	0	2	1	0	1	0	0	
34	190	160	3	H	40	2			246	148.0	5	PR	29.6	27.7	5.5			4.7	5.0	18.4	4.2	NO	UY	CP	HD	0	3	1	0	0	0	0	2 PIECES REF
34	190	160	3	H	40				247	148.0	5	PR	19.5	8.5	4.0			0.7	3.6	9.8	2.8	NO	UP	FL	SD	0	2	1	0	0	0	0	
34	190	160	3	H	40				248	105.0	5	CO	13.2	13.1	2.5	13.1	13.2	0.3	1.2	6.5	1.2	DS	UP	FL	PG	0	2	1	0	0	0	0	
34	190	160	3	H	40	1			249	119.0	5	CO	38.9	37.2	6.6	38.9	37.2	10.7	6.6	19.6	5.0	DS	UP	FL	HD	0	3	1	0	0	0	0	
34	190	160	3	H	40				250	119.0	5	PR	14.2	14.6	2.5			0.4	1.9	5.3	1.9	DS	UD	CP	HD	0	3	1	0	0	0	0	
34	190	160	3	H	40				251	149.0	5	DS	22.7	11.5	3.9			0.8				NO			FD	0	2	1	0	0	0	0	PLATFORM HIN
34	190	160	3	H	40				252	36.0	6	MI	18.0	10.6	3.8			0.5							SD	0	2	1	1	0	0	0	
35	193	150	3	H	42		NORTH 1/2		253	107.0	5	DS	18.7	15.1	4.4			1.4				NO			SD	0	2	1	0	0	0	0	
35	193	150	3	H	42		NORTH 1/2		254	102.0	5	DS	18.3	16.4	3.7			1.0				NO			SD				0	1	0	0	
35	193	150	3	H	42		NORTH 1/2		255	36.0	6	CO	23.9	12.8	3.6	23.9	12.8	1.0	4.3	8.4	4.2	NO	UP	FL	FD	0	2	1	1	0	0	0	
74	193	145	3	H	43		N1/2		594	124.0	5	CO	45.9	37.9	19.3			27.7							SD				0	1	0	0	
46	195	195	3	G	33		2.22	2.86	344	8.0	1	PR	17.5	14.7	1.7			0.2	1.2	6.1	1.4	BT	PR	CP	SD	0	3	2	0	0	0	0	
46	195	195	3	G	33		2.22	2.86	346	8.0	1	CO	29.6	15.4	2.3	29.6	15.4	0.9	1.8	3.1	1.6	BT	PG	AB	FD	0	2	1	0	0	0	0	
46	195	195	3	G	33		2.22	2.86	347	38.0	2	CO	10.9	7.8	1.4	10.9	7.8	0.1	1.2	3.4	1.0	RT	PG	AB	FD	0	3	1	0	0	0	0	
46	195	195	3	G	33		2.22	2.86	348	43.0	6	DS	34.4	21.4	1.8			0.9				BT			FD	0	3	2	0	0	0	0	A1922.40
46	195	195	3	G	33		2.22	2.86	349	43.0	6	DS	21.7	14.8	2.3			0.5				BT			FD	0	3	1	0	0	0	0	
46	195	195	3	G	33		2.22	2.86	350	43.0	6	DS	23.1	20.4	2.1			0.9				BT			FD	0	3	2	0	0	0	0	
46	195	195	3	G	33		2.22	2.86	351	43.0	6	DS	10.8	6.6	0.8			0.1				RT			FD	0	2	1	0	0	0	0	PLATFORM HIN
46	195	195	3	G	33		2.22	2.86	352	43.0	6	MI	20.6	16.3	2.0			0.7				BT			SD	0	3	1	0	1	0	0	
46	195	195	3	G	33		2.22	2.86	354	43.0	6	CO	21.4	11.5	2.3	11.5	21.4	0.3	2.0	7.5	2.3	BT	PG	AB	FD	0	3	1	0	0	0	0	
46	195	195	3	G	33		2.22	2.86	355	43.0	6	PR	9.7	5.8	0.8	5.8	9.7	0.1	0.8	2.8	0.8	RT	PR	CP	SD	0			0	0	0	0	
46	195	195	3	G	33		2.22	2.86	356	44.0	6	PR	17.2	15.7	1.0			0.3	1.7	4.2	2.0	BT	UD	CP	SD	0	3	1	0	0	0	0	
46	195	195	3	G	33		2.22	2.86	357	44.0	6	PR	18.1	10.9	1.6			0.2	1.0	2.8	1.0	BT			SD	0	3	2	0	2	0	0	CACO3 PLATFO
46	195	195	3	G	33		2.22	2.86	358	44.0	6	PR	15.4	11.9	1.5			0.3	1.8	5.8	1.3	DS	UD	CP	SD	0	3	1	0	1	0	0	
46	195	195	3	G	33		2.22	2.86	359	44.0	6	PR	12.7	10.0	1.1			0.1	0.8	5.1	0.8	BT	PFR	CP	SD	0	3	2	0	0	0	0	
46	195	195	3	G	33		2.22	2.86	360	25.0	6	MI	16.3	11.9	2.6			0.3							SD				1	0	0	0	
46	195	195	3	G	33		2.22	2.86	361	45.0	2	CO	19.0	9.4	1.7	9.4	19.0	0.2	2.1	3.7	1.6	NO	UY	FL	HD	0	2	1	0	0	0	0	
46	195	195	3	G	33		2.22	2.86	362	105.0	5	CO	30.5	15.7	2.6	15.7	30.5	1.0	2.6	21.2	2.7	NO	UP	FL	SD	0	2	1	0	0	0	0	
46	195	195	3	G	33		2.22	2.86	363	117.0	5	PR	13.0	7.1	2.3			0.1		10.8	2.9				SD				0	0	0	0	ONLY PLATFOR
83	195	190	3	G	34	2		2.85	665	43.0	6	MI	22.5	10.2	1.6			0.2				BT			HD	0	2	1	0	0	0	0	
83	195	190	3	G	34	3		2.68	666	43.0	6	DS	26.8	24.4	2.9			1.7				NO			HD	0	2	1	0	0	0	0	
83	195	190	3	G	34	4		2.98	667	16.2	2	MI	9.0	7.3	1.6			0.1				RT			PG	0	3	2	0	1	0	0	PLATFORM HIN

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
83	195	190	3	G	34	1		2.97	668	71.0	6	PR	16.5	11.3	1.3			0.2	1.5	5.7	1.6	BT	PR	CP	SD	0	1	1	0	0	0	0	
29	195	180	3	G	36	3		2.58	241	22.0	2	DS	13.9	11.8	1.6			0.2				BT			FD	0	3	1	1	0	0	0	PLATFORM HIN
62	195	165	3	G	39	13		2.69	441	147.0	5	CO	21.2	12.3	2.4	21.2	12.3	0.4	1.0	3.2	0.8	NO	UP	FL	PG	0	2	1	0	1	0	0	
62	195	165	3	G	39				442	119.0	5	CO	21.8	12.6	2.9	21.8	12.6	0.9	3.0	6.9	3.1	NO	UP	FL	PG	0	2	1	0	0	0	0	
81	195	160	3	G	40	2		2.61	649	70.0	6	MI	14.9	9.5	2.2			0.2							SD	0	3	1	0	0	0	0	PLATFORM HIN
81	195	160	3	G	40	3		2.78	650	21.0	6	PR	8.5	8.0	1.0			0.1	2.2	8.2	2.0	RT	UY	CP	SD	0	3	1	0	0	0	0	
81	195	160	3	G	40	5		2.6	651	112.0	5	DS	23.7	22.6	4.6			2.2				NO			FD	1	3	1	0	0	0	0	PLATFORM HIN
30	195	150	3	G	42		2.72	2.8	242	125.0	5	MI	27.9	19.6	5.0			2.2				NO			SD	1	1	1	0	0	0	0	
76	195	145	3	G	43	23		2.96	625	124.0	5	MI	38.9	31.5	9.7			9.5							SD	0			0	0	0	0	BURNED BONE
76	195	145	3	G	43	14		2.69	626	124.0	5	MI	12.9	9.0	1.5			0.1							SD	0	2	1	0	0	0	0	PLATFORM HIN
76	195	145	3	G	43	22		2.92	627	158.0	5	MI	40.2	31.4	4.3			7.1				NO			SD	3	0	0	0	0	0	0	
76	195	145	3	G	43	16		2.69	628	158.0	5	SH	24.3	14.2	7.6			2.2							SD	3			0	0	0	0	
76	195	145	3	G	43	20		2.92	629	112.0	5	DS	15.1	8.1	2.8			0.3							SD	0	3	1	0	0	0	0	
76	195	145	3	G	43	17		2.95	630	105.0	5	CO	41.3	26.5	6.2	39.0	25.4	5.7	4.0	10.3	3.8	NO	UP	FL	PG	3	0	0	1	0	0	0	
76	195	145	3	G	43	19		2.82	631	125.0	5	noncul													SD				1	0	0	0	STREAM COBBL
76	195	145	3	G	43	11		2.81	632	126.0	5	PR	36.6	15.9	5.3			3.3	5.3	23.1	5.3	NO	UP	CR	SD	3	0	0	1	0	0	0	
76	195	145	3	G	43	18		2.96	633	126.0	5	SH	25.9	14.6	5.2			2.4							HD	3	0	0	1	0	0	0	ref w/.632
76	195	145	3	G	43	9		2.74	634	127.0	5	DS	23.1	13.4	3.2			0.7				NO			FD	0	2	1	1	0	0	0	ref w/.635
76	195	145	3	G	43	10		2.74	635	127.0	5	PR	35.9	33.6	4.7			6.8	4.3	6.7	3.4	NO	UP	FL	SD	0	3	1	1	2	0	0	ref w/.634
76	195	145	3	G	43	12		2.96	636	128.0	5	CO	38.0	27.8	11.8	27.8	38.0	8.3	2.0	4.9	1.7	NO	UD	CP	PG	0	3	1	0	0	0	0	
76	195	145	3	G	43	24		3	637	129.0	5	DS	31.9	22.3	4.3			3.7				NO			HD	0	1	1	1	0	0	0	PLATFORM HIN
76	195	145	3	G	43	13		2.96	638	130.0	5	CO	21.6	16.5	3.8	21.6	16.5	1.1	1.1	9.3	1.1	NO	UD	CU	HD	0	2	1	1	0	0	0	
76	195	145	3	G	43	16		2.69	639	138.0	5	DS	13.5	10.1	1.3			0.2				RT			PG	0	2	1	1	0	0	0	PLATFORM HIN
76	195	145	3	G	43	15		2.69	640	130.0	5	MI	11.5	8.5	1.3			0.1							SD				1	0	0	0	
89				FP	68		SURFACE		705	105.0	5	SH	55.5	41.5	25.5			57.8											0	0	0	0	
89				FP	68		SURFACE		706	105.0	5	CO	72.1	54.4	13.7	66.6	44.2	40.0	4.2	18.1	4.2	NO	UP	FL	SD	2	2	1	0	0	0	0	.707, .708
89				FP	68		SURFACE		707	105.0	5	DS	40.9	23.7	6.8			6.4				NO			PG	2	1	1	0	0	0	0	.706, .708
89				FP	68		SURFACE		708	105.0	5	PR	47.5	34.3	9.5	36.7	34.3	12.4	3.5	9.0	2.0	NO	UP	FL	SD	2	1	1	0	0	0	0	.706, .707
89				FP	68		SURFACE		709	102.0	5	CO	64.0	54.1	13.7	58.5	54.1	35.8	13.2	33.8	12.3	NO	UP	FL	PG	1	1	1	0	0	0	0	
89				FP	68		SURFACE		710	102.0	5	PR	56.1	46.3	12.8	51.2	46.7	28.4	4.0	13.4	3.8	NO	UP	FL	HD	1	1	1	0	0	0	0	
89				FP	68		SURFACE		711	158.0	5	DS	47.3	42.5	11.1			19.0				NO			FD	2	1	1	0	0	0	0	
89				FP	68		SURFACE		712	158.0	5	DS	52.5	27.1	7.2			9.5				NO			SD	3	0	0	0	0	0	0	
89				FP	68		SURFACE		713	102.0	5	CO	33.6	29.8	11.9			12.1	7.4	15.5	7.3	NO	UP	FL	HD	1	1	1	0	0	0	0	
89				FP	68		SURFACE		714	158.0	5	PR	59.3	51.0	14.2			37.9	6.1	14.9	6.2	NO	UP	FL	HD	3	0	0	0	0	0	0	
89				FP	68		SURFACE		715	148.0	5	MI	45.1	37.2	9.3			12.6				NO			SD	0	3	1	0	0	0	0	
89				FP	68		SURFACE		716	102.0	5	MI	46.0	39.7	8.2			13.4				NO			SD	0	3	1	0	0	0	0	
89				FP	68		SURFACE		717	105.0	5	PR	43.7	28.5	6.0			7.3	4.8	15.2	4.3	NO	UP	FL	SD	0	2	1	0	0	0	0	
89				FP	68		SURFACE		718	102.0	5	CO	39.0	30.8	8.6	33.3	33.2	7.7	3.9	7.1	2.9	NO	UP	FL	SD	1	2	1	0	0	0	0	
89				FP	68		SURFACE		719	163.0	5	CO	59.7	54.2	6.3	54.2	59.7	19.0	5.0	11.5	4.3	NO	UP	FL	SD	0	3	1	0	0	0	0	
89				FP	68		SURFACE		720	102.0	5	PR	40.5	22.6	7.1			6.6	4.3	10.7	3.9	NO	UY	CP	HD	0	2	1	0	0	0	0	
89				FP	68		SURFACE		721	105.0	5	DS	36.2	30.2	6.3			5.4				NO			PG	0	2	1	0	0	0	0	PLATFORM HIN
89				FP	68		SURFACE		722	105.0	5	SH	21.8	23.0	9.0			4.2								0			0	0	0	0	
89				FP	68		SURFACE		723	105.0	5	DS	30.4	17.1	4.7			2.4				NO			SD	0	3	1	0	0	0	0	
89				FP	68		SURFACE		724	105.0	5	CO	29.5	28.4	8.6	29.5	28.4	4.5	9.5	23.8	9.4	NO	UP	FL	PG	0	3	1	0	0	0	0	
89				FP	68		SURFACE		725	105.0	5	DS	26.4	19.4	4.4			2.4				NO			HD	0	2	1	0	0	0	0	
89				FP	68		SURFACE		726	163.0	5	DS	36.0	24.7	6.7			5.0				NO			HD	1	2	1	0	0	0	0	
89				FP	68		SURFACE		728	105.0	5	PR	20.7	16.5	3.0			1.0	2.0	4.1	2.1	NO	UP	FL	HD	0	2	1	0	0	0	0	
89				FP	68		SURFACE		729	102.0	5	PR	14.7	9.0	3.6			0.4	2.3	7.5	2.1	NO	PG	AB	SD	0	2	1	0	0	0	0	
89				FP	68		SURFACE		730	148.0	5	DS	38.1	35.1	4.0			5.5				NO			PG	2	3	2	0	0	0	0	PLATFORM HIN
89				FP	68		SURFACE		731	102.0	5	CO	25.8	18.3	3.1	25.8	18.3	1.6	4.2	14.3	4.1	NO	UP	CR	HD	1	2	1	0	0	0	0	
89				FP	68		SURFACE		732	102.0	5	CO	17.8	11.7	5.0	17.8	11.7	1.1	3.2	4.7	2.8	NO	UP	FL	HD	2	1	1	0	0	0	0	
89				FP	68		SURFACE		733	102.0	5	DS	24.3	15.4	2.9			1.1				NO			SD	1	2	1	0	0	0	0	
89				FP	68		SURFACE		734	163.0	5	DS	27.4	14.7	3.6			1.4				NO			PG	3	0		0	0	0	0	.741.739.742

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
89				FP	68		SURFACE		735	102.0	5	SH	15.6	11.7	5.1			0.5								0			0	0	0	0	
89				FP	68		SURFACE		736	102.0	5	DS	10.1	9.8	3.7			0.1				NO			PG	0	2	1	0	0	0	0	
89				FP	68		SURFACE		737	102.0	5	LT	13.0	8.4	1.4			0.2							HD				0	0	0	0	
89				FP	68		SURFACE		738	102.0	5	LT	10.1	7.6	1.5			0.1							SD				0	0	0	0	
89				FP	68		SURFACE		739	163.0	5	PR	26.1	18.9	4.6			2.7	5.1	11.6	4.2	NO	UP	FL	SD	2	1	1	0	0	0	0	.734.741.742
89				FP	68		SURFACE		740	158.0	5	LT	29.0	20.0	6.5			3.1				NO			HD	3	0	0	0	0	0	0	
89				FP	68		SURFACE		741	102.0	5	DS	34.4	28.8	8.6			7.3				NO			SD	2	1	1	0	0	0	0	.734.739.742
89				FP	68		SURFACE		742	103.0	5	DS	29.1	21.5	5.8			2.7				NO			PG	3	1	1	0	0	0	0	.734.739.741
89				FP	68		SURFACE		743	105.0	5	MI	32.7	29.2	3.3			3.7				NO			SD	0	2	1	1	0	0	0	PLATFORM HIN
89				FP	68		SURFACE		744	132.0	5	MI	57.4	56.9	12.3			36.7				NO			SD	0	2	1	0	0	0	0	PLATFORM HIN
89				FP	68		SURFACE		746	132.0	5	CO	50.3	28.0	8.1	28.0	50.3	10.2	4.8	24.0	3.2	NO	UP	FL	HD	0	3	2	0	0	0	0	
89				FP	68		SURFACE		748	132.0	5	CO	49.3	37.7	5.4	46.0	37.4	8.6	3.6	4.7	3.5	NO	UP	FL	SD	0	3	1	0	0	0	0	
89				FP	68		SURFACE		749	132.0	5	DS	48.0	43.0	4.6			8.7				NO			SD	0	3	2	0	0	0	0	PLATFORM HIN
89				FP	68		SURFACE		751	132.0	5	MI	47.3	39.0	5.1			7.8				NO			HD	0	2	1	0	0	0	0	PLATFORM HIN
89				FP	68		SURFACE		752	132.0	5	CO	43.0	35.7	10.1	35.2	42.2	14.9	11.9	35.3	11.9	NO	UP	CR	SD	1	2	1	0	0	0	0	2 PIECES REF
89				FP	68		SURFACE		753	132.0	5	CO	47.6	38.4	10.2	38.1	47.6	14.1	11.4	18.1	9.9	NO	UP	CR	SD	0	2	1	0	0	0	0	
89				FP	68		SURFACE		754	132.0	5	CO	44.6	18.0	9.5	23.5	28.4	5.3	14.1	18.1	14.1	NO	UP	FL	HD	0	2	1	0.	0	0	0	
89				FP	68		SURFACE		756	132.0	5	PR	36.0	24.4	3.3			3.2	3.2	8.6	2.7	NO	UY	CP	HD	0	2	1	0	0	0	0	
89				FP	68		SURFACE		757	132.0	5	CO	26.4	25.6	2.1	26.4	25.6	1.6	3.1	9.0	2.9	NO	UP	FL	PG	0	2	1	1	0	0	0	
89				FP	68		SURFACE		759	132.0	5	MI	23.8	19.4	3.4			1.0				NO			HD	0	1	1	1	0	0	0	
89				FP	68		SURFACE		760	132.0	5	MI	24.6	17.5	1.7			0.8				NO			SD	0	1	1	1	0	0	0	PLATFORM HIN
89				FP	68		SURFACE		761	132.0	5	PR	32.8	21.8	2.9	21.8	32.8	2.2	2.2	9.1	2.2	NO	UP	FL	SD	0	3	1	0	0	0	0	
89				FP	68		SURFACE		762	132.0	5	CO	46.3	26.6	3.2	46.3	26.6	2.9	2.3	5.9	2.3	NO	PR	CP	HD	0	2	1	0	0	0	0	
89				FP	68		SURFACE		763	132.0	5	DS	27.7	19.6	2.7			1.2				NO			HD	0	2	1	0	0	0	0	PLATFORM HIN
89				FP	68		SURFACE		764	132.0	5	CO	27.8	13.2	2.0	13.2	27.9	0.9	2.8	9.6	2.6	DS	UP	FL	HD	0	1	1	0	0	0	0	
89				FP	68		SURFACE		765	132.0	5	PR	21.5	21.1	3.0			1.6	1.8	5.7	1.2	NO	UP	FL	HD	0	3	1	0	0	0	0	
89				FP	68		SURFACE		766	132.0	5	MI	26.0	22.4	2.9			2.0				DS			SD	0	3	1	0	0	0	0	
89				FP	68		SURFACE		767	132.0	5	PR	21.6	18.8	2.7			0.9	3.0	12.7	3.2	NO	PG	CP	HD	0	3	1	0	0	0	0	
89				FP	68		SURFACE		768	132.0	5	LT	14.3	10.3	2.9			0.4							SD				0	0	0	0	
89				FP	68		SURFACE		769	132.0	5	DS	15.4	6.0	1.7			0.2							HD				0	0	0	0	
89				FP	68		SURFACE		770	102.0	5	MI	21.9	18.1	3.3			1.5							HD	0	3	1	0	0	0	0	PLATFORM HIN
89				FP	68		SURFACE		771	133.0	5	DS	48.2	30.9	5.5			7.8				NO			PG	1	3	1	0	0	0	0	PLATFORM HIN
89				FP	68		SURFACE		772	133.0	5	CO	31.7	26.8	3.7	31.7	26.8	4.2	3.2	11.7	3.4	NO	PFG	AB	PG	0	3	1	0	0	0	0	
89				FP	68		SURFACE		773	133.0	5	PR	20.5	11.9	6.9			1.1	8.5	13.9	7.6	NO	UP	CR	SD	1	2	1	0	0	0	0	
89				FP	68		SURFACE		774	133.0	5	DS	25.2	18.7	3.5			1.7				NO			HD	0	1	1	0	0	0	0	PLATFORM HIN
89				FP	68		SURFACE		775	133.0	5	PR	23.9	9.6	3.8			0.7	1.7	7.0	1.6	DS	PR	CP	SD	0	3	1	0	0	0	0	
89				FP	68		SURFACE		776	133.0	5	DS	20.5	13.4	2.1			0.5				ST			SD	0	3	2	0	0	0	0	PLATFORM HIN
89				FP	68		SURFACE		777	133.0	5	PR	15.1	11.3	1.3			0.3	2.6	6.4	2.4	NO	UP	CR	SD	0	3	2	0	0	0	0	
89				FP	68		SURFACE		778	133.0	5	DS	21.9	12.9	1.8			0.2				RT			FD	0	2	1	0	0	0	0	
89				FP	68		SURFACE		780	102.0	5	CO	36.0	36.0	3.0	36.0	36.0	5.0	5.5	11.8	3.5	NO	UP	FL	FD	2	1	1	0	0	0	0	
89				FP	68		SURFACE		781	164.0	5	PR	26.2	20.0	3.5			1.6	1.8	7.6	1.6	NO	UP	FL	SD	0	3	1	0	0	0	0	
89				FP	68		SURFACE		782	102.0	5	DS	25.2	12.4	4.0			1.0				NO			PG	1	2	1	0	0	0	0	
89				FP	68		SURFACE		783	136.0	5	MI	14.5	11.5	2.8			0.4				NO			SD	1	1	1	0	0	0	0	PLATFORM HIN
89				FP	68		SURFACE		784	164.0	5	MI	13.3	11.5	1.6			0.2							SD				0	0	0	0	
89				FP	68		SURFACE		785	102.0	5	LT	15.2	11.8	1.8			0.3							SD	1	1	1	0	0	0	0	
89				FP	68		SURFACE		786	123.0	5	CO	8.6	6.9	0.7	8.6	6.9	0.1	0.7	2.9	0.6	RT	PR	CP	SD	0	3	1	0	0	0	0	
89				FP	68		SURFACE		787	123.0	5	MI	30.5	21.4	4.5			2.4				NO			SD	1	2	1	0	0	0	0	
89				FP	68		SURFACE		788	123.0	5	MI	22.5	14.5	4.3			1.4				NO			SD	1	2	1	0	0	0	0	
89				FP	68		SURFACE		789	123.0	5	CO	20.6	13.0	2.0	14.0	20.3	0.7	2.3	10.1	2.2	DS	PG	AB	HD	0	3	1	0	0	0	0	
89				FP	68		SURFACE		790	123.0	5	LT	15.7	13.0	1.6			0.1							SD				0	0	0	0	
89				FP	68		SURFACE		791	120.0	5	DS	23.4	20.2	6.7			2.8				NO			SD	2	1	1	1	0	0	0	PLATFORM HIN
89				FP	68		SURFACE		792	120.0	5	SH	18.3	16.5	4.3			0.8								3			1	0	0	0	
89				FP	68		SURFACE		793	120.0	5	MI	11.0	11.2	2.9			0.4							SD	0	1	1	1	0	0	0	

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
89				FP	68		SURFACE		794	106.0	5	DS	16.2	8.2	2.1			0.2							HD	0	2	1	1	0	0	0	
89				FP	68		SURFACE		795	128.0	5	DS	35.7	26.9	10.9			9.6				NO			SD	3	0	0	0	0	0	0	PLATFORM HIN
89				FP	68		SURFACE		796	128.0	5	CO	26.0	15.4	5.4	26.0	15.4	1.7	3.2	7.5	3.2	NO	UP	FL	PG	1	2	1	0	0	0	0	
89				FP	68		SURFACE		797	105.0	5	MI	14.6	14.5	6.4			1.1				NO			SD	0	2	1	0	0	0	0	
89				FP	68		SURFACE		798	121.0	5	LT	16.0	13.9	2.2			0.5							SD				0	0	0	0	
89				FP	68		SURFACE		799	155.0	5	MI	11.2	10.4	1.4			0.1							SD				0	0	0	0	
89				FP	68		SURFACE		800	110.0	5	LT	33.6	20.4	7.4			3.5				NO			SD	0	3	1	0	0	0	0	
89				FP	68		SURFACE		801	110.0	5	SH	11.8	9.3	4.1			0.3								0			0	0	0	0	
89				FP	68		SURFACE		802	157.0	5	DS	26.9	13.6	3.9			1.7				NO			SD	0	2	1	1	0	0	0	
89				FP	68		SURFACE		803	120.0	5	SH	46.1	16.8	13.1			8.7								2			1	0	0	0	
89				FP	68		SURFACE		804	156.0	5	SH	17.5	19.0	4.2			1.1								0			1	0	0	0	
89				FP	68		SURFACE		805	117.0	5	SH	38.4	32.4	19.7			23.9											0	0	0	0	
89				FP	68		SURFACE		806	42.0	6	DS	32.5	22.5	4.9			2.5				NO			FD	1	2	2	1	0	0	0	
89				FP	68		SURFACE		807	42.0	6	CO	26.9	22.1	8.0	26.9	22.1	4.3	3.0	10.6	2.8	NO	PG	AB	HD	0	3	1	1	0	0	0	
89				FP	68		SURFACE		808	42.0	6	DS	21.7	15.6	4.0			1.4				NO			PG	0	3	1	1	0	0	0	
89				FP	68		SURFACE		809	42.0	6	PR	24.8	16.6	2.0			0.6	1.8	4.6	1.8	BT	PRG	CP	SD	0	3	1	1	0	0	0	
19	200	210	3	F	30				188	30.0	6	PR	19.4	9.9	1.4			0.2	1.5	3.2	1.4	BT	UD	CP	SD	0	3	1	0	0	0	0	
19	200	210	3	F	30				189	70.0	6	MI	31.5	18.5	2.4			1.5							SD				0	0	0	0	
19	200	210	3	F	30				190	28.0	6	PR	20.7	18.0	2.2			0.7	1.4	3.2	1.2	BT	PFR	CP	SD	0	3	2	0	0	1	0	
20	200	205	3	F	31		2.81	2.93	191	29.0	6	CO	12.4	9.1	3.0	9.4	12.4	0.1	2.8	4.9	3.1	NO	PR	CP	FD	0	2	1	0	0	0	0	
20	200	205	3	F	31		2.81	2.93	192	30.0	6	MI	21.0	18.1	2.5			0.7				BT			SD	0	3	2	0	0	0	0	
52	200	200	3	F	32		2.57	2.82	372	201.0	4	MI	31.9	25.7	5.2			3.0				ST			SD	0	3	2	0	0	0	0	
52	200	200	3	F	32		2.57	2.82	373	201.0	4	CO	20.5	16.2	1.9	20.5	16.2	0.6	2.4	5.0	1.9	NO	UD	CP	SD	0	2	1	0	1	0	0	
52	200	200	3	F	32		2.57	2.82	374	201.0	4	PR	19.5	8.0	1.4	8.0	19.5	0.3	1.5	11.5	1.5	DS	PF	CP	HD	0			0	0	0	0	
52	200	200	3	F	32		2.57	2.82	375	201.0	4	PR	14.7	7.7	1.9	7.7	14.7	0.2	1.9	10.1	1.7	DS	PF	CP	HD	0			0	0	0	0	
52	200	200	3	F	32		2.57	2.82	376	201.0	4	MI	14.4	10.4	3.1			0.4							SD				0	1	0	0	
52	200	200	3	F	32		2.57	2.82	377	201.0	4	LT	15.4	6.1	2.9			0.3							SD				0	0	0	0	
52	200	200	3	F	32		2.57	2.82	378	201.0	4	DS	16.5	14.2	1.8			0.2							HD	0			0	0	0	0	
52	200	200	3	F	32		2.57	2.82	379	201.0	4	DS	5.8	8.6	0.7			0.1							SD				0	0	0	0	
52	200	200	3	F	32		2.57	2.82	380	201.0	4	DS	5.6	5.3	0.7			0.1							SD				0	0	0	0	
52	200	200	3	F	32		2.57	2.82	381	201.0	4	DS	12.5	7.0	1.2			0.1				RT			FD	0	2	1	0	0	0	0	PLATFORM HIN
52	200	200	3	F	32	11		2.64	382	7.1	3	MI	7.0	5.9	0.8			0.1				RT			SD	0	2	1	0	0	0	0	PLATFORM HIN
52	200	200	3	F	32	13		2.62	383	7.1	3	DS	11.7	8.7	1.4			0.1				BT			FD	0	3	2	0	0	1	0	
52	200	200	3	F	32		2.55	2.74	384	30.0	6	PR	9.7	7.2	1.4			0.1	2.1	7.9	2.3	BT	PFG	CP	HD	0	3	1	0	0	0	0	
52	200	200	3	F	32				385	30.0	6	DS	12.6	8.3	0.9			0.1							FD	0	3	1	0	0	0	0	
52	200	200	3	F	32		2.55	2.82	386	28.0	6	CO	13.9	11.6	1.3	13.9	11.6	0.1	1.9	5.5	1.7	DS	PG	AB	FD	0	3	2	0	0	0	0	
52	200	200	3	F	32		2.55	2.74	387	48.0	6	LT	20.4	11.9	1.9			0.4							SD				0	3	0	0	
52	200	200	3	F	32		2.55	2.74	388	48.0	6	MI	24.0	13.6	2.5			0.7				BT			HD	0	3	2	0	0	0	0	PLATFORM HIN
53	200	195	3	F	33				390	138.0	5	DS	53.3	29.4	8.5			12.2				NO			PG	0			0	1	0	0	PLATFORM HIN
53	200	195	3	F	33				391	15.0	2	DS	11.9	10.7	1.5			0.1				BT			FD	0	3	2	0	3	0	0	
53	200	195	3	F	33				392	32.0	6	LT	19.7	13.2	2.0			0.4							HD				0	0	0	0	
53	200	195	3	F	33				393	30.0	6	PR	12.2	8.1	2.2	8.1	12.2	0.1	1.8	2.2	1.3	NO	UY	CP	HD	0			0	1	0	0	
53	200	195	3	F	33	3,5			394	30.0	6	DS	8.2	4.0	1.2			0.1							FD	0			0	0	0	0	REFITS?
53	200	195	3	F	33				396	56.0	3	DS	21.7	17.3	2.9			0.7							FD				0	3	0	0	refit w/.446
21	200	190	3	F	34				193	32.0	1	MI	25.1	19.7	2.8			1.1							SD	0	3	2	0	0	0	0	
48	200	190	3	F	34				367	41.0	6	LT	22.8	15.4	3.2			0.7				NO			SD	0			0	1	0	0	
22	200	180	3	F	36	2		2.55	195	12.0	3	DS	10.4	6.6	1.0			0.1				BT			FD	0			0	0	0	0	
22	200	180	3	F	36		2.45	2.72	196	4.0	2	DS	11.6	8.3	1.8			0.1							FD	0	3	2	0	0	0	0	
22	200	180	3	F	36		2.45	2.72	197	4.0	2	DS	9.3	7.2	2.5			0.1				RT			FD	0	3	2	0	0	0	0	PLATFORM HIN
22	200	180	3	F	36		2.45	2.72	198	4.0	2	PR	10.7	6.4	0.9			0.1	2.3	6.4	2.3	BT	PF	CP	SD	0	2	1	0	0	0	0	
22	200	180	3	F	36		2.45	2.72	199	15.0	2	MI	8.4	5.3	0.7			0.1				RT			SD	0	3	1	0	0	0	0	
22	200	180	3	F	36		2.45	2.72	200	6.0	6	CO	15.4	12.1	4.0	15.4	12.1	0.7	1.8	7.4	1.8	ST	PRG	AB	FD	0	3	1	0	0	0	0	BIPOLAR?
22	200	180	3	F	36		2.45	2.72	201	21.0	6	CO	22.0	13.6	2.4	13.6	22.0	0.8	3.6	13.9	3.8	NO	UD	FL	HD	0	1	1	0	0	0	0	

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
22	200	180	3	F	36		2.45	2.72	202	96.0	2	CO	13.6	9.6	2.2	13.6	9.6	0.2	0.9	3.7	0.9	ST	PR	CP	HD	0	3	1	0	0	0	0	BIPOLAR?
22	200	180	3	F	36		2.45	2.72	203	96.0	2	CO	10.4	6.3	2.3	6.9	10.4	0.1	2.1	3.8	1.2	RT	PG	AB	FD	0	3	2	0	0	0	0	
22	200	180	3	F	36		2.45	2.72	204	19.0	6	CO	17.3	7.9	1.8	17.3	7.9	0.1	1.1	3.2	1.1	BT	PRG	AB	FD	0	3	1	0	0	0	0	
22	200	180	3	F	36		2.45	2.72	205	16.1	2	PR	6.9	8.9	1.3			0.1	1.1	2.0	1.2	RT	PR	CP	SD	0	3	1	0	0	0	0	
22	200	180	3	F	36		2.45	2.72	206	16.2	2	PR	14.7	10.1	1.2			0.1	0.9	2.3	0.8	BT	PR	CP	FD	0	3	1	0	0	0	0	
22	200	180	3	F	36		2.45	2.72	207	16.2	2	PR	14.0	9.8	1.2			0.1	1.3	6.6	1.2	BT	PR	CP	FD	0	3	2	0	0	0	0	
22	200	180	3	F	36		2.45	2.72	208	16.2	2	CO	8.7	7.5	0.7	7.5	8.4	0.1	0.6	1.9	0.5	RT	PR	CP	FD	0	2	1	0	0	0	0	
22	200	180	3	F	36		2.45	2.72	209	108.0	5	PR	23.2	15.6	5.0			1.7	4.2	11.3	3.3	NO	UD	FL	HD	0	3	1	0	0	0	0	
22	200	180	3	F	36		2.45	2.72	211	106.0	5	PR	12.3	9.1	2.0			0.2	2.1	5.8	2.2	NO	UP	CU	SD	0	1	1	0	0	0	0	
22	200	180	3	F	36		2.45	2.72	212	6.0	6	PR	18.0	15.4	3.7			1.1	3.5	11.0	2.3	NO	UP	FL	HD	3	0	0	0	0	0	0	
22	200	180	3	F	36		2.45	2.72	213	33.0	6	PR	17.4	15.0	4.1			1.0	4.6	11.7	4.4	NO	UD	FL	HD	0	1	1	1	0	0	0	
23	200	175	3	F	37		2.57	2.73	214	109.0	5	DS	18.9	21.2	7.8			2.9				NO			HD	2	1	1	0	0	0	0	
23	200	175	3	F	37		2.57	2.73	215	119.0	5	MI	15.5	6.8	4.0			0.6				NO			SD				0	0	0	0	
23	200	175	3	F	37		2.57	2.73	216	113.0	5	CO	13.7	8.1	13.7	8.1	13.7	0.2	1.8	6.4	2.1	DS	UD	FL	HD	0	2	1	0	0	0	0	
23	200	175	3	F	37		2.57	2.73	217	105.0	5	DS	30.7	20.3	6.5			3.8				ST			FD	0	3	2	0	0	0	0	
23	200	175	3	F	37		2.57	2.73	218	103.0	5	MI	34.0	30.1	7.6			9.3				NO			SD	2	1	1	0	0	0	0	
23	200	175	3	F	37		2.57	2.73	219	103.0	5	DS	16.7	6.8	3.0			0.3				NO			HD	0			0	0	0	0	
23	200	175	3	F	37		2.57	2.73	220	103.0	5	PR	19.7	15.0	4.2	15.0	19.7	1.2	3.0	8.1	2.2	NO	UY	CP	HD	0	2	1	0	0	0	0	
23	200	175	3	F	37		2.57	2.73	221	16.2	2	CO	12.7	12.2	1.2	12.2	12.7	0.1	1.5	2.3	1.5	BT	PR	CP	PG	0	3	1	0	0	0	0	
23	200	175	3	F	37		2.57	2.73	222	34.0	6	PO	12.2	9.3	2.5			0.2							SD	0			1	0	0	0	SPALL
56	200	170	3	F	38	3		2.59	399	2.0	2	MI	10.9	10.9	1.1			0.1	1.5			RT			SD				0	0	0	0	PLATFORM HIN
24	200	165	3	F	39			2.27	223	35.0	6	PR	28.3	21.1	4.8			2.0	3.5	7.4	3.3	DS	UY	CP	SD	0	3	2	1	0	0	0	ref A1922.38
61	200	160	3	F	40			2.76	440	43.0	6	CO	24.7	18.8	2.7	18.8	24.7	1.0	2.8	9.0	3.0	NO	UY	CP	HD	0	2	1	0	0	0	0	
25	200	155	3	F	41	15		2.72	224	70.0	6	PR	19.1	14.3	3.5			0.6	2.3	7.6	2.3	DS	PRG	CP	HD	0	3	2	1	0	0	0	
25	200	155	3	F	41	6		2.74	225	28.0	6	MI	17.7	14.4	2.9			0.3							SD				1	0	0	0	
25	200	155	3	F	41	12		2.66	226	28.0	6	MI	16.9	13.2	1.5			0.2							SD	0			1	0	0	0	
25	200	155	3	F	41	7		2.8	227	28.0	6	PR	16.6	16.4	1.9	16.4	16.6	0.3	2.1	8.1	2.8	DS	UD	FL	SD	0	3	2	1	0	0	0	
25	200	155	3	F	41	8		2.74	228	28.0	6	CO	21.2	14.2	1.6	21.2	14.2	0.3	1.4	6.7	1.4	BT	PR	CP	FD	0	3	2	1	0	0	0	
25	200	155	3	F	41	13		2.72	229	10.0	6	DS	10.8	8.5	1.9			0.1							FD	0			1	0	0	0	
25	200	155	3	F	41	18		2.7	230	4.2	2	CO	12.8	10.1	1.3	12.8	10.1	0.1	1.7	5.8	1.1	RT	PR	CP	FD	0	3	2	0	0	0	0	
25	200	155	3	F	41	14		2.72	231	56.0	3	DS	20.4	8.7	1.9			0.2				BT			FD	0	3	1	1	0	0	0	
25	200	155	3	F	41	10		2.74	232	138.0	5	MI	14.7	11.6	4.9			0.7				NO			SD	0	2	1	1	0	0	0	
25	200	155	3	F	41	4		2.69	233	138.0	5	DS	14.6	10.4	3.5			0.5				NO			HD	0	2	1	1	0	0	0	
25	200	155	3	F	41	5		2.55	234	109.0	5	PR	28.2	24.4	4.6	24.4	28.2	2.6	2.9	7.3	2.4	DS	UD	FL	SD	0	3	1	1	0	0	0	
25	200	155	3	F	41	9		2.57	235	109.0	5	CO	25.9	22.8	3.9	22.8	25.9	1.8	3.1	11.1	2.4	DS	PG	AB	HD	0	3	1	0	0	0	0	
87	200	150	3	F	42	13		2.76	672	21.0	6	CO	10.1	7.5	1.3	7.5	10.1	0.1	1.4	3.2	0.6	RT	PR	CP	FD	0	3	2	0	0	0	0	
87	200	150	3	F	42	7		2.56	673	21.0	6	DS	12.3	11.6	1.3			0.2				RT			PG	0	3	2	0	0	0	0	PLATFORM HIN
87	200	150	3	F	42	19		2.73	674	10.0	6	CO	18.1	16.5	2.7	18.1	16.5	0.4	1.5	10.8	1.1	NO	UP	FL	FD	0	3	1	1	0	0	0	
87	200	150	3	F	42	24		2.7	675	4.2	2	DS	8.4	6.7	0.9			0.1				RT			PG	0	2	1	0	0	0	0	PLATFORM HIN
87	200	150	3	F	42	5		2.54	676	16.2	2	CO	7.4	5.5	0.9	7.4	5.5	0.1	0.6	2.3	0.6	RT	PR	CP	PG	0	3	1	0	0	0	0	
87	200	150	3	F	42	10		2.77	677	16.2	2	DS	4.5	3.1	0.5			0.1				RT			FD	0	2	1	0	0	0	0	
87	200	150	3	F	42	12		2.79	678	43.0	6	MI	17.1	14.9	1.2			0.3				NO			SD	0	2	1	0	1	0	0	
87	200	150	3	F	42	18		2.75	679	70.0	6	MI	9.7	11.8	1.1			0.1							SD	0	2	1	0	0	0	0	
87	200	150	3	F	42	22		2.74	680	43.0	6	CO	5.4	4.3	0.8			0.1	1.0		0.9	RT	UP	FL	FD	0	2	1	0	0	0	0	
87	200	150	3	F	42	3		2.56	681	18.0	2	DS	8.2	7.7	0.8			0.1							FD	0	2	1	1	0	0	0	
87	200	150	3	F	42	14		2.76	682	19.0	6	MI	5.5	4.1	0.7			0.1							SD				1	0	0	0	
87	200	150	3	F	42	11		2.77	683	70.0	6	DS	10.6	7.5	0.9			0.1				RT			HD	0	2	1	0	0	0	0	PLATFORM HIN
87	200	150	3	F	42	25		2.74	684	51.0	6	DS	14.5	13.7	2.2			0.4				NO			HD	0	1	1	0	0	0	1	PLATFORM HIN
87	200	150	3	F	42	21		2.75	685	51.0	6	DS	12.5	8.7	2.3			0.2							SD	0	3	1	0	0	0	0	
87	200	150	3	F	42	9		2.51	686	51.0	6	DS	8.7	7.0	1.0			0.1				DS			FD	0	1	1	0	0	0	0	PLATFORM HIN
87	200	150	3	F	42	16		2.72	687	51.0	6	DS	12.1	7.3	1.8			0.1				RT			HD	0	3	1	0	0	0	0	PLATFORM HIN
87	200	150	3	F	42	15		2.72	688	51.0	6	CO	9.3	5.7	1.0			0.1	0.6	2.5	0.5	RT	PR	CP	FD	0	2	1	0	0	0	0	
87	200	150	3	F	42	29		2.78	689	51.0	6	CO	6.4	5.0	1.2	6.4	5.0	0.1	0.6	1.6	0.5	RT	PG	AB	PG	0	3	2	0	0	0	0	

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
87	200	150	3	F	42	23		2.77	690	51.0	6	DS	7.6	4.2	0.9			0.1				RT			HD	0	1	0	0	0	0	0	PLATFORM HIN
87	200	150	3	F	42	8		2.7	691	51.0	6	DS	7.5	5.2	1.0			0.1				RT			FD	0	2	1	0	0	0	0	
87	200	150	3	F	42	2		2.75	692	51.0	6	DS	4.9	3.0	0.3			0.1				RT			FD	0	2	1	0	0	0	0	
87	200	150	3	F	42	1		2.85	693	105.0	5	DS	33.9	16.7	3.1			1.4				NO			FD	0	3	1	0	0	0	0	
87	200	150	3	F	42	4		2.61	694	138.0	5	DS	20.8	13.2	3.5			0.6				NO			HD	0	2	1	0	0	0	0	
87	200	150	3	F	42	30		2.79	696	113.0	5	CO	20.6	14.0	1.5	13.7	17.8	0.8	4.9	16.3	4.9	NO	UP	FL	PG	0	2	1	0	1	0	0	
87	200	150	3	F	42	20		2.82	697	109.0	5	PR	16.7	8.9	1.4			0.2	1.3	7.4	1.0	DS	UP	FL	SD	0	2	1	0	0	0	0	
87	200	150	3	F	42	28		2.4	698	127.0	5	PR	34.1	22.8	3.4			3.9	2.0	6.9	1.3	ST	PFG	AB	SD	0	3	2	1	0	0	0	
26	200	145	3	F	43	4		2.5	236	105.0	5	PR	17.6	15.5	3.0			0.7	1.7	5.9	1.6	DS	PR	AB	HD	0	3	2	0	0	0	0	
26	200	145	3	F	43	3		2.79	237	18.0	2	MI	12.0	13.4	1.9			0.2				BT			SD	0	3	2	1	0	1	0	WASHED
26	200	145	3	F	43	5		2.8	238	15.0	2	CO	7.0	6.9	0.8	7.0	6.9	0.1	0.9	1.5	0.8	RT	PR	FL	FD	0	3	1	0	0	0	0	
27	200	145	3	F	43	180	POST		239	138.0	5	MI	21.4	15.0	5.6			1.5				NO			SD	0	2	1	0	0	0	0	A1922.35
86	205	215	3	E	29				671	2.2	2	MI	14.0	12.5	2.3			0.3				BT			HD	0	3	2	0	0	0	0	PLATFORM HIN
68	205	210	3	E	30		2.82	2.96	461	28.0	6	PR	28.2	24.6	3.4			2.1	2.5	6.7	2.5	BT	PFR	CP	HD	0	3	2	0	0	1	0	
65	205	205	3	E	31	10		2.39	446	56.0	3	MI	35.2	30.5	2.8			2.5							SD	0	2	1	0	0	0	0	
65	205	205	3	E	31	11		2.24	447	57.0	6	PR	26.2	20.2	2.4			1.0	3.5	7.5	3.4	BT	UD	FL	HD	0	3	1	0	0	0	0	
65	205	205	3	E	31	19		2.73	448	77.0	1	CO	21.4	10.4	4.4	10.4	21.4	0.7	2.7	6.1	1.5	NO	UP	FL	HD	1	2	1	0	0	0	0	
65	205	205	3	E	31	17		2.73	449	49.0	1	CO	19.4	15.5	3.8	19.4	15.5	0.9	2.8	6.8	2.7	NO	UP	FL	PG	0	2	1	0	1	0	0	
65	205	205	3	E	31	16		2.7	450	49.0	1	LT	11.2	7.3	2.9			0.1							SD				0	0	0	0	
65	205	205	3	E	31	14		2.7	451	29.0	6	DS	16.0	11.9	1.6			0.2				BT			PG	0	3	1	0	0	0	0	PLATFORM HIN
65	205	205	3	E	31	17		2.47	452	49.0	1	DS	16.3	10.7	2.5			0.2				NO			HD	0			0	1	0	0	
65	205	205	3	E	31	20		2.47	453	48.0	6	MI	27.7	19.8	1.9			1.1							SD				0	1	0	0	ref w/ .454?
65	205	205	3	E	31				454	48.0	6	MI	18.4	7.5	1.9			0.2							SD				0	1	0	0	ref w/ .453?
65	205	205	3	E	31				455	16.1	2	DS	10.6	7.2	3.3			0.1				ST			FD	0	3	2	0	2	0	0	
65	205	205	3	E	31				456	201.0	4	DS	8.5	4.7	1.2			0.1				RT			FD	0	3	1	0	0	0	0	
80	205	205	3	E	31	6		2.68	646	69.0	6	CO	12.8	4.5	1.3	12.8	4.5	0.1	0.5	1.4	0.5	RT	PR	CP	PG	1	3	1	1	0	0	0	SCRAPER REFI
80	205	205	3	E	31	7		2.81	647	59.0	2	LT	14.5	3.0	2.1			0.1							HD	0			1	0	0	0	SCRAPER REFI
84	205	205	3	E	31	18		2.76	669	49.0	1	DS	20.6	6.7	1.7			0.2				BT			FD	0	2	1	0	1	0	0	PLATFORM HIN
6	205	200	3	E	32			2.56	27	201.0	4	CO	18.4	17.6	2.0	15.7	15.3	0.4	2.4	7.8	2.1	NO	UD	FL	HD	0	1	1	0	0	0	0	
60	205	200	3	E	32	5		2.57	422	7.3	3	MI	14.2	15.9	1.6			0.3				BT			SD	0	3	2	0	0	0	0	
60	205	200	3	E	32	12		2.47	423	7.3	3	MI	9.7	12.9	1.7			0.2				BT			SD	0	3	2	0	0	0	0	
60	205	200	3	E	32	15		2.78	424	7.1	3	CO	11.2	8.7	1.7	11.2	8.7	0.1	1.0	3.4	0.8	RT	PG	AB	FD	0	3	2	0	1	0	0	
60	205	200	3	E	32	2		2.68	425	10.0	6	PR	8.7	6.4	1.6	6.4	8.7	0.1	1.4	4.0	1.3	NO	UP	FL	SD	0	2	1	0	0	0	0	
60	205	200	3	E	32	10		2.35	428	30.0	6	LT	22.6	12.0	4.5			0.9							HD	0	3	2	0	0	0	0	
60	205	200	3	E	32	11		2.5	429	30.0	6	PR	11.7	10.4	1.3			0.1	2.5	2.8	2.4	NO	UP	FL	SD	0	2	1	0	0	0	0	
60	205	200	3	E	32	17		2.79	430	3.0	2	DS	12.8	9.5	0.8			0.1				BT	PR	CP	FD	0	3	1	0	0	0	0	SPLIT PLATFO
60	205	200	3	E	32			2.69	431	16.2	2	CO	10.7	6.7	1.1	8.5	10.7	0.1	0.7	1.8	0.6	RT	PG	CP	FD	0	3	1	0	0	0	0	
60	205	200	3	E	32		2.35	2.69	433	55.0	6	DS	13.2	8.0	1.4			0.1				NO			FD	0	2	1	0	0	0	0	
60	205	200	3	E	32		2.52	2.79	434	201.0	4	MI	17.4	12.7	1.4			0.2				NO			SD	0	2	1	0	0	0	0	
60	205	200	3	E	32		2.52	2.79	435	201.0	4	LT	15.2	11.0	2.4			0.3				NO			FD	0	2	1	0	2	0	0	
60	205	200	3	E	32		2.52	2.79	436	201.0	4	CO	9.9	5.8	0.9	9.9	5.8	0.1	1.8	4.0	1.8	RT	UD	FL	FD	0	3	1	0	0	0	0	2 PIECES REF
60	205	200	3	E	32		2.52	2.79	437	201.0	4	PR	14.4	14.1	1.4			0.3	1.1	4.8	1.3	NO	PR	CP	SD	0	1	1	0	0	0	0	
60	205	200	3	E	32		2.52	2.79	438	201.0	4	CO	15.6	13.3	2.3	13.3	15.6	0.3	2.4	6.6	1.9	NO	UP	FL	HD	0	2	1	0	0	0	0	
60	205	200	3	E	32		2.52	2.79	439	201.0	4	DS	16.5	12.0	1.4			0.2				BT			HD	0	3	1	0	0	0	0	
10	205	180	3	E	36			2.62	100	19.0	6	MI	6.0	4.3	0.6			0.1				RT			SD	0	3	2	0	0	0	0	PRESSURE-FLK
10	205	180	3	E	36			2.62	101	20.0	6	CO	11.7	12.0	1.6	11.7	12.0	0.2	1.9	6.9	2.0	NO	UP	FL	SD	0	2	1	0	0	0	0	
10	205	180	3	E	36			2.62	102	20.0	6	MI	9.1	8.3	1.0			0.1				BT			SD	0	3	2	0	0	0	0	
10	205	180	3	E	36			2.62	103	22.0	2	PR	13.6	7.7	1.0			0.1	0.8	4.8	0.8	DS	UP	FL	FD	0	3	1	1	0	0	0	
10	205	180	3	E	36			2.62	104	22.0	2	LT	8.2	4.2	1.5			0.1							HD	0			1	1	0	0	
10	205	180	3	E	36			2.62	105	21.0	6	CO	18.3	10.5	4.5	10.5	18.3	0.7	4.4	6.2	4.2	DS	UP	FL	HD	0	2	1	0	0	0	0	
10	205	180	3	E	36			2.62	106	21.0	6	DS	11.4	8.8	1.3			0.1				BT			FD	0	3	2	0	0	0	0	
8	205	180		E	36				34	105.0	5	SH	35.1	29.3	9.7			4.8								0			0	0	0	0	BURIN-LIKE
10	205	180	3	E	36			2.62	83	12.0	3	LT	11.6	6.8	1.1			0.1							HD	0			1	1	0	0	

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
10	205	180	3	E	36			2.62	84	16.2	2	SH	22.9	8.3	8.5			1.2								0			0	1	0	0	TOOL
10	205	180	3	E	36			2.62	85	4.0	2	CO	12.6	11.6	1.9	12.3	10.0	0.2	1.9	3.4	1.3	RT	UD	FL	SD	0	3	2	0	0	0	0	
10	205	180	3	E	36			2.62	86	30.0	6	DS	8.0	7.4	1.0			0.1				RT			SD	0	3	2	0	0	0	0	
10	205	180	3	E	36			2.62	87	30.0	6	DS	5.1	3.1	0.3			0.1				RT			FD	0	3	1	0	0	0	0	PRESSURE-FLK
10	205	180	3	E	36			2.62	88	6.0	6	CO	13.9	12.8	4.3	13.9	12.8	0.6		6.1	1.9	ST	PR	CU	SD	0	3	2	0	2	0	0	
10	205	180	3	E	36			2.62	89	6.0	6	CO	12.9	8.9	1.8	12.9	8.9	0.1	1.6	3.6	1.3	RT	PRG	CP	FD	0	3	1	0	1	0	0	
10	205	180	3	E	36			2.62	90	6.0	6	DS	12.8	6.9	1.5			0.1				RT			FD	0	2	1	0	0	0	0	POSS. REFIT?
10	205	180	3	E	36			2.62	91	6.0	6	CO	8.5	4.9	1.3	8.5	4.9	0.1		2.6	1.0	RT	PR	CP	FD	0	3	1	0	0	0	0	
10	205	180	3	E	36			2.62	92	108.0	5	PR	17.8	15.8	4.4			1.1	4.1	10.6	4.0	NO	UP	FL	SD		2	2	0	1	0	0	
10	205	180	3	E	36			2.62	93	16.2	2	PR	6.2	3.3	1.0			0.1		2.8	0.8	RT	PR	CP	HD	0	2	1	0	0	0	0	
10	205	180	3	E	36			2.62	94	15.0	2	CO	15.4	10.3	1.4	15.4	10.3	0.1	0.9	2.4	0.8	RT	UP	FL	SD	0	2	1	0	0	0	0	
10	205	180	3	E	36			2.62	95	16.0	2	DS	7.0	6.3	0.9			0.1							FD	0	2	1	0	0	0	0	
10	205	180	3	E	36			2.62	96	17.0	2	PR	8.4	9.6	1.3			0.1	1.5	4.2	1.3	RT	PF	FL	SD	0	2	1	0	0	0	0	
10	205	180	3	E	36			2.62	97	17.0	2	CO	7.7	4.7	0.5	7.7	4.7	0.1	0.6	1.8	0.6	RT	PR	CP	FD	0	3	1	0	0	0	0	PRESSURE-FLK
10	205	180	3	E	36			2.62	98	18.0	2	PO	15.9	13.5	3.3			0.4							SD	0	3	2	1	0	0	0	
11	205	175	3	E	37			2.6	107	22.0	2	CO	21.8	15.1	1.4	15.1	21.8	0.4	1.3	5.1	0.9	DS	PF	CP	HD	0	1	1	1	0	0	0	REFIT (108)
11	205	175	3	E	37			2.6	108	22.0	2	CO	21.6	15.1	3.4	15.1	21.6	0.8	3.0	10.7	2.5	DS	UP	FL	HD	0	2	1	1	0	0	0	REFIT (107)
11	205	175	3	E	37			2.6	109	6.0	6	CO	14.1	12.0	4.0	12.0	14.1	0.6	2.0	8.1	1.7	ST	PF	CU	HD	0	3	2	0	0	0	0	WASHED
11	205	175	3	E	37			2.6	110	16.2	2	PR	9.0	6.8	1.4			0.1	1.0	3.6	0.7	RT	PR	CP	FD	0	3	1	0	0	0	0	
11	205	175	3	E	37			2.6	111	10.0	6	PR	17.6	14.3	3.1			0.7	2.9	6.9	3.0	NO	UD	FL	SD	0	2	1	1	0	0	0	
11	205	175	3	E	37			2.6	112	23.0	2	PR	16.9	10.8	4.3			0.7	1.5	3.3	1.3	NO	PR	CP	SD	0	2	1	0	0	0	0	
11	205	175	3	E	37			2.6	113	119.0	5	CO	50.7	30.2	11.7	36.6	32.6	11.0	11.3	23.9	8.1	NO	UP	FL	HD	0	2	1	0	0	0	0	
11	205	175	3	E	37			2.6	114	109.0	5	DS	26.2	15.0	4.3			0.9				NO			SD	0	2	1	0	0	0	0	
11	205	175	3	E	37			2.6	115	109.0	5	MI	16.8	10.6	3.4			0.5				NO			SD	0	2	1	0	0	0	0	
13	205	175	3	E	37			2.65	136	17.0	2	PR	11.9	10.1	1.3			0.1	1.1	4.9	1.0	RT	UY	CU	HD	0	2	1	0	0	0	0	
13	205	175	3	E	37			2.65	137	24.0	2	PR	23.4	16.1	2.2			0.7	2.9	9.6	3.6	NO	PR	CP	SD	0	2	1	0	0	0	0	
13	205	175	3	E	37			2.65	138	24.0	2	PR	21.1	12.7	1.9			0.4	2.4	7.4	2.9	DS	UY	FL	SD	0	2	1	0	0	0	0	
13	205	175	3	E	37			2.65	140	24.0	2	DS	9.1	8.0	1.0			0.1				NO			SD	0	1	1	0	0	0	0	
13	205	175	3	E	37			2.65	141	30.0	6	MI	16.6	10.3	1.4			0.3							SD	0			0	0	0	0	
13	205	175	3	E	37			2.65	142	16.2	2	PR	11.9	8.5	0.9			0.1	0.8	2.9	0.8	BT	PR	CP	SD	0	3	2	0	0	0	0	
13	205	175	3	E	37			2.65	143	16.2	2	PR	10.6	9.9	1.6			0.1	1.6	5.3	1.5	BT	PFR	CP	SD	0	3	2	0	0	0	0	
13	205	175	3	E	37			2.65	144	19.0	6	PR	16.2	14.5	2.2			0.3	2.8	7.6	2.6	NO	UY	FL	SD	0	2	1	0	0	0	0	WASHED
13	205	175	3	E	37			2.65	145	6.0	6	CO	15.9	9.3	2.0	15.9	9.3	0.2	2.0	4.7	1.6	BT	PFG	CU	FD	0	3	1	0	0	0	0	
13	205	175	3	E	37			2.65	146	6.0	6	CO	13.7	8.4	1.7	8.7	13.4	0.1	1.2	4.3	0.9	BT	PF	CU	FD	0	3	1	0	0	0	0	
13	205	175	3	E	37			2.65	147	7.1	3	CO	9.8	8.1	0.9	9.8	8.1	0.1	0.5	1.3	0.4	RT	PR	CP	HD	0	3	2	0	0	0	0	
13	205	175	3	E	37			2.65	148	22.0	2	CO	14.1	10.1	2.0	14.1	10.1	0.2	2.0	7.0	0.7	BT	PG	CU	FD	0	3	1	1	0	0	0	
13	205	175	3	E	37			2.65	149	22.0	2	MI	13.2	7.1	2.0			0.1				NO			SD	0			1	0	0	0	
13	205	175	3	E	37			2.65	150	76.0	2	CO	11.4	10.0	1.1	10.6	11.2	0.1	1.5	5.0	0.9	RT	PRG	CP	FD	0	3	2	0	0	0	0	
13	205	175	3	E	37			2.65	151	4.0	2	CO	9.2	6.8	1.3	9.2	6.8	0.1	0.7	3.8	0.7	RT	PG	AB	FD	0	3	2	0	0	0	0	
13	205	175	3	E	37			2.65	152	25.0	6	MI	13.5	11.2	1.5			0.3							SD	0			1	0	0	0	
13	205	175	3	E	37			2.65	153	25.0	6	CO	8.7	7.5	1.0	8.7	7.5	0.1	1.1	2.8	1.1	RT	UD	FL	SD	0	3	1	1	0	0	0	
13	205	175	3	E	37			2.65	154	26.0	3	CO	21.4	10.7	2.0	21.4	10.7	0.3	2.0	2.8	1.3	BT	UP	FL	FD	0	3	2	0	0	0	0	2-PIECES REF
14	205	170	3	E	38				155	119.0	5	MI	17.1	16.6	4.1			1.1				NO			SD	0	2	1	0	0	0	0	
14	205	170	3	E	38				157	78.0	3	DS	14.6	11.2	4.5			0.4				NO			PG	0	2	1	1	0	0	0	
14	205	170	3	E	38				158	2.2	2	CO	9.9	8.2	1.4	9.9	8.2	0.1	1.2	4.5	0.8	BT	PG	AB	FD	0	3	2	0	0	0	0	
14	205	170	3	E	38				159	24.0	2	DS	21.6	14.4	3.1			0.7				DS			SD	0	2	1	0	0	0	0	
12	205	165	3	E	39			2.65	117	7.1	3	CO	30.6	19.5	2.4	30.6	19.5	1.2	2.6	6.1	1.5	BT	PG	AB	FD	0	3	2	0	0	0	0	
12	205	165	3	E	39			2.65	118	7.1	3	CO	34.4	16.1	2.0	34.4	16.1	1.1	2.3	5.7	1.0	BT	PG	AB	FD	0	3	2	0	0	0	0	2-PIECES REF
12	205	165	3	E	39			2.65	119	7.1	3	CO	15.0	11.6	1.2	15.0	11.6	0.3	1.6	5.3	1.3	RT	PRG	AB	FD	0	3	2	0	0	0	0	
12	205	165	3	E	39			2.65	120	56.0	3	PR	17.8	9.9	1.7			0.2	1.3	3.2	1.0	BT	PG	AB	HD	0	3	2	0	0	0	0	
12	205	165	3	E	39			2.65	121	7.1	3	PR	6.0	5.8	0.6			0.1		2.5	0.6	RT	PR	CP	SD	0	2	1	0	0	0	0	PRESSURE-FLK
12	205	165	3	E	39			2.65	122	201.0	4	CO	31.6	25.3	9.7	25.3	31.6	6.6	9.7	12.4	9.3	NO	UP	FL	HD	2	1	1	0	0	0	0	
12	205	165	3	E	39			2.65	123	201.0	4	MI	14.4	15.9	6.3			1.6				NO			SD	3	0	0	0	0	0	0	

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
12	205	165	3	E	39			2.65	124	201.0	4	CO	16.7	11.5	4.6	16.7	11.5	0.8	4.8	10.7	4.7	NO	UP	FL	SD	2	1	1	0	0	0	0	
12	205	165	3	E	39			2.65	125	201.0	4	PR	14.0	12.0	3.3			0.6	2.6	6.2	2.9	NO	UD	CR	SD	1	2	1	0	0	0	0	
12	205	165	3	E	39			2.65	126	201.0	4	CO	15.2	13.7	4.4	15.2	13.7	0.6	2.6	4.1	2.0	DS	UD	FL	SD	0	3	1	0	0	0	0	
12	205	165	3	E	39			2.65	127	201.0	4	DS	12.0	8.6	1.9			0.2				NO			HD	3	0	0	0	0	0	0	
12	205	165	3	E	39			2.65	128	201.0	4	CO	9.8	5.5	1.5	7.8	7.5	0.1	1.5	3.9	1.6	RT	UD	CR	FD	1	2	1	0	0	0	0	
12	205	165	3	E	39			2.65	129	14.0	6	PR	20.6	14.4	4.9			0.9	3.2	4.0	2.4	NO	UD	FL	HD	0	2	1	1	0	0	0	
12	205	165	3	E	39			2.65	130	14.0	6	MI	16.8	14.6	3.6			0.6				NO			SD	1	2	1	1	0	0	0	
12	205	165	3	E	39			2.65	131	10.0	6	CO	17.5	12.8	0.5	17.5	12.8	0.5	1.2	2.6	1.1	NO	PR	CP	PG	1	2	1	1	0	0	0	
12	205	165	3	E	39			2.65	132	74.0	6	DS	30.4	23.2	7.8			2.9				NO			HD	3	0	0	0	0	0	0	
12	205	165	3	E	39			2.65	133	104.0	5	CO	46.0	45.8	7.0	43.2	36.2	6.6	3.0	16.8	2.9	DS	UP	FL	HD	0	3	2	0	0	0	0	
12	205	165	3	E	39			2.65	134	104.0	5	PR	12.1	9.1	1.9			0.1	1.5	3.3	1.5	NO	UY	FL	FD	0	1	1	0	0	0	0	
12	205	165	3	E	39			2.65	135	46.0	3	CO	24.1	19.5	2.1	24.1	19.5	0.9	2.8	14.6	3.1	BT	PFG	CP	FD	0	3	2	1	0	1	0	2-PIECES REF
15	205	165	3	E	39			2.65	161	70.0	6	DS	23.7	16.2	2.2			0.8				NO			HD	0			0	0	0	0	
15	205	165	3	E	39			2.65	162	203.0	4	SH	37.7	19.7	16.7			11.2								2			0	0	0	0	
15	205	165	3	E	39			2.65	163	104.0	5	MI	45.3	27.5	3.0			3.5				BT			SD	0	3	2	0	0	0	0	
15	205	165	3	E	39			2.65	164	104.0	5	CO	31.4	25.1	6.8	31.4	25.1	4.5	5.5	12.3	5.1	DS	UD	FL	FD	0	3	1	0	0	0	0	ref w/ .165
15	205	165	3	E	39			2.65	165	104.0	5	DS	49.2	29.5	6.8			4.7				BT			PG	0	3	2	0	0	0	0	ref w/ .164
16	205	155	3	E	41			2.9	166	43.0	6	PR	23.4	18.4	2.7			0.9	2.6	7.9	2.6	DS	PRG	AB	SD	0	2	1	0	0	0	0	"AGATE BASIN
17	205	150	3	E	42	R		2.82	167	43.0	6	DS	13.2	14.5	1.3			0.1				BT			FD	0	3	2	0	0	0	0	
17	205	150	3	E	42	S		2.75	168	24.0	2	CO	13.5	11.3	1.3	10.4	12.6	0.1	1.7	5.4	1.4	BT	UP	FL	FD	0	2	1	0	0	0	0	
17	205	150	3	E	42	Q		2.63	169	43.0	6	DS	16.2	5.8	1.7			0.1							HD	0			0	0	0	0	ref w/.161?
17	205	150	3	E	42	Z		2.69	170	43.0	6	DS	12.0	5.9	1.5			0.1				RT			FD	0	2	1	0	0	0	0	
17	205	150	3	E	42	V		2.87	171	2.0	2	CO	4.5	4.1	1.2	4.5	4.1	0.1	1.5	3.3	1.5	RT	UP	FL	FD	0	3	2	0	0	0	0	
17	205	150	3	E	42	J		2.75	172	27.0	2	CO	10.1	7.8	0.9	10.1	7.8	0.1	0.5	1.1	0.5	RT	PG	AB	FD	0	3	1	0	0	0	0	
17	205	150	3	E	42	Y		2.8	173	27.0	2	CO	8.2	7.5	1.1	8.2	7.5	0.1	0.9	2.8	0.9	RT	PRG	AB	FD	0	3	2	0	0	0	0	
17	205	150	3	E	42	F		2.85	174	27.0	2	CO	10.0	4.9	0.8	10.0	4.9	0.1	0.6	1.7	0.6	RT	PR	CP	FD	0	3	1	0	0	0	0	
17	205	150	3	E	42	P		2.81	175	5.0	6	PR	10.7	10.2	1.4			0.1	1.4	6.5	1.6	BT	PR	CP	SD	0	3	2	0	0	0	0	
17	205	150	3	E	42	N		2.84	176	8.0	1	CO	9.8	6.9	0.7	6.9	9.8	0.1	1.1	6.0	1.0	DS	UP	FL	FD	0	2	2	0	0	0	0	
17	205	150	3	E	42	W		2.75	178	109.0	5	DS	8.0	5.0	0.7			0.1				RT			FD	0	3	2	0	0	0	0	PRESSURE-FLK
17	205	150	3	E	42	G		2.72	179	110.0	5	DS	7.5	7.2	2.0			0.1							FD	0			1	0	0	0	
17	205	150	3	E	42	M		2.87	180	111.0	5	CO	9.8	8.1	1.1	8.1	9.8	0.1	1.5	3.6	1.5	RT	UP	FL	FD	0	3	1	0	0	0	0	
17	205	150	3	E	42	O		2.84	181	111.0	5	DS	8.4	5.2	1.8			0.1				RT			FD	0			0	0	0	0	
17	205	150	3	E	42	L		2.82	182	112.0	5	PR	6.8	4.0	0.8			0.1	0.8	3.3	0.8	DS	UP	FL	FD	0	1	1	0	0	0	0	
17	205	150	3	E	42	X		2.75	183	112.0	5	DS	7.8	5.6	0.7			0.1				RT			FD	0	1	1	0	0	0	0	
17	205	150	3	E	42	I		2.76	184	138.0	5	DS	19.6	13.7	3.3			0.9				DS			FD	0	2	1	0	0	0	0	
17	205	150	3	E	42	U		2.82	185	138.0	5	MI	12.2	6.9	1.8			0.1							SD				0	0	0	0	
17	205	150	3	E	42	H		2.66	186	113.0	5	CO	7.2	6.4	0.9	6.4	7.2	0.1	1.4	5.4	1.5	RT	UP	FL	FD	0	2	1	0	0	0	0	
18	205	150	3	E	42	E		2.85	187	113.0	5	CO	47.6	44.3	7.8	43.5	39.2	12.1	6.9	18.2	6.2	NO	UP	FL	HD	0	3	1	0	0	0	0	
59	205	150	3	E	42	D		2.77	402	70.0	6	MI	28.3	27.7	2.7			2.1				BT			SD	0	3	2	0	0	0	0	
59	205	150	3	E	42				403	43.0	6	PR	30.5	27.2	3.3			2.6	3.2	7.5	2.7	BT	PFG	CP	SD	0	3	1	0	1	0	0	
50	210	205	3	D	31	2		2.67	369	47.0	6	DS	19.4	18.9	2.0	18.9	19.4	0.7				NO			PG	0	2	1	1	0	0	0	PLATFORM HIN
51	210	200	3	D	32		2.59	2.9	371	28.0	6	CO	54.1	31.3	3.2	54.1	31.3	5.5	3.0	8.0	2.3	BT	PF	CP	FD	0	3	1	0	0	0	0	
5	210	180	3	D	36				20	15.0	2	DS	17.0	12.6	1.2			0.3							FD	0	3	2	0	0	0	0	
5	210	180	3	D	36				21	3.0	2	MI	23.5	17.4	3.6			1.2							SD	0	3	1	0	0	0	0	
5	210	180	3	D	36				22	4.0	2	DS	14.2	9.9	2.0			0.1							FD	0	2	1	0	0	0	0	
5	210	180	3	D	36				23	16.2	2	CO	6.7	5.6	0.7	4.9	6.7	0.1	0.7	2.7	0.5	DS	PG	AB	FD	0	3	2	0	0	0	0	
5	210	180	3	D	36				24	5.0	6	PR	15.9	9.9	2.4			0.3	2.7	10.0	2.4	DS	PR	FL	HD	0	2	1	0	0	0	0	
5	210	180	3	D	36				25	6.0	6	PR	12.1	9.4	2.7			0.2	2.2	6.7	2.6	NO	PG	AB	HD	0	3	2	0	0	0	0	
5	210	180	3	D	36				26	6.0	6	PR	8.9	5.7	2.0			0.1	2.0	5.3	2.2	NO	PG	AB	SD	0	2	1	0	0	0	0	
4	210	175	3	D	37			2.5	17	102.0	5	CO	41.7	31.7	7.2	29.2	38.3	10.9	6.9	33.6	7.2	DS	UP	FL	HD	1	1	1	0	0	0	0	BASE OF PRIS
4	210	175	3	D	37			2.5	18	103.0	5	CO	20.8	16.2	6.3	15.4	20.1	1.5	4.6	7.3	2.5	NO	UP	FL	HD	0	2	2	0	0	0	0	BASE OF PRIS
4	210	175	3	D	37	A		2.5	19	2.0	2	CO	12.7	11.3	1.9	12.7	10.9	0.2	1.9	5.1	1.8	BT	PFG	AB	FD	0	3	2	0	0	0	0	BASE OF PRIS
9	210	165	3	D	39	F	2.5	2.6	36	7.1	3	DS	28.0	21.7	1.9			1.0							HD	0	3	2	0	0	0	0	

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
9	210	165	3	D	39		2.5	2.6	37	7.1	3	CO	17.4	9.7	1.7	17.0	9.7	0.2	1.8	6.7	1.4	DS	PG	AB	FD	0	2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	38	7.1	3	CO	20.5	19.1	2.5	15.2	19.1	0.6	3.0	9.6	3.1	DS	PFG	AB	FD	0	2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	39	7.1	3	DS	26.1	21.0	1.8			0.8							FD	0	3	2	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	40	61.0	6	CO	17.7	14.9	1.0	17.7	14.9	0.3	0.8	9.2	1.0	NO	PG	AB	FD		2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	41	7.1	3	MI	17.4	14.9	1.0			0.4							SD	0	2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	42	7.1	3	CO	18.8	12.8	1.3	14.3	13.6	0.2	1.1	3.4	1.3	NO	UY	AB	FD	0	2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	43	7.1	3	PR	14.3	8.9	1.4			0.1	1.5	5.5	1.2	NO	PFG	AB	HD		2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	44	56.0	3	DS	16.8	14.5	1.4			0.2							FD	0	2	2	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	45	7.1	3	PR	13.9	11.7	1.3			0.2	1.2	4.8	0.9	BT	PFG	AB	HD	0	3	2	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	46	7.1	3	CO	14.4	7.7	1.0	14.4	7.7	0.1	0.9	3.2	0.8	BT	PF	CP	FD		3	1	0	0	0	0	BIPOLAR?
9	210	165	3	D	39		2.5	2.6	47	7.1	3	PR	11.0	8.0	1.2			0.1	1.4	5.3	1.4	BT	PFG	AB	HD	0	2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	48	7.1	3	CO	10.5	7.7	0.9	10.5	7.7	0.1	1.0	3.1	1.0	NO	PFG	AB	HD	0	3	2	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	49	7.2	3	PR	11.1	9.1	1.1			0.1	1.4	4.2	1.4	BT	PRG	AB	SD	0	3	2	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	50	7.1	3	CO	9.5	7.9	1.0	7.9	9.0	0.1	1.1	5.2	1.1	NO	UY	CU	FD	0	2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	51	7.1	3	LT	9.4	5.9	0.9			0.1							SD	0			0	0	0	0	
9	210	165	3	D	39		2.5	2.6	52	7.1	3	DS	7.3	6.1	1.1			0.1							FD	0	2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	53	7.1	3	DS	8.3	7.6	0.8			0.1							FD	0	2	2	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	55	8.0	1	PR	8.5	6.3	1.8			0.1	1.0	2.9	0.8	NO	PR	CP	SD	0	2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	57	201.0	4	CO	37.4	28.5	7.0	31.4	36.1	6.3	5.6	7.4	3.0	DS	UP	FL	HD	2	3	2	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	58	201.0	4	PR	23.3	18.9	3.3			0.9	2.0	8.6	2.0	DS	UD	FL	SD	0	2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	59	201.0	4	DS	17.1	10.8	2.7			0.3				NO			FD	1	2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	60	201.0	4	PR	9.5	9.4	1.1			0.1	1.0	3.7	0.9	NO	UD		SD	0	1	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	61	201.0	4	CO	8.8	8.5	1.3	8.8	8.4	0.1	0.7	2.1	0.6	NO	PRG	AB	HD	0	2	2	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	62	201.0	4	DS	12.3	7.2	2.2			0.1				DS			HD	1	3	2	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	63	202.0	4	CO	19.5	10.4	4.5	19.5	10.4	0.5		3.0	1.5	NO	UD	CU	SD	0	2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	64	202.0	4	CO	9.0	7.5	2.2	9.0	7.5	0.1	1.2	3.8	0.9	NO	UD	FL	HD	0	3	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	65	202.0	4	SH	8.2	6.8	2.6			0.1								0			0	0	0	0	
9	210	165	3	D	39		2.5	2.6	66	104.0	5	DS	14.4	11.1	4.4			0.3							HD	0	3	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	67	104.0	5	LT	12.5	9.9	2.3			0.2							SD	3	1	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	68	9.0	3	CO	25.1	22.6	2.2	25.1	22.6	1.0	2.3	6.2	1.6	BT	PFRG	CP	FD	0	3	2	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	69	9.0	3	DS	12.4	10.8	1.3			0.1				NO			FD	0	2	2	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	70	9.0	3	MI	10.8	9.7	1.9			0.2							SD	0	3	2	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	71	9.0	3	CO	10.7	6.9	3.3	10.7	6.9	0.1	2.5	3.1	1.3	DS	PG	AB	FD	0	3	2	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	72	9.0	3	CO	10.3	5.3	1.4	10.3	5.3	0.1	1.0	3.6	1.0	BT	PR	CP	FD	0	3	2	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	73	9.0	3	CO	11.3	4.8	1.1	11.3	4.8	0.1	0.8	2.8	0.7	RT	PG	AB	FD	0	2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	74	10.0	6	CO	9.4	6.9	1.6	9.4	6.9	0.1		3.5	1.0	RT	PR	AB	SD	0	2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	75	11.0	6	CO	14.1	11.1	3.0	11.1	14.1	0.4	2.9	10.5	2.1	DS	UD	CU	FD	0	3	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	77	12.0	3	CO	9.6	7.4	1.8	9.6	7.4	0.1	0.9	1.9	0.9	RT	PR	CP	HD	0	3	2	1	0	0	0	
9	210	165	3	D	39		2.5	2.6	78	13.0	6	CO	7.8	6.9	1.0	7.5	6.7	0.1	0.8	2.1	0.7	RT	PF	CU	HD	0	2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	79	106.0	5	PO	12.8	9.1	1.8			0.1							SD	0			1	0	0	0	
9	210	165	3	D	39		2.5	2.6	81	14.0	6	PR	10.5	6.9	1.3			0.1	1.1	2.6	0.9	RT	UP	FL	SD	0	2	1	0	0	0	0	
9	210	165	3	D	39		2.5	2.6	82	107.0	5	CO	29.0	22.5	4.6	24.5	25.8	3.2	7.2	14.5	7.2	DS	UP	FL	HD	0	2	1	0	0	0	0	
7	210	160	3	D	40			3.4	28	2.2	2	CO	20.3	14.8	2.7	17.8	12.4	0.4	1.0	3.1	0.9	BT	PR	AB	FD	0	2	2	0	0	0	0	
7	210	160	3	D	40			3.4	29	7.1	3	PR	21.6	17.2	2.1			0.6	1.5	5.0	1.2	BT	PF	CU	FD	0	3	2	0	0	0	0	
7	210	160	3	D	40			3.4	30	7.1	3	DS	29.0	16.7	1.3			0.3							FD	0	2	2	0	0	0	0	
7	210	160	3	D	40			3.4	31	7.1	3	DS	16.2	12.8	1.6			0.3							FD	0	2	2	0	0	0	0	BIPOLAR
7	210	160	3	D	40			3.4	32	104.0	5	CO	31.0	21.0	4.9	25.7	23.2	1.5	5.0	9.3	5.5	DS	UP	FL	HD	0	2	1	0	0	0	0	
7	210	160	3	D	40			3.4	33	202.0	4	CO	19.8	19.6	2.7	19.1	17.4	0.6	2.5	12.8	1.5	NO	UP	FL	FD	0	3	1	0	0	0	0	
2	215	185		C	35			2.87	15	101.0	5	CO	34.2	25.7	3.9	29.1	25.0	3.5	4.8	19.4	5.1	DS	PRG	AB	FD	0	3	2	0	0	0	0	
91							SURFACE		1002	42.0	6	MI	23.7	16.4	4.0			1.7				ST			PG	0	3	2	1	0	0	0	
91							SURFACE		1003	42.0	6	MI	8.8	8.0	1.3			0.1				RT			SD	0	2	1	1	0	0	0	PLATFORM HIN
91							SURFACE		1004	18.0	2	PR	22.4	21.0	6.3			2.6	8.2	6.9	7.9	NO	UY	CP	HD	0	3	1	1	0	0	0	
91							SURFACE		1005	36.0	6	SH	27.3	17.4	7.2			3.5								0			1	0	0	0	

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
91							SURFACE		1007	203.0	4	MI	15.2	7.1	1.6			0.1							SD	0			0	0	0	0	
91							SURFACE		1008	203.0	4	PR	9.8	7.8	1.0			0.1	1.9	3.5	1.8	NO	UY	CP	SD	0	2	1	0	0	0	0	
91							SURFACE		1010	72.0	1	SH	12.0	12.7	6.8			1.4								0			0	0	0	0	
91							SURFACE		1011	3.0	2	MI	14.1	10.7	1.3			0.1							SD	0	2	1	0	0	0	0	
91							SURFACE		1012	95.0	2	DS	12.3	8.5	1.8			0.1				RT			FD	0	2	1	0	1	0	0	PLATFORM HIN
91							SURFACE		1013	58.0	6	CO	11.0	8.5	1.7	11.0	8.5	0.1	0.8	1.8	0.8	RT	PR	CP	PG	0	3	1	0	2	0	0	CHECK REFITS
91							SURFACE		1017	6.0	6	CO	7.2	5.3	1.1	5.3	7.2	0.1	1.3	3.0	1.2	RT	PRG	CP	HD	0	2	1	0	0	0	0	
1			1				1.73	2.58	14	1.0	6	CO	18.1	9.1	2.4	18.1	9.4	0.2	1.9	3.9	1.5	NO	UP	FL	SD	0	1	1	0	0	0	0	
45							UNIDENT		341	2.0	2	CO	17.5	12.6	1.1	17.5	12.6	0.3	0.9	3.7	0.9	BT	PG	AB	FD	0	3	1	0	0	0	0	
45							UNIDENT		342	38.0	2	DS	14.4	10.7	4.7										FD	0	2	1	0	0	0	0	
45							UNIDENT		343	28.0	6	CO	38.8	24.7	3.3	38.8	24.7	2.4	2.2	5.8	2.4	BT	PR	CP	FD	0	3	2	0	0	0	0	
71	195	250	1	G	22		HORN CORE		467	17.0	2	CO	7.4	5.7	0.9	7.4	5.7	0.1	0.8	2.0	0.7	RT	PR	CP	FD	0	3	1	0	0	0	0	
71	195	250	1	G	22		HORN CORE		468	16.0	2	CO	10.8	5.8	0.7	10.8	5.8	0.1	0.7	1.7	0.7	RT	PR	CP	FD	0	2	1	0	0	0	0	
71	195	250	1	G	22		HORN CORE		469	30.0	6	PR	5.0	4.1	0.8			0.1	0.6	1.6	0.5	RT	PR	CP	SD	0	2	1	0	0	0	0	
71	195	250	1	G	22		HORN CORE		470	60.0	6	MI	7.2	6.6	0.9			0.1				RT			SD	0	2	1	0	0	0	0	PLATFORM HIN
91							SURFACE		864	103.0	5	DS	36.0	33.0	6.2			8.3				NO			PG	2	1	1	0	0	0	0	
91							SURFACE		865	103.0	5	CO	38.7	28.4	9.3	30.6	34.9	10.0	3.5	13.2	2.0	NO	UP	FL	PG	3			0	0	0	0	
91							SURFACE		866	103.0	5	CO	43.7	42.0	9.4	42.3	43.7	15.8	5.8	13.8	5.8	NO	UP	FL	PG	1	1	1	0	3	0	0	
91							SURFACE		867	103.0	5	CO	42.2	31.2	5.2	39.7	30.9	8.3	5.6	11.8	5.4	NO	UP	FL	PG	1	2	1	0	0	0	0	
91							SURFACE		868	103.0	5	MI	38.1	23.7	8.5			9.7				NO			SD	2	3	2	0	0	0	0	
91							SURFACE		869	103.0	5	PR	38.5	23.0	6.2			7.5	5.1	17.9	4.8	NO	UP	CR	SD	1	1		0	0	0	0	
91							SURFACE		870	103.0	5	CO	34.9	24.8	9.9	22.6	29.6	5.6	4.3	10.1	4.1	NO	UP	FL	SD	0	2	1	0	0	0	0	
91							SURFACE		871	103.0	5	MI	41.0	24.9	4.7			4.3				NO			SD	0	2	1	0	0	0	0	
91							SURFACE		872	103.0	5	DS	30.1	19.4	4.4			2.8				NO			SD	0	3	1	0	0	0	0	
91							SURFACE		873	103.0	5	CO	32.2	27.9	4.9	31.9	27.9	3.7	5.1	7.6	5.1	NO	UP	FL	PG	0	2	1	0	0	0	0	
91							SURFACE		874	103.0	5	MI	29.8	19.4	3.1			2.2				NO			SD	2	1	1	0	0	0	0	
91							SURFACE		875	103.0	5	SH	30.6	13.7	6.6			2.2								0			0	0	0	0	
91							SURFACE		876	103.0	5	DS	27.1	15.2	4.1			1.8				NO			SD	1	2	1	0	0	0	0	PLATFORM HIN
91							SURFACE		877	103.0	5	PR	23.2	17.5	4.7			1.7	2.7	8.3	2.3	NO	UD	CP	HD	0	2	1	0	0	0	0	
91							SURFACE		878	103.0	5	DS	20.5	14.3	3.0			0.5				NO			FD	0	2	1	0	0	0	0	
91							SURFACE		879	103.0	5	PR	22.0	20.0	4.0			1.4	2.0	9.5	2.1	NO	PR	CP	SD	0			0	1	0	0	
91							SURFACE		880	103.0	5	PR	20.5	14.4	3.0			0.9	2.5	4.1	2.5	NO	UP	FL	SD	0	2	1	0	0	0	0	
91							SURFACE		881	103.0	5	MI	25.2	9.1	2.4			0.7							SD				0	0	0	0	
91							SURFACE		882	103.0	5	DS	16.2	10.1	2.7			0.4				NO			SD	3	0	0	0	0	0	0	
91							SURFACE		883	103.0	5	PO	14.0	11.2	2.1			0.3							SD	3	0	0	0	0	0	0	
91							SURFACE		884	103.0	5	DS	11.7	10.1	2.3			0.1				NO			FD	0	2	1	0	0	0	0	
91							SURFACE		885	103.0	5	MI	11.3	7.8	2.3			0.2				NO			SD	0	1	1	0	0	0	0	PLATFORM HIN
91							SURFACE		886	102.0	5	SH	76.8	40.3	29.2			66.9															???
91							SURFACE		887	102.0	5	DS	32.7	29.2	8.4			10.0				NO			HD	1	1	1	0	0	0	0	PLATFORM HIN
91							SURFACE		888	102.0	5	CO	51.9	43.2	12.3	43.4	41.0	20.7	4.8	15.6	4.3	NO	UP	FL	PG	2	2	1	0	0	0	0	
91							SURFACE		889	102.0	5	PR	39.8	27.0	7.3			8.0	3.0	12.7	3.0	NO	PRG	CP	SD	1	3	1	0	0	0	0	
91							SURFACE		890	102.0	5	DS	35.3	28.9	9.2			7.6				NO			SD	1	2	1	0	0	0	0	
91							SURFACE		892	102.0	5	PR	36.4	24.4	5.4			5.8	5.9	13.7	5.5	NO	UY	CP	SD	0	2	1	0	0	0	0	
91							SURFACE		893	102.0	5	DS	38.9	27.8	5.2			5.2				NO			SD	2	1	1	0	0	0	0	
91							SURFACE		894	102.0	5	DS	34.0	25.5	5.0			4.0				NO			HD	0	3	2	0	0	0	0	
91							SURFACE		895	102.0	5	DS	31.3	26.7	4.7			3.7				NO			SD	0	3	2	0	0	0	0	
91							SURFACE		896	102.0	5	DS	23.7	15.1	3.2			0.8				NO			HD	0	2	1	0	0	0	0	
91							SURFACE		897	102.0	5	SH	17.1	8.8	7.3			0.7								0			0	0	0	0	
91							SURFACE		898	102.0	5	LT	14.6	9.4	2.5			0.3							SD	0	2	1	0	0	0	0	
91							SURFACE		899	102.0	5	SH	13.8	6.3	5.4			0.3								0			0	0	0	0	
91							SURFACE		900	102.0	5	SH	13.0	7.4	4.5			0.1								0			0	0	0	0	
91							SURFACE		901	105.0	5	PR	28.2	22.0	5.1			2.5	2.4	9.2	2.4	NO	UP	FL	HD	0	2	1	0	0	0	0	
91							SURFACE		902	105.0	5	PR	27.3	21.3	9.3			6.2	8.5	13.2	8.5	NO	UP	CR	HD	2	1	1	0	0	0	0	

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
91							SURFACE		903	105.0	5	MI	20.6	18.5	3.4			1.6				NO			SD	0	2	1	0	0	0	0	
91							SURFACE		905	105.0	5	MI	13.6	13.1	2.4			0.4				ST			SD	0	3	2	0	0	0	0	PLATFORM HIN
91							SURFACE		906	105.0	5	MI	14.6	13.2	3.5			0.5				DS			HD	0	3	2	0	0	0	0	PLATFORM HIN
91							SURFACE		907	102.0	5	PR	28.4	19.9	4.5			2.5	4.5	17.6	3.9	DS	UP	FL	SD	1	1	1	0	0	0	0	
91							SURFACE		908	128.0	5	MI	22.0	18.2	4.9			2.3				NO			SD	1	2	1	0	0	0	0	PLATFORM HIN
91							SURFACE		909	128.0	5	DS	24.1	16.6	6.5			2.1				NO			HD	0	3	2	0	0	0	0	
91						28	SURFACE		910	110.0	5	MI	35.8	33.9	7.2			8.0				NO			HD	0	3	2	1	0	0	0	
91							SURFACE		911	110.0	5	LT	25.7	19.0	4.9			2.2				NO			HD	0	2	1	1	0	0	0	RADIAL BREAK
91							SURFACE		912	110.0	5	SH	27.7	18.9	4.4			2.4								0			0	0	0	0	
91							SURFACE		914	109.0	5	PR	38.0	23.9	5.9			5.3	10.0	29.7	10.8	NO	UP	CR	HD	1	3	1	0	0	0	0	
91							SURFACE		915	109.0	5	MI	27.7	15.0	4.4			2.3				NO			HD	0	3	1	0	0	0	0	
91							SURFACE		916	109.0	5	LT	24.7	18.1	5.5			2.2				NO			SD	0	3	2	0	0	0	0	
91							SURFACE		917	109.0	5	MI	20.0	19.3	5.3			1.7				NO			SD	1	1	1	0	0	0	0	PLATFORM HIN
91							SURFACE		918	109.0	5	LT	27.4	11.6	4.1			1.1				NO			SD	0	2	1	0	0	0	0	
91							SURFACE		919	109.0	5	CO	12.9	10.7	2.3	12.9	10.7	0.3	2.5	6.3	2.5	BT	UY	CP	PG	0	3	1	0	0	0	0	
91							SURFACE		920	109.0	5	DS	8.6	4.7	2.7			0.1							FD	0	2	1	0	0	0	0	
91							SURFACE		921	109.0	5	DS	12.7	7.4	2.0			0.1				RT			FD	1	2	1	0	0	0	0	PLATFORM HIN
91							SURFACE		922	133.0	5	MI	24.7	17.9	5.0			3.1				NO			SD	1	2	1	0	0	0	0	PLATFORM HIN
91							SURFACE		923	133.0	5	PR	24.9	22.1	3.5			2.0	4.4	17.3	4.4	NO	PG	AB	SD	0	1	1	0	0	0	0	
91							SURFACE		924	133.0	5	PR	25.9	15.7	4.1			1.4	2.5	5.0	2.3	DS	PF	CR	SD	0	1	1	0	0	0	0	
91							SURFACE		925	133.0	5	DS	20.3	13.2	2.3			0.7				NO			FD	0	1	1	0	0	0	0	
91							SURFACE		926	133.0	5	LT	17.6	15.8	3.9			1.1				NO			SD	3	0	0	0	0	0	0	
91							SURFACE		927	133.0	5	PR	13.9	10.1	3.0			0.4	1.6	4.8	1.4	NO	UD	CP	SD	0	2	1	0	0	0	0	
91							SURFACE		928	133.0	5	CO	17.2	9.3	1.9	17.2	9.3	0.2	1.6	3.8	1.5	BT	UY	CP	FD	0	2	1	0	0	0	0	
91							SURFACE		929	133.0	5	MI	12.3	10.5	2.0			0.2				NO			SD	0			0	0	0	0	PLATFORM HIN
91							SURFACE		930	133.0	5	PR	11.7	8.3	1.8			0.2	1.9	5.5	1.8	DS	UD	CP	SD	0	3	1	0	0	0	0	
91							SURFACE		931	113.0	5	LT	17.9	11.7	2.0			0.4				BT			HD	0	3	2	0	0	0	0	RADIAL BREAK
91							SURFACE		932	125.0	5	DS	16.7	15.1	1.5			0.4				NO			PG	0	1	1	0	0	0	0	
91							SURFACE		933	108.0	5	SH	19.4	18.4	5.3			2.4											0	0	0	0	
91							SURFACE		934	134.0	5	DS	55.3	53.6	10.5			28.9				NO			PG	0	3	2	0	0	0	0	
91							SURFACE		935	135.0	5	DS	67.5	49.5	22.4			74.0				NO			PG	2	2	1	0	0	0	0	PLATFORM HIN
91							SURFACE		936	135.0	5	CO	29.4	26.1	8.6	29.4	26.1	6.2	2.8	8.1	2.5	NO	UP	FL	SD	1	1	1	0	0	0	0	
91							SURFACE		937	135.0	5	LT	22.7	21.1	3.1			1.2				NO			SD	0			0	0	0	0	
91							SURFACE		938	135.0	5	DS	39.9	14.8	4.6			2.9				NO			PG	0	2	1	0	0	0	0	
91							SURFACE		939	135.0	5	MI	22.7	10.2	3.2			0.8				NO			HD	0	2	1	0	0	0	0	
91							SURFACE		940	135.0	5	CO	17.1	15.2	3.4	15.2	17.1	0.9	2.3	6.8	2.2	NO	UY	CP	SD	0	2	1	0	0	0	0	
91							SURFACE		941	135.0	5	CO	29.8	17.7	4.2	20.8	23.4	1.9	2.3	8.9	2.2	NO	UP	FL	SD	0	1	1	0	1	0	0	
91							SURFACE		942	135.0	5	LT	25.1	8.6	4.4			0.8							SD				0	0	0	0	
91							SURFACE		943	135.0	5	PR	46.1	36.6	6.8			10.1	5.0	11.2	4.3	NO	UP	FL	HD	1	2	1	0	1	0	0	ref w/ .944
91							SURFACE		944	135.0	5	DS	26.2	16.4	4.4			1.5				NO			SD	2	1	1	0	0	0	0	ref w/ .943
91							SURFACE		945	110.0	5	PR	21.0	13.3	3.0			1.0	3.5	12.2	3.3	NO	UY	CP	SD	0	2	1	0	2	0	0	
91							SURFACE		946	110.0	5	LT	19.1	11.4	1.9			0.4							SD				0	0	0	0	
91							SURFACE		947	110.0	5	SH	9.8	9.3	1.2			0.1								0			0	0	0	0	
91							SURFACE		948	107.0	5	CO	38.0	33.1	9.4	32.7	38.0	12.2	4.3	18.0	3.8	NO	UP	FL	PG	2	1	1	0	0	0	0	
91							SURFACE		949	107.0	5	DS	35.1	21.6	4.0			3.2				NO			FD	2	1	1	0	0	0	0	PLATFORM HIN
91							SURFACE		950	107.0	5	DS	24.0	12.1	2.5			2.5				NO			FD	0	2	1	0	0	0	0	
91							SURFACE		951	107.0	5	PR	27.2	17.3	2.7			1.6	3.0	8.8	3.2	BT	PR	CP	SD	0	3	2	0	0	0	0	
91							SURFACE		952	113.0	5	PR	19.7	11.3	3.5			0.7	2.9	7.2	2.9	NO	UP	FL	HD	0	2	1	0	0	0	0	
91							SURFACE		953	124.0	5	DS	30.9	22.9	4.7			2.9				NO			HD	0	3	1	0	0	0	0	
91							SURFACE		954	102.0	5	CO	44.1	26.8	10.5	26.8	37.7	9.9	3.4	8.3	2.7	NO	UP	FL	PG	3	0	0	0	0	0	0	
91							SURFACE		955	136.0	5	CO	61.9	48.4	16.1	48.4	61.9	38.4	6.1	13.5	4.3	NO	UP	FL	HD	1	3	2	0	0	0	0	
91							SURFACE		956	136.0	5	DS	44.4	34.7	9.6			15.6				NO			SD	1	3	2	0	0	0	0	
91							SURFACE		957	136.0	5	MI	40.7	30.2	7.2			9.0				NO			HD	2	1	1	0	0	0	0	

F	N	E	LO	UT	UN	FL	MI	MX	CT	MAT	MT2	EL	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CR	SC	SDR	HT	CA	WD	PA	COMMENTS
91							SURFACE		958	136.0	5	MI	34.8	28.3	8.4			8.4				NO			HD	0	3	1	0	0	0	0	PLATFORM HIN
91							SURFACE		959	136.0	5	MI	31.4	30.5	3.7			5.0				NO			SD	0	2	1	0	0	0	0	
91							SURFACE		960	136.0	5	DS	27.4	22.4	5.1			2.7				NO			HD	0	2	1	0	0	0	0	
91							SURFACE		961	136.0	5	MI	31.3	17.3	8.6			6.2				NO			SD	3	0	0	0	0	0	0	PLATFORM HIN
91							SURFACE		962	136.0	5	PR	25.8	19.6	3.5			1.7	3.2	16.2	3.1	DS	UP	FL	SD	0	2	1	0	0	0	0	
91							SURFACE		963	136.0	5	DS	22.7	18.1	3.7			1.7				NO			FD	0	2	1	0	0	0	0	
91							SURFACE		964	136.0	5	PR	21.1	20.1	5.3			1.8	3.8	9.4	3.8	NO	UP	FL	HD	0	2	1	0	0	0	0	
91							SURFACE		965	136.0	5	MI	21.5	17.7	5.9			1.6				NO			SD	0	2	1	0	0	0	0	
91							SURFACE		967	136.0	5	LT	18.7	13.1	2.7			0.8				NO			SD	0	2	1	0	0	0	0	
91							SURFACE		968	136.0	5	MI	17.6	14.4	3.3			0.9				NO			SD	0	3	2	0	0	0	0	
91							SURFACE		969	136.0	5	MI	14.7	6.8	2.0			0.2							HD	0	2	1	0	0	0	0	
91							SURFACE		970	136.0	5	PR	9.0	8.3	1.1			0.1	1.3	4.1	1.1	BT	PR	CP	SD	0	1	1	0	0	0	0	
91							SURFACE		971	136.0	5	DS	13.9	13.0	1.5			0.2				BT			FD	0	2	1	0	1	0	0	PLATFORM HIN
91							SURFACE		972	136.0	5	DS	26.6	20.4	4.6			3.1				NO			PG	2	1	1	0	0	0	0	
91							SURFACE		973	136.0	5	DS	18.9	15.0	2.6			0.7				NO			SD	1	1	1	0	2	0	0	SPLIT PLATFO
91							SURFACE		974	136.0	5	DS	27.5	12.6	5.3			1.6				NO			PG	1	2	1	0	0	0	0	
91							SURFACE		975	102.0	5	MI	22.3	22.1	6.1			3.8				NO			HD	2	1	1	0	0	0	0	PLATFORM HIN
91							SURFACE		976	102.0	5	MI	19.6	12.0	2.0			0.5				NO			HD	0	1	1	0	0	0	0	
91							SURFACE		977	102.0	5	LT	18.0	0.3	2.3			0.4							SD				0	0	0	0	
91							SURFACE		978	102.0	5	PR	17.1	10.7	3.1			0.3	1.3	4.9	1.4	NO	UP	FL	PG	1	2	1	0	0	0	0	
91							SURFACE		979	137.0	5	PR	14.3	10.1	1.7			0.3	1.3	5.5	1.3	RT	PR	CP	SD	0	3	2	0	0	0	0	
91							SURFACE		980	137.0	5	DS	14.5	11.8	1.6			0.2				NO			FD	0	2	1	0	0	0	0	
91							SURFACE		981	108.0	5	MI	26.0	16.8	4.8			2.7				NO			SD	0	2	1	0	0	0	0	
91							SURFACE		984	16.2	2	PR	16.6	15.6	2.3			0.4	3.3	7.1	3.4	NO	PFG	CP	HD	0	2	1	0	0	0	0	
91							SURFACE		985	23.0	2	CO	15.5	12.2	2.0	15.5	12.2	0.4	1.2	2.6	1.0	BT	PRG	CP	PG	0	3	2	0	0	0	0	
91							SURFACE		986	23.0	2	PR	13.2	12.1	2.3			0.4	1.8	5.5	1.8	BT	PG	AB	HD	0	2	1	1	0	0	0	
91							SURFACE		987	16.2	2	LT	12.0	8.9	1.5			0.1							SD	0			0	0	0	0	
91							SURFACE		988	2.1	2	MI	16.2	11.2	1.4			0.2				BT			SD	0	3	1	0	0	0	0	
91							SURFACE		989	2.1	2	PR	10.6	8.5	0.9			0.1	0.9	1.6	0.8	RT	PG	AB	PG	0	2	1	0	0	0	0	
91							SURFACE		990	2.1	2	DS	9.3	5.5	0.8			0.1				RT			FD	0	2	1	0	0	0	0	PLATFORM HIN
91							SURFACE		991	7.3	3	CO	41.7	28.9	2.7	41.7	28.9	3.3	2.2	9.9	2.4	BT	PRG	CP	FD	0	3	2	0	0	1	0	
91							SURFACE		994	23.0	2	PR	18.0	10.4	3.3			0.7	3.8	13.4	4.0	BT	PFG	AB	HD	0	3	1	0	0	0	0	
91							SURFACE		996	23.0	2	PR	9.4	11.1	1.8			0.1	1.5	3.8	1.3	BT	PRG	CP	SD	0	3	2	0	0	0	0	
91							SURFACE		997	65.0	6	MI	8.5	9.6	1.5			0.1							SD	0	3	1	0	0	0	0	PLATFORM HIN
91							SURFACE		998	2.2	2	CO	18.0	14.3	2.5	18.0	14.3	0.6	1.8	6.6	1.4	BT	PR	CP	FD	0	3	1	0	0	0	0	
91							SURFACE		999	15.0	2	DS	7.8	6.1	1.2			0.1				RT			FD	0	2	1	0	0	0	0	PLATFORM HIN
91							SURFACE		1000	4.0	2	CO	20.4	11.0	2.7	11.0	20.4	0.6	2.6	5.1	1.8	NO	FL	UP	HD	0	0	0	0	0	0	0	A1922.181
9	210	165		D	39		2.5	2.6	80	14.0	6	SH	35.1	18.8	14.9			6.9								1	3	2	0	0	0	0	
	190	175		H	37	3		2.7	1992.109	148.0	5	DS	50.9	43.5	17.5			43.6				NO			PG	1	3	2	0	0	0	0	
	200	165		F	39				1922.112	149.0	5	SH	45.0	27.7	21.6			21.9								0	3	2	0	0	0	0	
91									1015	204.0	4	SH	38.2	28.1	14.9			16.9								0	3	2	0	0	0	0	
	190	310		H	10				1922.121	10.0	6	SH	40.2	28.1	10.6			14.8								0	3	2	1	0	0	0	
			2			28			1922.105	128.0	5	SH	64.8	29.1	29.1			48.2								2	3	2	0	0	0	0	

Table B3. Tool Codes and Data

F	Number Assigned by Museum for Collection Control
N	Northing (Based on grid block designations set-up by Slessman)
E	Easting (based on grid block designations set-up by Slessman)
LO	Locality (based on original locality designations by Wormington)
UT	Unit letter (based on original designations by Wormington)
UN	Unit number (based on original designations by Wormington)
FD	Flake number designated in field
MI	Minimum Depth
MX	Maximum Depth
CT1922	Catalog/Accession Number (previously cataloged)
CT1552	Catlog/Accesion Number
MAT	Material Type
MT2	Material Type (collapsed into one of seven categories)
EL	Element (Tool Type)

1 = Projectile Point
2 = Early Stage Biface
3 = Late Stage Biface
4 = Core
5 = Edge-modified flake
- 5.1 = modification along only one lateral margin
- 5.2 = modification along both lateral margins
- 5.3 = modification along both laterals and the distal margin
- 5.4 = modification along only the distal margin
- 5.5 = modification along one lateral and the distal margin

6 = Retouched Flake
- 6.1 = modification along only one lateral margin
- 6.2 = modification along both lateral margins
- 6.3 = modification along both laterals and the distal margin
- 6.4 = modification along only the distal margin
- 6.5 = modification along one lateral and the distal margin

7 = Formal Uniface
- 7.1 = Side Scraper
- 7.2 = Disto-lateral Scraper
- 7.3 = End Scraper

PR Portion of Tool (If applicable)
- PR= Proximal
- DS= Distal
- ME= Medial
- CO= Complete
- NCO = Not Complete

ML Maximum Length

Tool Codes and Data (continued)

MW	Maximum Width
MT	Maximum Thickness
CL	Complete Length
CW	Complete Width
WT	Weight
BT	Bulb Thickness
PI	Platform Width
PH	Platform Thickness
FY	Flake Type
	DS = Discoidal
	BT = Biface Thinning
	NO = Normal
	RT = Retouch
	ST = Standardized
PTY1	Platform Type (Frison and Bradley 1980:27-30)
	UP = Unprepared plain
	UD = Unprepared dihedral
	UY = Unprepared polyhedral
	PF = Prepared faceted
	PR = Prepared reduced
	PG = Prepared ground
	PFR = Prepared faceted and reduced
	PFG = Prepared faceted and ground
	PRG = Prepared reduced and ground
	PFRG = Prepared reduced, ground, and faceted
PT2	Platform Type (Andrefsky 1989:94-96)
	CR = Cortical
	FL = Flat
	CP = Complex
	AB = Abraded
FR	Flake Termination
	FD = Feathered
	SD = Stepped
	HD = Hinged
	PG = Overshot/plunging
CR	Cortex
	0 = no cortex
	1 = >0%, less than or equal to 50%
	2 = >50%, less than 100%
	3 = completely cortical

Tool Codes and Data (continued)

SC	Number of Dorsal Flake Scars 0 = no scars (cortical surface) 1 = single flake scar 2 = two flake scars 3 = three or more flake scars
SCD	Dorsal Scar Direction 1 = Uni-directional 2 = Multi-directional
HT	Heat altered 0 = Absence 1 = Presence
CA	Calcium Carbonate 1 = Ventral 2 = Dorsal 3 = Ventral and Dorsal
PA	Patinated 0 = Absence 1 = Presence
EM	Edge-modification 1 = Unifacial 2 = Bifacial
GV	Graver Tip 0 = Absent 1 = Present
NT	Notch 0 = Absent 1 = Present
RD	Radial Break 0 = Absent 1 = Present
WD	Worn Dorsal Surface 0 = Absence 1 = Presence
COMMENTS	General comments– Special tool information, excavator notes, etc.

F	N	E	LO	UT	UN	FD	MI	MX	CT1922	CT1552	MAT	MT2	EL	PO	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CO	SC	SCD	HT	CA	PA	EM	GV	NT	RD	WD	RF	Comments
	180	315		J	9			0	137		152	7	5.3	CO	38	30.2	7	38	30.2	7	5.8	16.3	4.9	NO	UP	FL	FD	0	3	2		1	1							
			8					0	134		154	7	7.1	CO	54.5	33.6	8.9	54.5	33.6	12.5	6.8	14.4	4.5	NO	UP	FL	FD	2	1	1		2	1							
				X	1			0	63		101	5	5.4	DS	46.7	25.4	10.5			9.7				NO			PG	0	3	1		1	1							
	210	160		D	40	1		2.7	59		79	2	7.1	CO	76.4	39.9	11.2	76.4	39.9	38.1	5.8	18.6	4.5	DS	UP	FL	PG	1	3	2		1	1							BIF RET LAT
	195	185		G	35	1		2.72	26		2.2	2	7.1	LT	44.5	17.9	4.5			3.5							PG	0	3	1		1	1				1			
	195	145		G	43	7		2.85	46		105	5	7.2	CO	62.6	38.1	5.6	62.6	38.1	17.3	3.9	11.5	3.8	NO	UP	FL	PG	0	2	1		1	1	1						
	200	175		F	37	6		2.41	138		104	5	5.4	CO	56.8	26.1	13.4	26.1	56.8	11.3	7.8	24.6	6.8	NO	UY	CP	PG	0	3	2		1	1							
	200	155		F	41	1		2.6	156		90	6	7.1	LT	26.7	16.4	5.7			2.6							HD	0	2	1		1	1					1		
	205	165		E	39	6			169		104	7	5.4	CO	40.6	37.9	7.3	40.1	37.7	8.4	6	10.5	5.7	NO	UP	FL	FD	2	3	1		1	1							
	205	175		E	37	2			171		18	2	7.1	LT	29.1	22.5	7.1			4.9				NO			HD	0				1	1					1		
	205	165		E	39	3			131		123	7	5.2	MI	37.9	30.7	3.8			5				NO				1	2	1		1	1							
	195	190		G	34	1			187		27	2	6.3	CO	61.8	22.4	18.2			19.5							PG	0	3	2		1.2	1							prox ret/em
	205	175		E	37	4		2.65	163		77	1	6.3	CO	41.9	39	11.3	41.9	39	19.2	7.1	18.3	7.4	NO	PRG	CP	PG	1	2	1		1	1							
	210	170		D	38	1/A			162		93	6	6.2	MI	51.7	40.5	6.8			13.8				NO			HD	0	3	1		1	1				1			
	185	230		I	26				82		22	2	7.2	DS	43.8	40.7	11.4			16.8				NO			HD	0	3	2		1	1	1				1		
53	200	195	3	F	33					395	50	6	5.1	MI	23.3	21.9	1.8			1.3				BT	NA	NA	SD	0	3	2		1	1					1	0	
	180	180		J	36	13		2.9	41		7.2	3	2	NCO	23.9	22.3	7.4			3.4							HD	0	3	2		2	1							HINGE BREAK
	195	145		G	43	8		2.94	132		120	7	5.3	CO	43.9	40.6	5.1	40.6	43.9	12.1	4.7	21.1	4.2	NO	UP	FL	PG	1	1	1		1	1					1		
	195	205		G	31	1/5		2.84	183		78	3	7.3	CO	25.9	20.2	6.7	25.9	20.2	3.8				NO			PG	0				1	1					1		PROX RET/EM
	205	175		E	37	8		2.67	176		16.2	2	5.3	CO	28.1	19	2.9	28.1	19	1.8	1.8	4	1.4	BT	PG	AB	PG	0	3	2		1	1							
	205	165		E	39	8			136		136	5	5.3	CO	38.4	34.2	2.1	38.4	34.2	5.3	5	11	4.9	NO	UY	CP	FD	0	3	2		1	1							
				FP	68				14		133	7	6.1	CO	56.7	48.8	4.4	54	50.6	12.8	3.6	9.5	3.5	NO	PR	CP	HD	0	2	1		1								
91								0		1014	73	4	5.3	DS	37.1	24.5	5.4			3.7				NO	NA	NA	PG	0	3	1		1.2						0	0	
	200	150		F	42	17		2.8	139		156	7	6.1	MI	28.1	17.8	7.5			3.4				NO				0	2	1		1								
			3			6		0	133		153	7	6.1	LT	51.4	24.5	6.2			7.9				NO			SD	0	2	1		2								2PREV. REFIT
			2			1		0	69		7	3	6.1	CO	70	42.3	7	70	42.3	21.1	3.1	13.6	3.3	NO	PRG	AB	HD	0	3	1		1								
72	180	180	3	J	36	131		2.79		478	7	3	6.1	LT	31.1	7.3	6.2			0.7				NA	NA	NA	SD					0.1						0.1	0	
	155	320		O	8			0	125		203	4	6.1	DS	32.7	29.6	9.7			10.2								0	3	2		1						1		
	170	315	9	L	9			0	124		87	6	6.1	SH	25.8	18.4	7.9			4.5								2				1						1		
			3			7		0	113		203	4	5.3	CO	46	42.9	6.4	46	42.9	12.6	3.7	11.3	3.3	NO	PRG	CP	PG	0	3	1		1								WORN DORSA
			2			6		0	122		141	7	6.1	PR	53.5	32.3	9.3			19.4	4.8	11.4	4.3	NO	UP	FL	SD	1	3	1		1								
82	195	160	3	G	40	6		2.69		652	156	7	6.1	LT	33	27.6	7.1			7.1				NA	NA	NA	NA					1						0		
	195	145		G	43	5		2.93	101		112	5	6.1	DS	62.3	57.6	12.1			42.4				NO			PG	0	2	1		1								AUGPR BREAK
22	200	180	3	F	36		2.45	2.72		210	16	2	6.1	LT	17.1	9.2	6.2			0.5				NA	NA	NA	NA					0.1						0.1	0	
				X		2			117		201	4	6.1	CO	67	57.2	8.7	67	57.2	34.7	10.1	27	9.2	NO	UP	FL	PG	1	2	1		1								
	195	145		G	43	4		3.01	103		112	5	6.1	PR	54.7	37.5	14.8			32.4	9.5	23.9	10	NO	UP	FL	SD	1	3	2		1								
			3			4		0	106		106	7	6.1	PR	70.6	35.5	6.1			15.3	4.2	17.7	3.6	NO	UP	FL	HD	0	2	1		1								
	195	185		G	35	1		2.72	107		130	7	6.1	PR	50.3	46.1	8			23.3	3.9	9.6	3.7	NO	UY	CP	HD	0	3	2		1				1				
	195	205		G	31	1		2.59	108		147	5	6.1	CO	62.3	58.4	9.9	58.4	62.3	32.4	6.2	17.9	4	NO	PR	CU	SD	0	3	2		1				1				PLAT SPLIT
			2			2/38		0	144		136	5	6.1	SH	53.1	32.8	15.5			24.3								2	3	2		1		1						
91								0		891	102	5	5.5	CO	29.4	29.3	3.9	29.4	29.3	2.8	3.2	6.9	3.2	BT	UP	FL	FD	0	3	1		1						0	0	
91								0		1016	203	4	5.5	DS	33.5	16.3	6.5			3.8				NO	NA	NA	FD	1	2	1		1						0	0	
	200	170		F	38	2			159		22	2	5.3	DS	37.1	32.2	8.3			11.3				NO			HD	0	3	2		1						1		
				FP	68				23		133	7	5.3	DS	35.7	17.8	5.6			3.3				NO			FD	0	3	1		1								
	195	185		G	35	1		2.74	143		45	2	5.3	CO	20.1	19.1	2.6	20.1	19.1	0.9	1.3	3.7	1.1	BT	PR	CP	PG	0	3	2		1								
	200	205		F	31	1		2.8	151		88	3	5.3	DS	61.2	33.2	6.8			11.8				BT			PG	0	3	2		2								PLAT SNAP
			3			10		0	71		80	1	5.3	CO	66.4	32.2	6.8			14.9	4.1	12.6	4	NO	PRG	AB	PG	0	3	1		1			1					
60	205	200	3	E	32	14		2.63		421	7	3	5.3	CO	33.6	25.6	4.7	33.6	25.6	3.5	1.4	6.7	1.4	ST	PG	AB	FD	0	3	2		1						1	1	
	200	195		F	33	1			40		43	6	5.3	CO	46.3	33.6	2.5			3.9	1.8	6.3	1.8	BT	PRG	AB	HD	0	3	2		2								
9	210	165	3	D	39		2.5	2.6		54	8	1	5.3	CO	65.2	33.3	3.6	65.2	34	6.2	2.8	6.7	1.7	BT	PFG	AB	FD	0	3	2		1		1				0	0	
	165	320		M	8			0	142		157	7	5.3	CO	29.7	28.8	2.7	28.8	29.7	2.8	3.5	16.9	3.9	BT	PRG	CP	FD	0	3	2		1								
89				FP	68			0		727	102	5	5.3	CO	42.3	42	3.6	42	42.3	6.4	4	17.8	4.4	BT	PFR	CP	FD	0	3	2		1		1				0	0	
	210	175		D	37	29		2.7	180		24	2	5.4	CO	34.9	23.4	4.4	29.2	29.8	2.8	2.4	7.3	2	BT	PRG	AB	PG	0	3	2		1	1					1		
91								0		995	23	2	5.3	DS	17.9	15.5	3.1			0.8				NO	NA	NA	PG	0	3	2		1						0	0	
69	205	210	3	E	30	45		2.91		463	105	5	5.3	CO	54.7	43.8	13.5	54.7	43.8	26.5	4.2	19	4	NO	UP	FL	FD	1	3	1		1						0	0	
91								0		983	16	2	5.3	DS	24	22.7	5.6			3.3				NO	NA	NA	HD	0	2	1		1						0	0	
	205	165		E	39	10			67		104	7	5.4	CO	50.8	43	10.4	43	50.8	18	3.9	11.1	3.5	NO	PR	CP	HD	0	3	2		1								

F	N	E	LO	UT	UN	FD	MI	MX	CT1922	CT1552	MAT	MT2	EL	PO	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CO	SC	SCD	HT	CA	PA	EM	GV	NT	RD	WD	RF	Comments
	195	150		G	42	2		2.81	116		105	5	5.4	DS	44.8	28.4	6.4			6.1				NO			PG	0	2	1		1								PLAT SNAP
59	180	180	3	J	36	47		2.9		408	2	2	5.4	CO	20.2	11.2	2.5	20.2	11.2	0.5	1.4	4.3	1.1	BT	PR	CP	FD	0	3	2		1						0	0	
	195	142.5	3	G	44.45	7			62		105	5	5.4	PR	60.1	59.8	13.2			47.6	17.3	29.4	15.4	NO	UY	FL	SD	1	3	1		1								
			6					0	58		123	7	5.3	DS	24.3	19.5	7.9			3.1				NO			SD	1	3	2		1								PLAT HINGE
89				FP	68			0		745	132	5	5.5	DS	74.5	48.7	11			24.8				NO	NA	NA	FD	0	3	2		1						0	0	
			3			5		0	111		130	7	6.1	PR	42.2	40.4	8.6			15	4	13.5	3.7	NO	PG	AB	SD	0	3	2		1								RESIDUE???
				BACK DIRT					160		92	2	7.2	CO	37.6	27.8	8	37.6	27.8	9.5				NO			HD	0	3	1		1								WORK PROX
	190	175		H	37	2		2.67	157		91	2	7.2	CO	37.4	31.4	10.9	37.4	31.4	11.4	1.6	3.1	1.5	NO	UP	FL	FD	0	3	2		1				1				
	200	175		F	37	1		2.6	170		16.2	2	7.2	DS	44.1	36	6.9			9.5				NO			PG	0	2	1		2								
9	210	165	3	D	39		2.5	2.6		72	83	3	7.2	DS	10.3	5.3	1.4			0.1	1	3.6	1	BT	PR	CP	FD	0	3	2		0						0	0	plat hinge
			3			1		0	172		82	2	7.2	CO	43.2	30.6	7.2	37.7	29.6	11.1	4.4	8.3	3.2	NO	PF	CP	PG	0	3	2		1								
	200	155		F	41	3		2.72	50		77	1	7.2	DS	38.5	31.8	14			13.1				NO			SD	2	3	2		1	1					1		PLAT HINGE
			2			4		0	178		83	3	7.2	CO	34	27.1	6.6	33.2	25.6	6.6				NO			PG	0	3	2		1								PLAT WORKED
	205	160		E	40	1		2.7	38		35	6	7.1	MI	33.7	25.3	4.8			4								0				1						1		
	195	145		G	43	6		2.85	185		95	2	7.1	PR	63.2	43.4	11.3			29.2	5.6	11	6.1	NO	PG	AB	SD	1	3	1		1								
	180	185		J	35				80		141	7	7.1	CO	63.5	54.2	9	63.5	54.2	22.5	4	12.4	3	NO	UP	FL	HD	1	3	2		1						1		
			2			24			65		3	2	7.2	DS	26.5	24.7	7.1			5.3				NO			HD	0	2	1		1								PLA HIN MAT?
			3			11		0	70		140	7	7.2	CO	102.6	58	10.6	102.6	58	94.3	11.5	27.5	9.5	NO	UP	FL	FD	2	2	1		1								
	185	175		I	37	2		3.12	73		81	6	7.3	PR	38.7	32.2	10.6			9.3	3.2	12.6	3	NO	PRG	AB	FD	0	3	1		1.2								
	180	180		J	36	2			174		81	6	7.3	DS	29.1	23.3	9.7			5.2							HD	0				1.2								
	205	175		E	37	4		2.47	161		79	2	7.3	DS	61.7	33.1	11.2			22.3				NO			PG	0	3	1		2								PLAT HINGE
			2			1R/14		0	153		89	2	7.2	DS	50.3	37.2	13			21.5				NO			PG	2	3	1		1								PLAT SNAP
			3			2		0	53		23	2	7.2	DS	30.8	23.9	6.3			6.2				NO			PG	0	1			1								PLAT HINGE
			2			5		0	168		16.2	2	7.2	CO	27.2	26.3	8.4	27.2	26.3	5.9	3.8	8.3	3.5	NO	PFG	CP	PG	0	3	1		1								
			2			3		0	83		84	6	7.2	CO	39.9	34	8.6	39.9	34	10.6	3.8	6	3.6	NO	PRG	AB	PG	0	2	1		1								
	210	165		D	39	14		2.59	79		83	3	7.2	CO	41.2	35.6	8	41.2	35.6	11.1	2.1	7	1.5	NO	PF	CP	PG	0	3	1		1				1				
	205	165		E	39	2			72		7.1	3	7.2	CO	37.2	32.8	9.1	37.2	32.8	14.9	8.4	16.5	7.6	NO	PF	CU	PG	0	2	1		1.2								
	200	185		F	35	1		3.07	54		78	3	7.2	CO	35.1	28.2	9.1	35.1	28.2	6.4	2.4	8.2	2.2	NO	PRG	AB	PG	0	3	1		1								
			3			13		0	56		137	7	7.1	LT	44.1	32.6	4			8.1				NO			PG	0	3	1		1								PLAT HINGE
	200	145		F	43	1		2.75	90		105	5	7.1	CO	82.5	40.2	14.3	82.5	40.2	52.7	14.4	22.6	12.4	NO	UP	FL	FD	1	3	2		1								
	195	205		G	31	10		2.67	49		45	2	7.1	MI	21.6	19.3	8.4			3.8				NO			HD	0	3	2		1								
				FP	68	10		0	93		106	7	6.2	CO	75.5	34.9	11.8	75.5	34.9	27	4	10.3	3.5	NO	UP	FL	PG	1	2	1		1								
			3.2			11/15		0	104		123	7	6.2	DS	60.8	39.4	12.2			32.7				NO			HD	2	3	2		1								PREV. REFIT
			5			4			186		117	7	6.2	MI	39.6	37.2	8			10.5				NO				0				1								
	195	180		G	36	1		2.45	68		2.2	2	6.2	MI	31.7	25.4	6.4			5				NO			HD	0	3	1		1								
	195	150		G	42	3		2.81	66		3	2	6.2	LT	34.5	10.4	6.7			1.8							SD	0				1								CHECK MAT
	190	245		H	23	1		2.5	76		82	2	1	CO	60.2	22	7.5	60.2	22	10.7								0				1								
17	205	150	3	E	42	T		2.85		177	6	6	6.1	CO	10.4	4.6	2.2	4.6	10.4	0.1	1.8	2.5	1.8	RT	PRG	CU	FD	0	1	1		1						0	0	
			2			26		0	115		103	5	6.1	PR	50.4	43.8	6.3			21.2	5.7	13.7	5.2	NO	UP	FL	PG	2	1	1		1								
14	205	170	3	E	38					156	3	2	6.1	DS	18.2	10.8	3.1			0.6				NA	NA	NA	NA					0.1						0.1	0	
10	205	180	3	E	36			2.62		99	8	1	6.1	LT	12.3	9.8	2.6			0.4				NA	NA	NA	SD	0				1						0	0	
	195	145		G	43	3		2.8	92		133	7	6.2	CO	67.1	48.2	7.2	67.1	48.2	23.6	3.4	13.8	2.6	NO	UY	CP	HD	0	2	1		1								
	200	315		F	9			0	130		78	3	6.2	DS	30.1	19	7.2			3.4				NO			PG	1	3	2		1								
	210	160		D	40	26		2.57	91		16.2	2	7.1	LT	47.9	22.3	8.3			9.4				NO				0	2	1		1.2								
	205	175		E	37	3			175		85	6	7.1	MI	35.4	29.3	5.9			5.2				NO			SD	0	3	2		1								
91								0		1001	4	2	7.2	LT	30.1	13.1	3.2			1.4				NA	NA	NA	SD					0.1						0.1	0	
	210	215		D	29	2			182		133	7	6.4	DS	31.7	21.8	5			3.8				NO			PG	0	3	2		1								
			2			19		0	96		105	5	6.4	CO	66.3	54.3	20.3	51	50.4	46.1	20.9	38.4	20.7	NO	UP	FL	HD	0	3	1		1								
81	195	160	3	G	40	1		2.72		648	6	6	6.4	DS	29.4	23.7	4.1	29.4	23.7	2.9				ST	NA	NA	PG	1	3	2		1.2						0	0	
	205	175		E	37	4		2.47	75		80	1	6.3	PR	69.9	33.2	6.7			15.8	5	19.2	5.2	NO	PRG	AB	FD	0	2	1		1								
			2			25/35		0	149		148	5	6.3	CO	40	26.8	10.6	40	26.8	15.7	5	19.6	4.6	NO	UP	CR	FD	1	3	2		1								
	195	195		G	33	1		2.44	32		75	6	6.3	DS	19.2	16.5	3.9			1.4								0				1						1		
	205	175		E	37	7		2.6	167		76	2	6.3	DS	36.5	21.9	4.9			5.2				NO			HD	0	1	1		1								PLAT HINGE
				X	35				152		27	2	6.2	PR	28.7	26.4	9.3			5.7	2.7	10	2.7	NO	PFG	CP	HD	0	3	2		1								
91								0		913	109	5	5.3	CO	41.3	36.2	7.9	41.3	36.2	11.1	4.6	17.6	4.5	NO	UP	FL	PG	2	2	1		1		1				0	0	
	195	150		G	42	5		2.67	34		105	5	5.1	LT	41.9	13.9	4			2							HD	0	2	1		1					1			

F	N	E	LO	UT	UN	FD	MI	MX	CT1922	CT1552	MAT	MT2	EL	PO	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CO	SC	SCD	HT	CA	PA	EM	GV	NT	RD	WD	RF	Comments
9	210	165	3	D	39		2.5	2.6		56	201	4	5.1	DS	49.7	28.3	14.8			15.3				NA	NA	NA	NA	1	3	2		1						0	0	plat hinge
				X	2	3		2.9	36		132	5	5.1	PR	35.3	23.3	6.3			4.1	5.2	14.3	5.2	NO	UP	FL	SD	1	2	1		1								
			2			20		0	42		101	7	5.1	LT	25.4	17.2	3.6			1.7							SD	1	3	2		1		1						
				FP	68				9		102	5	5.1	CO	60.7	47	9.4	60	48.1	23.6	3.3	8.1	3.3	NO	UP	FL	PG	1	3	1		1								
				FP	68				5		102	5	5.1	CO	54.3	32.9	10.7	54.3	32.9	21.5	6.6	14.7	6.5	NO	UP	FL	FD	1	2	1		1								
91								0		992	23	2	5.1	DS	14	12.7	2.5			0.3				BT	NA	NA	FD	0	3	2		1						0	0	
21	200	190	3	F	34					194	31	1	5.1	PR	36.1	28.3	3.2			2.8	1.5	5.3	1.3	BT	PRG	AB	FD	0	3	2		1						0	0	
									87		85	6	5.1	MI	36.7	23.3	5.3			4.7				NO			SD	0	2	1		2								
91								0		1006	203	4	5.1	DS	31.1	31.1	6.5			4.2				NO	NA	NA	HD	2	2	1		2						0	0	
91								0		1009	103	5	5.1	DS	20.3	15.7	3.3			0.9				NO	NA	NA	PG	0	2	1		0						0	0	
	200	170		F	38	1		1.7	55		102	5	5.1	CO	46.7	33.6	12.6	46.7	33.6	16.9	6.3	21.1	5.8	NO	UP	FL	SD	1	3	2		1								
				FP	68				22		132	5	5.1	LT	34	23.6	5.3			4.6							HD	0	2	1		1		1						
				FP	68	3			20		102	5	5.1	CO	67.7	57.6	14.2	62.1	67.6	45.4	7	17.9	6.8	NO	UP	FL	PG	2	2	1		1								
89				FP	68			0		779	133	7	5.1	CO	31.6	14.6	1.5	31.6	14.6	0.8	1.7	4.5	1.5	BT	PR	CP	FD	0	2	1		0			1			0	0	
72	180	180	3	J	36	31		2.77		485	39	6	5.1	DS	37.1	25.3	2.9			1.7				BT	NA	NA	FD	0	3	1		1	1				1	0	1	
91								0		982	16	2	5.1	PR	24.1	19.2	3.2			1.4	2	6.1	2	NO	PRG	CP	SD	0	2	1		1						0	0	
			2			13		0	95		136	5	5.1	CO	89.6	38.4	11	89.6	38.4	43.3	3.4	14.8	3.1	NO	PFG	AB	PG	1	3	2		1		1	1					
	205	165		E	39	4			173		109	5	5.1	CO	34.6	27.5	3.9	27.5	34.6	4.4	2.6	10.2	2.3	NO	UP	FL	HD	0	1	1		1								
	210	165		D	39	2			177		105	5	5.1	CO	38.2	20.8	5.1	34.8	28.5	3.7	1.7	11.3	1.2	NO	UP	FL	HD	0	3	1		1						1		
				FP	68				13		132	5	5.1	PR	44.6	36.5	6.4			10.6	6.6	23.1	6.3	NO	PG	AB	SD	0	3	2		1								
				FP	68				15		103	5	5.1	DS	53.9	36.8	11.5			27.2				NO			PG	2	2	2		1								PLAT HING
				FP	68				16		132	5	5.1	CO	76.8	36.5	6.8	76.8	36.5	20.9	3.7	8.9	3.5	NO	PF	CP	PG	0	3	1		1			1					
				FP	68				17		132	5	5.1	SH	19.9	14.9	4.8			1.3							SD	0	3	2		1								
				FP	68				19		120	7	5.1	LT	28	19.3	7.2			3							SD	0				1						1		
			2			7		0	166		94	9	5.1	DS	55.9	29	14.5			19.8				NO			PG	1	3	2		1								PLAT HINGE
				FP	68	1			4		102	5	5.1	DS	93.4	53	14.9	93.4	53	83.5				NO			PG	1	3	1		1								PLAT SNAP
			6					0	135		155	7	2	CO	47.6	36.2	10.5	47.6	36.2	21.5								0	3	2		2						1		
			2			11		0	102		145	5	2	NCO	76.9	62.8	10			44.2							HD	0	3	2		1								RESIDUE???
	180	180		J	36	1		2.58	25		74	6	2	PR	32.9	27.8	5.7			6.8							SD	0	3	2										
				FP	68				18		68	6	2	NCO	35	32.8	6.9			10.5							HD	0				2								
			1			5		0	44		76	2	1	DS	22	21.5	6.6			3.6							HD	0				1								GROUND LATS
			1			8		0	45		2.2	2	1	DS	25	18.6	5.8			3.3							HD	0				1								GROUND LATS
			1			4		0	47		76	2	1	MI	57	23.3	6.4			11.1							HD	0	3	2										REWORKED?
			1			10		0	74		201	4	1	DS	65.6	24.6	7.9			16.9							HD	0				1								CHK MAT
	175	255		K	21				81		142	7	1	CO	51.2	21.9	6.9	51.2	21.9	9.3								0												
			1			2		0	78		16.2	2	1	DS	66.9	25.4	6.9			14.4								0												IMPACT BREA
	198	224	1	G	28/27	1			150		16.1	2	1	CO	89.7	24.3	7.1	89.7	24.3	18.8								0												
			3			3		0	64		201	4	2	CO	52.4	49.3	11.8	52.4	49.3	37.2								0	3	2		1								
			3			9		0	184		103	5	2	CO	58.7	33.7	8.8	58.7	33.7	20.1								0	3	2										
	185	175		I	37	1/34		2.9	158		105	5	2	CO	56.5	34.1	16.1	56.5	34.1	30.8								0	3	2										
46	195	195	3	G	33		2.22	2.86		345	8	1	5.1	PR	19	17.6	2.1			0.8	3.6	6.2	3.8	NO	UD	FL	SD	0	2	1		1						0	0	
				FP	68	13			3		163	5	5.1	CO	62.1	54.3	12.1	54.3	62.1	36.5	3.8	17.5	3.6	NO	UP	FL	SD	0	3	2		1								
				FP	68				2		102	5	5.1	CO	72.9	59.3	15.2	59.3	72.9	43	14.1	26	12.4	NO	UP	FL	SD	2	2			1								
14	205	170	3	E	38					160	22	2	5.1	LT	20.3	9.4	3.2			0.6				NO	NA	NA	HD	0				1						0	0	
	165	320		M	8			0	94		86	6	4	CO	57.2	40	18.8			34.6								0	3	1		1								
			2			8		0	99		72	1	4	CO	80.1	45.1	27.3			70.6								1	3	1		1								
	205	210		E	30	1		2.82	98		103	5	4	CO	80.5	42.2	19.2			89.1								1	3	2										
			1			9		0	88		203	4	4	CO	79.3	54.3	34.5			153.3								2	3	2		1								
9	210	165	3	D	39		2.5	2.6		76	12	2	3	LT	12.3	7.2	6.1			0.3				NA	NA	NA	NA	0	0	0								1	0	
	205	175		E	37	6			179		16.2	2	2	CO	40.2	26.5	10.7			11.9								0	3	2								1		
	205	175		E	37	5			181		4	2	2	CO	46.7	34.7	15.1			24.6								1	3	2										
			2			23		0	127		135	7	5.1	PR	50.8	33.4	7.2			15	4.9	13.2	4.4	NO	UP	FL	HD	1	3	1		1								
72	180	180	3	J	36	146		2.7		477	7.3	3	5.1	LT	34.2	19.1	3.6			2.5							HD	0	2	1		0						0	0	
59			0	0	0	129				426	7	3	5.2	DS	47.2	24.1	2.8			2.8				NA	NA	NA	FD	0	3	1		2	1	1	1			0	1	
68	205	210	3	E	30	44		2.84		462	59	6	5.2	PR	23.7	18.6	2.5			1.2	1.9	2.8	1.7	BT	PRG	CP	SD	0	3	2		1				1		0	0	
				FP	68	9			21		109	5	5.2	DS	35.7	17.8	5.6			3.3				NO			HD	0	3	1		2								PLAT SNAP
68	205	210	3	E	30		2.82	2.96		460	28	6	5.2	PR	31.9	30	3.1			2.5	1.6	6.4	1.4	BT	PR	CP	HD	0	3	2		1				1		0	1	

F	N	E	LO	UT	UN	FD	MI	MX	CT1922	CT1552	MAT	MT2	EL	PO	ML	MW	MT	CL	CW	WT	BT	PW	PT	FT	PT1	PT2	FR	CO	SC	SCD	HT	CA	PA	EM	GV	NT	RD	WD	RF	Comments
52	200	200	3	F	32		2.55	2.82		389	49	2	5.2	MI	36.8	30.4	2.7			2.8				NO	NA	NA	SD	0	3	2		1						0	0	
90				TP	1	43		0		823	102	5	5.2	DS	48.9	23	6			6.3				NO	NA	NA	SD	0	3	1		0			1			0	0	
9	210	165	3	D	39		2.5	2.6		35	7	3	5.2	CO	34.9	22.2	3.2	34.3	21.4	2.1	2.6	4.9	1.8	BT	PRG	AB	FD	0	3	2		1				1		0	0	
									0	126		22	2	5.2	DS	21.6	13.6	2.4			0.7				BT			FD	0	3	2		1							
	185	305	1	I	11			0	120		72	1	5.2	CO	23.2	12.8	1.9	23.2	12.8	0.6	1.4	3.3	1.3	BT	PRG	CP	FD	0	3	2		1				1			
			2			17/38		0	141		130	7	5.2	MI	44.2	24.8	3.7			4.4				NO	CU	CU	SD	0	2	1		2								PLAT SNAP
	205	165		E	39	1			118		133	7	5.2	CO	94	29	12	94	29	26.4	4.3	7.4	4.3	NO	PRG	AB	PG	1	3	1		1			1				RESIDUE????
60	205	200	3	E	32	67				427	7	3	5.2	CO	33.8	27.8	2.8	26.8	28.3	2.3	3.7	8	2.5	DS	PFG	CP	PG	0	3	1		1						0	1	
				FP	68				10		132	5	5.2	CO	86.6	58.2	6.5	86.6	58.2	41.8	4.6	13.9	3.9	NO	PRG	AB	PG	0	2	1		1							
				FP	68				11		105	5	5.2	DS	71.3	36.5	8.8			23.9				NO			PG	0	3	1		1			1				
89				FP	68			0		755	132	5	5.3	CO	24.6	22.7	2.9	24.6	22.7	1.4	2.1	4.3	1.8	DS	UP	FL	FD	0	2	1		1						0	0	
12	205	165	3	E	39			2.65		116	7	3	5.2	PR	31.8	19.6	2.4			1.6	2.6	3.9	1.9	BT	PRG	AB	SD	0	3	1		1			1			0	0	
	195	170		G	38	73		2.46	33		102	5	5.2	MI	38	19.7	4			3.3							HD	0	2	1		1								PLAT SNAP
	205	150		E	42	C		2.82	35		138	7	5.2	PR	32.6	28	7.2			7.3	2.8	6.4	2.5	NO	UP	FL	SD	0	2	1		1							
31	190	210	3	H	30	43				243	30	6	5.2	CO	43.1	21.9	4.1	43.1	21.9	3.1	1.9	4.2	1.8	BT	PRG	AB	FD	0	3	2		1		1		1		0	0	
91								0		993	23	2	5.2	MI	14.5	19.6	3.6			1.8				BT	NA	NA	HD	0	3	2		1						0	0	
44	175	185	3	K	35					337	8	1	5.2	CO	26	17.2	1.9	26	17.2	0.9	4.3	15	4.3	BT	PR	CP	HD	0	2	1		1						1	0	
48	200	190	3	F	34					366	46	3	5.2	PR	41.7	38.4	41.7	38.4	41.7	9.2	2.4	10	2.4	ST	PRG	CP	HD	0	3	2		1				1		0	0	
89				FP	68			0		747	132	5	5.2	DS	42.5	34.8	8.1			9.2				NO	NA	NA	HD	0	3	1		1						0	0	
				FP	68				12		113	7	5.2	DS	63.1	43.3	3.6			11.4							PG	0	3	1		1							
66	190	185	3	H	35					457	30	6	5.2	CO	40.4	24.4	2	40.4	24.4	2.2	2.8	8	2.6	BT	PFG	CP	FD	0	3	1		1				1		0	1	
	195	145		G	43	1		2.8	61		105	5	5.2	PR	39.3	36.8	9.6			10.2	3.7	10.9	3.3	NO	PR	CP	SD	0	3	2		1							
	185	165		I	39	1			77		105	5	5.2	CO	82.3	22.4	6.5	82.3	22.4	12.8	4	5.5	3.8	NO	PF	CP	PG	0	3	1		1			1				RESIDUE???
75	175	180	3	K	36					621	9	3	5.1	PR	33	29.3	1.3			1.6	2.1	11	3.4	BT	PFR	CP	FD	0	3	2		1						0	1	
73	185	160	3	I	40					584	68	6	5.1	CO	35.2	24.3	2.1	35.2	24.3	2.6	1.7	5	1.5	BT	PRG	CP	HD	0	3	2		1				1		1	0	
46	195	195	3	G	33		2.22	2.86		353	43	6	5.1	PR	18.6	17.9	2.3			0.5	1.8	4.4	1.5	BT	PRG	CP	HD	0	3	2		1				1		0	0	
	205	165		E	39	5			155		103	5	5.1	PR	25.9	18	3.5			2	2.8	6.1	2.6	NO	PG	AB	HD	0	2	1		1					1			
51	210	200	3	D	32		2.59	2.9		370	30	6	5.1	PR	31.5	23.9	2.5			2.5	2	5.1	1.8	BT	PG	AB	HD	0	3	1		1				1		0	0	
	205	165		E	39	9			154		104	7	5.1	MI	31.9	21.4	3.7			2.1				NO			HD	2	1	1		1							
44	175	185	3	K	35					339	40	3	5.1	DS	27.5	11.6	2.1			0.5				BT	NA	NA	FD	0	3	2		1			1			0	0	
	195	205		G	31	2		2.69	148		84	6	5.1	LT	23.6	15.4	3.5			1.4				NO			HD	0	2	1		1					1			
	195	150		G	42	1		2.61	145		158	5	5.1	LT	40.4	39.2	9			9.6				NO			HD	0	3	2		1					1			
60	205	200	3	E	32		2.35	2.69		432	55	6	5.1	CO	31.2	22.2	5	30.9	22.6	2.7	2.9	7	2.5	NO	UY	CP	PG	1	3	2		2						0	0	
	210	175		D	37	7			140		106	7	5.1	PR	32	28.1	5.8			5.4	3.6	14	2.9	NO	UP	FL	SD	0	3	2		1						1		CHK REF .664
			2			16		0	114		150	7	5.1	MI	45.6	43.9	9.6			16.3				NO			SD	0	3	2		1						1		3PREV REFIT
89				FP	68			0		750	132	5	5.1	DS	43.6	22.9	6.2			6.6				NO	NA	NA	HD	1	1	1		2						0	0	
89				FP	68			0		758	132	5	5.1	DS	35.9	17.5	3.6			1.9				NO	NA	NA	FD	0	3	1		2			1			1	0	
	200	145		F	43	2		2.82	60		105	5	5.2	LT	47.5	35.4	8.6	57.9	38.1	11.8				NO			SD	0	3	2		1	1	1						NOTCH
			2			22			147		136	5	5.2	DS	54.3	39	8.4			18.3				NO			PG	0	3	1		2							
	205	205		E	31	5			57		140	7	5.2	DS	44.1	32.6	4			8.1				NO			PG	0	3	1		1							
	205	155		E	41	1		2.8	110		113	7	5.2	PR	57.4	41.4	8.7			19	4.3	13.5	4.6	NO	PRG	AB	HD	0	3	2		1							
91								0		904	105	5	5.1	MI	27.1	17.9	4.9			1.9				NO	NA	NA	SD	0	3	2		1						0	0	
	205	170		E	38	2			165		104	7	5.1	CO	57.6	24.1	3.5	51	41.1	4.9	1.9	6.1	1.8	NO	UP	FL	SD	1	2	1		1							
84	205	205	3	E	31	9		2.43		670	7	3	5.1	PR	41.1	29.1	4			3.8	2.7	5.1	2.1	BT	PRG	CP	SD	0	3	2		1						1	0	
87	200	150	3	F	42	27		2.66		695	158	5	5.1	CO	42.4	28.6	3.7	42.4	28.6	6.1	7.8	15.4	7.5	NO	UP	FL	SD	0	1	1		2						0	0	
90				TP	1	49		0		810	102	5	5.1	CO	88.9	53.1	15.5	86.3	68.3	73.1	8.2	22.2	6.9	NO	UP	FL	FD	1	3	1		1						0	0	
			2			27		0	119		105	5	5.1	DS	42.7	30.9	8			11.9				NO	UP	FL	PG	2	2	1		1							
	200	155		F	41	2		2.66	164		7.3	3	5.1	DS	36.6	19.2	3.6			2.3				BT			FD	0	3	1		1						1		WORN DORSAL
RAK												1	7.1	MI	23.2	19.8	12.5			5.8									1	1			1.1							
																																								Knudson

TABLE B4. REFIT CODES AND DATA

F	Number Assigned by Museum for Collection Control
N	Northing (Based on grid block designations set-up by Slessman)
E	Easting (based on grid block designations set-up by Slessman)
LO	Locality (based on original locality designations by Wormington)
UT	Unit letter (based on original designations by Wormington)
UN	Unit number (based on original designations by Wormington)
FL	Flake number designated in field
MI	Minimum Depth
MX	Maximum Depth
CT1552	Catalog/Accession Number (previously cataloged)
CT1922	Catalog/Accession Number
MAT	Material Type
MT2	Material Type (collapsed into one of seven categories)
PO	Portion of Tool or Debitage (If applicable)

PR= Proximal
DS= Distal
ME= Medial
CO= Complete
NCO = Not Complete

TY Tool Type

1 = Projectile Point
2 = Early Stage Biface
3 = Late Stage Biface
4 = Core
5 = Edge-modified flake
- 5.1 = modification along only one lateral margin
- 5.2 = modification along both lateral margins
- 5.3 = modification along both laterals and the distal margin
- 5.4 = modification along only the distal margin
- 5.5 = modification along one lateral and the distal margin

6 = Retouched Flake
- 6.1 = modification along only one lateral margin
- 6.2 = modification along both lateral margins
- 6.3 = modification along both laterals and the distal margin
- 6.4 = modification along only the distal margin
- 6.5 = modification along one lateral and the distal margin

7 = Formal Uniface
- 7.1 = Side Scraper
- 7.2 = Disto-lateral Scraper
- 7.3 = End Scraper

RF Refit Information

N	E	LO	UT	UN	FL	MI	MAX	CAT 1552	CAT 1922	MAT	MT2	PO	TY	RF
185	175	3	I	37	15		2.8	654		7.2	3	LT		ref w/.616?
.	.		FP	68		SURF		741		102	5	DS		.734.739.742
.	.		FP	68		SURF		734		163	5	DS		.741.739.742
180	180	3	J	36	161		2.9	472		7.3	3	PR		ref w/.302
180	180	3	J	36				418		54	.	CO		ref w/.417
180	180	3	J	36				417		54	.	CO		ref w/.418
180	180	3	J	36	114		3.01	515		7.3	3	DS		ref w/ .72?
.	.		FP	68		SURF		708		105	5	PR		.706, .707
.	.		FP	68		SURF		707		105	5	DS		.706, .708
.	.		FP	68		SURF		706		105	5	CO		.707, .708
195	145	3	G	43	10		2.74	635		127	.	PR		ref w/.634
195	145	3	G	43	9		2.74	634		127	.	DS		ref w/.635
195	145	3	G	43	18		2.96	633		126	5	SH		ref w/.632
.	.		FP	68		SURF		739		163	5	PR		.734.741.742
195	195	3	G	33		2.22	2.86	348		43	.	DS		A1922.40
180	180	3	J	36	123		2.78	560		9	3	PR		ref w/.559?
190	180	3	H	36				244		102	5	DS		ref w/.17
200	165	3	F	39			2.27	223		35	.	PR		ref A1922.38
.	.		FP	68		SURF		742		103	5	DS		.734.739.741
.	.					SURF		943		135	.	PR		ref w/ .944
.	.					SURF		944		135	.	DS		ref w/ .943
205	165	3	E	39			2.65	165		104	.	DS		ref w/ .164
205	165	3	E	39			2.65	164		104	.	CO		ref w/ .165
205	205	3	E	31				454		48	.	MI		ref w/ .453?
200	145	3	F	43	180	POST		239		138	.	MI		A1922.35
205	175	3	E	37			2.6	108		22	.	CO		REFIT .107
205	175	3	E	37			2.6	107		22	.	CO		REFIT .108
205	205	3	E	31	20		2.47	453		48	.	MI		ref w/ .454?
210	165	3	D	39		2.5	2.6	72	.	83		CO	8	1922.79
200	145	.	F	43	2	.	2.82	.	60	105		LT	5.2	1922.61
195	145	.	G	43	1	.	2.8	.	61	105		PR	5.2	1922.6
.	.	.		.		0	.	1000	.	4		CO	4	1922.181
185	175	.	I	37	2	.	3.12	.	73	81		PR	9.3	1922.174
195	160	3	G	40	6	.	2.69	652	.	156		LT	6.1	1922.139
205	175	.	E	37	2	.	.	.	171	18		LT	7	1558.98
.	.	.		.		.	0	992	.	23		DS	5.1	1552.993
.	.	.		.		.	0	993	.	23		MI	5.2	1552.992
200	150	.	F	42	17	.	2.8	.	139	156		MI	6.1	1552.652
205	160	.	E	40	1	.	2.7	.	38	35		MI	7	1552.223
.	.	3.2	.	11or 15	.	0		.	104	123		DS	6.2	.104

TABLE B5. Worksheet showing calculations used for TIE and MNT.

Portion	n	ETE (Wi)	ETE*n		ETE (Wi)2	ETE2*n		TIE	MNT
	Formal Uniface								
intact	16	100	1600		10000	160000			
proximal	2	33	66		1098	2178			
medial	10	33	330		1098	10890			
distal	9	33	297		1098	9801			
Total	**37**		2293			182869		**27.9**	**26**
	Biface								
	n	ETE (Wi)	ETE*n		ETE (Wi)2	ETE2*n		TIE	MNT
intact	7	100	700		10000	70000			
proximal	1	33	33		1098	1089			
medial	4	33	132		1098	4356			
distal	0	33	0		1098	0			
Total	**12**		865			75445		**9.09**	**11**
	Point								
	n	ETE (Wi)	ETE*n		ETE (Wi)2	ETE2*n		TIE	MNT
intact	3	100	300		10000	30000			
proximal	0	33	0		1098	0			
medial	1	33	33		1098	1089			
distal	4	33	132		1098	4356			
Total	**8**		465			35445		**5.33**	**7**
	EM Flake								
	n	ETE (Wi)	ETE*n		ETE (Wi)2	ETE2*n		TIE	MNT
intact	46	100	4600		10000	460000			
proximal	20	33	660		1098	21780			
medial	20	33	660		1098	21780			
distal	33	33	1089		1098	35937			
Total	**119**		7009			539497		**90.2**	**79**
	Ret Flake								
	n	ETE (Wi)	ETE*n		ETE (Wi)2	ETE2*n		TIE	MNT
intact	11	100	1100		10000	110000			
proximal	8	33	264		1098	8712			
medial	12	33	396		1098	13068			
distal	9	33	297		1098	9801			
Total	**40**		2057			141581		**29.1**	**23**
	Debitage								
	n	ETE (Wi)	ETE*n		ETE (Wi)2	ETE2*n		TIE	MNT
intact	225	100	22500		10000	2250000			
proximal	184	33	6072		1098	200376			
medial	259	33	8547		1098	282051			
distal	274	33	9042		1098	298386			
Total	**942**		46161			3030813		**702.3**	**499**