

An Evaluation of the Lowland Patayan Ceramics Typology

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Abstract

The ceramics of southwestern Arizona and southeastern California pose a specific set of problems for the researchers of this region. The limited number of definable diagnostic elements within these undecorated types has led to divisions among researchers and various versions of typologies. With the creation of the Lowland Patayan Ceramics Typology by Michael Waters in 1982, a systematic classification of the ceramics was introduced. However, the applicability of Waters' typology has come under great scrutiny by those who work within this region. An analysis of the typology shows that a type classification based on empirical attributes might not be the best approach for these buff ware ceramics. The inclusion of more verifiable attributes, such as Munsell color, thickness measurements, and associated features, could be a great aid to researchers in typing the ceramics of the Lower Colorado River Region.

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To my Family

*Thank you for being my
strength, inspiration, and guiding light
on my journey*

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Introduction

Ceramics (Pottery), along with lithics, are the only remnants of past cultures that endure the ages and leave us with fragments of the culture of ancient peoples. Through these glimpses of the past, ceramic research gives archaeologists insight into the material culture of these past people. By developing ceramic typologies, which are a classification of the various ceramics within a specified region, we can tie the spatial and temporal elements of these people to their material culture and presumably give chronological legitimacy to these pieces of past cultures.

To date, the research into the ceramics of the Lower Colorado River Region has been geared to understanding the ceramic traditions of the people of the Sonoran Desert, namely the cultures of the Yuman language family. The use of ceramics is one definitive quality that marks a peak in cultural development. From the study of ceramics we can derive insights into the social and economic practices of the past. Therefore, a better understanding of these practices can aid in defining the regional boundaries and the social evolution of a cultural group.

One new area of ceramic research is the investigation into the correlation between the thickness of the ceramics to the chronological date of the ceramics. Although this method has not been tested in the desert southwest region, exploration of the viability of this approach to the ceramics of the Lowland Patayan Ceramic Typology is needed. If viable, this method may help to reorganize and better define the ware types of the current typology.

Presently a great deal of discussion surrounds the current Lowland Patayan Ceramics Typology compiled by Michael Waters and first published in 1982. Although Waters based his typology on the research of Malcolm Rogers, the debate over the applicability of this typology continues. The wide variety of the attributes of the ceramics included in this typology have allowed for the continuation of research and refinement of the typology. Researchers, both past and present, have investigated areas

of study that incorporate petrographic analysis, land use, and resource procurement patterns for the manufacture of ceramics, interpretation of ceramic design elements and style, and the distribution of ceramic wares. These studies further our understanding of the cultures of the past, the time frames of their occupations, and their ability to adapt and utilize the resources of the surrounding environment.

Recent research in the southwestern desert regions has emphasized the creation of regional boundaries for the ceramics of southwestern Arizona and southeastern California (See Neff and Beck 2006, Schaefer 1989,1994, and 1995). The research is fueled by the ongoing controversy that surrounds the Lowland Patayan Ceramic Typology created by Michael Waters. Ceramics dating methods, such as thermoluminescence, Carbon 14 dating, petrographic analysis, and newly proposed thickness studies complement the attributes Waters used in creation of the typology. The research produced from these areas of study will help to refine Waters' work into a more comprehensive and accurate typology.

The study of the ceramics of the Lower Colorado River region has a relatively brief history. Unlike the northern regions of the Southwest, the ceramics of the Lower Colorado River region seem to lack appeal to most researchers. This fact, coupled with the extreme environment of the region and perceived lack of depth to archaeological sites, has left this area without a long record of research. Only a handful of early archaeologists such as Malcolm Rogers, Albert Schroeder, Julian Hayden, Paul Ezell, and Harold Colton dared to tackle the problem of classifying the remnants of past cultures in this virtually unexplored region. Each had his own theory on these past cultures, which many times contradicted the other; however their combined research has laid the groundwork for future generations of archaeologists. In the latter decades of the twentieth century and the beginnings of the twenty first century, the area has seen a resurgence of interest on the part of researchers reexamining previous research issues.

The controversy that surrounds the Lowland Patayan Ceramics Typology created by Michael

Waters, in 1982, is centered on its applicability within the vast regions of the Lower Colorado River which include portions of southeastern California and southwestern Arizona. The ceramics of this landscape are, for the most part, undecorated buff wares with few distinguishing characteristics. Given these parameters, building a typology for this region is a major undertaking.

The focus of this thesis is to assess the applicability of Michael Waters' Lowland Ceramic Typology. My thesis reviews the current issues with the Lowland Patayan Ceramics Typology and examines the various research methods that are currently being explored to improve upon the typology. Issues discussed within this thesis will include the creation of more reliable chronometric measures for the ceramics of this region and the applicability of the Waters' typology for the ceramics within the study area. The current Waters' typology utilizes attributes that are judged merely on an empirical basis which can lead to misidentification of the ceramics by individual ceramics researchers. Both Albert Schroeder and Ronald May incorporated Munsell color and thickness measurements into their typologies, while Waters used only subjective references to general color and wall thickness variations. The addition of thickness measurements and Munsell color provides verifiable characteristics, which would provide more productive assessment tools in future research. Both of these attributes were utilized during the research work for this thesis. These attributes were added to the ceramics data sheet and this information was collected during the recording process for both the field specimens and museum collections.

To complete this work, I drew from both past and current research in an effort to address the most prevalent concerns with applying Waters' typology to this region. The focus of my thesis work centers on the issues that have been raised by researchers such as May (1975), Schaefer et al. (1989), Schroeder (1952), and Seymour (2006), to name just a few. The contention has been that the current Lowland Patayan Ceramics Typology created by Michael Waters does not adequately and correctly represent the ceramics of this region. Issues are raised in relation to the addition of new type/ware

taxonomy by May, Schaefer, and, Schroeder within their specific regions of study. The issue of adding additional wares to the typology and restructuring the geographical boundaries of the typology are highly germane to the continued use of the Waters' typology and its relevance to researchers currently working within this region. These controversies have led to the construction of alternative typologies.

The issues surrounding Waters' typology, which have been previously discussed, and issues with ceramic identification within this region are the basis of my thesis work. Field specimens of ceramic sherds, previously recorded and typed, and museum collections were recorded, examined and analyzed against the current typology to assess the applicability of the typology from the researcher's perspective. Additionally, in completing this work, new tools were created by the author to assist in the analysis of ceramic sherds using the Lowland Patayan Ceramics Typology. The development of a data recording sheet, searchable typology database, and the addition of new attributes to the list of ceramic assessment characteristics, such as Munsell color and thickness measurements are addressed throughout the thesis. As a result of this thesis work, several conclusions were reached. First, the misidentification of ceramics in the current typology is prevalent. Second, the act of assessing the attributes of ceramics while recording in the field is extremely difficult. Third, the current typology is difficult to apply, at best, for even an experienced ceramics researcher. Finally, more definitive chronometric measures should be explored as a means to more accurately date the ceramics.

Chapter 1

Background – Literature Review

The literature on the ceramics of the Lower Colorado River Region goes back to the early part of the 20th century and the work of archaeologist Malcolm Rogers. Rogers spent decades roaming the Sonoran Desert collecting and cataloging ceramic specimens. However, Rogers died before his life's work culminated into a usable typology for the region and the culture he named Yuman; the term Yuman was later changed to Patayan. The name Patayan was created at the 1956 Pecos Conference to describe the groups of the Yuman language family. Among the distinctive characteristics of this group is a similarity in ceramic production. Various features signify the attributes of the ceramics included in the current Lowland Patayan Ceramic Typology such as: rim form, vessel shape, paste, temper, surface color/treatment, and firing atmosphere.

Malcolm Rogers is unquestionably the most recognizable figure in the study of the cultures of the Yuman language family and the standard that all archaeologists working in this region aspire to. Although trained as a geologist, Rogers' interests turned to archaeology when he moved to Southern California in 1919 and quickly became interested in the local archaeology. In the 1920s, Rogers was the sole archaeological researcher willing to tackle the virtually unexplored desert regions of southeastern California and southwestern Arizona. As other archaeologists came and went, always moving on to other more lucrative regions of the Southwest, Rogers endured. Over more than three decades, Rogers made vast collections of ceramics, whole vessels, and sherds, and cataloged numerous features across the desert landscape. All of this work led him to believe that the region had witnessed a long and complex history of societies. Ultimately, his ceramics collections left him with the problem of categorizing these materials into a useful identification and dating model.

Malcolm Rogers' immense collection of ceramics from southwestern Arizona and southeastern

California was the result of decades of field work within the region. However, classifying this vast collection into a usable typology would be a formidable task and ultimately one Rogers would never accomplish. Although Rogers compiled several unpublished types based upon his notes and field work, he was never able to produce a complete typology. Assessing which attributes were the most significant for building a chronological sequence proved difficult. Over years of research, Rogers constructed several variations of names and sherd types in an ever evolving list of ceramic types (see Table 1 below). Rogers' attempts at categorizing the sherds and providing definitive names never made it past his own unpublished notes. Others such as Harold Colton (1939), Albert Schroeder (1952), and Ronald May (1978) did later, however, publish type names created by Rogers.

Table 1. Sherd characteristics and chronologic ranges for Lower Colorado Buff Ware types according to Rogers (1945b).

Final Type Name	Synonyms	Remarks	Temper size and shape	Quantity	Chronologic Range
Black Mesa Gray	Putty Ware, Drab Gray	Subtype of Black Mesa Buff	No temper, microscopic inclusions of water rounded oligoclase grains	few	Yuman I
Black Mesa Buff	Archaic pink, Brick, or Drab ware		same	same	Yuman I
Black Mesa Fugitive Red	Previously called Black Mesa Red		same	same	Early Yuman I
Black Mesa Red	Previously noted temperless reds		same	same	Late Yuman I
Black Mesa Red-on-Buff	Related to Tumco Buff?	Rare, no stratigraphic evidence	same	same	
Colorado Beige I	Beige Ware Parker Variant	A third Sub-type is called Biscuit Beige	variable - crushed quartz to coarse quartzose with some magnetite	30 to 50 %	All Yuman I, early II
Colorado Beige II	same		quartz is finer than above and more angular	10 to 30 %	Mid to Late Yuman I, early II
Colorado Red-on-beige		Sub-type is Col Red-on-red	same as Col. Beige II		same
Colorado Red I	Col. Red sub-type I, Fugitive Red	Thin wall finer paste with more mica was called Parker Variant	same		Fugitive Red, early Yuman I/ Col. Red Late Yuman I
Colorado Red II	Col. Red sub-type II	same	same		Late Yuman I and all Yuman II

Table 1 (continued)

Final Type Name	Synonyms	Remarks	Temper size and shape	Quantity	Chronologic Range
Picacho Gray		Subtype of Tunco Buff	No temper, inclusions are clear water worn quartz	occasional	same
Picacho Red-on-Gray		same			same
Picacho Stucco		same			same
Tunco Buff	Brick Ware, Tolbard Buff		No temper, shell inclusions	occasional	same
Tunco Red-on-buff		Some may be Black Mesa Red-on-buff	same	same	same
Tunco Stucco			same	same	
Blythe Buff			subangular quartz and feldspar, inclusions of water-rounded oligoclase	20 to 40 %	Late Yuman I to Early Yuman III
Blythe Red-on-buff			same	same	
Blythe Stucco			same	same	
La Paz Buff			microscopic pellets of round granite	fewer than in Blythe Buff	Yuman II
La Paz Red-on-buff					
La Paz Stucco					
Parker Buff	Also Parker Red and Parker Red-on-red		Crushed feldspar, same as Col. Beige, becomes finer in Yuman III	Granular, medium to fine	Late Yuman I to early Yuman III
Parker Red-on-buff			same	same	
Parker Stucco			same	same	

Table 1 (continued)

Final Type Name	Synonyms	Remarks	Temper size and shape	Quantity	Chronologic Range
Pyramid Gray		Named By Colton	Coarse and angular crushed clear and opaque quartz	30 to 40 % some small amounts of white mica, hornblende, and magnetite	Patayan II
Pyramid Red-on-gray			same	same	
Pyramid Stucco			same	same	
Topoc Buff			coarse to medium crushed quartz, a higher percentage of hornblende and mica than in Pyramid Gray. This temper is also more variable and includes reddish quartz.	30 to 50 %	Yuman II to early III
Topoc Red-on-buff			same		
Topoc Stucco			same		
Palomas Buff	Dome Buff		Inclusions of microscopic pellets of water washed feldspar, temper round to subangular of feldspar gathered from ant hills, minutes amounts of mica and hornblende	20 to 35 % in early types and 10 to 20 % in late types. Smallest of these pellets are equal to the biggest in Blythe Buff.	
Palomas Red-on-buff		None had been found to date			
Palomas Stucco			same	same	

Table 1 (continued)

Final Type Name	Synonyms	Remarks	Temper size and shape	Quantity	Chronologic Range
El Rio Buff	Colorado Buff I	Early name for a variety of Salton Buff			Late Yuman I to early Yuman III
El Rio Red-on-buff	Colorado Red-on-buff I	Also an El Rio Black-on-buff			Yuman III
El Rio Stucco	Colorado Stucco I				Yuman II
Colorado Buff, southern	Colorado Buff II				Yuman III
Colorado Red-on-buff, southern	Colorado Red-on-buff II	Also a Colorado Red-on-red and Red-on- black			Yuman III
Colorado Stucco, southern	Colorado Stucco II				Yuman III
Colorado Buff, northern	Needles Buff II and III	Needles Buff (Colton)			Yuman II and III
Colorado Red-on-buff, northern	Needles Red-on-buff II and III	Needles Red-on-buff (Colton)			Yuman II and III
Colorado Stucco, northern	Needles Stucco II and III				Yuman II and III
Colorado Red III, southern and northern	Needles II and III				Yuman II and III
Colorado Buff, eastern	Gila Bend Buff				
Colorado Red on Buff, eastern	Gila Bend Buff				
Colorado Stucco, eastern	Gila Bend R/B				

Table 1 (continued)

Final Type Name	Synonyms	Remarks	Temper size and shape	Quantity	Chronologic Range
Salton Buff	Palo Verde Buff, El Rio Buff	El Rio is now a definite type of Y-III period not resembling old recordings of El Rio which was tempered (El Rio was ultimately added to Colorado Buff.	coarse rounded pellets of colored feldspar, shell inclusions		Yuman II
Salton Red on Buff		Very rare			Yuman II
Salton Stucco					Yuman II
Carrizo Buff I	Desert Ware				Yuman III
Carrizo Red-on-buff I	" "				Yuman III
Carrizo Stucco I	" "				Yuman III
Carrizo Buff II	" "				Yuman III
Carrizo Red-on-buff II	" "				Yuman III
Carrizo Stucco II	" "				Yuman III
Vallecito Red-on-buff	Desert Mountain Ware				Yuman III
Vallecito Buff	" "				Yuman III

Rogers' method of dating ceramics relied on a direct correlation with surrounding features such as trails, trail shrines, sleeping circles, geoglyphs, and rock art. Trails were a significant feature in his development of a ceramic typology sequence. In Rogers' time, ceramics were found in abundance near trails. Because trails obviously had evolved over long periods of time, the ceramic deposits could, theoretically, mark the chronology of ceramic development in the region. In Rogers' theory the complex trail systems of the desert region act much the same as stratigraphy does in an excavated site, where in an excavated site the older materials are found in the lower levels and the newer are found nearer to the surface. Given that the majority of ceramics in this region were not obtained through excavation, but rather from surface collections, a different process needed to be developed.

In Rogers' theory the earlier ceramics were found on older, abandoned trails and later ceramics were found on later trails. Trails were used for specific periods of time; newer trails were created and earlier trails were abandoned. Therefore the ceramics types found in association with these trails would be more easily datable. Additionally, Rogers used intrusive Hohokam ceramics, which had established chronological periods, as a relative dating method to construct loosely based temporal periods for his local ceramics. This theory led Rogers to develop a framework of ceramic seriation for Lower Colorado River Buff Wares.

Other methods used by Rogers involved vertical stratigraphy. Rogers used the ceramics excavated from trail side shrines that were deposited in a stratigraphic context over the years of use of the shrines. Additionally, he studied the ceramics accumulated from collections around Lake Cahuilla that also laid in a stratigraphic context buried under the deposits of the numerous in-fills of the ancient lake. From the ceramics found in these locations, he could distinguish the distribution of the successive strata of the ceramics and therefore assign relative dates to them. All of these methods were used in the development of his Yuman I, II, and III phases, which later became Patayan I, II, III. These phases roughly captured the arbitrary time frames Rogers assigned to the changes in cultural development;

however not everyone agreed with his phase system. Michael Waters later based his ceramics type time frames on Rogers' Patayan phases with some changes in overlapping phases. Patayan I ranges from 700A.D. to 1000 – 1050A.D., Patayan II ranges from 950 – 1000A.D. to 1500A.D., and Patayan III ranges from 1500A.D. to 1850-1900A.D. Although Rogers had put years of research into the ceramics of the Lower Colorado Region, his work lacked chronometric methodology, relying heavily on relative chronology and associations of a few intrusive sherds. These issues and the fact that Rogers never completely pieced together a typology from his years of research have been the fuel that has fed the critics of his work.

Future archaeologists were both thankful for and frustrated by Rogers' work, for although he laid the groundwork for future research he also left many questions unanswered. Rogers' vast collections and copious notes may hold the clues needed to answer these questions nevertheless; he left an abundant amount of work for future researchers.

Albert Schroeder

Albert Schroeder was the next researcher to address the issue of Lower Colorado River ceramics. Schroeder was a contemporary to Rogers during the 1940s and 1950s, however their theories on the ceramics of the Lower Colorado River region did not always coincide; Schroeder took a different approach to the question of categorizing Lower Colorado region ceramics. During his survey project from Davis Dam to the international boundary with Mexico, Schroeder began to construct distinct ideas about the ceramics of the Lower Colorado River region, which differed from those of Malcolm Rogers.

Schroeder believed that Rogers incorrectly based his ceramics chronology on refinements in color, rim form, vessel design, and form, whereas Schroeder believed that temper variation was the primary factor in building a chronology. Temper was dependent on the source of manufacture; where the clay originated from. Clays from one region would not necessarily require the same temper as clays from another region. This fact would highlight the clay source and possibly allow for study of the movements of cultural groups in this region. Schroeder believed neither form nor construction was a good bases for typing and that clay color was a secondary attribute of consideration. Based on this, he constructed his version of a Lower Colorado River Buff Ware typology which included six series based on temper: Parker, Gila Bend, Palo Verde, Salton, Lower Gila, La Paz, and Barstow (see Table 2 below).

Table 2. Lower Colorado Buff Series: (from Schroeder 1958).

<u>Parker Series</u> - small to medium quartz and feldspar			
1	Parker	4	Parker Stucco
1a	Fort Mohave variant	5	Colorado Beige
2	Parker Red-on-buff	6	Colorado Red-on-beige
2a	Fort Mohave variant	7	Colorado Red
3	Parker Black-on-red		
<u>Gila Bend Series</u> - quartz and black particles			
8	Gila Bend Plain	10	Gila Bend Beige
9	Gila bend Stucco	11	Gila Bend Red
<u>Palo Verde Series</u> - sherd and occasional quartz			
12	Tumco Buff	15	Black Mesa Beige
13	Tumco Red-on-buff	16	Black Mesa Red
14	Tumco Stucco	17	Black Mesa Polychrome
<u>Salton Series</u> - rounded, often colored, arroyo sand			
18	Topoc Buff	20	Topoc Fugitive Red
19	Topoc Red-on-buff	21	Topoc Stucco
<u>Lower Gila Series</u> - abundant, small, rounded sands			
22	Palomas Buff	23	Palomas Stucco
<u>La Paz Series</u> - small to fine sherd and quartz sand			
24	Needles Buff	28	Needles Red-on-beige
25	Needles Stucco	29	Needles Red
26	Needles Red-on-buff	30	Needles Black-on-red
27	Needles Beige		
<u>Barstow Series</u> - large quartz and some biotite mica			
31	Pyramid Gray		

Schroeder had studied Rogers' collections and notes prior to his own survey and excavation work. He believed Rogers' ideas on the ceramics were generalized, lacked definition, and could be improved upon. Schroeder's definitive work on the ceramics of the Lower Colorado River came with his excavations at Willow Beach in 1958. Schroeder excavated test units and made counts of the types of ceramics found that were described and dated by other archaeologists. When a site at Willow Beach yielded a fairly conclusive date of 700 A.D., Schroeder suggested dates for his own typology by association with the buried levels. These dates were generally accepted until Michael Waters published his typology in 1982, at which time most researchers began to use his typology.

Ronald May

Ronald May's contributions to the field of ceramics study for the Lower Colorado River region complemented Malcolm Rogers' work. May's interest in the ceramics of the Lowland Patayan began in the late 1960s with his introduction to notable archaeological researchers Paul Ezell, Emma Lou Davis, and Albert Schroeder, all of whom worked in either southeastern California or southwestern Arizona. These early influences were instrumental in guiding him to develop his own research areas and expand upon the work of Malcolm Rogers and Albert Schroeder. Through his connections to these early pioneers, May gained not only crucial personal insights, but also access to rare collections and Rogers' unpublished ceramics field notes.

Through his own field work and the encouragement of other researchers, May continued to refine his research and focused on core paste composition of the regional ceramics. Along with focusing on the creation of a typology of Lower Colorado River Buff Ware, May was able to put Rogers' typology to the test with ceramics collected from Cottonwood Creek (CA-SDI-777) and Kitchen Creek (CA-SDI-80) excavations, and later completed an analysis of a ceramics sample collection from the Barrel Springs area, which added immensely to his own research. It was during

this analysis that May discovered a new type of Lower Colorado River Buff Ware never described by Schroeder, Rogers, or any other researcher. He called this new type Ocotillo Buff.

In 1975 May published a paper, presented at a conference for the Archaeological Survey Association, where he met Ben and Lucille McCown. The McCowns asked May to assist them in the analysis of a ceramics collection, recovered in 1957, that encompassed samples from nearly 300 sites from around the shoreline of Lake Cahuilla. Using 3,000 rim sherds and the critiques of other researchers regarding his earlier work, May was able to fine-tune his research. The result of these revisions led to his 1978 publication, *A Southern California Indigenous Ceramics Typology: A Contribution to Malcolm J. Rogers' Research*. In this publication May outlined numerous ware varieties that elaborated on Malcolm Rogers' earlier work.

May's typology was intended to further refine the ceramics of the region into more definitive wares. The typology included thickness measurement data that had not been collected by Rogers. Schroeder did include thickness measurements in his work, but he gave no analysis of their importance to type definition. Essentially, May's work was a synthesis of his years of research and that of previous researchers, which produced an amalgamation of various data, wares, and types to create a typology reflective of the great variation within the region. Although May's 1978 publication was a contribution to Malcolm Rogers' work, he put great stock in the work of Albert Schroeder as well. In his own words, "Most everyone in the Southwest held Schroeder in high esteem" (May, personal communication 2008). Although May's typology is inclusive of the work of many years of research and the insights of various researchers, it is extremely difficult to follow and apply to actual sherds; therefore it remains a rarely used resource.

Michael Waters

Michael Waters, a geologist by training, took up the mantle of Malcolm Rogers' work and

began to synthesize Rogers' collections and field notes into a working typology model. Waters' interest in the ceramics of the Lowland Patayan began with his 1980 thesis *Lake Cahuilla: Late Quarternary Lacustrine History of the Salton Trough, California*, which focused on the area of southeastern California. It was from his thesis work that Waters developed his theories and ideas about the ceramics of the region. His examination of the archaeology of Lake Cahuilla, from a geological perspective, allowed a temporal context to be combined with the ethnographic and spatial data to formulate the basis of his exploration into the topic.

Waters' typology is a continuation of the unfinished work of Malcolm Rogers. One goal he set out to accomplish was to confirm Rogers' typology while refuting the work of Albert Schroeder. He synthesized Rogers' loose type associations into nine types and their variant wares. Schooled as a geologist, rather than as an archaeologist, Waters relied heavily on Rogers' notes and collected sherds to form the basis of his theories of the ceramics. Waters developed a type collection, based on Rogers' sherds, to work from. In doing so, Waters found many redundancies and combined many of Rogers' types with similar characteristics into a single type. His typology relies heavily on temper paste consistency, rim form, and vessel form, following Rogers' initial theories.

Current Research

Current research into the ceramics of the Lower Colorado River region follows the pattern of previous research in this field. Researchers today still struggle to provide a viable temporal pattern to apply to the ceramics of the region. This research includes various means of classification of the types and wares of the Lower Colorado River. Presently a great deal of discussion surrounds the current typology compiled by Michael Waters and first published in 1982. Although Waters based his typology on the research of Malcolm Rogers, the debate over the applicability of this typology continues. Various researchers continue to investigate areas of study that incorporate petrographic analysis (see

Neff and Beck 2006), land use, resource procurement patterns for the manufacture of ceramics, interpretation of ceramic design elements and style, and the distribution of ceramic types (see Schaefer et al.1989). Additionally, researchers recently began to measure sherd thickness to determine if there are correlations between thickness and specific types. Current researchers continue to debate Waters' typology, his methodology in creating the typology, and his "lumping" together of several types.

In conclusion, the development of a working typology within the vast regions of the Lower Colorado River has encompassed not only a great span of time, but also a great number of individual researchers. Each individual has put his or her own stamp on the research of this area with their contributions to a greater understanding of the ceramics of this overall region. Although not all agree on a single classification system, each can agree that an understanding of the aforementioned history is crucial to the future of ceramics research in this region.

Lowland Patayan Ceramics Typology Ware Definitions

What follows are brief descriptions of the wares of the Lowland Patayan Ceramics Typology that were used to conduct the research for this thesis (see Appendix B for complete descriptions of each ceramic type).

Black Mesa Buff

Time Period - Patayan I - 700 – 1000 A.D.

Range - Along the Colorado River, confined mostly to the California side in eastern Imperial County. Occurs up to 60 miles east of the Colorado River, south to the Sierra Pinacate, Sonora; west to the Laguna Salada in Baja California; north to the Mojave Desert.

Surface Finish/Color - Rough to wiped smooth by hand or mop. Neck either pinched, paddled, or coiled. Color from gray to buff depending on degree of oxidation – Thin scum coat may be present, but not common.

Temper - Clay made from crushed pot sherds or incompletely crushed clays; little or no mineral temper

Rim - Direct – lips of large vessels and bowls occasionally notched – slight tapers noted sometimes on jar rims

Vessel Form - Colorado Shoulder – Jar types 1 – Bowl types 1 & 3 – Scoops symmetry poor but improves with time.

Tumco Buff

Time Period - Patayan II - 1000-1500 A.D.

Range - Blythe to Gulf of California – Origin near Yuma, AZ – wide distribution of type; east to Yuma County line – west to Laguna Salada, Baja, California – south to the Delta, Sierra Pinacate – north to Mojave Sink

Surface Finish/Color - Smooth – stuccoed when used for cooking – Color pink to light buff to gray – thin cream colored scum coat may be present

Temper - Clay made from crushed pot sherds or incompletely crushed clays; little or no mineral temper – better finished than Black Mesa Buff – rarely shell temper found – mica, hornblende, sand, clay

Rim - Recurved – roughly flattened lips

Vessel Form - Jar types- 1,2; bowl types 1 ; scoops

Colorado Red

Time Period - Patayan I - 700-1000 A.D.

Range - Greatest concentrations on Arizona side of the Colorado River between Palo Verde Valley and the Delta, and also up the lower Gila River east to Yuma County line – west to Lake Cahuilla – south to northern boundary of the Delta Sierra Pinacate, Sonora

Surface Finish/Color - Burnished – Red clay slip – surface color brown to red colored clay slip

Temper - Variable – Fine rounded quartz, feldspars, mica, and other opaque colored spars. Occasionally freshwater snail shells

Rim - Direct

Vessel Form - jar types 1,2,4; bowl types 1,2,3 and scoops - Colorado Shoulder; more exaggerated along lower Gila River

Colorado Beige

Time Period - Patayan I - 700-1050 A.D.

Range - Southern end of the Colorado River – Along the Colorado River north of Blythe to Gila River – Intrusive west to Lake Cahuilla; south to Colorado Delta, Sierra Pinacate, Sonora; east to eastern Yuma County border

Surface Finish/Color - Burnished – cream slip – variable roughly smoother to rough wipe marks – coarse particles of temper show through the surface – Color; beige to brown gray – occasionally thin cream-colored scum coat

Temper - Variable -ranging from 5-55% - Rounded quartz sands, feldspar, mica ranging in size from fine to large - occasionally freshwater snail shells

Rim - Direct

Vessel Form - Jar type 1,3,4 - bowl type- type 1,2,3 - vessel symmetry improves with time

Colorado Red-on-Beige

Time Period - Patayan I - 800-1000 A.D.

Range - Confined almost entirely to lower end of the Colorado and Gila Rivers with restricted east – west range – most commonly occurs on the Arizona side of the Colorado River

Surface Finish/Color - Generally burnished; roughly done, but some vessels are merely smoothed. A thick red paint is used.

Temper - Variable -ranging from 5-55% - Rounded quartz sands, feldspar, mica ranging in size from fine to large - occasionally freshwater snail shells

Rim - Rim notching – Red colored rim is common

Vessel Form - Jar types 1,2,4 - Bowl types 1,2

Colorado Buff

Time Period - Patayan III - 1500-1850 A.D.

Range - Origins of southern subtype along Colorado River – west of the Salton Sea at San Sebastian

Wash

Surface Finish/Color - Well smoothed with faint wipe marks left by mops. A thin cream-colored scum coat is common along the river regions; in the desert a thick scum coat is common.

Temper - Occasionally a freshwater mollusk shell or bone, carbonized twig impressions. Vugs occur in the desert materials. Inclusions can vary in amount from 1-10 percent. Generally very fine (very even grained) Fine grains of subangular to subrounded quartz, feldspars, and other opaque spars.

Rim - Recurved with finely flattened lips of reinforced rim bands. Rim line is straight

Vessel Form - Jar type 2,3 and 4; bowls types 1 and 3 and scoops. Jar type 3 very common in the California desert

Colorado Red-on-Buff

Time Period - Patayan III - 1500-1900 A.D.

This type is the decorated equivalent of Colorado Buff. During this period the amount of decorated ware increased. Design elements are geometric along the river and geometric and zoomorphic in the desert. The Chemehuevi decorated some Colorado Buff vessels with a black paint in the CA desert region. Colton's Topoc Red-on-Buff and Needles Red-on-buff are varieties of Colorado Red-on-buff

Salton Buff

Time Period - Patayan II - 950-1500 A.D.

Range - Focus 12m shoreline of L. Cahuilla - Occurs as trade east into Colorado River area; rarely across river in Arizona

Surface Finish/Color - Rough grains - Wiping common - most sandblasted - occasional cream-colored scum coat - has a stucco variety - COLOR ranges from buff to red

Temper - Rounded quartz - Well rounded coarse beach sands, ranging from 15-50% - 90% is quartz and feldspar remainder black and red jasper - Sherds from Western shoreline of Salton Sea tempered with fine-grained sands, Eastern Shoreline medium to large temper - Fragments of freshwater mollusk shells

Rim - Variable - Late Patayan I direct rim - some rim notching – Patayan II recurved rims – Patayan III reinforced rim bands

Vessel Form - Jars, bowls most common - scoops

Parker Buff

Time Period - Patayan II & III - 1000 post – 1900 A.D.

Range - Parker Valley origins - ranges from Bill Williams River to Yuma area (W/R) North of Needles Mohave Valley to North of Ehrenberg - north end of Palo Verde Valley

Surface Finish/Color - Wiped with mop, temper never shows through - cream-colored scum coat- may have stucco cooking variety - COLOR : pink to gray

Temper - Medium - fine grained, subangular to angular crushed white feldspar and quartz with some hornblende - temper in med. - relatively abundant amounts

Rim - Recurved - early roughly flattened margins in time refined and smoothed

Vessel Form - Jar type 2; bowl type 1,2,3 and scoops

Topoc Buff

Time Period - Patayan II - 1000-1500 - PIII 1150-1550 A.D.

Range - Although this type is most common in the Mohave Desert region it was probably imported there, origins in Colorado River Valley south of Black Canyon. Clay is typical of the sedimentary river region clays. It is found west of the western boundary of San Bernardino County, CA; south to the Chemehuevi Valley; and east to Sacramento Wash AZ

Surface Finish/Color - Rough coarser temper particles visible through time exterior surfaces - smoothness varies w/ coarseness & amount of temper- exterior surface may have cream-colored scum

coat - stuccoing is used - COLOR - ranges from buff to slate gray -

Temper - Variable - Ranges from 30-50% coarse to med. Grained subangular to subrounded clear to white quartz with some feldspars, black hornblende - occas. micas occur adhering to feldspars and quartz

Rim - Most belong to earlier direct rim; rounded lips - late group; recurved rims, flattened lips

Vessel Form - Jars, bowls - scoops

Palomas Buff

Time Period - Patayan II & III - 1000-1850 A.D.

Range - Lower Gila River - Dome Mnt., Agua Caliente along Gila River- South to Sierra Pinacate - North to Gila, Kofa Little Horn Mnts. - Confined entirely to AZ

Surface Finish/Color - Early samples roughly smoothed with cracking around the temper particles – later specimens smoothed with mop; cream-colored scum coat – Color – gray to gray buff – some tan to buff

Temper - Variable - Coarse to medium grained subangular to subrounded clear, & white quartz with some feldspars, lithic sand grains with mica - ranges from 10-35%

Rim - **Recurved**, straight roughly flattened lips - P III reinforced rim bands

Vessel Form - Jars, bowls, and scoops

Palomas Red-on-Buff

Time Period - Patayan II - III - 1000-post-1900 A.D.

Range - Generally the same as Palomas Buff, but more restricted

Surface Finish/Color - Early samples roughly smoothed with cracking around the temper particles – later specimens smoothed with mop; cream-colored scum coat – Color – gray to gray buff – some tan to buff

Temper - Early specimens are roughly smoothed, with cracking around the temper particles common. Later specimens are roughly smoothed with a mop and often have a cream-colored scum coat. This type has a stucco cooking variety

Rim - Recurved rims with straight roughly flattened lips which with time were refined. Reinforced rim bands appear during the beginning of and through the Patayan III period

Vessel Form - Jars and bowls, the latter decorated on both exterior and interior surface

Chapter 2

Identification of the Study Area

The Lower Colorado River region is generally described as the river corridor that runs from Lake Mead south to the Southern International Boundary. Additionally included is an area stretching out several miles both east and west into California and Arizona along the river. For the purposes of this thesis, the area of the lower Colorado River region will be defined as the river region south of the Imperial Dam to the Southern International Boundary. The study area will also include an area east of the Colorado River to the Mohawk Mountains, north to the mountains of the Kofa National Wildlife Refuge, and south to the International Boundary (see Figure 1).

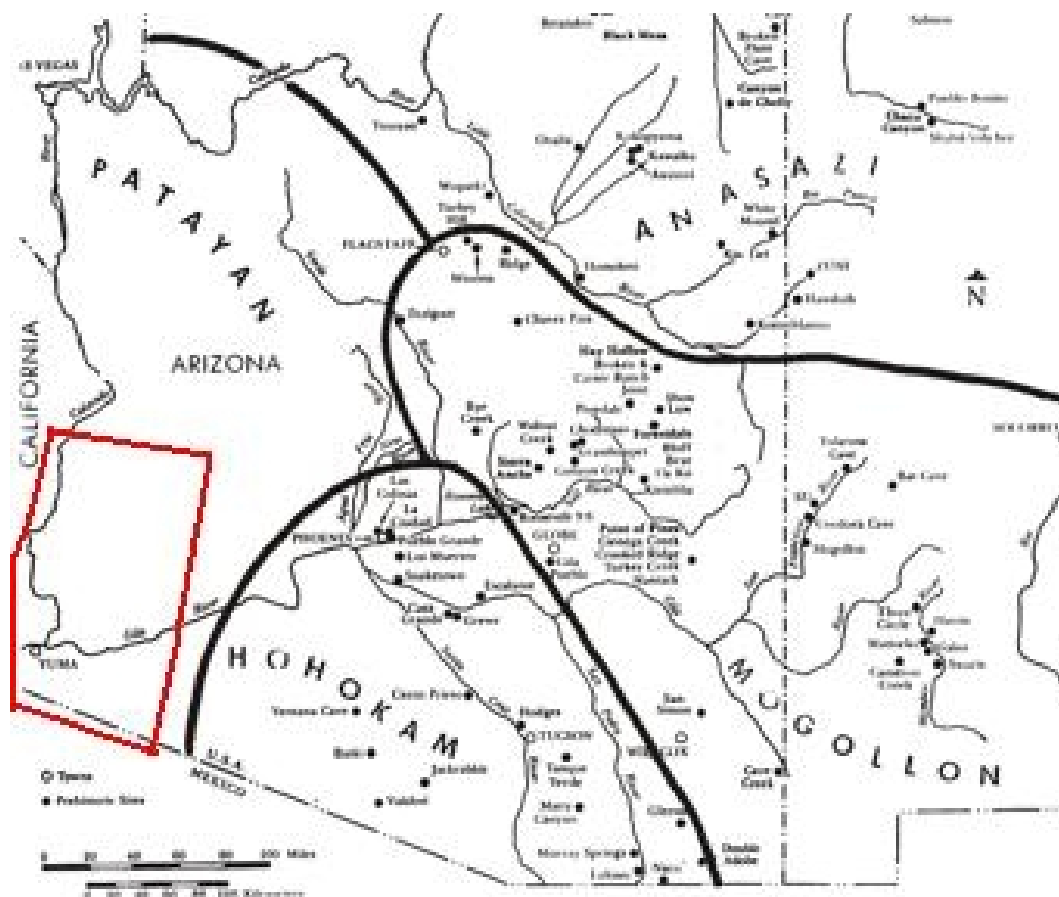


Figure 1. Study Area (out lined in red) and Cultural Boundaries

This region is described as the western edge of the Papagueria, and the heart of the Sonoran Desert. Specifically this region is part of the so-called Colorado Desert and lies within the Basin and Range Province. The Colorado Desert is comprised of southeastern California, southwestern Arizona, the lowlands of Baja California, and the western portion of the Sonoran Desert. Differing from the surrounding Mohave Desert, the Colorado Desert is a subtropical desert that is much flatter and lower in elevation. The Colorado Desert is also warmer in the summer and winter months and has less annual rainfall. This area is the most arid portion of the Sonoran Desert and is dominated by a hot, dry climate with extreme temperatures during the summer months and erratic and spotty rainfall, averaging between 3 and 5 inches a year. The sun shines more than 90 percent of the time that it is above the horizon (Bailey 1966).

Geology

The overall elevation of the lower valley of the Colorado River averages little more than one hundred feet above sea level. The general topography of the region is relatively flat with ranges of mountains, averaging from two thousand to six thousand feet, that abruptly rise from the desert floor. This region of desert is defined by the two rivers, the Gila River and the Colorado River, that bisect the desert and provide a much needed source of water and fertile silts from up river. The Colorado River descends some eight thousand feet in elevation from its origin to its end in the California Delta. This drastic elevation change allows the river to cut a deep canyon in the upper regions, picking up generous amounts of silts that will later be deposited along its lower course in the Lower Colorado River desert region.

The Colorado and Gila River channels cut through a variety of deposits that comprise the geological history of the region. "This whole low desert area, with its mountains, is separated from a plateau region to the north by a complicated irregular line of cliffs facing southwest, which are sometimes regarded as distinct mountains" (Castetter and Bell 1951:2). The Colorado River Valley is a

complex variety of desert plains and mountain cliffs, with an assortment of geologic formations. Ranging from volcanic to sedimentary, the geology of this region lends itself to irregularity depending on the proximity of the mountain ranges that lie on either side of the river channel. From its origins to the Delta, the river streambed varies from bedrock to gravel and sand,

The flood plain is bounded on both sides by a continuous terrace of coarse gravel and sand, marked by a conspicuous bluff which rises from fifty to one hundred feet above the plain and extending far to the north above Yuma along the valley as well as along the Gila River. These terraces, thirty to fifty feet in height above the river flood plain, lie at approximately the same height above the river flood plains as does the ancient beach line above sea level (Castetter and Bell 1951:3).

The diversity of the Colorado and Gila Rivers in terms of their effects on the surrounding geology lends itself to a rich matrix of clay materials for indigenous cultures to exploit. Sedimentary clays are those that have been transported by alluvial means from their original parent source. “Transported clays are more abundant than residual clays and may be more homogeneous, as well as finer in texture, as a result of sorting and redeposition” (Rice 1987:37). Thus, those cultures which resided along either the Colorado or Gila River found themselves with an endless source of fine materials with which to produce ceramics.

Chapter 3

Research Design and Methodologies

The Problem

One of the most prominent themes concerning the typing of ceramics within the project area is the need to create a usable ceramics typology that accurately reflects the types within this region. Unlike most other locations within the Southwest, archaeologists working in the desert regions are without the ability to use certain absolute dating methods, such as dendrochronology, that provide a control method for corroborating ceramic type time frames. Additionally, most sites lack the depth necessary for excavation. Generally speaking, excavation of a site allows a stratigraphic record of deposits to be recorded and can give a temporal view of the artifacts of a site. While surface collections can denote spatial reference, they can lack the necessary components that stratified sites have in terms of a temporal link to build a chronological view of the ceramic deposits.

However, the most perplexing issues are that of distinguishing between the various buff ware types found within this region and that decorated ceramics are found only on rare occasions. In other regions, such as that of Northern Arizona, decoration styles can give an immediate distinction between the temporal and spatial relationship of the sherds. Such is not the case in the lower Colorado River region. Therefore, the distinction between types must be made based on surface color, paste-temper composition, and rim-vessel form. These attributes can be highly subjective to empirical analysis; therefore a more rigorous and all-encompassing set of tests and recording methods for all of the attributes of the ceramics must be developed to create a potentially more refined typology.

Hypotheses

Based on my own work and the work of others over the years, it is clear that researchers must establish a more comprehensive and descriptive typological reference for the ceramics of the Lower

Colorado River region. As has already been established, certain inadequacies are apparent within the Lowland Patayan Ceramics Typology created by Michael Waters, and these deficiencies are linked to the applicability of the typology. The research questions that can be created from these issues can be grouped into four main themes: field recording of ceramics, mobility, changes through time, and a miscellaneous category for the themes that expanded beyond the bounds of the other categories. The answers to any or all of these questions will aid in building a chronological view that encompasses features, sites, and local ceramics. These answers will aid in acquiring a better knowledge of the applicability of Waters' typology within this specific study area. Many questions can be raised from the use of this data; I address only those themes relevant to the specific purpose of this thesis.

Typology – Field Recording

Gaining complete and accurate data in the field is key to the recorder's ability to place ceramics within a type class with some measure of confidence. Gathering empirical data is essential when working with ceramics within the Lowland Patayan Typology. Evaluating minute variations in paste-temper ratios and establish firing and construction techniques in the field is a tedious and sometimes futile process for even the most experienced of archaeologists. Therefore, more thought must be given to developing a more standard means of obtaining useful data to aid in field typing ceramics within this typology. Expanding on this theme we can then begin to pose questions regarding the typology and methods of field recording for use in typing the ceramics. What attributes should be recorded to build a typology that more clearly reflects the ceramic variation and morphology? Is Waters' typology usable for field typing ceramics in the study region? What is the relevance of the typology if it is in question? Does the current Lowland Patayan Ceramics Typology extend over too broad of a region that encompasses too much variation to accurately type the sherds found in the study area?

Discussion: The objective of data collection for ceramics is to obtain information pertinent to aid in classifying ceramics and gaining a chronological framework for known types within the

typology. The buff ware types of the lower Colorado River region commonly lack the obvious characteristics of the ceramics of Northern Arizona that possess decoration styles that greatly aid in typing the sherds of that region. Therefore, other diagnostic attributes must be used in classifying the ceramics of this region such as rim form, paste-temper composition, and vessel form. However, many times the recorded ceramic sherds of this region are small and lack important diagnostic features crucial to aiding in successful classification of the ceramics.

When recording Lowland Patayan ceramics, archaeologists must have specific attributes to correctly classify the ceramics; without these specific attributes classification within the typology is impossible. The question then becomes: can any or enough of these diagnostic attributes be recorded in the field to allow the recorder to apply a relatively reliable taxonomy?

Finally, the geographical range of the Lowland Patayan Ceramics Typology extends over an area of much cultural and geographic diversity. Several researchers (Laylander 2008, May et al. 1975, and Schaefer et al. 1989), have questioned the extents of the Lowland Patayan Ceramics Typology with regard to the variety and range of types. Their discussion suggests revising the current typology by excluding some types and including new types. This kind of modification may be regional in its nature and call for the creation of more than one typology. Smaller regional typologies may be more descriptive and specific to the local variation found in the attributes of the ceramics in the smaller area.

Archaeological Data Requirements: Ceramic assemblages from museum collections and field samples will be examined and have data collected such as presence or absence of diagnostic attributes, surface treatment, temper-paste distribution, and core composition to draft new descriptions of types. This information can then be used to ascertain the applicability of the data when applied to the Lowland Patayan Ceramics Typology. The creation of an attribute data sheet, such as the one created by the author, can be used to consistently record the essential attributes necessary for classification of sherds. Museum collections of well dated and typed sherds will also be utilized to establish a type set

of relevant data. Use of the attribute data sheet on museum collections that have been typed and tested would provide a baseline of the known attributes that could be applied to the sherds to be examined in the field. The application of the attribute data sheet will be useful in defining regional variation in attributes and aid in creating more accurate typologies to reflect the regional cultural and geological variations expressed in the local ceramics

Mobility

To expand upon the subject of regional typological data, we must explore the dynamics of the group mobility. The movements of groups of people can be related to factors linked to both natural resources and cultural issues. Regional research questions that can relate to these themes and expand upon our understanding of ceramic mobility within regional or cultural group areas can be posed to address these issues. Are there distinguishable differences in temper-paste composition, which can be field recorded, between sites or regions? Can ethnic groups' movements be traced based on ceramics types in association with related features such as trails, geoglyphs, petroglyphs, or resource areas? Can the mobility of groups be shown through the recorded locations of various wares? Can we pinpoint the onset of agricultural lifestyle by the thickness and construction methods of the ceramics?

Discussion:

Any discussion surrounding ceramics typologies must include the topic of mobility. The range of ceramic types in both a temporal and spatial context is integral in establishing regional boundaries within individual cultures. Additionally, this concept is crucial to creating a regional ceramics typology. Ceramics were produced by aboriginal peoples who roamed the landscape exploiting natural resources. To track the reaches of one ethnic group several key factors must be examined, such as the production and movement of ceramics. Several cultural traditions are encompassed within the study area including the Cocopah, Quechan, Mojave, Chemehuevi, Tohono O'odham, and Pai Pai. These various groups have similar practices in the production of ceramics; however variations exist between

these cultural groups which could be represented within their individual ceramic traditions.

Recently several ceramic researchers have explored the topic of petrography. Petrography is a branch of geology that describes and classifies rocks, usually after microscopic study. These studies are key to understanding the origins of clay materials. Studying the original source of the clay is essential in defining the geographical origins of a vessel; however it does not take into account the movements of raw materials out of their source area. Sherds can contain clay from one area and temper from another; however, how this affects the entire composition of the vessel has not yet been examined.

Pursuing this avenue of research may satisfy the greater question of ceramic production origins; however it does not include the crucial ethnographic component. The production of ceramics is a learned skill handed down from generation to generation and some element of this research should follow the movements of individual clan groups. More research in this area can serve to expand on many of the spatial issues of the Lowland Patayan Ceramics Typology. Although the typology lists the geographical range of each type, it is based on imposed impressions of the cultural boundaries of the regional cultures that may not accurately reflect the ethnographical data on this topic.

In turn, by putting more study into these areas, researchers may find links to the questions they have been pursuing in other areas. Understanding the concepts of the subsistence lifestyle of these people within their harsh environments can help us to gain insights into other aspects of the cultures as well. The link between mobility, resource procurement, the advent of agriculture, and material culture are little understood within the study area. Further research into the ceramics of the region can shed light on mobility patterns, resource procurement locations, and group dynamics. By recording ceramic locations, types of material used in their manufacture, and vessel characteristics, researchers may begin to see patterns across the landscape that relate to the cultural boundaries of the various tribes.

Archaeological Data Requirements:

Using the aforementioned ceramics data recording sheet, a reexamination of museum collections and new field identification studies will be conducted across the study area. Data collection of specific attributes such as paste–temper composition, surface color, and surface treatment will be collected. Known clay sources will be recorded within the various cultural territories within the study area. Ethnographic sources from each culture regarding ceramic production will also be gathered.

Changes Through Time

The diversity in the ceramics of the region of the lower Colorado River is without question. Understanding the diversity and how it is linked to cultural groups both temporally and spatially is important in our perceptions of these groups. Certain questions arise from these issues that should be explored. How do variations in vessel thickness correlate to group mobility? Do Lower Colorado River types change drastically over time in regard to thickness, temper, paste, vessel form, decoration styles? How do these variations in vessel thickness, for example, correlate to group mobility? Are the current time spans associated with each type long enough to show changes in thickness that would occurred during economic and/or environmental changes?

Some specific questions do not fall squarely within the above category, but do address topics relevant to the theme of change and the measurement thereof. These types of questions are still highly relevant to the regional ceramics research of the Lower Colorado River. What kinds of changes occur through time such, as weathering, that would affect the ability to field record attributes of sherds? What testing methods should be standard for collected sherds in the ower Colorado River region? Is the color of the sherd relevant to the type; could some, or all, of the color come from the use of the sherd during its lifetime, e.g., cooking vessel, storage vessel, or ceremonial vessel?

Discussion:

As noted previously, the development of distinctive attributes and traits both technical and stylistic expand through time. The study of these developments and their organization within the framework of ceramic production and distribution not only sheds light on construction and aesthetic components, but also increases the knowledge of the diversity of communities and their social and economic systems. This research has the potential to expose information about the temporal and spatial patterns of production and distribution of ceramics throughout the lower Colorado River region.

The range of aspects of ceramic production varies through time; these aspects include clay sources, temper material and quantity, and vessel size and shape. These components can be affected by many factors within the cultures' chronological records. How these factors are exhibited in the ceramic production of the culture can be displayed by such means as changes in decoration style, vessel types and sizes, and temper-paste ratios. However, these attributes can be difficult to measure on small sherds, the predominant size of sherds found during field surveys. How these changes are documented will affect the development of types within a typology. Therefore, the ability to develop an all inclusive system of recordation for these sometimes subtle changes is imperative.

The current sources of testing methods are mostly centered on the aspects of either clay source or chronology; however, no standard means of data collection exists. By applying standards to the collection of attributes and the basic testing methods, a uniform data baseline could be achieved. By obtaining this baseline data the probability of observing changes through time should be more apparent.

Archaeological Data Requirements:

An examination of ceramic collections and field ceramics from various locations within the study area should be completed with detailed recording of attributes. Detailed data collection of sherds to include specific attributes such as paste-temper composition, surface color (Munsell color), surface treatment, thickness measurements, location, and associated features will be completed. Known clay

sources will be recorded within the various cultural territories within the study area. Ethnographic sources, from selected cultures, regarding ceramic production should be gathered as well. A complete list will be created of the testing methods used for ceramics and their effectiveness in establishing a temporal relationship within the study area.

Chapter 4

Study Methodology

Introduction

To conduct this study, ceramics within the predetermined study area of the southwestern portion of Yuma County, Arizona were reexamined. Ceramics obtained through previous survey projects and currently held in collections at both the Arizona State Museum and the San Diego Museum of Man were utilized in this study. Additionally, ceramic specimens from three sites were examined and recorded in the field. All ceramics were subjected to the same series of data collection methods, whether in the field or in museum collections; these included a more detailed recording of the attributes of the ceramics, including thickness measurements, than the original recordation. The previous recording of the ceramics and the newly recorded data from the ceramics were compared. The use of a more detailed recording method on the ceramics will record a variety of attributes that may not have been recorded previously. By comparing the new data with the previous data it will be determined if the sherds' previously assigned type was accurate.

Field Methodologies

The purpose of the surveys conducted for this project are geared towards identification of sites that contain ceramics within the study area. Sites with ceramics previously recorded using the Michael Waters Lowland Patayan Ceramics Typology were revisited and rerecorded with the new recording methodology developed for this study. Baseline data for each type was collected by examination of the type collection compiled by Michael Waters to construct the Lowland Patayan Ceramics Typology housed at the San Diego Museum of Man. Examples of each type were photographed and recorded

using the ceramics data collection sheet. Additionally, museum collections that contain collected ceramics from specific sites within the study area were recorded with the new recording methodology.

The aim of this research project was to obtain information on types of ceramics, recording methods of the diagnostic characteristics and attributes, their locations throughout the study area, and the relationship of the thickness of the ceramics to the specific types, which previously had not been examined. This information was analyzed against the Lowland Patayan Ceramics Typology created by Michael Waters. Waters' typology highlights distinctive attributes within various sherds and uses these attributes to classify the ceramics into specific types. For those sherds previously assigned to a specific type classification, a comparison of old and new data was completed as well as an assessment of the methodology used to reach the final type determination.

The Class I survey is crucial to understanding the background of the area, in which surveys have been conducted and ceramics were recorded. By examining the previous survey and research work completed in an area the researcher can begin to ascertain use patterns and predict locations for further inspection for the probability of sites containing ceramics. The Class I survey, in this case, was used to identify previously recorded sites that contain ceramics, and whether the ceramics have been collected or left in the field.

The most logical first step in assessing a location for archaeological resources is the site survey. "Such a survey should locate as many of the area's archaeological sites as possible, assess their nature and importance by surface examination and collection of associated artifacts, and leave behind an adequate record for future investigations" (Hester et al. 1975:16). At each site the ceramics were relocated and a brief survey of the site area was conducted to ensure that all ceramics were identified during the previous survey. The methods used for these surveys were designed to gather all pertinent information on the ceramics at the site as well as their relationship to surrounding features and artifacts within the site and surrounding area. The documentation of all aspects of each of the sites should help

in future research pertaining to the use of the ceramic type, and will aid in showing a correlation between the numerous trails, cleared areas, lithic scatters, and ceramics found in nearby locations.

The boundaries for each ceramic area were demarcated prior to any recording. It was determined, for the purpose of this work, that a trail feature should be followed out for one half of a mile or to its conclusion, whichever occurred first. This method was used to ascertain if any additional ceramics would be found along the trail segment outside of the previous site boundary. The boundary of the site is defined as the extent of cultural materials. For the purpose of this research any ceramic isolate would be fully recorded using the new recording methodology. After the initial extensive survey was conducted within each site boundary, a more intensive survey was conducted on the areas that had been previously flagged during the extensive survey of the site. These areas were completely surveyed by walking at five meter intervals searching for additional ceramics. The extent of this survey was carried out for five meters in all directions from the point of the pin flag. This more intensive survey was conducted to determine the extents of the features, artifacts, and ceramics within the site.

After the intensive surveys of the features were completed, the next step was to examine the trail segments; oftentimes additional ceramics can be along trail segments and might not have been recorded in the initial survey. An intensive survey of all trail segments ensured that all ceramics within the site would be recorded. The trail segments were then recorded with a GPS; the trails were walked with the same Delorme PN-20 GPS device taking a tracking log. The track was collected using UTM's set at Datum NAD83 Zone 11S. If additional ceramics were found along trail segments, they were recorded with the same GPS unit. This data was then processed into the Delorme Topo 6 mapping system (see Figure 2).

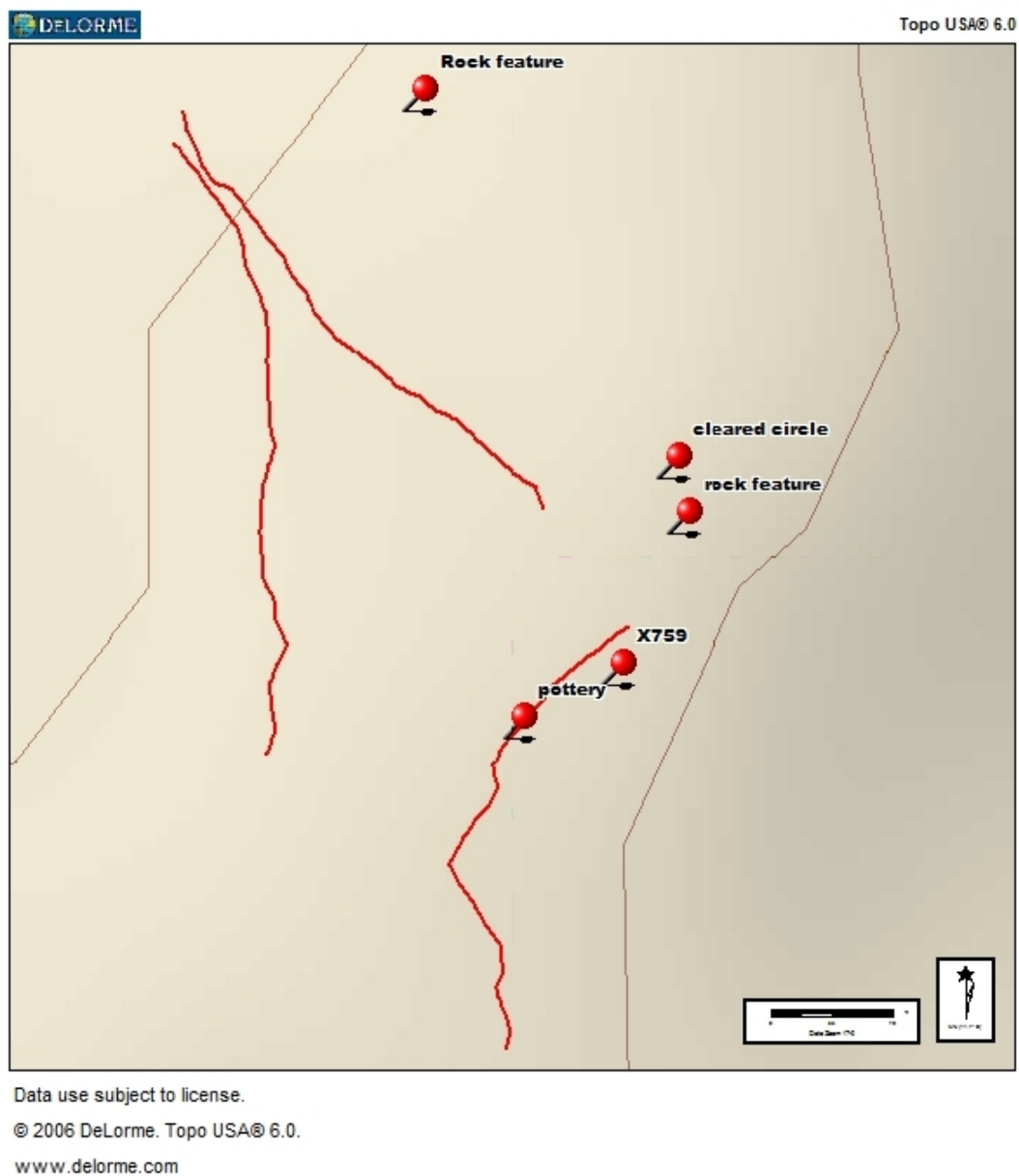


Figure 2. Example of Recorded Trail Segments, Features, and Ceramics

Field Analysis of Ceramics

The second aspect of this research was to assess the applicability of the Lowland Patayan Ceramics Typology in the field. Given that not all ceramics are collected during surveys, proper application of the typology to ensure accurate recordation of the ceramics is particularly important.

Each ceramic scatter encountered during the survey was intensively recorded; this began by marking the extent of the scatter and marking of the boundary with flagging tape; the area of the scatter was then measured and recorded. Next, each sherd location was individually marked by flagging tape or pin flag. A count of the sherds was conducted and the presence of any diagnostic sherds, such as rims, Colorado Shoulders, or large body pieces was specifically noted (see Figure 3).



Figure 3. Ceramic Sherd Scatter

At this point the experimental pottery data sheet was used to record various aspects of the selected sherds. The concept for this data sheet was to obtain detailed information to aid in field typing of the sherds based on the Lowland Patayan Ceramic Typology developed by Michael Waters. Additional data regarding features found in association with the ceramics was recorded on the ceramics data sheet. The information such as ceramic locations, types, and associated features will be compiled, at a later date, into the same GIS database for further study of trail systems, and transport of ceramics.

The ceramics data sheet was designed to gather information on specific aspects that would aid in the identification of Patayan ceramics. The Lowland Patayan Ceramic Typology is based on criteria such as rim form, vessel shape, and diagnostic traits that occur in the various wares. The data sheet collects information such as color, rim form, vessel form, surface treatment, and temper. Sketches were made of large body or rim sherds, and thickness measurements of the sherds were taken on four corners and the center of the sherds (see Figures 4 and 5 below). After the completion of the data sheet, the information can be checked against the Waters typology flow chart to begin the field typing process (see Figure 6).

Once the sherd has been diagnosed into a basic category, more precise analysis can be completed by consulting the specific type description in the Waters' typology. Using the ceramics data sheet in correlation with the attributes assigned in the Waters' typology (Waters 1982), the ceramics associated with each site can be identified into a type classification.

Date: 1/23/88		Project: Patayan School	
Locality: UTM 95780		361782	
Number of Shards: 178	Mundic: 8. 178. 6.5 5.6	Thickness: 1.48. 1.48. 1.48. 1.48	Di. 1.48. 3.28
Association:	Trail: ☒ Yes ☐ No	Inlay: ☒ Yes ☐ No	Polychrome: ☒ Yes ☐ No
Orientation of Trail:	North: ☐ South: ☐ East: ☐ West: ☐ NW: ☐ SE: ☐ SW: ☐ NE: ☐	Wedge: ☐ Temp. Camp: ☐ Other: ☐	
Temper Type: <u>untempered clay</u>	Paint and Temper: ☐	Shards: ☐	
Vessel / Rim: <u>Shard</u>			
Surface Treatment:	Pol: ☒ Paint: ☐ Glaze: ☐ Corrosion: ☒		
Decorations: <u>None</u>			
Palmetto: <u>None</u>			
Notes: <u>Dark Carbon Core</u>			
<u>2 Rim Pieces Present</u>			

Figure 4. Ceramic Data Recording Sheet (Front)

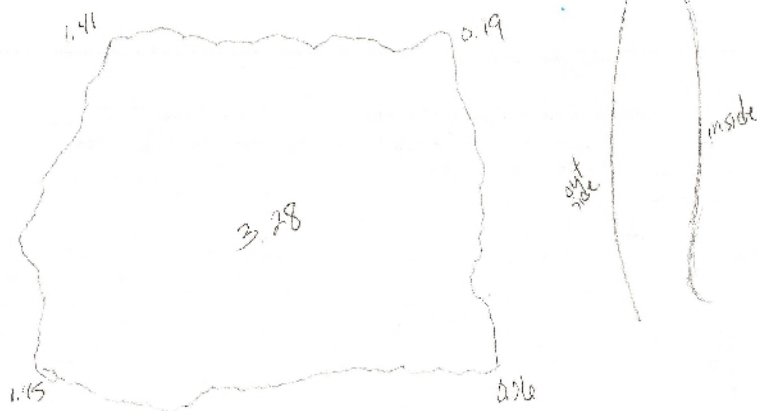


Figure 5. Ceramics Data Recording Sheet (Back)

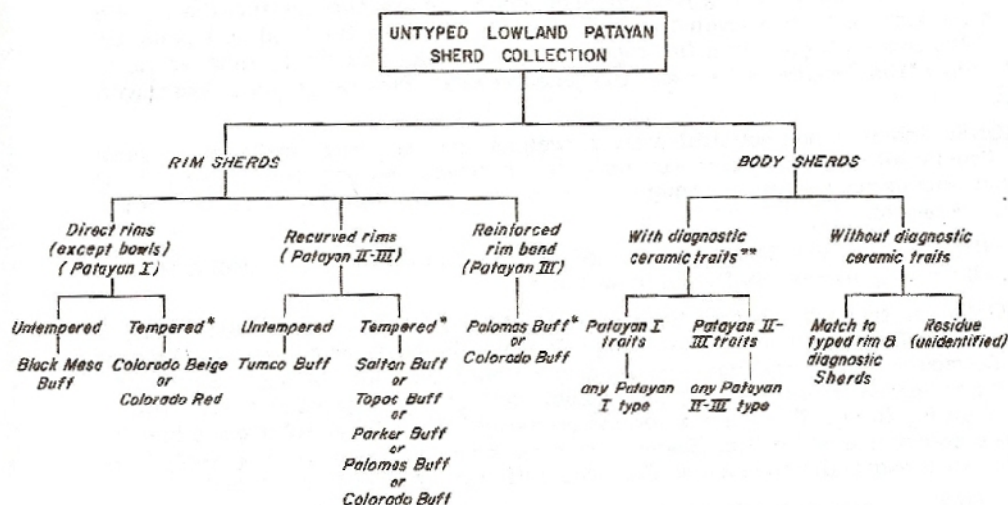


Figure 6. Flow Chart for Typing Lowland Patayan Buffwares From Waters (1982: Figure G.1)

In discussing the effectiveness of the data sheet, few changes would be recommended at this time. The attributes assigned on the sheet are indicative of the diagnostic criteria used for typing Patayan ceramics. However, more tests on the data sheet will be expected to provide useful observations. At

this time, it can be stated that field inspection of temper type and grain size observations are challenging to achieve in the field setting. It is difficult to distinguish the temper-paste consistency in the field using only a hand lens. Making a small break on the sherds in the field exposes a fresh surface that can be more readily examined and gives some clue of the hardness of the sherd, an attribute used by both Waters' and Schroeder's typologies. The second option would be removing the sherds from the site and taking them to a laboratory setting for examination of the paste and temper materials under a microscope.

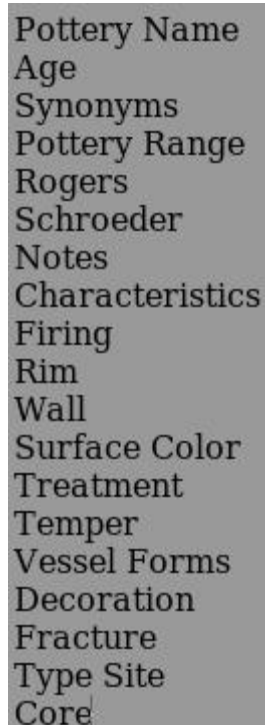
The additional associations included on the ceramics data sheet such as trails, camps and other features will likely be valuable information to determine transport, exchange, and habitation models when the information is later input into a GIS database system that is in development. Likewise, with more data compiled, the usefulness of thickness measurements and their application to typing wares will become clearer.

Museum Collections

For those sherds examined within the museum collections a process similar to the field recording was completed. Previously recorded, collected, and typed sherd specimens were reexamined using the ceramics recording data sheet. The sherds were examined for those diagnostic attributes generally used to classify sherds, within the Lowland Patayan Ceramics Typology, along with those additional attributes contained within the ceramics recording data sheet. Once the recording has been concluded, a comparison with the previously determined type was completed to determine if the same conclusions can be reached. This assessment was used to ascertain the consistency of use of the Lowland Patayan Ceramics Typology.

Searchable Database

An additional aid to field typing ceramics developed by this author is a searchable database of Waters' Lowland Patayan Ceramics Typology. This database contains additional attribute information from Albert Schroeder and Malcolm Rogers. The range of attributes found on the database include a complete listing of all of the types recorded by Waters, Schroeder and Rogers; synonyms, pottery range, characteristics, firing technique, rim form, wall, surface color, surface treatment, temper, vessel form, fracture, core, and type site (see Figures 7, 8, and 9 below).



Pottery Name
Age
Synonyms
Pottery Range
Rogers
Schroeder
Notes
Characteristics
Firing
Rim
Wall
Surface Color
Treatment
Temper
Vessel Forms
Decoration
Fracture
Type Site
Core

*Figure 7. List of
Attributes from
Searchable Database*



Black Mesa Buff
Tumco Buff
Colorado Red
Colorado Beige
Colorado Buff
Salton Buff
Parker Buff
Topock Buff
Palomas Buff
Palomas Red on Buff
Schroeder Black Mesa Beige
Black Mesa Red on Buff
Schroeder Tumco Buff
Tumco Red on Buff
Schroeder Tumco Red on Buff
Schroeder Colorado Red
Schroeder Colorado Beige
Colorado Red on Beige
Schroeder Colorado Red on Beige
Colorado Red on Buff
Schroeder Parker Buff
Schroeder Topoc Buff
Topoc Red on Buff
Schroeder PalomasBuff

*Figure 8. List of Ceramics Types within the
Searchable Database*

The searchable typology database is extremely useful for distinguishing types with limited recordable attributes, e.g. small body sherds. In conjunction with the ceramics data sheet, a listing of the recordable attributes can be documented then checked against the typology database for a more comprehensive view of the ceramics for typing. The use of the searchable typology database is unique in that it will have the capability to be used in the field on hand-held devices with a windows mobile operating system, which creates a more accessible option for the individual performing data collection. Currently the database can be operated on hand-held devices that support a full browser, or on a laptop. The hope is that with the increased ability to access these components simultaneously in the field the recorder will be able to make a more informed assessment of the ceramics and more accurately assign the sherd(s) to the correct type.

Feature Name	Type	Signature	Feature Name	Feature	Substrate	Notes	Characteristics	Clay	Size	Color	Surface Color - Treatment	Temper	Visual Notes	Small Stronich	Decorations	Dimensions	Type Site	Site
Black Ware	Black Ware	Black Ware	Black Ware	Black Ware	Black Ware	Black Ware	Black Ware	Black Ware	Black Ware	Black Ware	Black Ware	Black Ware	Black Ware	Black Ware	Black Ware	Black Ware	Black Ware	Black Ware

Figure 9. Screen Shot from Searchable Database

Chapter 5

Field Recording and Analysis

Field Recording of Ceramic Sites

Before any field data was collected, baseline information was gathered on each individual type within the Lowland Patayan Ceramics Typology. This was achieved by examination of Michael Waters' type collection, housed at the San Diego Museum of Man, used to construct the Lowland Patayan Ceramics Typology. This data is intended to be used later for comparative attribute analysis between field specimens and ceramics within the type collection. Two representative sherds from each type within the type collection were analyzed using the ceramics data recording sheet.

The specimens were examined under a Boreal stereomicroscope with a 10X/20 eyepiece, using both 2x and 4x objectives, to determine temper-paste consistency, temper type, size, and abundance. Munsell color, surface treatment, decoration, rim characteristics, and thickness measurements were also recorded for each sample. Additionally, photographs were taken of the sherd's core, exterior and interior surfaces, and of any diagnostic attributes, such as rims and Colorado Shoulder.

The following sections discuss the application of this data under field recording conditions. The collection of the baseline data on the ceramics from the Waters' type collection supplied necessary empirical experience regarding each type. This experience was critical to gaining familiarity with each type before conducting in-field analysis of the ceramics.

Statistical Research, Inc. Sites

Although each of the sites listed below was surveyed independently by Statistical Research, Inc. (SRI) during separate survey projects, the methodologies employed were uniform and detailed data was

collected. All three of the sites visited were surveyed by SRI for various projects for both the Bureau of Reclamation and the Wellton-Mohawk Irrigation and Drainage District. The methods employed to conduct the surveys followed the prescribed requirements set forth by the Arizona State Museum (ASM) for survey procedures and protocols. These locations were subjected to intensive 100% Class III surveys to identify all cultural resources for future data collection and mitigation. Specific information recorded at each site location included the basic topographic and environmental setting, site size, feature descriptions, artifact counts and descriptions, and an assessment of the site's chronological, functional, and cultural context. Additionally, each site was given a datum number and the datum location was captured using a Trimble GeoExplorer II handheld GPS unit; post processing differential correction was applied.

At each site a sketch map was created using a compass and measuring tape. Also, photographs were taken of significant features, artifact concentrations, and the overall site environment. The Class III field survey was conducted by a crew of three to nine individuals walking 15 meter systematic transects. When a cultural feature or artifact was encountered, the location was marked and an intensive survey of the surrounding area was conducted to determine if additional artifacts or features were present. All features and artifacts at each site were recorded per ASM guidelines using ASM standard site cards.

Field Recording of Ceramics

The procedures for data collection at each site were conducted as follows. Using SRI's site map an initial investigation of the site was conducted to relocate the ceramics. Once the ceramics were located the extent of the scatter was delineated with a temporary boundary. Each sherd was pin flagged and a count of the sherds was conducted; diagnostic sherds within the scatter were noted. The sherds were then examined to determine if more than one type was present, which would require each to be

individually recorded.

Using the Ceramic Data Recording Sheet (see Figure 10 below),

Pottery Information Sheet																
Date:		Location: <u>UTM</u>														
Number of Sherds:		Munsell Color				Thickness		Edge:		/ / /		Center:				
Association:		Trail:		Yes	No	Integric:		Yes	No	Petroglyphs:		Yes	No	Village	Temo Camp	Other
Orientation of Trail:		North	South	East	West	NE	NW	SE	SW							
Temper Type:		Paste and Temper:				Grain Size:										
Vessel / Rim Form:																
Surface Treatment:		Plain				Faint:				Stucco		Scraped				
Decoration type:																
Fabrication:																
Notes:																

Figure 10. Blank Ceramics Data Recording Sheet

specific attributes of the sherds were recorded such as Munsell color, temper type and size, surface treatment, and additional diagnostic attributes if present, e.g., rim sherds or Colorado Shoulder. Additionally, surrounding features such as trails, petroglyphs, and habitation areas were recorded, as these may provide supplemental information regarding the use of the ceramics. Once the recording was completed, the information obtained was used to further isolate the sherd into a type designation. By using the ceramics data recording sheet, in conjunction with the Lowland Patayan Ceramics Typology, the objective was to determine 1) was the type assignment by SRI correct and 2) what is the applicability of the typology for the researcher doing field recordation?

Site X: 7:59

ASM Site X: 7:59 was surveyed in 2001 by SRI, for the Bureau of Reclamation in conjunction with the Wellton-Mohawk Generating Facility. The surveys were completed on areas designated for future transfer from the Bureau of Reclamation to Wellton-Mohawk Irrigation and Drainage District. Site X: 7:59 is located near Dome Valley, Arizona on Pleistocene terraces along the Gila River floodplain. Several small drainages meander through the site. The site is bounded on the east by Ligurta Wash and

on the west by the Wellton-Mohawk Main Canal and Pumping Station 3. Soils consist of gravels composed of granite, volcanics, and quartz that form a poorly developed desert pavement. Vegetation at the site consists of creosote bush, Russian thistle, and pencil cholla.

The cultural components at the site, as recorded by SRI, are comprised of two rock features, two sets of cleared circles, four trail segments, and one ceramic concentration. SRI typed the ceramics at this site based on the empirical attributes recorded on these sherds, which included temper-paste consistency, surface treatment, and rim type. Based on the information gathered, SRI concluded that the ceramics were from a single Black Mesa Buff vessel (see Figure 11).

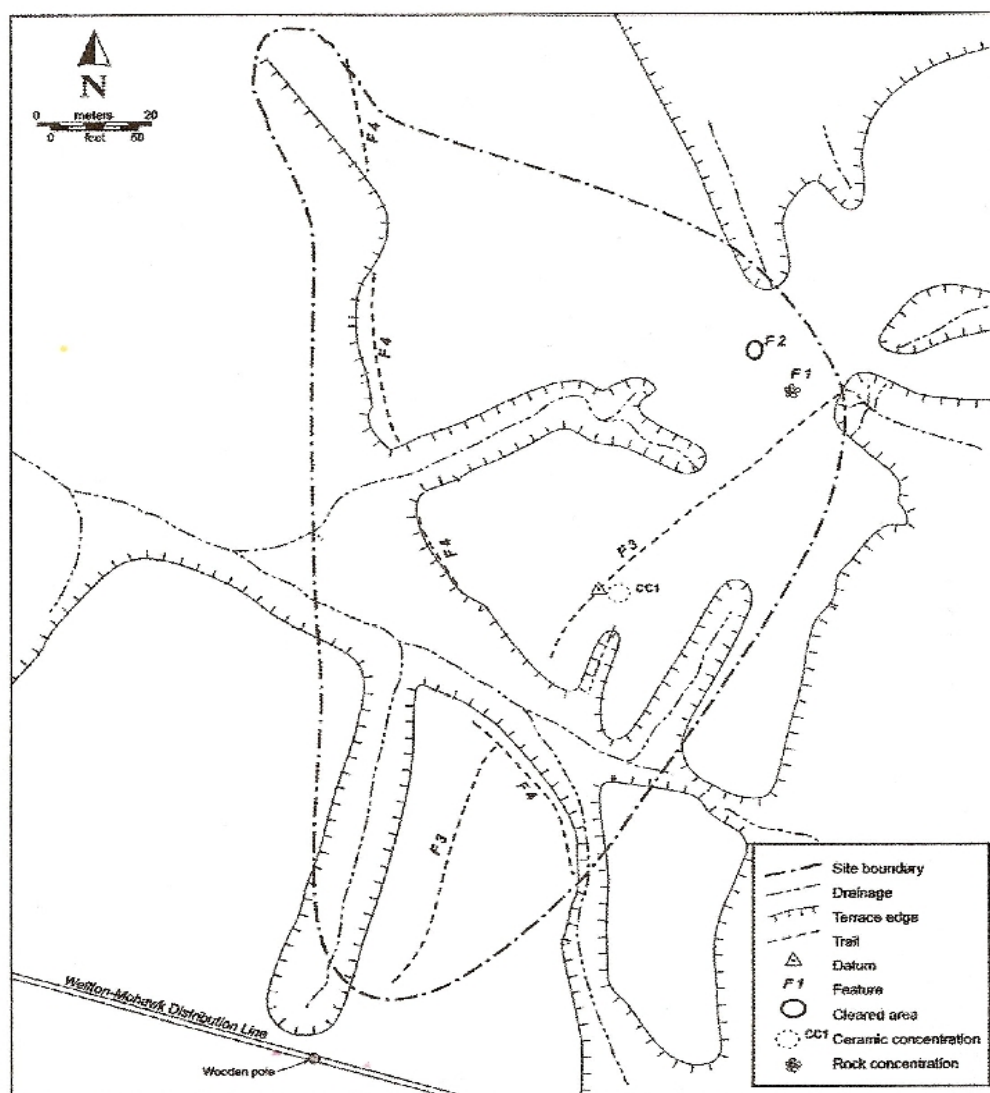


Figure 11. Site Map for ASM X:7:59 From Vanderpot and Altschul (2005: Figure 3.69)

Analysis

The procedures for data collection at this site followed the procedures outlined above. Following the data collection, an analysis of the information was completed. Using the information recorded on the ceramics data recording sheet (see Figures 16 and 17 below) and aided by the searchable typology database, the sherds were designated into a type assignment. At Site X: 7:59 the sherd scatter was exclusively from one vessel with two rim sherds present. Based on the presence of two direct rim sherds, the absence of distinguishable temper, and the surface color and treatment of the sherds, these sherds were typed as Black Mesa Buff, which confirmed the initial determination of SRI (see Figures 12 through 15).



Figure 12. Ceramic Body Sherd at ASM X: 7:59



Figure 13. Ceramics at ASM X: 7:59



Figure 14. Rim Sherds at ASM X: 7:59



Figure 15. Rim Sherds at ASM X: 7:59

Pottery Information Sheet											
Date:	1/23/08										
Location: UTM	19480 341752										
Number of Sherds:	170		Munsell Color:	8.5R 6.5/5.0		Thickness:	Edge: 1.4-1.45 mm		Center:	3.28	
Association:	Trail: ☒ Yes ☐ No		Intaglio: ☐ Yes ☒ No		Petroglyphs: ☐ Yes ☒ No		Village:		Temp Camp:		Other:
Orientation of Trail:	North	South	East	West	NE	NW	SE	SW			
Temper Type:	unpolished clay										
Vessel / Rim Form:	Direct										
Surface Treatment:	Paint ☒		Paint		Stucco		Scraped ☒				
Decoration type:	none										
Palination:	none										
Notes:	2 rim pieces present										

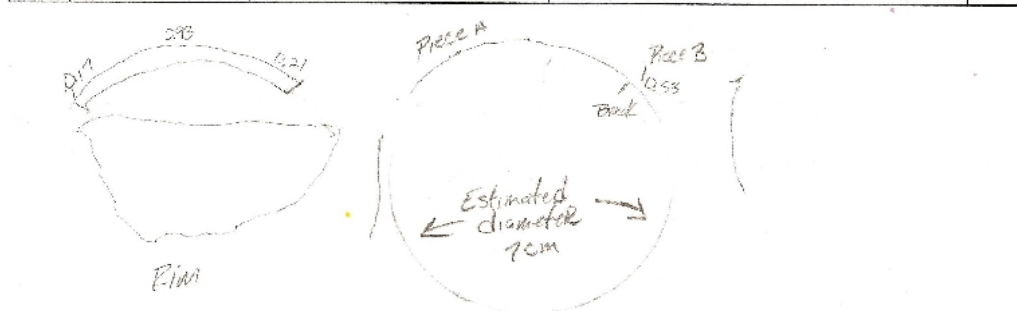


Figure 16. ASM X: 7:59 Ceramics Data Recording Sheet (Front)

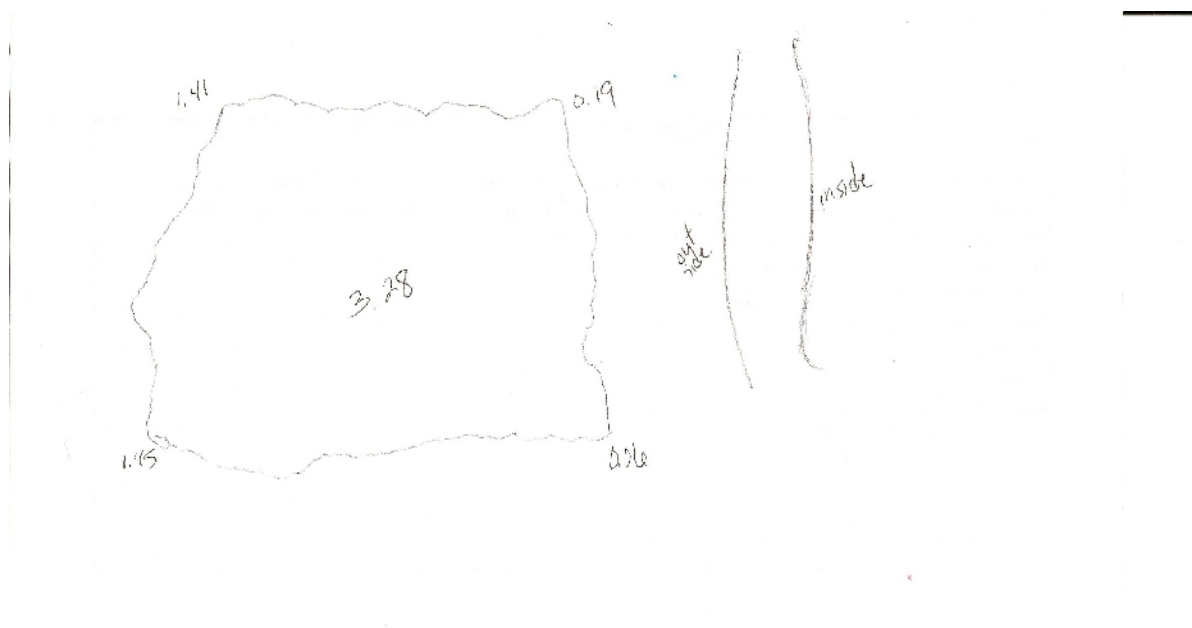


Figure 17. ASM X: 7:59 Ceramics Data Recording Sheet (Back)

Site X: 8:119

Site X: 8:119 was surveyed in 2005 by SRI as a part of the Bureau of Reclamation's Wellton-Mohawk Title Transfer Project. Site X: 8:119 was recorded during an additional Class III 100% survey of approximately 4,800 acres at the request of the Bureau of Reclamation and Wellton-Mohawk Irrigation and Drainage District as an addendum to the original survey report.

Site X: 8:119 is set on a broad alluvial fan approximately four miles south of the current town of Wellton, Arizona, and nearly 140 meters south of the Mohawk Canal. Vegetation in the area consists of creosote bushes, annual plants, mesquite, and palo verde trees. The site consists of a ceramic concentration and a few scattered individual sherds. All of the sherds are an unpainted brown ware. The sherds contain quartz and mica temper, and a few exhibit a highly polished or burnished exterior. SRI concluded that the ceramics at this site location were from two or more separate vessels (see Figure 18).

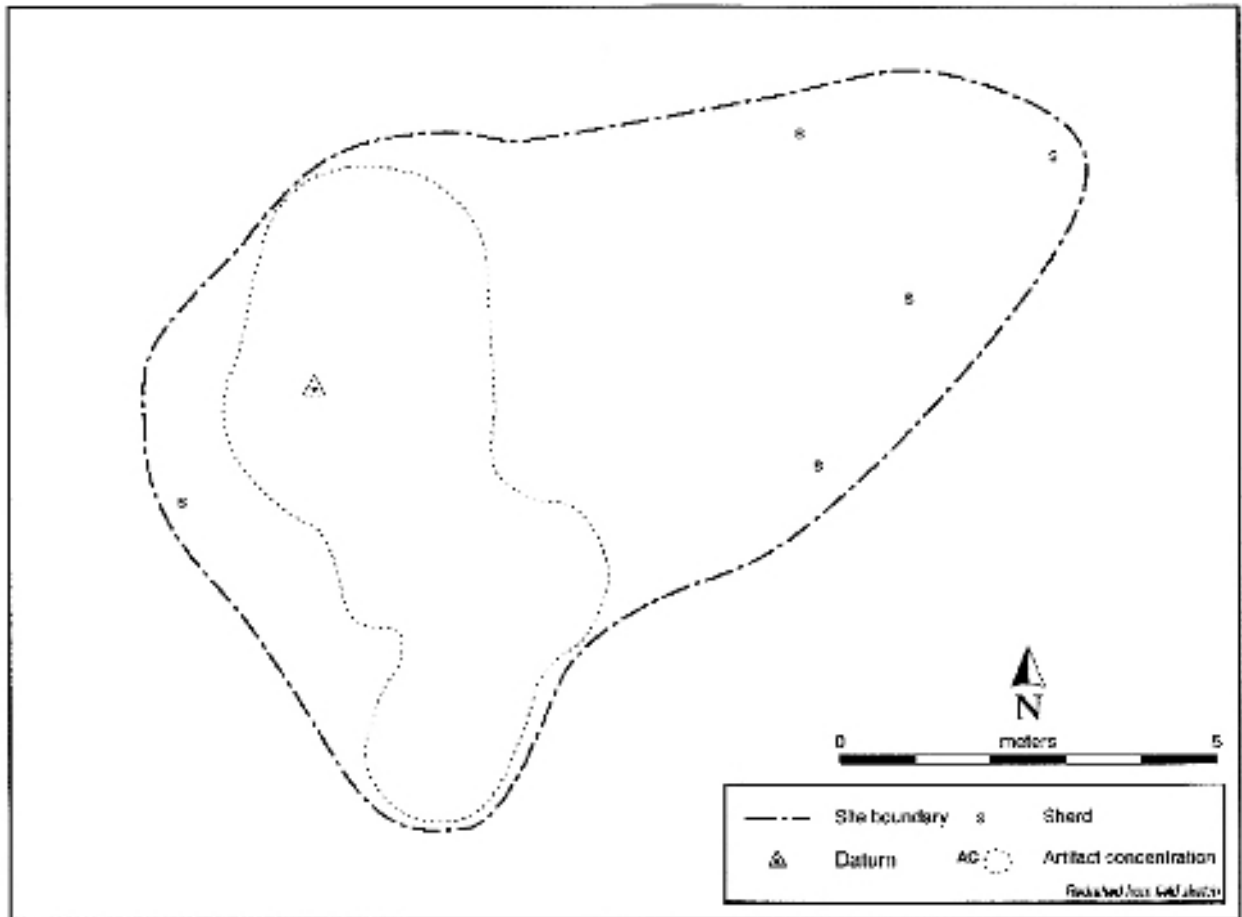


Figure 18. SRI Site Map for ASM X:8:119 From Vanderpot and Altschul (2005: Figure 7)

Analysis

The procedures for data collection, at this site followed the procedures outlined above. Following the data collection, the information was analyzed. Using the information from the ceramics data recording sheet and the searchable typology database, the sherds were designated into a type assignment. At Site X: 8:119 a total of thirty-five sherds were located (see Figures 19 and 20).



Figure 19. Ceramic Scatter at ASM X: 8:119



Figure 20. Ceramic Scatter at ASM X: 8:119

The sherds were then examined and categorized, based on initial observations of surface treatment and visible attribute variations. It was determined that two, possibly three, types were present at this site.

Based on the initial reconnaissance survey of the site's ceramics, three sherds with distinctively different attributes were chosen for recording. The information gathered on the ceramics data recording sheets showed a clear distinction of attributes in the recorded sherds. An analysis of these distinctive attributes led to the following conclusions regarding the sherds.

Sherd Group 1

The sherds in this group clearly show signs of surface burnishing, abundant rounded mica, quartz, feldspar temper, are crumbly when broken, and have a Munsell color of 6/10yr/4. Based on an analysis of these attributes using the Lowland Patayan Ceramics Typology and after a search of the searchable typology database using the attribute “burnishing”, it is found that only one type is listed as possessing a burnished finish. Therefore, this sherd can be classified as Colorado Beige because of the unique attribute of burnishing. This is the only type that possesses a burnished finish, and is constructed with medium to thick walls, and fits within the range of temper material and abundance. Additionally, the range description for this type defines examples found in a wide geographic range along the southern portions of the Colorado River east to Gila River. Given the location of the site, the sherds fit into the geographic range of this type. No rim sherds or Colorado Shoulder pieces were identified at this site, so this attribute could not be cross checked with the typology (see Figures 21 through 23 below).

Pottery Information Sheet												
Date: 7/30/09	Site: 8:119 Group 1			Location: UTM 115 7160241		3614070						
Number of Sherds: 15	Munsell Color: 4L/10YR/4			Thickness:		Edge: .251, .240, .299, .245			Center: .291			
Association:	Trail:	Yes	No	Intaglio:	Yes	No	Petroglyphs:	Yes	No	Village	Temp Camp	Other
Orientation of Trail:	North	South	East	West	NE	NW	SE	SW				
Temper Type: 9/1 mica/feldspar	Paste and Temper:			Grain Size: Sub Angular - Rounded								
Vessel / Rim Forms:	none											
Surface Treatment:	Plain	Paint			Stucco			Scraped - Burnished				
Decoration Type:	none											
Patination:	Carbon Streak Absent											
Notes:	mica showing through surface Break Crumbly - frags present											

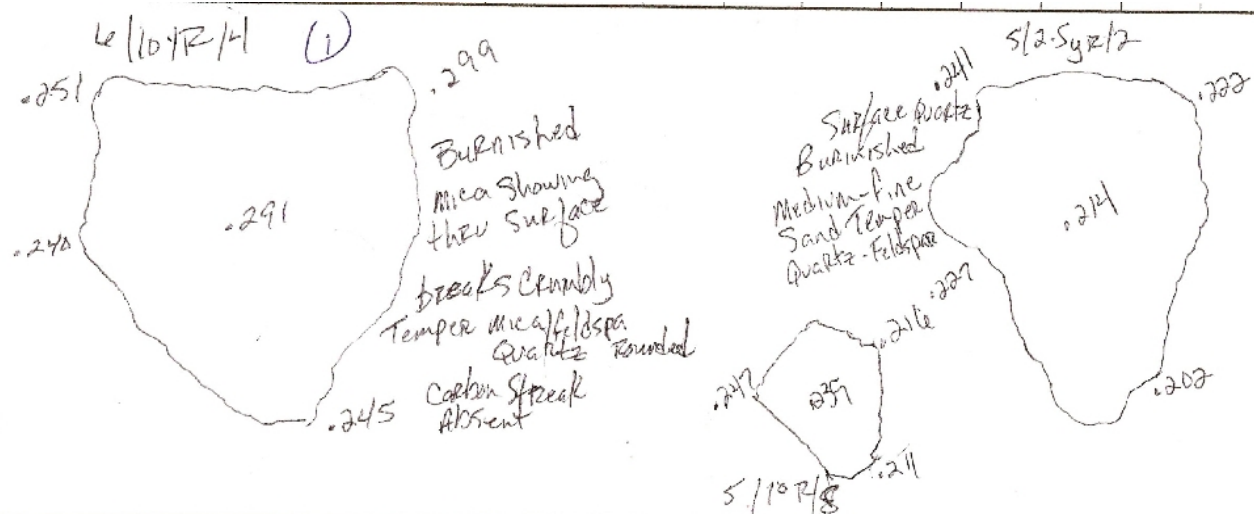


Figure 21. ASM X: 8:119 Group 1 Ceramics Data Recording Sheet



Figure 22. ASM X: 8:119 Group 1 Ceramic Sherd



Figure 23. ASM X: 8:119 Group 1 Ceramic Sherd

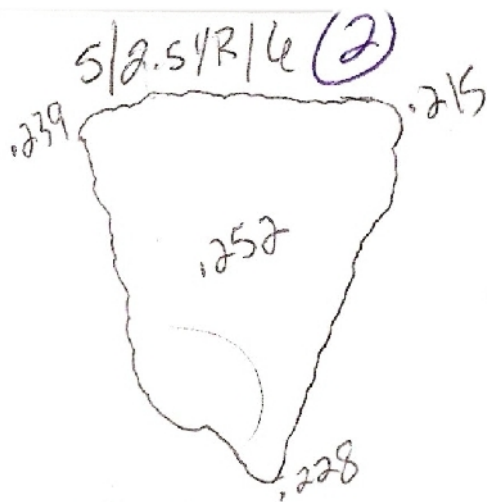
Sherd Group 2

The sherds in this group possess a red slip surface treatment on the exterior, with a Munsell color of 5/2.5yr/6. The sherds are tempered with a fine mica, quartz temper, break crumbly, and have medium to thin walls. Based on the analysis of these attributes, using the Lowland Patayan Ceramics Typology, and using the searchable typology database to look for the attribute “red slip”, these sherds are classified as Colorado Red. When a search of the database is conducted only one type is returned under the search criteria for the attribute “red slip”. A further examination of the attributes of Colorado Red finds that this type has medium to thick walls, and variable temper constituency. Additionally, the geographical range of the type extends from the Colorado River Delta to the Palo Verde Valley and along the Gila River east to the Yuma County line. Given the range of the type and the location of the sherds, just south of the town of Wellton, these sherds fit into the geographic range of this type. No rim sherds or Colorado Shoulders were recorded at this site, so these attributes could not be cross checked with the typology (see Figures 24 through 27).



Figure 24. ASM X: 8:119 Group 2 Ceramic Sherd

Pottery Information Sheet											
Date: 7/30/19	Location: UTM 11S 766241 2614076										
Site: X: 8: 119 Group 2											
Number of Sherds: 10	Munsell Color: 5Y 2.5/10	Thickness:	Edge: 239, 238, 215	Center: 252							
Association:	Trail: Yes ☐ No ☒	Intaglio: Yes ☐ No ☒	Petroglyphs: Yes ☐ No ☒	Village	Temp Camp	Other					
Orientation of Trail:	North	South	East	West	NE	NW	SE	SW			
Temper Type: Micaceous	Paste and Temper:		Grain Size: Fine - Sub Angular								
Vessel / Rim Forms: none											
Surface Treatment:	Plain	Paint	Stucco	Scraped	Red Slip						
Decoration Type: Red Slip											
Patination:											
Notes:	Carbon Streak Absent - 8 Rim Shards Breaks Crumbly - 8										



Red Slip
Micaceous Temper
Fine Carbon Streak absent
Breaks Crumbly

Figure 25. ASM X: 8:119 Group 2
Ceramics Data Recording Sheet



Figure 26. ASM X: 8:119 Group 2 Ceramic Sherd



Figure 27. ASM X: 8:119 Group 2 Ceramic Sherd

Sherd Group 3

The sherds in this group proved to be more problematic with regard to categorization. These sherds differed from the two previous groups in that they showed no distinguishable surface treatment. The sherds have a Munsell color of 5/7.5yr/4, possess abundant fine-grained mica, quartz, feldspar temper, and have medium to thick walls. These attributes can be found in varying combinations in several types, posing the problem of correctly placing the sherds within the type category that best represents the recorded attributes.

Upon further diagnosis the sherds were narrowed down to three possible type categories. Using the searchable database to examine the sherd attributes, three possible types were chosen for further examination: Tumco Buff, Colorado Buff, and Palomas Buff. Colorado Buff was excluded after additional inspection of the type's attributes. Most desert versions of Colorado Buff possess a scum coat, which these sherds lack. This type is generally known to consist of little temper, and therefore the vessels will be a fine and thin-walled. Additionally, the geographical range of this ware does not fit. Colorado Buff is normally found along the Colorado River and west to the Salton Sea at San Sebastian Wash; clearly this does not fit with the location of ceramics at Site X: 8:119.

Initially, the sherds looked like they would fit well within the Tumco Buff attributes. However, further examination proves that this determination is incorrect; Tumco Buff has minimal mineral temper content consisting of small amounts of mica, hornblende, quartz, sand, and crushed clays. The recorded sherd has a temper content of abundant amounts of angular and sub-angular quartz, hornblende, mica, and feldspar. Tumco Buff has a wide geographic distribution range, which covers an area from near Yuma, Arizona to the Gulf of California and east to the Yuma County line. Although the geographic range would seem to be in agreement with the location of Site X: 8: 119, other attributes of this type are not consistent with the sherds, therefore it is determined that the sherd cannot be labeled

Tumco Buff.

The final type analyzed seems to be the closest fit for the majority of the attributes examined. The attributes of Palomas Buff fit for geographical range, temper, surface treatment, and relative thickness. The analyzed sherd contains temper that consists of angular and subangular quartz, feldspars, mica and hornblende; this is consistent with the temper found in Palmosa Buff. Surface treatment for Palomas Buff ranges from early specimens roughly smoothed to later specimens smoothed with a mop. The surface of the analyzed specimens is roughly smoothed, which would be consistent with that of Palomas Buff.

The geographical range for Palomas Buff encompasses the whole of Yuma County, Arizona, ranging along the lower Gila River, from Agua Caliente west to Dome Mountain and from the Kofa Mountains south to the Sierra Pinacate in Mexico. Clearly, Site X: 8:119 fits within this geographical range. Additionally, thickness measurements obtained from the sherds place it within the medium walled thickness range, which is consistent with that of the Palomas Buff type. Given the evidence provided from the analysis of the sherds, it was concluded that the sherds are Palomas Buff (see Figures 28 through 31).



Figure 28. ASM X: 8:119 Group 3 Ceramic Sherd

Pottery Information Sheet											
Date: 7/50/09	Location: UTM 11S 7602416 3614076										
Site: X: 8:119 Group 3											
Number of Sherds: 15	Munsell Color: 5Y 7.5 YR 4	Thickness:	Edge: 258, 290, 234	Center: 222							
Association:	Trail: Yes ☒ No ☐	Intaglio: Yes ☒ No ☐	Petroglyphs: Yes ☒ No ☐	Village	Temp Camp	Other					
Orientation of Trail:	North	South	East	West	NE	NW	SE	SW			
Temper Type: Quartz / mica / feldspar	Paste and Temper:		Grain Size: Fine - well rounded								
Vessel / Rim Forms: none											
Surface Treatment:	Plain	☒ Roughly Smoothed	Paint	Stucco	Scraped						
Decoration Type: none											
Patination:											
Notes:	no visible surface treatment - fine temper same temper showing through surface Jugs present - cracking around temper oxidized surface										

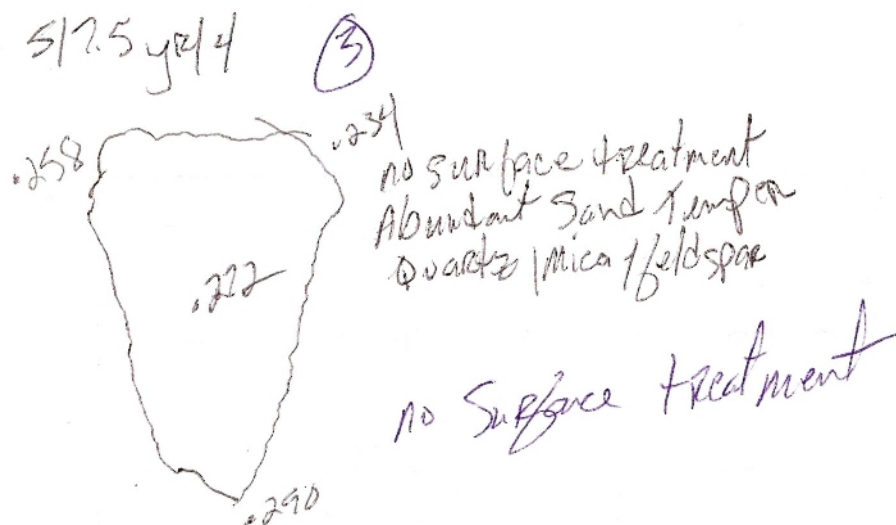


Figure 29. ASM X: 8:119 Group 3 Ceramics Data Recording Sheet



Figure 30. ASM X: 8:119 Group 3 Ceramic Sherd



Figure 31. ASM X: 8:119 Group 3 Ceramic Sherd

Site X: 7:73

ASM Site X: 7:73 was surveyed in 2004 by SRI, as part of the Bureau of Reclamation Wellton-Mohawk Title Transfer Project. The surveys were completed on areas designated for future transfer from the Bureau of Reclamation to Wellton-Mohawk Irrigation and Drainage District.

Site X: 7:73 is located approximately one mile northeast of Ligurta, Arizona, one-half of a mile south of the Gila River on a series of active aeolian dunes. Vegetation at the site consists solely of creosote bush. The cultural components at this site are comprised of a rock cluster, two rock concentrations, and numerous, site-wide ceramic scatters. Based on the information gathered and assessed, SRI concluded that the ceramics at this site were from multiple vessels; likely the location was utilized as a ceramics production and resource processing site. The ceramics at the site were classified into five types within the Lowland Patayan Ceramic Typology (see Table 3 below).

Ceramic Type	Sherd Count	Temper	Vessel Form	Time Period
Colorado Beige?	24	quartz, opaque spars	unknown	Patayan I? (A.D. 700-1050)
Topoc Buff	18	quartz and feldspar visible on surface	unknown	Patayan II (A.D. 1000-1400)
Colorado Buff	13	small amount of quartz	unknown	Patayan III (A.D. 1500-1900)
Palomas Red-on-Buff	22	feldspars	jar with reinforced rim band	Patayan III (A.D. 1000-1900)
Palomas Buff?	13	dark spars	unknown	Patayan III? (A.D. 1000-1900)
Total	90			

Table 3. SRI Ceramic Types at X: 7:73 From Vanderpot and Altschul (2005: Figure 3.37)

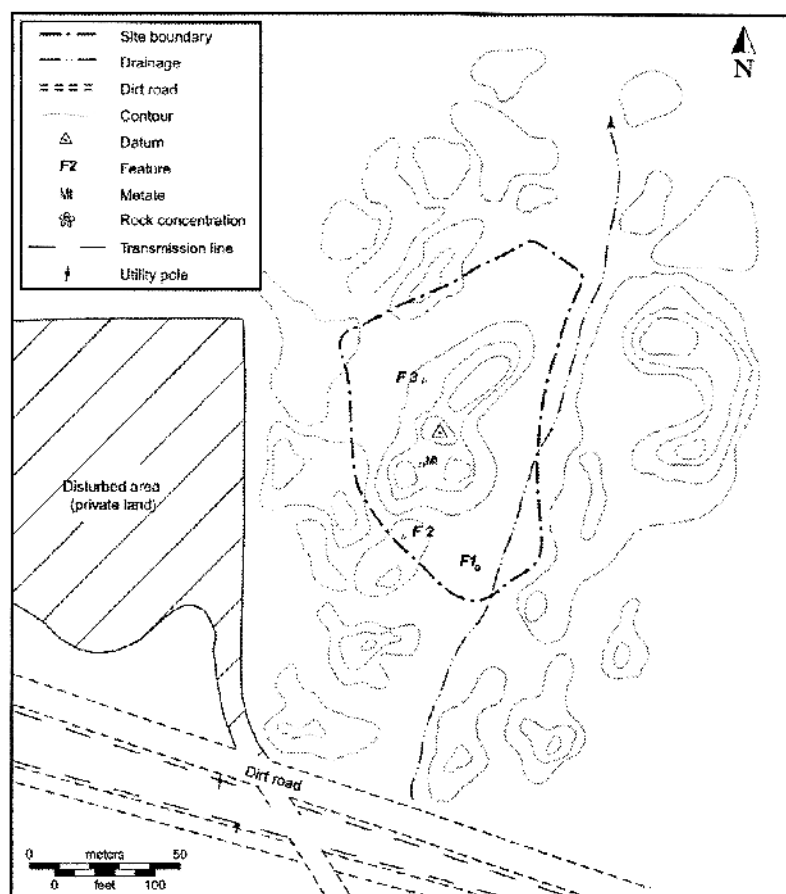


Figure 32. SRI Site Map for ASM X: 7:73 From Vanderpot and Altschul (2005: Figure 3.74)

Analysis

The procedures for data collection at this site followed the procedures outlined above. Following the data collection an analysis of the information was completed. Using the information from the ceramics data recording sheet and the searchable typology database, the sherds are assigned to a type. At Site X: 7:73 a total of 38 sherds were within the site boundary; two rim sherds were identified (see Figures 33 and 34 below).



Figure 33. Ceramic Scatter at ASM X: 7:73



Figure 34. Ceramic Scatter at ASM X: 7:73

Once all sherds were located, they were examined and classified into separate categories based on initial observations of surface treatment and other visible attribute variations. It was determined that possibly five types were present within the sherd groupings at this site. Based on the initial

reconnaissance survey of the ceramics at the site, one distinctive sherd, two if a rim was present, from each group was chosen for recording. The information gathered on the ceramics data recording sheet showed a clear distinction of attributes among these sherds leading to the following conclusions regarding the field specimens.

Sherd Group 1

The sherds in group 1 show visible signs of burnishing. They have a Munsell color of 6/10yr/4, contain a very fine mica, quartz temper, and possess an obvious carbon streak. One small rim sherd was located within this group. The rim is direct, but appears to be folded or reinforced. The sherds in this group possess characteristics that fit into two, possibly three, types making typing of the sherds difficult even with the diagnostic rim sherd. Based on an analysis of the recorded attributes using the Lowland Patayan Ceramics Typology, and after an examination of the searchable typology database, the sherds were grouped into the most likely categories; the sherds in group 1 could belong to Colorado Beige, Palomas Buff, or Colorado Buff.

Although the sherds may appear to fit within only one or two types, the remaining characteristics can fit within several other types in the typology. The burnishing of the sherds' surface is a diagnostic trait of Colorado Beige; however this ware also contains heavy, angular temper, which the field specimens do not possess. Additionally, the field specimens show a carbon streak within their core, also a trait of Colorado Beige; however, the consistency of the temper does not fit for this type. The field specimens' Munsell color of 6/10yr/4 is within the 6/10yr/4 – 6/7.5yr/4 Munsell color range for Colorado Beige. The geographical range of Colorado Beige encompasses the southern end of the Colorado River and east along the Gila River. Intrusive specimens can be found south to the Colorado River Delta, east to the Yuma County line, and west to Lake Cahuilla; therefore these field specimens are well within the geographical range of this type.

The sherds were also analyzed against the attributes of Palomas Buff and Colorado Buff. Like

Colorado Beige, Palomas Buff specimens possess a carbon streak within their core and have a reinforced rim. The Munsell color range for this type varies greatly from 5/2.5yr/6 – 8/10yr/3, which does not include the field specimen, which has a Munsell color of 6/10yr/4. The temper consistency of this type is medium to heavy temper composed of a quartz, mica, feldspar mix. Whereas the temper constituents are similar to our field specimen, one main component, hornblende, which is noticeably present in the field specimen, is absent in Palomas Buff. Because Palomas Buff can be found along the lower Gila River from Dome Mountain to Agua Caliente and from the Kofa Little Horn Mountains south to Sierra Pinacate in Mexico, this site falls within its geographical range.

When gauging the sherd specimens against Colorado Buff attributes, it can be noted that the distinguishing attributes of this type include some qualities consistent with the field specimens found at Site X: 7:73. The temper constituents of Colorado Buff include quartz, mica, and hornblende, which are similar to the field specimen. The Munsell color range of Colorado Buff, recorded from the Waters' type collection, is from 5/5yr/6 to 7/5yr/6; the field specimen's Munsell color of 6/10yr/4 falls within this range. However, when we begin to examine the complete list of attributes we find inconsistencies between the attributes of the field specimen and those of Colorado Buff. Whereas the field specimens possess a carbon streak, a burnished finish, and a direct reinforced rim, these attributes are not found in Colorado Buff. Colorado Buff was fired in an oxidized atmosphere and the desert form possesses a scum coat on the exterior surfaces. The rim form for Colorado Buff is recurved with a straight rim line; notched and reinforced rims can be found in some specimens as well. These attributes are not consistent with the field specimen, which has a reinforced direct rim. Additionally, the geographical range of Colorado Buff is from the Colorado River to west of the Salton Sea at San Sebastian Wash. This is clearly inconsistent with the location of the field specimens in Dome Valley, Arizona just above the Gila River flood plain.

After the full analysis of the data collected on the sherds within Group 1, the conclusion was drawn

that the sherds within this group can be classified as Colorado Beige. This type best represented the majority of attributes identified during the field recording process. Whereas Palomas Buff and Colorado Buff did exhibit some related characteristics with the field specimens they did not exhibit the amount of similar characteristics as Colorado Beige. Both Palomas and Colorado Buff have recurved rims, unlike the field specimen, and neither ware is known to exhibit surface burnishing; both of these attributes are consistent with Colorado Beige. Additionally, the Munsell Color and carbon streak within the core of the field specimens are attributes found in Colorado Beige (see Figures 35 through 38 below).



Figure 35. ASM X: 7:73 Group 1 Ceramic Sherd

Pottery Information Sheet									
Date: 7/31/09	Location: UTM 113 67531712 3694135								
Site: X: 7:73	Group 1								
Number of Shards: 10	Munsell Color: 6/10YR/4	Thickness:	Edge: .194, .218, .218, .189	Center: .221					
Association:	Trail: Yes ☐ No ☒	Intaglio: Yes ☐ No ☒	Petroglyphs: Yes ☐ No ☒	Village	Temp Camp: ☒ Other				
Orientation of Trail:	North	South	East	West	NE	NW	SE	SW	
Temper Type: mica/quartz	Paste and Temper:	Grain Size: Fine grained							
Vessel / Rim Forms: 1 reinforced - folded									
Surface Treatment:	Plain	Paint	Stucco	Scraped	Burnished				
Decoration Type: none									
Patination:									
Notes:	Carbon Streak Present Rim found (folded) Surface cracking Temper showing on surface								

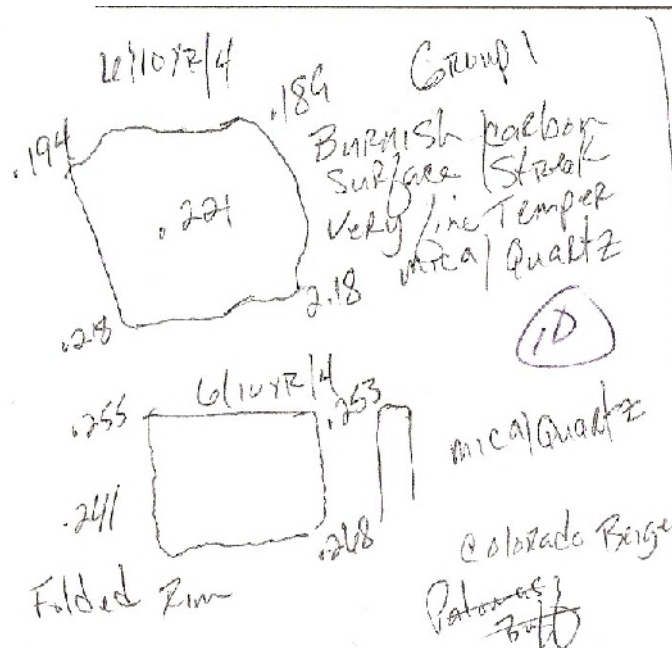


Figure 36. ASM X: 7:73 Group 1 Ceramics Data Recording Sheet



Figure 37. ASM X: 7:73 Group 1 Ceramic Sherd



Figure 38. ASM X: 7:73 Group 1 Ceramic Sherd

Sherd Group 2

The sherds in this group were difficult to analyze because of the composition of the temper and surface treatment of the sherds. Although no diagnostic rim sherds were located, the temper, surface color, and treatment are analytical attributes. The sherds in Group 2 at Site X: 7:73 have a Munsell color of 6/5yr/1 and have a coarse quartz, mica, feldspar, and hornblende temper that is evident on both the exterior and interior surface of the sherd. Additionally, the exterior surface shows evidence of vugs. Vug is a geological term for an open cavity that often has a mineral lining, usually a crystalline incrustation. No other diagnostic characteristics were recorded on these field specimens.

An examination of the Lowland Patayan Ceramics Typology, by means of the searchable typology database, for the attribute “coarse quartz temper” returned five possible types: Colorado Beige, Salton Buff, Parker Buff, Topock Buff, and Palomas Buff. However, when the geographical boundary for each type is tested in the searchable typology database, only two of the five types are found in the location of Site X: 7:73: Colorado Beige and Palomas Buff. When a search is initiated for the attribute “vug” only Colorado Buff is returned. Using these characteristics as the basis for analysis, the sherds were narrowed down into four possible types for examination: Palomas Buff, Colorado Beige, Colorado Buff, and Topock Buff.

On initial observation of the sherds, Topock Buff would be the most obvious choice. Topock Buff is characterized by its coarse quartz temper and rough finish, which these sherds exhibit. However, the geographical range of the field specimens does not fit with the prescribed geographical range of Topock Buff. Topock Buff ware is most common in the Mohave Desert region with its origins in the Colorado River Valley south of Black Canyon. The type can be found west of the western boundary of San Bernardino County, California, south to the Chemehuevi Valley, and east to Sacramento Wash in Arizona. The color for this type ranges from buff to slate gray, which does encompass the field specimens that have a Munsell color of 6/5yr/1. Obviously, this vessel could have been transported

into the region and be representative of trade between the two regions, which could explain its presence at Site X: 7:73.

Of the remaining three types, Palomas Buff, Colorado Beige, and Colorado Buff, each has individual characteristics in common with the field specimens; however none fully captures all of the recorded attributes. Each type is well fired in an oxidizing atmosphere, contains a quartz, feldspar, mica, temper composition, has medium to thick vessel walls, and has a surface color that varies from beige to brown to gray. The geographical boundaries of these types vary greatly. Colorado Beige is found along the southern end of the Colorado River from Blythe to the junction with the Gila River and east along the Gila River. Intrusive specimens have been found south to the Colorado Delta and Sierra Pinacate and west to Lake Cahuilla. The geographical range of Colorado Buff is along the Colorado River and west to San Sebastian Wash in California. Palomas Buff is found along the lower Gila River south to the Sierra Pinacate and north to the Kofa Little Horn Mountains. Surface treatments for these three types also differ significantly. Colorado Buff is well smoothed with faint wipe marks left by mops, and desert specimens commonly possess a thick scum coat. Colorado Beige surface treatment is variable from roughly smoothed to rough, with wipe marks, and coarse particles of the temper that show through the surface. This type also can be burnished or have a crème slip. The characteristics of the surface treatments for Palomas Buff include a stucco finish, a crème-colored scum coat, or variably smoothed with some early specimens showing cracking around the temper particles. Given the recorded attributes of the field specimens, and the analysis of the characteristics of the types examined, Palomas Buff is the most logical choice for these sherds (see Figures 39 through 41 below).

Date: 7/31/09		Pottery Information Sheet		Location: UTM 115 0753112 7119435	
Site: X: 7:73		Group 2			
Number of Sherds: 5	Munsell Color: 4.5YR/1	Thickness:	Edge: 2.65, 2.66, 2.66	Center: 2.70	
Association:	Trail: Yes ☐ No ☒	Intaglio: Yes ☐ No ☒	Petroglyphs: Yes ☐ No ☒	Village	Tomp Camp ☒ Other ☐
Orientation of Trail: North South East West NE NW SE SW					
Temper Type: mica/quartz/feldspar	Paste and Temper:	Grain Size: coarse - abundant - angular			
Vessel / Rim Forms: none					
Surface Treatment: none	Plain	Paint	Stucco	Scraped	
Decoration Type: none					
Patination:					
Notes:	Vugs on surface Heavy Temper No surface treatment Breaks crumbly				

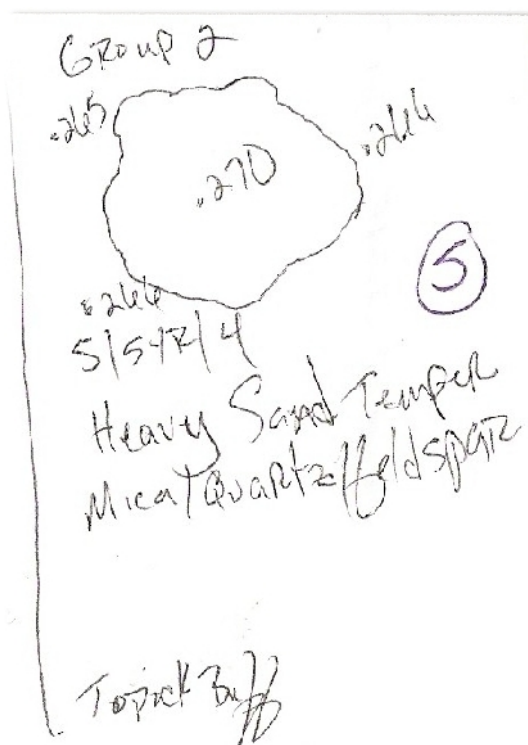


Figure 39. ASM X: 7:73 Group 2
Ceramics Data Recording Sheet



Figure 40. ASM X: 7:73 Group 2 Ceramic Sherd



Figure 41. ASM X: 7:73 Group 2 Ceramic Sherd

Sherd Group 3

The sherds in group 3 have a Munsell color of 6/5yr/4, contain a fine-grained sand temper, and have a roughly smoothed surface. One rim sherd was located within this group; the rim is direct and reinforced. Given that a reinforced rim sherd was located, the search of the typology was performed using this attribute. The searchable database returned four types with this attribute: Colorado Buff, Salton Buff, Palomas Buff, and Palomas Red-on-Buff.

Because none of the sherds exhibited signs of surface paint, this eliminated Palomas Red-on-Buff from the possible types. Similarly, Salton Buff was eliminated because of the parameters of its geographical range. This type is found within the 12 meter shoreline of Lake Cahuilla and occurs in the Colorado River area only through trade, but rarely across the river into Arizona. Both Colorado Buff and Palomas Buff have recurved rims, which would eliminate them also. Of the four possible types all were eliminated by virtue of the attributes. Therefore, by use of the typology, the sherds in this group cannot be typed (see Figures 42 through 45 below).



Figure 42. ASM X: 7:73 Group 3 Rim Sherd



Figure 44. ASM X: 7:73 Group 3 Ceramic Sherds



Figure 45. ASM X: 7:73 Group 3 Ceramic Sherds

Sherd Group 4

The sherds in this group show evidence of surface paint, no diagnostic rim sherds were located; however the existence of paint on the sherd is a diagnostic trait in itself. The Munsell color of the sherds is 5/2.5yr/8, and they contain a small amount of very fine sand temper. After referencing the Lowland Patayan Ceramics Typology, using the searchable typology database to search for the attribute decoration “paint”, only one type is returned, Palomas Red-on-Buff ware. This type is the equivalent of Palomas Buff, but with decorative paint. The attributes are generally the same as Palomas Buff; however the geographical range is more restrictive and no further explanation of these restrictions is given in the Waters' typology. We can say with some certainty that these specimens are Palomas Red-on-Buff given the rarity of decorated types within the typology (see Figures 46 through 48 below).



Figure 46. ASM X: 7:73 Group 4 Ceramic Sherd

Pottery Information Sheet											
Date: 7/31/09	Location: UTM 11S 07531112 3619435										
Site: X: 7:73 Group 4											
Number of Sherds: 7	Munsell Color: 5Y 2.5R/8	Thickness: Edge: .201, .188, .181, .193	Center: .193								
Association:	Trail: Yes ☐ No ☒	Intaglio: Yes ☐ No ☒	Petroglyphs: Yes ☐ No ☒	Village	Temp Camp: possible						
Orientation of Trail: North South East West NE NW SE SW											
Temper Type: Sand	Paste and Temper:	Grain Size: fine grained barely visible									
Vessel / Rim Forms: none											
Surface Treatment: Roughly Smoothed	Paint	Stucco	Scraped								
Decoration Type: Paint											
Patination:											
Notes:	Paint on Surface almost no temper carbon streak sharper locally										

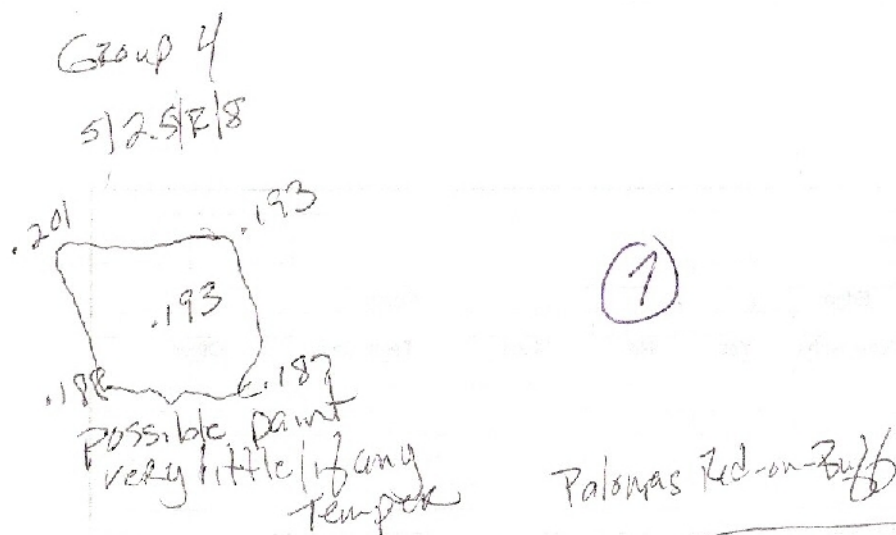


Figure 47. ASM X: 7:73 Group 4 Ceramics Data Recording Sheet



Figure 48. ASM X: 7:73 Group 4 Ceramic Sherd

Sherd Group 5

No diagnostic rim sherds were found in this group. The sherds in group 5 have a Munsell color of 6/7.5yr/4. These sherds have a carbon streak and an abundant amount of a fine-grained sand temper. Additionally, the surface of the sherds is covered with a scum coat. A search of the Searchable Typology Database for the attribute “scum coat” returned six types with this attribute: Tumco Buff, Colorado Beige, Salton Buff, Parker Buff, Topock Buff, and Palomas Buff. Of the six types, three wares, Salton Buff, Parker Buff, and Topock Buff, are eliminated because of their geographical boundaries. The remaining three types all contain fine-grained, lithic sand, quartz, mica, feldspar temper. Furthermore, each of these types has a surface color range of tan to gray, which encompasses the sherds in Group 5. However, none of the types possesses a carbon streak as the field specimens do. Given the limited number of diagnostic attributes that could distinguish these sherds in Group 5 and aid

in definitively typing them, these field specimens cannot be placed into a specific type category (see Figures 49 through 52 below).

Date: 7/31/07	Location: UTM 112 61531712 3619435	
Site: X: 7:73	Group 5	
Number of Sherds: 8	Munsell Color: 6P7.5YR/4-1	Thickness: Edge: .251, .251, .246, .232 Center: .243
Association:	Trail: Yes No	Intaglio: Yes No
Orientation of Trail: North South East West NE NW SE SW	Petroglyphs: Yes No	Village Temp Camp Other
Temper Type: Sand - Micaceous	Paste and Temper:	Grain Size: Fine - Sub Angular
Vessel / Rim Forms: none		
Surface Treatment: Roughly Smooth	Paint	Stucco Scraped Matted ?
Decoration Type: none		
Patination:		
Notes:	Carbon Streak present Scum coat present Sharp Brack possible mop wipe marks on surface	



Figure 49. ASM X: 7:73 Group 5 Ceramics Data Recording Sheet



Figure 50. ASM X: 7:73 Group 5 Ceramic Sherd



Figure 51. ASM X: 7:73 Group 5 Ceramic Sherd



Figure 52. ASM X: 7:73 Group 5 Ceramic Sherd

Chapter 6

Museum Collections Analysis

An important component of this research was to test a previously analyzed museum collection against the Lowland Patayan Ceramics Typology. The following analysis process was similar to the study completed on the Waters' type collection at the San Diego Museum of Man and after the field data collection; however this process included the analysis of the sherds against the Waters' Lowland Patayan Ceramics Typology. This portion of the research was conducted using ceramic collections from the Yuma Proving Ground (YPG). These collections are currently curated at the Cocopah Museum in Somerton, Arizona. The sample used in this portion of the research is relatively small. This is due to the limited availability of ceramics held in museum collections within the specific research area during the time frame that the research was being conducted. However, despite the small sample size, some tentative conclusions were reached. The following sections discuss the procedures followed to conduct the data collection, and the process for analysis of this data against the sherd's assigned type.

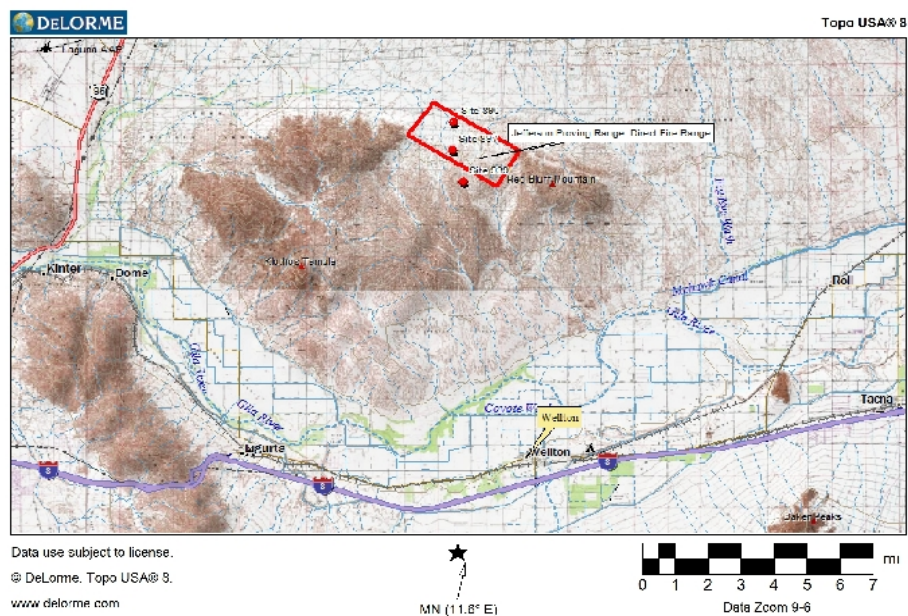


Figure 53. Yuma Proving Ground Jefferson Proving Range Direct Fire Range

Three sites, 890, 897, and 939, from the YPG collection were chosen for examination and analysis. The collections from these sites were chosen based on the number of sherds in the collection, the inclusion of rim sherds, and their presence within the study area. The sherds from these collections had been previously typed during the collection and curation process. All three sites are located in the south-central area of YPG, north of Red Cloud Mountain and within the Jefferson Proving Range Direct Fire Range (see Figures 53 and 54). These sites were located and artifacts were collected in response to archaeological investigations necessary in order to create the Jefferson Proving Ground Direct Fire Range. The archaeological investigations were conducted for YPG by Steven G. Dosh and William S. Marmaduke of Northland Research, Inc.

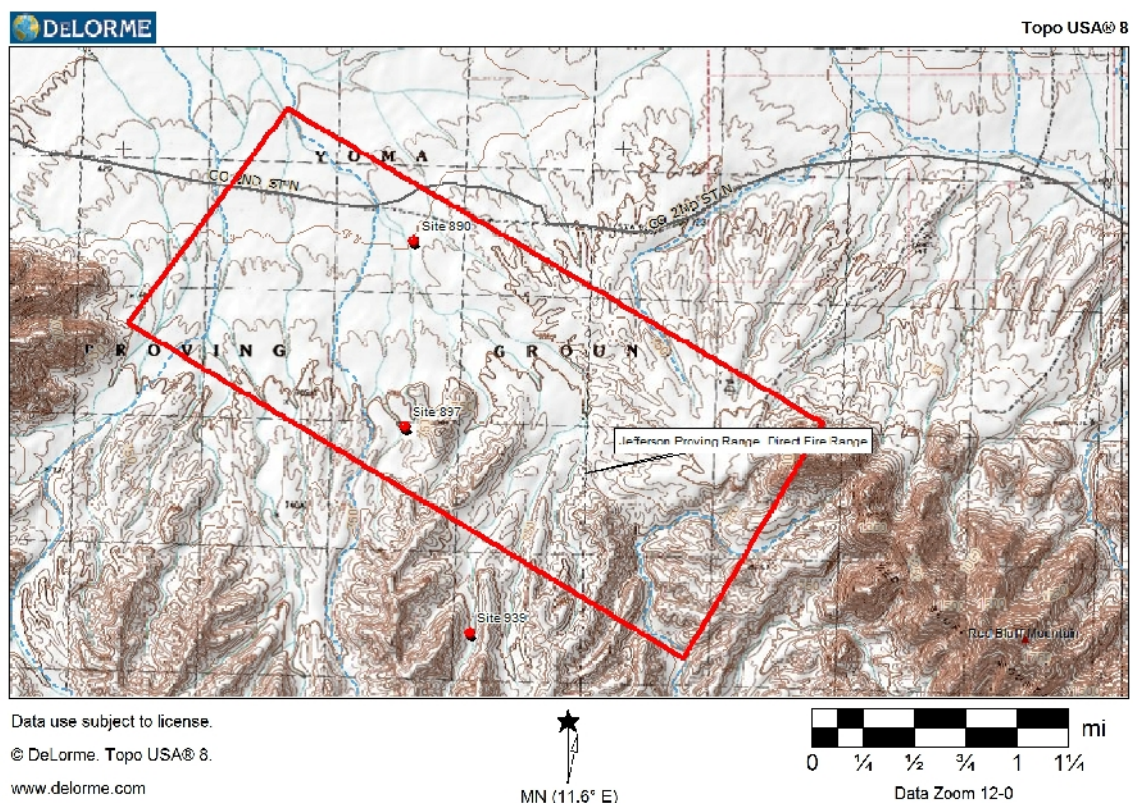


Figure 54. Yuma Proving Ground Jefferson Proving Range Direct Fire Range

The selected sherd specimens from Sites 890, 897, and 939 were examined under a Boreal stereomicroscope with a 10X/20 eyepiece, using both 2x and 4x objectives, to determine temper-paste consistency, temper type, size, and abundance. The ceramics data recording sheet was employed to collect data on relevant attributes such as Munsell color, surface treatment, decoration, rim characteristics, and thickness measurements for each sherd. Photographs were taken of the sherd's core under microscopic magnification. Any diagnostic attributes, such as rims and Colorado Shoulder, and the exterior and interior surfaces were also photographed. Using the data collected during the recording process, and the previous type assignment of the sherds, the specimens were analyzed using the Lowland Patayan Ceramics Typology by way of the searchable typology database created by the author. Attributes from the sample sherds were used to refine the search within the typology database. The attributes were assessed and a type assigned; this assignment was then compared with the previous type assignment given to the sherds during collection.

Site 890

Site 890 is in the northeastern portion of the Jefferson Proving Ground Direct Fire Range. This area is part of the Red Bluff Basin District. The area is characterized as a native food plant resource location because of the spatial distribution of temporary occupation sites in relationship to the abundantly available culturally significant plants. A total of three sherds were collected at Site 890; they were originally typed as Colorado Beige, but at some point were re-typed as Palomas Buff. The sherds were found in association with a combination of flaked stone, small rock clusters, and rock rings (see Figure 55 below).

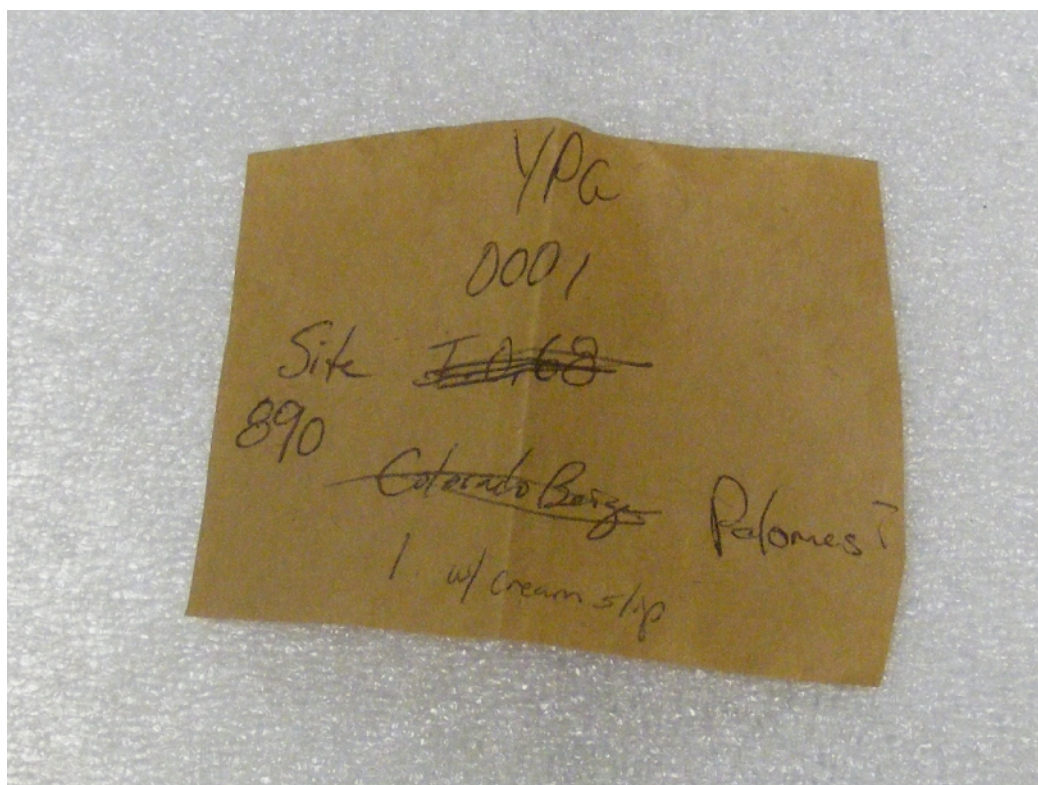


Figure 55. Collections Tag for Site 890

Information was gathered on the sherds in this collection using the ceramics data recording sheet (see Figure 56 below).

Coscopec Museum

Pottery Information Sheet										
Date:	11/19/89			Location: UTM						
Site #	896			Munsell Color	10YR 1/3			Thickness	Edge	Center
Number of Shards	3			Trail	Yes	No	Integrit	Yes	No	Temp Camp
Association:				Orientation of Trail	North	South	East	West	NE	NW
Temper Type:				Paste and Temper:	Grain Size			Subangular to 1/16 to 1/32		
Rim Type	Direct			Recurve	Rim Type			Round Rim	Flat Rim	Lipped Rim
Form:	Jar			Bowl	Scoop			Other		
Surface Treatment:	Plain			Shrink Cracks	Paint			Stucco	Scraped	Scum
Decoration type:	No Dec			Wipe Marks	Tamper Shows			X		
Patination:										
Notes:										

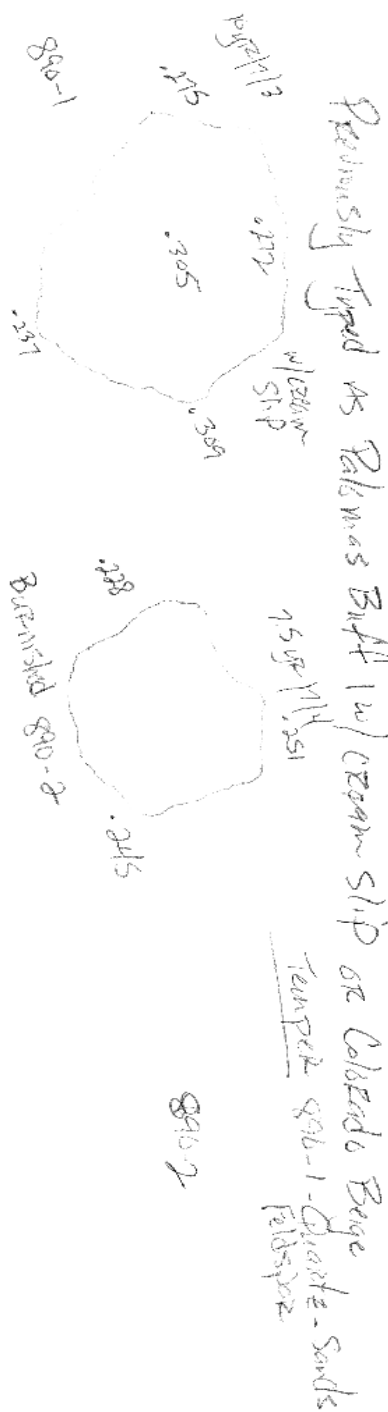


Figure 56. Site 890 -1 Ceramics Data Recording Sheet

Casper Museum

Revisedly Typed as Palomares Butte or Okkade Beige

Pottery Information Sheet											
Date:	11/1/89		Location: UTM								
Site #	890-2		Number of Shards		Total 3		Munsell Color		7.5YR 7/1		
Association:	Trail	Yes	No	Intaglio	Yes	No	Petroglyphs	Yes	No	Village	Temp Camp
Orientation of Trail:	North	South	East	West	NE	NW	SE	SW			
Temper Type:					Grain Size: Small				Subangular 20/6 temper		
Rim Type:	Direct	Recurve	Rim Type: Round Rim		Flat Rim		Lipped Rim		Reinforced Rim		
Form:	Jar	Bowl	Scoop		Other						
Surface Treatment:	Plain	Paint	Slucoco	Scraped	Sour	Burnish					
Decoration type:	None										
Patination:											
Notes:	outer layer cracking off - initially looked like burnishing but possibly be a slip										

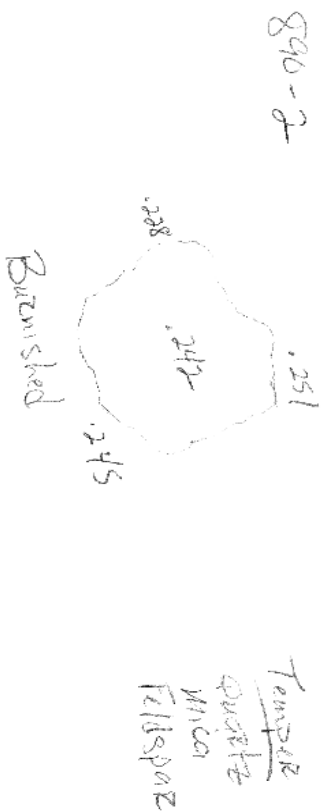


Figure 57. Site 890 -2 Ceramics Data Recording Sheet

Given that the Site 890 sherds were assigned to two different types, they had been analyzed against the attributes of both Colorado Beige and Palomas Buff. Of the three sherds in this group only two were analyzed. The third sherd was extremely small; it was determined that the attributes could not be correctly identified on a specimen of that size. The remaining two sherds were analyzed by the set of diagnostic attributes they possessed. The sherds did possess some dissimilar characteristics; this fact may be the reasoning for the dual typing for these sherds. Hereafter the sherds in this group will be referred to as 890-1 and 890-2 to highlight the specific differences in attributes

Sherd 890-1 had a Munsell color of 10YR/7/3. The temper consisted of medium subangular quartz, feldspar, and sand making up approximately 40% of the temper-paste consistency. A tag within the collection bag suggested the sherd had a cream-colored slip; however no slip was observed during this examination (see Figures 58 and 59 below).



Figure 58. Site 890-1 Body Sherd Interior



Figure 59. Site 890-1 Body Sherd Exterior

Sherd 890-2 had a Munsell color of 7.5yr/7/4. The temper in this sherd consisted of the same quartz, feldspar, sand materials found in Sherd 890-1; however the temper abundance was only approximately 20%. Sherd 890-2 did appear to have a thin slip that was cracking and falling off (see Figures 60 and 61 below).



Figure 60. Site 890-2 Body Sherd Exterior



Figure 61. Site 890-2 Body Sherd Interior

The recorded attributes of these two sherds are not singularly distinguishable to only one type within the typology, therefore the searchable typology database was used to refine the search based on the assessment of the various attributes of the sherds. Using the attributes “cream slip”, “burnishing”, and “scum coat” to conduct a search under the column heading “surface color - treatment”, the database suggested the following types: Tumco Buff, Colorado Beige, Colorado Buff, Salton Buff, Parker Buff, Topoc Buff, and Palomas Buff. However, when an additional search was conducted using the attribute of geographical range, only Tumco Buff, Colorado Beige and Palomas Buff fit the location where the sherds were collected (see Figures 62 and 63 below).



Figure 62. Site 890 Magnified Core Sample

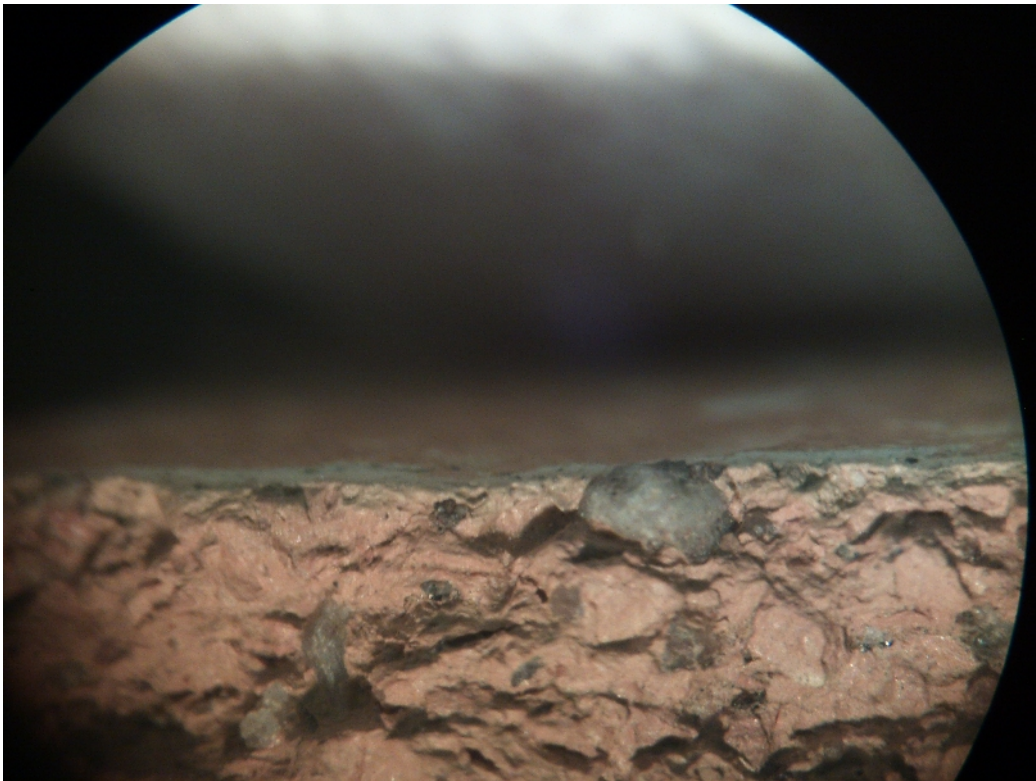


Figure 63. Site 890 Magnified Core Sample

Analysis of the temper consistency was used to refine the search. Each of these three types contain a similar quartz sand, feldspar, mica temper with the exception of Palomas Buff, which is distinguished by abundant white feldspar and quartz temper. Although this may appear to eliminate Palomas Buff from the list of viable types, without diagnostic rim sherds to examine these sherds cannot be definitively placed into one type category based on the recorded attributes.

Site 897

This site is in the south-central portion of the Jefferson Firing Range, within Red Cloud Basin. The sherd scatter within Site 897 was approximately six meters in diameter and in association with a cleared circle. Two-hundred-ninety-five sherds were collected, all believed to be from one Colorado Beige Jar (see Figure 64 and 65 below).



Figure 64. Site 897 Body Sherds



Figure 65. Site 897 Single Body Sherd

Given the large number of sherds within this collection, not all were recorded using the ceramics data recording sheet. The entire collection was visually examined and specific body sherds, that contained the most distinctive and representative attributes and three rim sherds were chosen to record (see Figures 66 through 69 below).

Leopold Museum Typed as Colorado Bigge

Date: 11/1/09

Number of Sheds: 295 total - 2150 Munsell color

Association: Trail Yes No Inlaid: Yes No Petroglyphs: Yes No Village Temp Camp Other

Orientation of Trail: North South East West NE NW SE SW

Temper Type: Shallow Paste and Temper: Grain Size: fine - abundant 90% temper

Rim Type: Up Direct Recurve Rim Type: Round Rim Flat Rim Lipped Rim Reinforced Rim

Form: Jar Bowl Scoop Other

Surface Treatment: Plain Paint Slipco Scraped Scum Burnish

Shrink Cracks Wipe Marks Temper Shows

Decoration type:

Palination:

Notes:

Pottery Information Sheet

Location: UTM

Thickness: Edge: Center:

512/614

.212 .211 .194

.186 .235 .235 .214

.201

Figure 66. Site 897 Ceramics Data Recording Sheet

Cocopal Museum Typed as Colored Beige

Date: 11/19/29										Ptery Information Sheet									
Location: UTM																			
Site # 897																			
Number of Shards: 209										Shard Munsell Color: 10 YR 6/13									
Association:										Thickness: Edge: / / /									
Trail: Yes No										Inglaze: Yes No									
Orientation of Trail: North South East West NE NW SE SW										Petroglyphs: Yes No Village Temp Camp Other									
Temper Type: 10/21 Soils										Paste and Temper Grain Size: Fine - Abundant 10/10 to 10/20									
Rim Type: Direct Recurve										Rim Type: Round Rim Flat Rim Lipped Rim Reinforced Rim									
Form: Jar Bowl										Scoop Other									
Surface Treatment: Plain Shrink Cracks Paint Stucco										Scraped Scum Burnish									
Wipe Marks										Temper Sticks									
Notes:																			

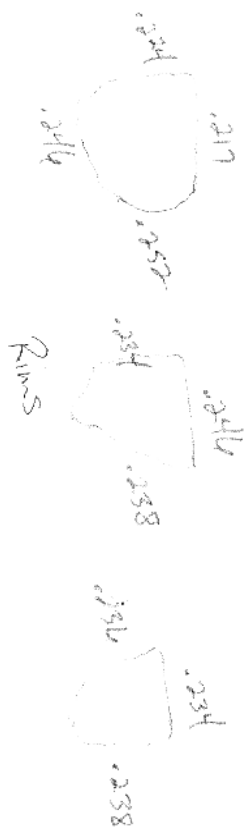


Figure 67. Site 897 Ceramics Data Recording Sheet

Cacupah Museum

Typed AS Colorado Beige

Pottery Information Sheet									
Date:	Location: UTM								
Site 897									
Number of Shards	295 total	295 total	Munsell Color:	Thickness	Edge	Center			
Association:	Trail:	Yes	No	Inglis:	Yes	No	Petroglyphs:	Yes	No
Orientation of Trail:	North	South	East	West	NE	NW	SE	SW	
Temper Type:	Grain Size: medium - fine								
Rim Type: AP Direct	Recurve	Rim Type: Round Rim	Flat Rim	Lipped Rim	Reinforced Rim				
Form:	Jar	Bowl	Scoop	Other					
Surface Treatment:	Plain	Streak Cracks	Wipe Marks	Scraped	Temper Shows	Sawn	Burnish		
Decoration type:	possible pond and leaf burnish								
Patination:									
Notes:	Burn colored to red some fine chipping shatters easily - crumbly - soft								

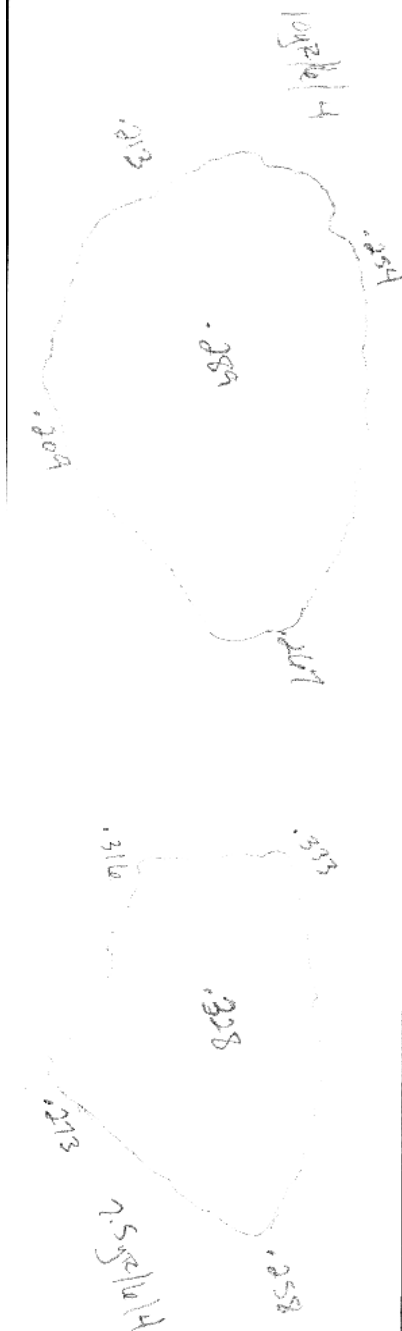


Figure 68. Site 897 Ceramics Data Recording Sheet

Cacopel Museum

Tyrod HS Colorado Beige

Date: 11/18/09		Pottery Information Sheet	
Location: UTM			
Number of Shards: 2 used	Munsell Color:	Thickness: Edge	Center
Association:	Trail: Yes No	Ingle: Yes No	Petroglyphs: Yes No Village Temp Camp Other
Orientation of Trail: North South East West NE NW SE SW	Grain Size: fine	Wooded	
Temper Type: Sands	Recurve Rim Type: Round Rim	Fat Rim	Lipped Rim Reinforced Rim
Rim Type: N/A-Direct	Form: Jar Bowl Scoop Other		
Surface Treatment: Plain Paint Shrink Cracks	Stucco Wipe Marks	Scraped Temper Shows	Scum Burnish Padded Smooth
Decorations type: N/A			
Palimpsest:			
Notes: Becks - Soft / locally			

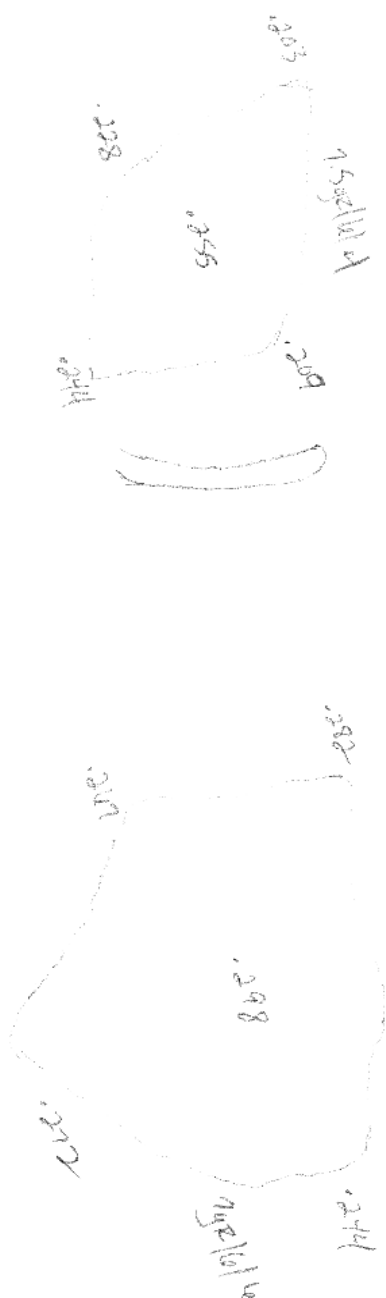


Figure 69. Site 897 Ceramics Data Recording Sheet

Because these sherds were previously typed as Colorado Beige, they were initially analyzed against this type. The Munsell color of the sherds in this collection ranged from 10yr/6/3 to 7yr/6/4 to 5yr/6/4 to 2.5/yr/4/6; this amount of variability in color within one vessel is common in types fired in well oxidized conditions. The recorded color range fits within the color range for Colorado Beige designated by Waters as beige to brown-gray with exterior surfaces occasionally displaying a thin cream-colored scum coat. The temper in these sherds is subangular and consists of quartz sands, feldspar, hornblende, and mica. The temper is found in abundant quantities of approximately 60-70%. This temper description is consistent with that of Colorado Beige found in the Waters' typology. Additionally, the 897 sherds were tested for fracture. The sherds were soft to medium and the edges crumbled easily when nipped, which is also consistent with Colorado Beige (see Figures 70 and 71 below).

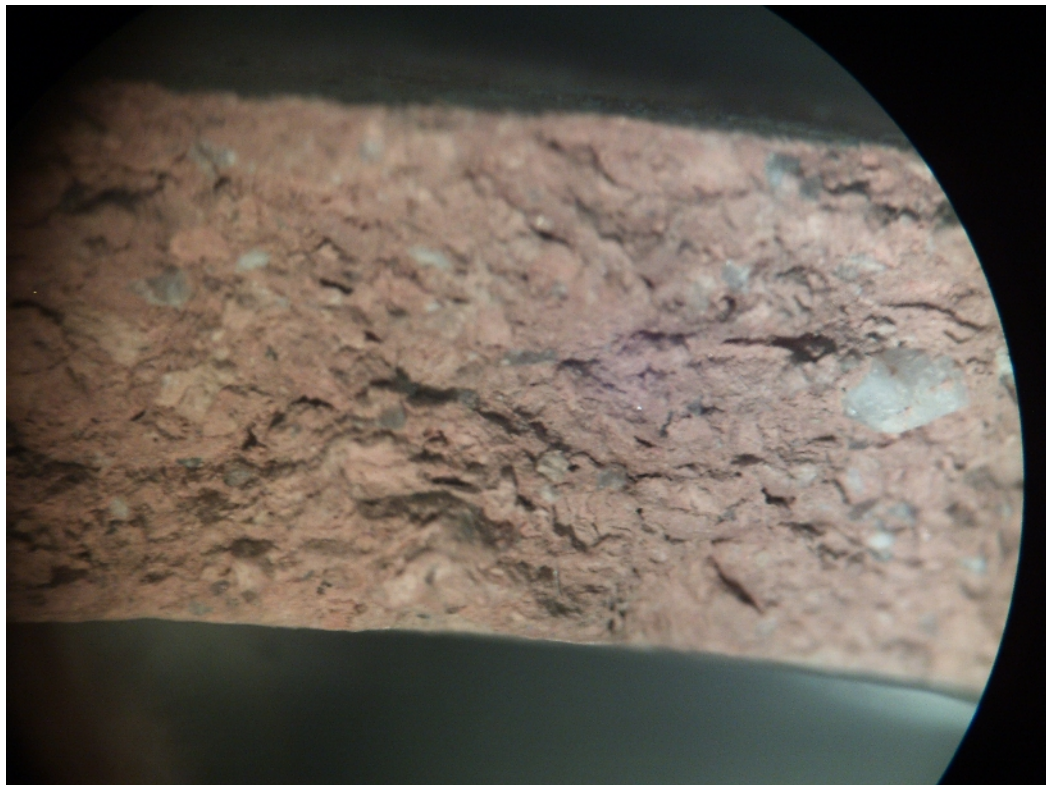


Figure 70. Site 897 Magnified Core Sample

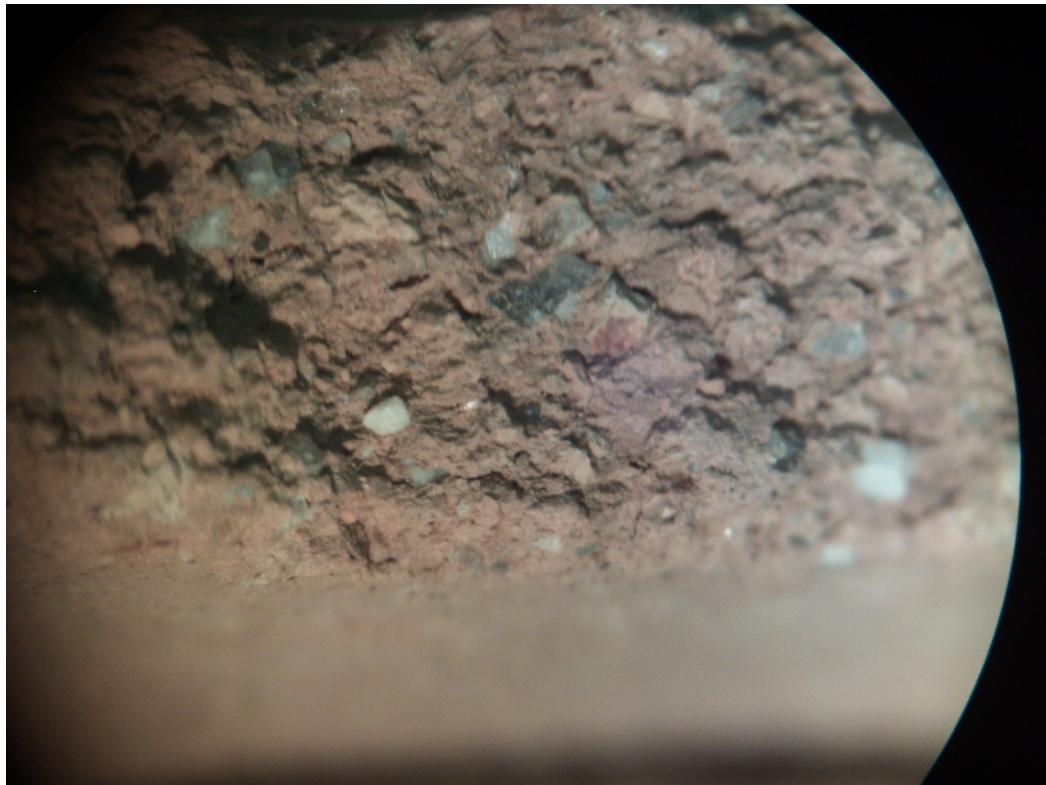


Figure 71. Site 897 Magnified Core Sample

Three rim sherds were also analyzed. The rim sherds had a Munsell color of 10yr/6/3 and quartz sands, feldspar, hornblende, mica temper. The rims are direct and rounded. However, within the Waters' typology Colorado Beige rims are described as direct with rim notching, which the Site 897 sherds lack. It is not known if rim notching was universal within Colorado Beige, or strictly an individually applied aesthetic component on certain vessels (see Figures 72 and 73 below).



Figure 72. Site 897 Rim Sherd



Figure 73. Site 897 Rim Sherd

Based on the data collected on the body sherds and the diagnostic rim sherds, Colorado Beige could be considered as a viable type for these sherds; nevertheless the issue with the rim notching leaves some doubt.

Site 939

Site 939 is south of the Jefferson Proving Ground Direct Fire Range boundary in the Upper Basin District. Its location was within the initial proposed area for the range. Through several revisions of the range boundary this area was excluded, but it was part of the original archaeological investigations for the project. The ceramics in Site 939 are associated with a cleared circle. The two rims and two body sherds were collected and were initially recorded as Parker Buff; however the tag within the collections bag has been altered to designate them currently as Tumco Buff (see Figure 74 and 75 below).

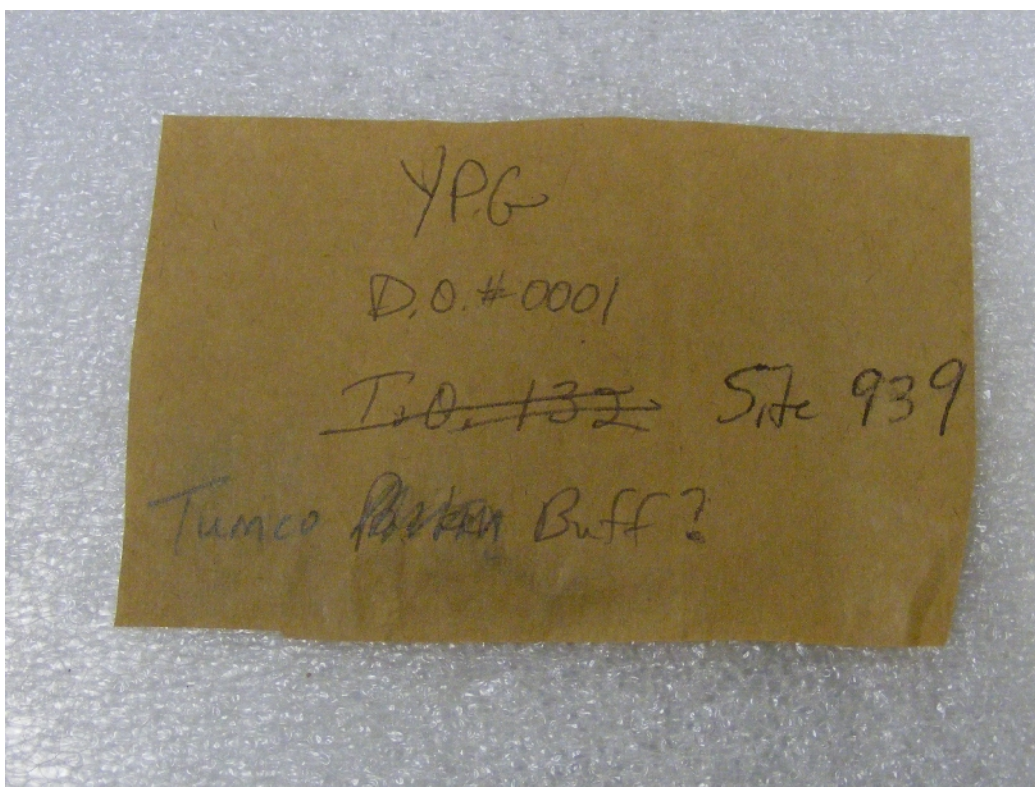


Figure 74. Collections Tag for Site 939

Joseph Museum

Pottery Information Sheet									
Date:	Location: UTV								
Site: <u>934</u>									
Number of Shards: <u>2</u>	<u>used</u>	Munsell Color: <u>Blue/White</u>	Thickness: <u>1</u>	Edge: <u>1</u>	Center: <u>1</u>				
Association:	Trail: <u>Yes</u>	Yes	No	Intaglio: <u>Yes</u>	No	Perforations: <u>Yes</u>	No	Village: <u>Temp Camp</u>	Other: <u>Other</u>
Orientation of Trail:	North	South	East	West	NE	NW	SE	SW	
Temper Type:	Paste and Temper:								
Rim Type:	Direct <u>X</u>	Recurve	Rim Type: Round Rim	Flat Rim	<u>X</u>	Lipped Rim	Reinforced Rim		
Form:	Jar	Bowl	Scoop	Other:					
Surface Treatment:	Plain	Paint	Stucco	Scraped	Squint	Burnished			
Decorative type:	Shrink Cracks	Wipe Marks							
Palination:									
Notes:									

Typed AS Tuncu Buff



The two body sherds have a Munsell color of 10YR/6/2, and the two rim sherds have a Munsell color of 10YR/6/4. The temper in these sherds is fine to medium grained, angular to subangular quartz, mica, and lithic sands with an abundance of 10-15%. The interior of the body sherds exhibits shrink cracks and surface temper (see Figures 76 and 77 below).

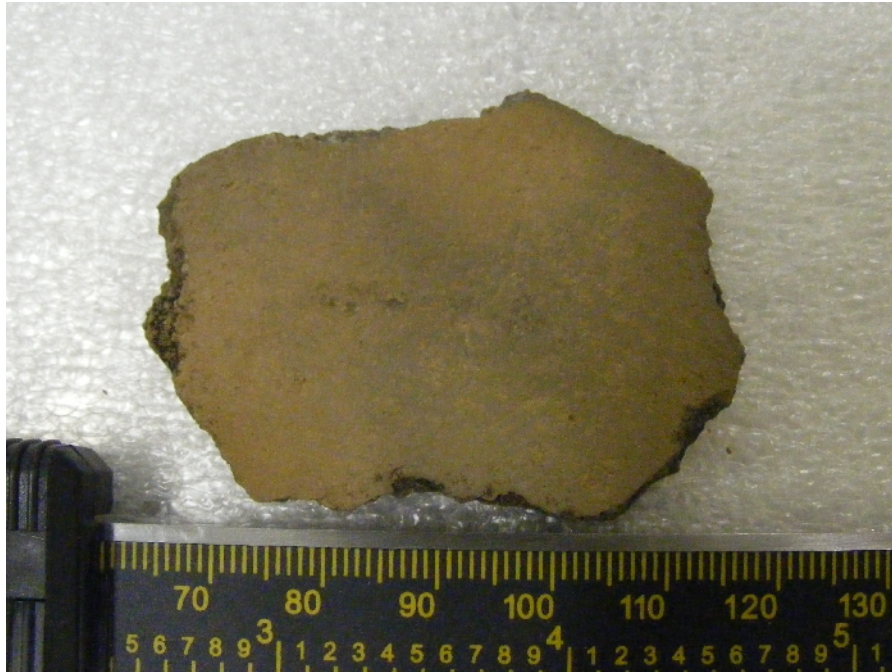


Figure 76. Site 939 Body Sherd Exterior



Figure 77. Site 939 Body Sherd Interior

The two rim sherds are direct rims with flat rim lines (see Figures 78 and 79 below).



Figure 78. Site 939 Rim Sherds



Figure 79. Site 939 Rim Sherds

The sherds were analyzed against the two types assigned to them, Parker Buff and Tumco Buff. Using the diagnostic rim sherds as a basis for the initial typing, both Parker Buff and Tumco Buff are incorrect type categories for these sherds; both Parker Buff and Tumco Buff have recurved rims. Using the geographical range attribute for further analysis, Parker Buff is rarely found within the region of the Site 939. However, Tumco Buff has a wide distribution that includes all of Yuma County, Arizona.

An analysis of the temper found in the sherds of Site 939 shows that the sherds are closer to the temper characteristics of Tumco Buff than Parker Buff. The temper of Tumco Buff is described as fine, rounded quartz and feldspar with other lithic grains, whereas Parker Buff is described as containing medium to relatively abundant amounts of medium-to-fine-grained, subangular to angular crushed white feldspar and quartz with some hornblende. Although neither type fits exactly with the temper attributes of the sherds, Tumco Buff is the closer of the two.

A search of the Searchable Typology Database for the attribute “direct rim” returned four types: Black Mesa Buff, Topoc Buff, Colorado Red, Colorado Beige. Salton Buff was also analyzed based on its listing as possessing a variable rim, with Patayan I specimens having direct rim with some rim notching, Patayan II having recurved rims, and Patayan III having reinforced rim bands. Comparing the full range of attributes of each type against those of the Site 939 sherds eliminates each of these types. Given that the Site 939 sherds contained a fine to medium grained, angular to subangular quartz, mica, and lithic sands temper, Black Mesa Buff is eliminated based on its lack of temper. Topoc Buff is eliminated based on temper as well. Topoc Buff is known for its coarse grained temper throughout the vessel, which even appears on the exterior and interior surfaces. Colorado Red is eliminated by its distinctive red slip, which these sherds do not possess. Finally, Salton Buff is eliminated by its geographical range along the shoreline of Lake Cahuilla and the fact that it is rarely traded into Arizona. Colorado Beige appears to be best fit based on rim type, color, and temper. The fracture of the

Site 939 sherds when nipped was very hard, breaking with a sharp straight margin. Colorado Beige is a very soft type that breaks easily and crumbly forming irregular, jagged margins. Likewise, the surface color-treatment attributes for Colorado Beige denote that this type is characterized by its beige color, burnishing, “crème slip” and rim notching, all attributes that the Site 939 sherd does not possess.

Based on the recorded attributes of the sherds from Site 939, and the analysis of the complete range of characteristics of both Parker Buff and Tumco Buff, they cannot be conclusively typed as either type. The use of a diagnostic attribute such as a rim sherd should greatly aid in typing the sherd as a specific type; however this was not case with these sherds. Colorado Beige could be a possibility for these sherds, however, again, when the full range of attributes for this type is examined against the attributes of the Site 939 sherds, the sherds do not fit. Therefore, these sherds cannot be conclusively typed using the Waters' Lowland Patayan Ceramics Typology.

Chapter 7

Results and Conclusions

This thesis has highlighted existing concerns surrounding the Michael Waters' Lowland Patayan Ceramics Typology. These issues focus on the buffware type system created by Waters, and the use of unverifiable attributes for analysis. As Don Laylander notes, “different analysts will often perceive or focus upon different aspects of the “type” and as a result they will arrive at highly inconsistent identifications” (Laylander 2009: 2). Therein lies the issue with the Waters' typology; it is a typology built on arbitrarily assumed characteristics and attributes that cannot be definitively identified and recorded by the analyst. All too often, as has been emphasized throughout this thesis, researchers doing in-field analysis focus on only one attribute when typing sherds, not taking into account the full range of attributes that might eliminate certain types from consideration. If the full range of attributes for each type is examined, inconsistencies within the Waters' typology arise.

The use of empirical analysis alone, without a wider range of recordation and analysis, to type sherds can lead to misconceptions by ceramic analysts. Again Laylander states, “A minor terminological anomaly is also produced by defining separate “types” on the basis of an attribute that may be present on some but not all parts of a single ceramic vessel” (Laylander 2009: 4). Most field analysis of ceramics in this region is done by archaeologists who lack the depth of experience to subject the specimens to a set of rigorous tests, and they merely assign ceramics based upon their initial observations and assumed knowledge regarding ware boundaries, general color, and temper materials. These specimens are then forced into a type category based on these subjective empirical observations.

Although all of the ceramics sites included in the field recording portion of this research were initially recorded by SRI, each site was recorded by different individuals from SRI for individual survey projects. Ultimately, each individual recorded sherd attributes differently with emphasis on

various attributes. Analysis is further complicated by the vague references to surface color, vessel wall thickness, temper abundance, and type by the SRI field recorders; a similar situation was noted for the ceramics recorded in the museum collections. It should be stated that the inclusion of a more uniform system of recording that employs thickness measurements of individual sherds, Munsell color, and more refined descriptions of rim forms and temper, such as were employed in this work by way of the ceramics data recording sheet, would be an immense aid to accomplishing standard data recording requirements for ceramics within this region. The Waters' typology uses vague color references, which can be easily misidentified or subjectively skewed during the recording process. Through the use of verifiable vessel surface colors this attribute can be more definitively recorded. The use of Munsell colors allows the information recorded by one individual to be confirmed by others with more certainty.

Although the thickness measurements included in this work are inconclusive in showing correlation between type and vessel wall thickness, this could be because of the relatively small sample size (See Appendix A). The use of a larger sample size that covers a greater regional area may prove to be more indicative of broader patterns in vessel construction. Another tool that might be employed would be the creation of a region-wide database to consolidate all data recorded on ceramics during survey projects and individual research studies. The utilization of a standard ceramics recording method, along with the compilation of regional data, would give researchers a greater foundation to work with for future research. Further research in this area could examine such issues relevant to vessel thickness and its use, time frame, and spatial connections to a specific region. The time spans associated with the wares within the Lowland Patayan Typology may not be long enough to show changes in vessel thickness associated with population increases, which may necessitate the use of larger storage vessels, improved construction techniques; or the advent of an agricultural lifestyle throughout the area.

The issue of the type classification, localized variation in materials, and design/style elements are

not clearly defined within the Waters' typology. As has been noted by past ceramic researchers, “A “ware” is a large grouping of pottery types which has few (sic) temporal or spatial implications but consists of stylistically varied types that are similar technologically and in method of manufacture.” (Wheat 1958:34-35). According to Harold Colton, ware is not a synonym for type (Colton 1953). A type is defined as a group of similar attributes observed within a group of ceramic specimens. Types reflect spatial and temporal variants that reveal cultural change through time. Temporal and spatial reference, however, are not meant to be derived from the ware classification. Waters' typology relies heavily on the inclusion or absence of a single attribute, or combinations of attributes, to define a type. However, their significance represented in the temporal and spatial aspect of the ceramics is unclear. These attributes could simply be reflective of stylistic characteristics or distinctive materials used for construction. It can be said that Waters' typology is not a proper reflection of the ware/type classification within a typology.

Given that all Lowland Patayan ceramics are produced through coiling and shaped or thinned by paddle and anvil, archaeologists generally agree that they can be identified within the same ware system. Additionally, all Lowland Patayan types are constructed with the use of sedimentary clays described by Waters as riverine with few if any inclusions. Therefore, it would be expected that the clays of this region would produce a uniform ware. Waters' typology relies heavily on rim forms and their diagnostic relevance within the typology. “Spatial variation probably resides primarily in the material from which the pottery is made; temporal variability may reside in the single, most evident stylistic characteristic of these vessels, rim/lip forms” (Lyneis 1988:152). Therefore, more consideration of the various characteristics of the direct and recurved rim forms within the typology should be taken. Within Waters' typology, a single type can range from a direct to recurved rim throughout the span of the Patayan I (700A.D. - 1000 A.D.) to Patayan III (1500A.D. - 1850A.D.) time frame. Therefore, with this much variability of rim form, the use of a rim sherd as a temporal

diagnostic has little validity within the typology. Within each rim form, further descriptive distinctions should be made to refine this attribute with the addition of subcategories such as round rim, flat rim, lipped rim, and reinforced rim to examine the temporal aspects, if any, of this attribute. Likewise, during the examination of the Waters' type collection, it was noted that within one type different rim forms, colors, tempers, and surface treatment were exhibited, sometimes all within the same time frame. With so much inconsistency of verifiable attributes within one type, the essence of the type designation is lost. Furthermore, some types, notably Black Mesa Buff and Tumco Buff, share many of the same attributes such as rim form, temper, surface treatment, vessel form, and geographical range, leading one to conclude that the specimens should belong to the same type and the differences merely highlight regional variability.

Past ceramics researchers in the Lower Colorado River Region have tested their typologies of the ceramics of the region through proven field and research methods (May 1978, Rogers 1935, Schroeder 1958). “I think what everyone was doing was setting up “straw men” to test their typologies against survey and excavation data to see what falls out” (May, personal communication 2009). Through these procedures they were able to refine and restructure their ideas on the ceramics, thus enriching the Lowland Patayan Ceramic Typology. These rigorous testing and field studies were not completed prior to the publication of Waters' typology. The necessary testing of the typology has been, and continues to be done, through the ongoing field work of ceramics researchers both past and present including Apple, Grisset, Laylander, May, and Schaefer. The questions raised through their research in regard to the refinement of the ware/type system, the naming of types, and the decision of which attributes to include for analysis should have been addressed using the archaeological standards for the construction of a ware/type system, and further refined through the testing process. This standard of the early archaeologists was not followed in the construction of the Lowland Patayan Ceramics Typology. Without the use of the standard ware/type concept in the construction of the typology and necessary

testing, the typology leaves us with more questions than answers.

Assessment of Recording Tools

Ceramics Data Recording Sheet

In discussing the effectiveness of the ceramics data sheet, it is acknowledged that the sheet could be further refined in the future. While the ceramics data recording sheet needs some improvement, its usefulness in providing field analysis is already clear. The attributes provided on the ceramics data recording sheet are indicative of and include the range of diagnostic attributes used for typing Lowland Patayan ceramics, and the sheet provides a standardized mechanism for recording these attributes. These categories will be useful for future research related to ceramics mobility, use, and cultural boundaries. More testing of the data sheet will provide useful observations for future improvements.

During the course of this work, changes were made to the ceramics data recording sheet. Through the field recording and museum analysis process, it was noted that a more specific system of recording rim sherds was necessary. Although only direct and recurved rims are noted in the Waters' typology, there is variation within each of these types, which is integral to their analysis. With the addition of subcategories such as round rim, flat rim, lipped rim, and reinforced rim, more specific information can be gathered on the sherds. Likewise, the subcategories within surface treatment, such as shrink cracks, wipe marks, scum coat, burnish, and notable surface temper, allow more definitive recording of the sherds. These additions increase the amount of data gathered and further aid with the typing process.

At this time, it can be stated that inspection of temper type and grain size are challenging to achieve in the field setting. It is difficult to distinguish minimal amounts of temper from the paste in the

field using only a hand lens. Additionally, the assessment of the angularity and quantity of temper is generally solely based on empirical analysis that can vary widely from recorder to recorder. This fact can pose a problem when the temper is the most readily accessible diagnostic attribute of the sherd. Making a small break on the sherd in the field exposes a fresh surface that can be more readily examined and gives some clue of the hardness of the sherd, an attribute used in both Waters' and Schroeder's typology. The second option is removing the sherds from the site and taking them to a laboratory setting to examine the paste and temper materials under a microscope and obtain more detailed analysis. This option does little to improve the in-field analysis, which is often the format for initial analysis of ceramics for most cultural resources surveys.

The additional associations included on the ceramics data sheet such as trails, intaglios, petroglyphs, and campsites will likely be valuable information to determine ceramic use, transport, exchange, and habitation models. This information can be used in future research in correlation with a GIS database system to create ceramic ware mobility models and resource procurement location data. Likewise, with more data compiled, thickness measurements, Munsell color, and more specific values in relation to attributes such as temper and rim type will be more useful in typing ceramics.

Searchable Database

An additional aid to field typing ceramics developed by this author is a searchable database of Waters' Lowland Patayan Ceramics Typology. This database contains additional attribute information from Albert Schroeder and Malcolm Rogers. The range of attributes found on the database includes a complete listing of all the types recorded by Waters, Schroeder, and Rogers; synonyms, pottery range, characteristics, firing technique, rim form, wall, surface color, surface treatment, temper, vessel form, fracture, core, and type site (see Figures 80, 81, and 82 below).

Pottery Name
 Age
 Synonyms
 Pottery Range
 Rogers
 Schroeder
 Notes
 Characteristics
 Firing
 Rim
 Wall
 Surface Color
 Treatment
 Temper
 Vessel Forms
 Decoration
 Fracture
 Type Site
 Core

Figure 80. List of Attributes from Searchable Database

Black Mesa Buff
 Tumco Buff
 Colorado Red
 Colorado Beige
 Colorado Buff
 Salton Buff
 Parker Buff
 Topock Buff
 Palomas Buff
 Palomas Red on Buff
 Schroeder Black Mesa Beige
 Black Mesa Red on Buff
 Schroeder Tumco Buff
 Tumco Red on Buff
 Schroeder Tumco Red on Buff
 Schroeder Colorado Red
 Schroeder Colorado Beige
 Colorado Red on Beige
 Schroeder Colorado Red on Beige
 Colorado Red on Buff
 Schroeder Parker Buff
 Schroeder Topoc Buff
 Topoc Red on Buff
 Schroeder PalomasBuff

Figure 81. List of Ceramic Types Within the Searchable Database

The searchable typology database is extremely useful for distinguishing wares with limited recordable attributes, e.g., small body sherds. In conjunction with the ceramics data sheet, a listing of the recordable attributes can be documented then checked against the typology database for a more comprehensive view of the ceramics for typing. The use of the searchable typology database is unique in that it will have the capability to be used in the field on hand-held devices with a windows mobile operating system, which creates a more accessible option for the individual performing data collection.

Currently the database can be operated on hand-held devices that support a full browser, or on a laptop. The hope is that with the increased ability to access these components simultaneously in the field, the recorder will be able to make a more informed assessment of the ceramics utilizing the full range of attributes of the wares instead of relying on only one attribute. This system will aid in making a more accurate assignment of the sherd(s) to the correct type.

[illegible]

Figure 82. Screen Shot from Searchable Database.

Conclusions

The relevance of the Waters' typology is in question, given the issues raised by the very individuals who use the typology in their field of study. Adding verifiable, recordable measures such as thickness measurements, Munsell color, and more defined descriptions of rim forms to the list of diagnostic attributes will aid in making determinations when typing sherds. By testing this hypothesis through this research work, we have begun to address the validity of the addition of these attributes to the analysis of ceramic sherds; however, further data collection is needed.

Future research could further expand upon the areas focused on in this thesis. Through the continued refinement of the recorded attributes, the weak points in the Lowland Patayan Ceramics Typology will surface and allow restructuring of the current typology to more correctly reflect the various ceramic types of the region. The creation of a regional database that could consolidate the data collected on the attributes such as rim forms, surface color (using Munsell colors), and thickness

measurements would be a starting point for producing models for these attributes. Continued research using thin sections of ceramics can give more detailed information on clays and tempers and their sources.

The addition of ethnographic information could further knowledge on the various uses of ceramics, be they utilitarian or ceremonial, forms of construction, temper materials, and vessel forms. These aspects could be useful for future research into the spatial boundaries of various types and the extent to which tribal boundaries match these areas. Ceremonial ceramics would be limited use vessels utilized for specific ceremonies and discarded at their conclusion. Making determinations on ceremonial use of ceramics would require that researchers obtain detailed data on the location where the ceramics were collected. This information would include landscape features such as mountains, rivers, washes, water catchments, view sheds, and associated features. Such information could be gathered using an instrument such as the ceramics data recording sheet. This would require ethnographic studies with tribes who claim cultural affiliation to the study area to identify these locations. Gathering this information would be a complex chore given the subjective nature of ceremonial sites; a site can be called ceremonial by one individual but not by another. The possibility still exists that the scarce availability of certain types could be because of their ceremonial use. Additionally, ethnographic studies could enhance our knowledge of resource procurement locations and mobility of types within the study area. Combining all this data with the work of past researchers and ethnographic information would provide a more well-rounded view of the ceramic production of the Lower Colorado River region and help to create a typology more reflective of the ceramics of the region.

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Appendix A

Sherd Measurement Data

Sherd	Location	Munsell Color	Edge 1	Edge 2	Edge 3	Edge 4	Center	Decoration	Other
Colorado Beige	X: 8:119	6/10YR/4	0.251	0.24	0.245	0.3	0.29	No	Burnishing
Colorado Beige	X: 8:119	5/2.5YR/2	0.241	0.23	0.202	0.22	0.21	No	Burnishing
Palomas Buff	X: 8:119	5/7.5YR/4	0.258	0.29	0.234		0.27	No	
Colorado Beige	X: 7:73	6/10/YR/4	0.194	0.22	0.218	0.19	0.22	No	Burnishing
Topock Buff	X: 7:73	5/5YR/4	0.265	0.27	0.266		0.27	No	
Palomas Buff	X: 7:73	5/5YR/1	0.200	0.2	0.210	0.19	0.21	No	
Palomas Red-on-Buff	X: 7:73	5/2.5YR/8	0.201	0.19	0.187	0.19	0.19	Red Paint	
Colorado Buff	X: 7:73	6/7.5YR/4	0.254	0.25	0.246	0.23	0.24	No	Scum Coa
Colorado Buff	X: 7:73	6/7.5YR/1	0.330	0.33	0.311	0.27	0.33	No	Stucco
Black Mesa Buff	X:7:59	5/7YR/3	0.241	0.23	0.215	0.23	0.13	No	

All measurements taken in inches

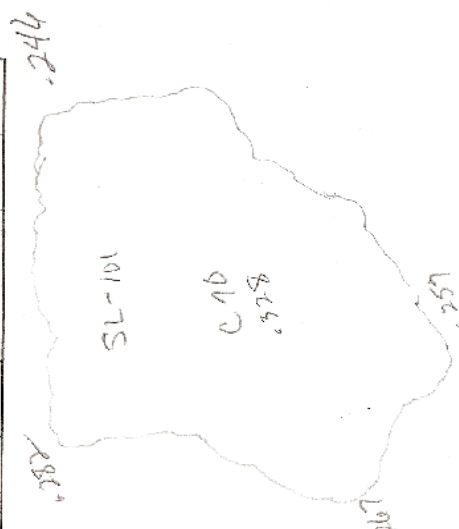
Appendix B

Photographs and Data Sheets from Waters' Type Collection

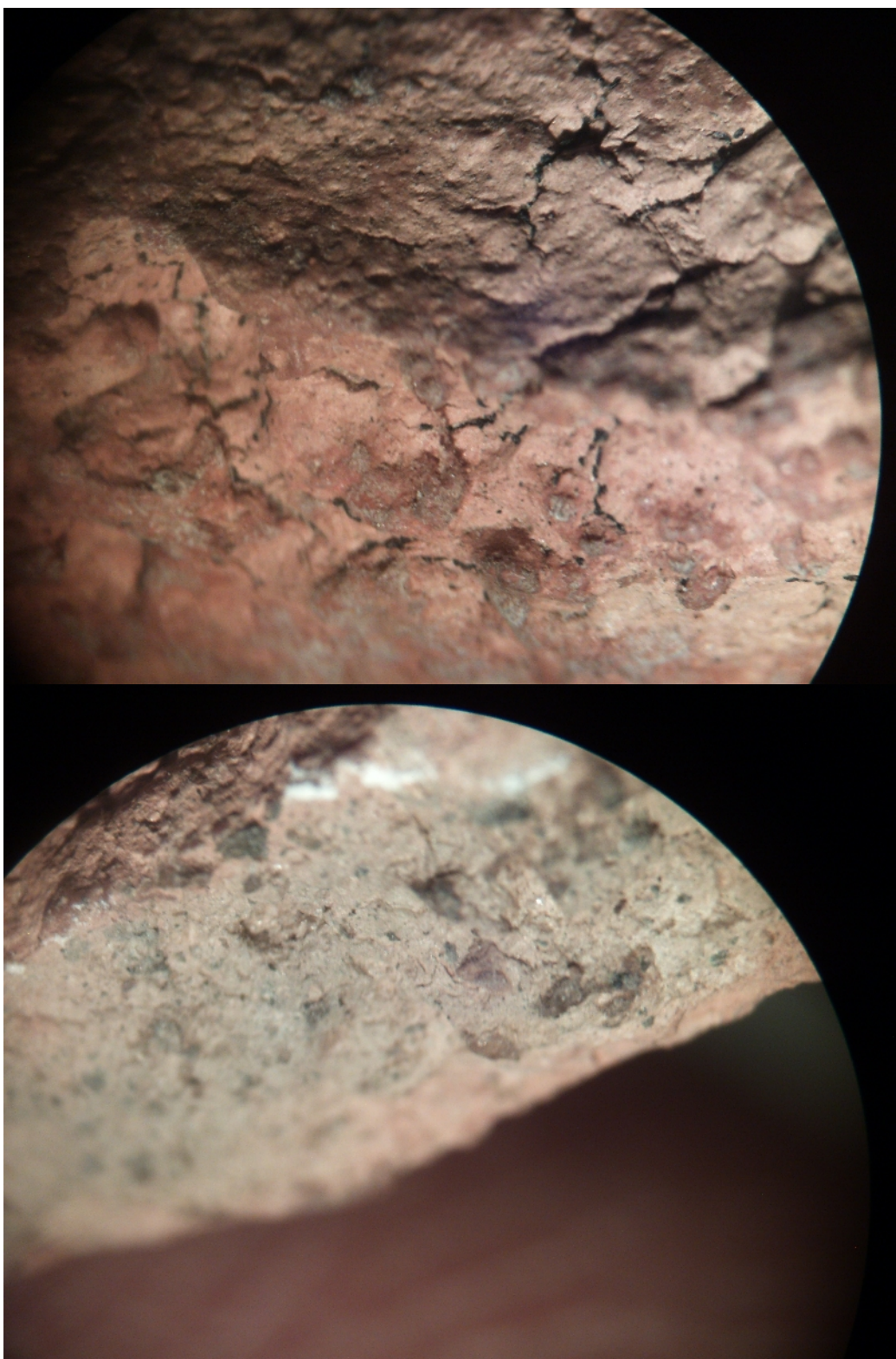
Black Mesa Buff

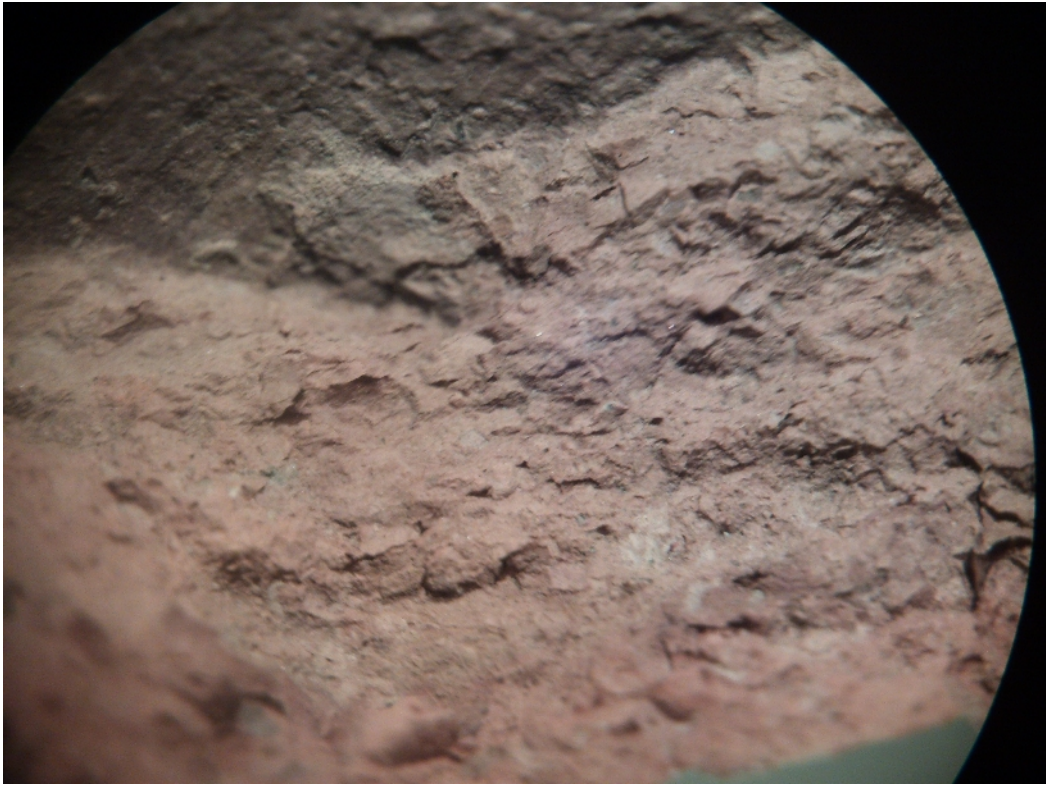
Black Mesa Buff SL-101 C-43

Pottery Information Sheet													
Location: UTM													
Date: 7/24/09													
Number of Shards:													
Association:													
Orientation of Trail:	North	South	East	West	NE	NW	SE	SW					
Temper Type:	none (crushed clay)												
Vessel / Rim Form:	direct rim												
Surface Treatment:	Plain												
Decoration Type:	none												
Patination:													
Notes:	Color ranges from Pink to Rust to Buff Carbon streaks												





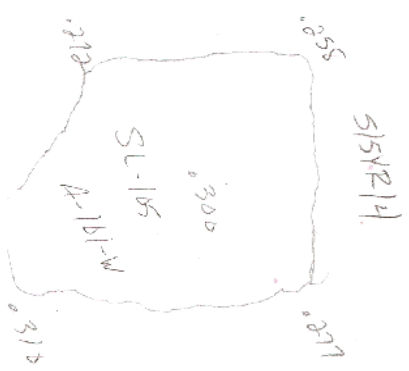
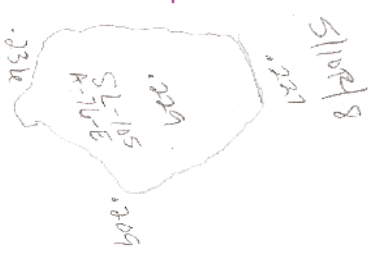
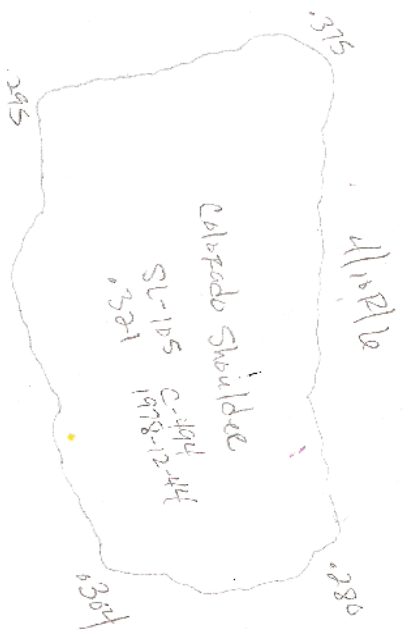




Colorado Red

Colorado Red

Pottery Information Sheet											
Date: 11/24/09		Location: UTM									
Number of Shards:		Munsell Color:		Thickness:	Edge:	Center:					
Association:	Trail: Yes No	Intrusive:	Yes No	Petroglyphs:	Yes No	Village:	Temp Camp:	Other:			
Orientation of Trail:	North South East West NE NW SE SW										
Temper Type:		Paste and Temper:		Grain Size:							
Vessel / Rim Forms:	10 Rim	Colorado Shoulder									
Surface Treatment:	Plain	Red Slip	Paint	Sluczo	Scraped						
Decoration Type:											
Patination:											
Notes:	A-101-W Carbon streak (thin) fine quartz temper										









Colorado Beige

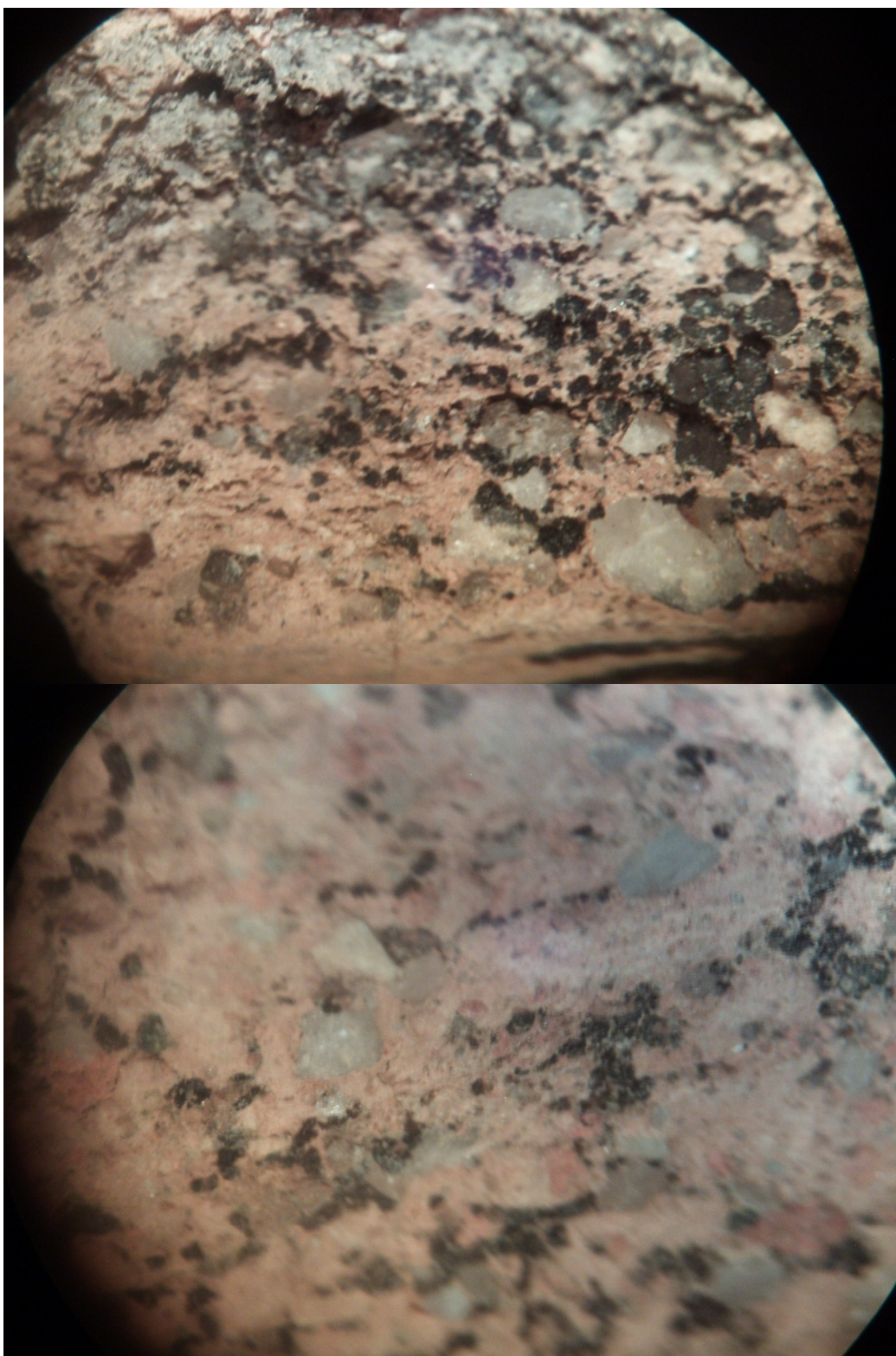
Pottery Information Sheet												
Date:	4/24/89											
Location:	UTM											
Number of Shards:		Munsell Color:		Thickness:		Edge:	/	/	/	Center:		
Association:	Trail:	Yes	No	Intaglio:	Yes	No	Petroglyphs:	Yes	No	Village	Temp Camp	Other
Orientation of Trail:	North	South	East	West	NE	NW	SE	SW				
Temper type:	Quartz			Paste and Temper:	Clay							
Vessel / Rim Forms:	Dish											
Surface Treatment:	Plain	Burnished			Paint	Stucco			Scraped			
Decoration Type:												
Palination:												
Notes:	Very thick walls can be burnished - caliche shoulder - small carbon streak heavily tempered with angular coarse quartz											









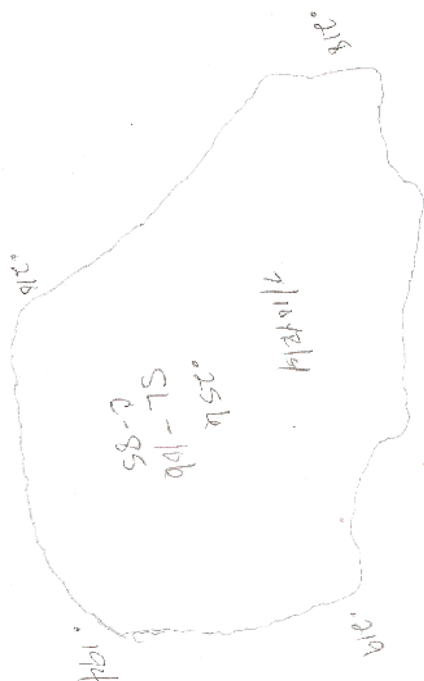


Tumco Buff

Tunco B. A.

Pottery Information Sheet

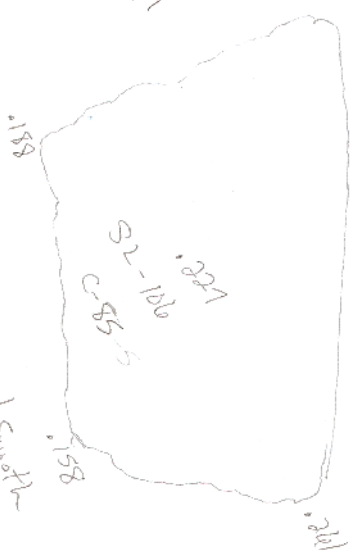
Date: 7/24/89		Location: UTM	
Number of Shards:		Munsell Color: 7/10YR-1/2	Thickness:
Association:	Trail: Yes No	Intaglio: Yes No	Edge: / / /
Orientation of Trail:	North South East West NE NW SE SW	Petroglyphs: Yes No	Center:
Temper Type: Adze visible	Paste and Temper:	Grain Size:	Temp Camp Other
Vessel / Rim Form: <u>Flange & Direct</u>			
Surface Treatment:	Paint	Stucco	Scraped
Decoration Type:			
Palination:			
Notes:			



2m Shred

Turned But

5/10/12/1

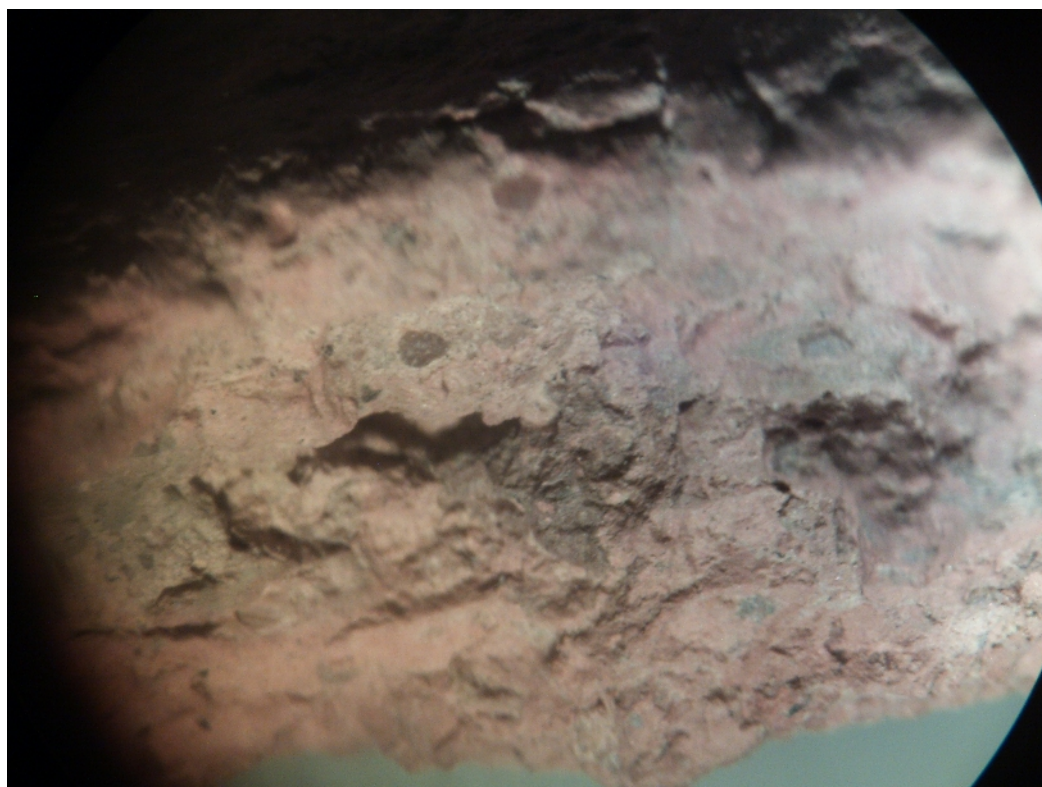


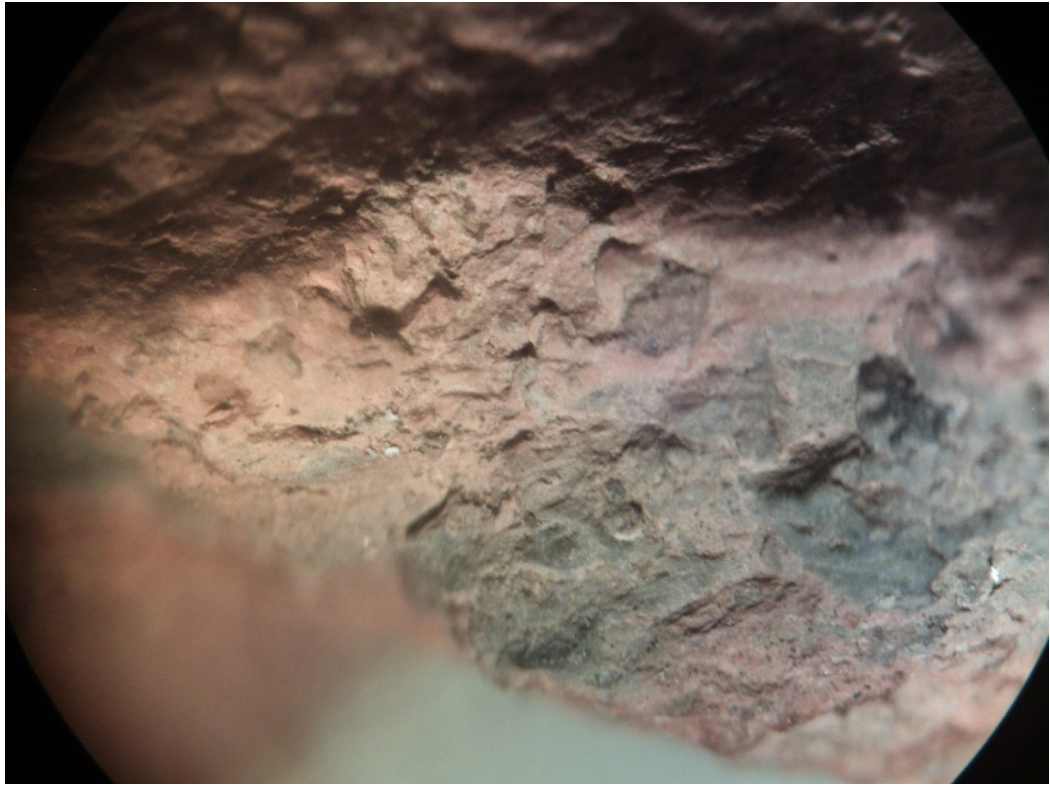
Appears to be under surface

Some Rins direct some slight lip on outside really grade Recurve









Salton Buff

Saltion Buff PII

Date: 1/24/69 Pottery Information Sheet
Location: UTM

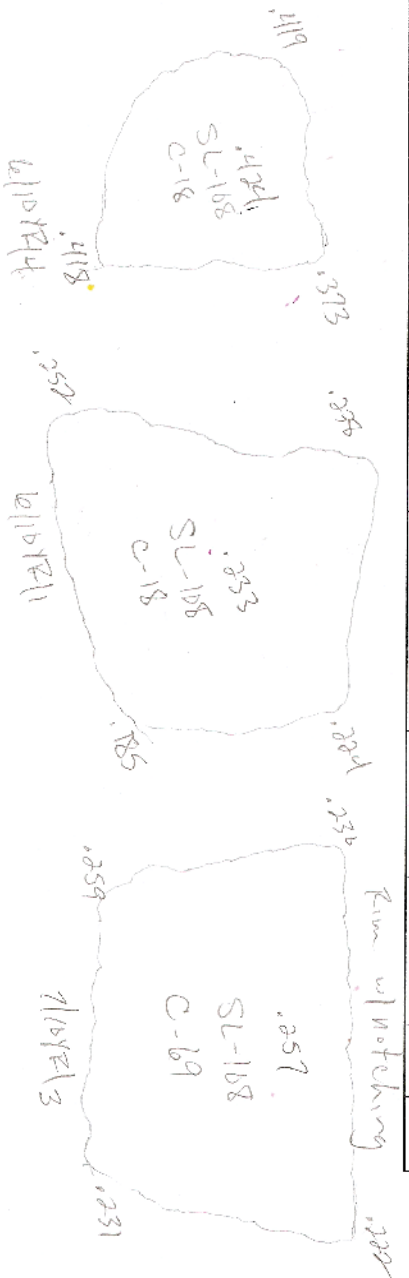
Number of Shards:	Trail:		Munsell Color:		Thickness:		Edge:		Center:	
Association:	Yes	No	Irregular:	Yes	No	Petroglyphs:	Yes	No	Village	Temp Camp
Orientation of Trail:	North	South	East	West	NE	NW	SE	SW		Other
Temper Type:	Grain Size:		Paste and Temper:							
Vessel / Rim Form:	Direct / Reverse									

Surface Treatment: ☒ Plain ☐ Paint ☐ Slipped ☐ Scraped

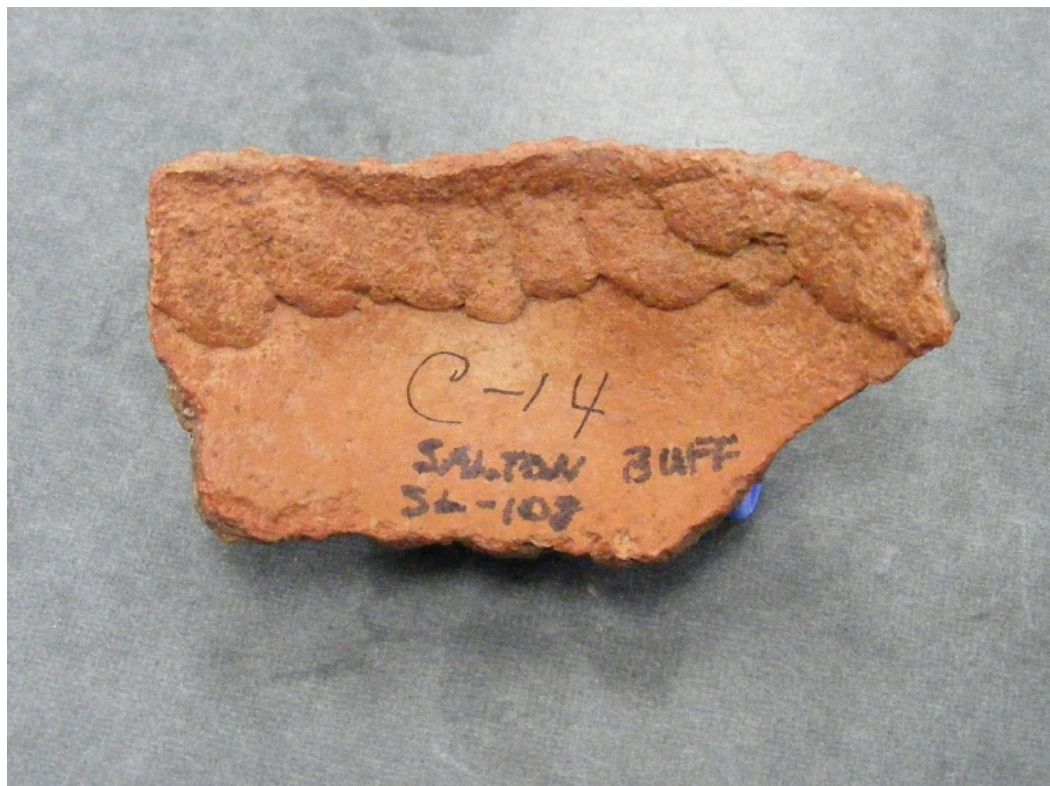
Decoration Type:

Patination:

Notes: Rim notching - rimmed - well fired - coarse temper
carbon streak



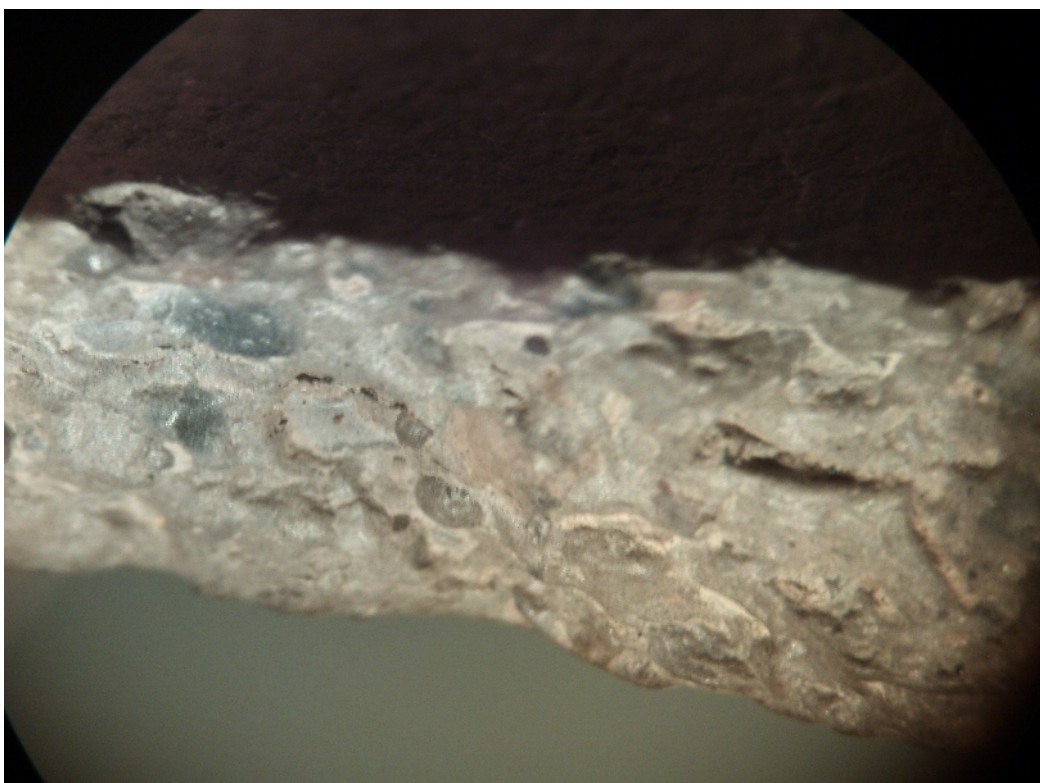










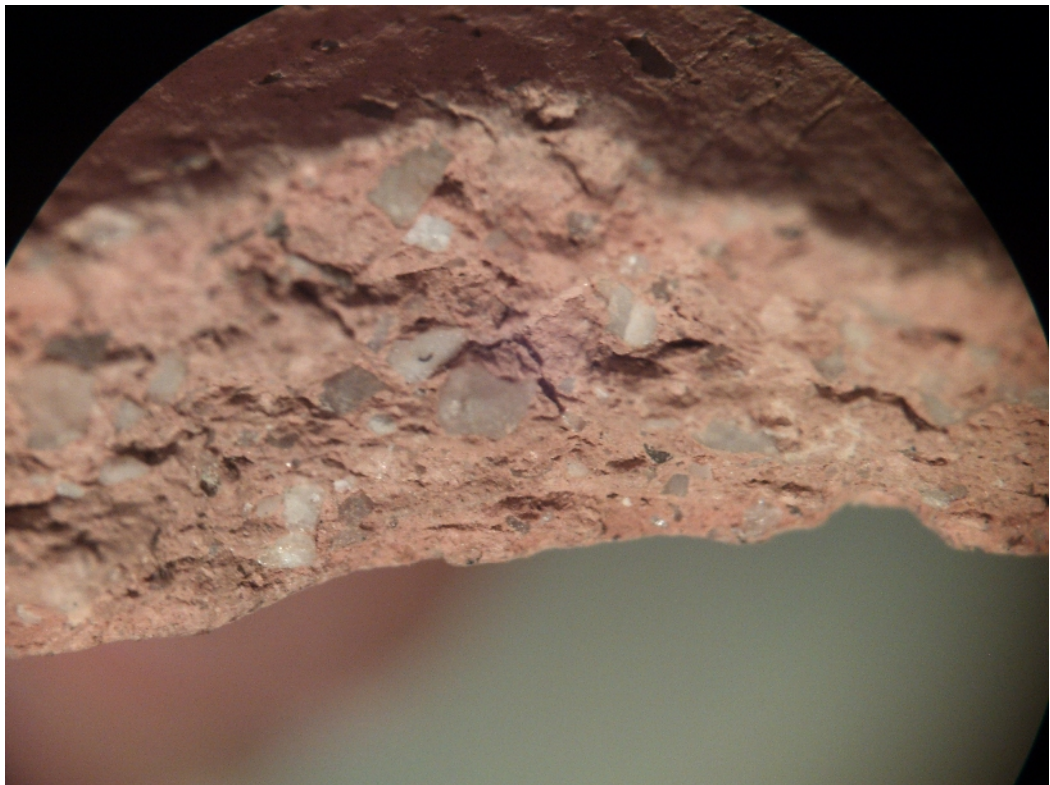
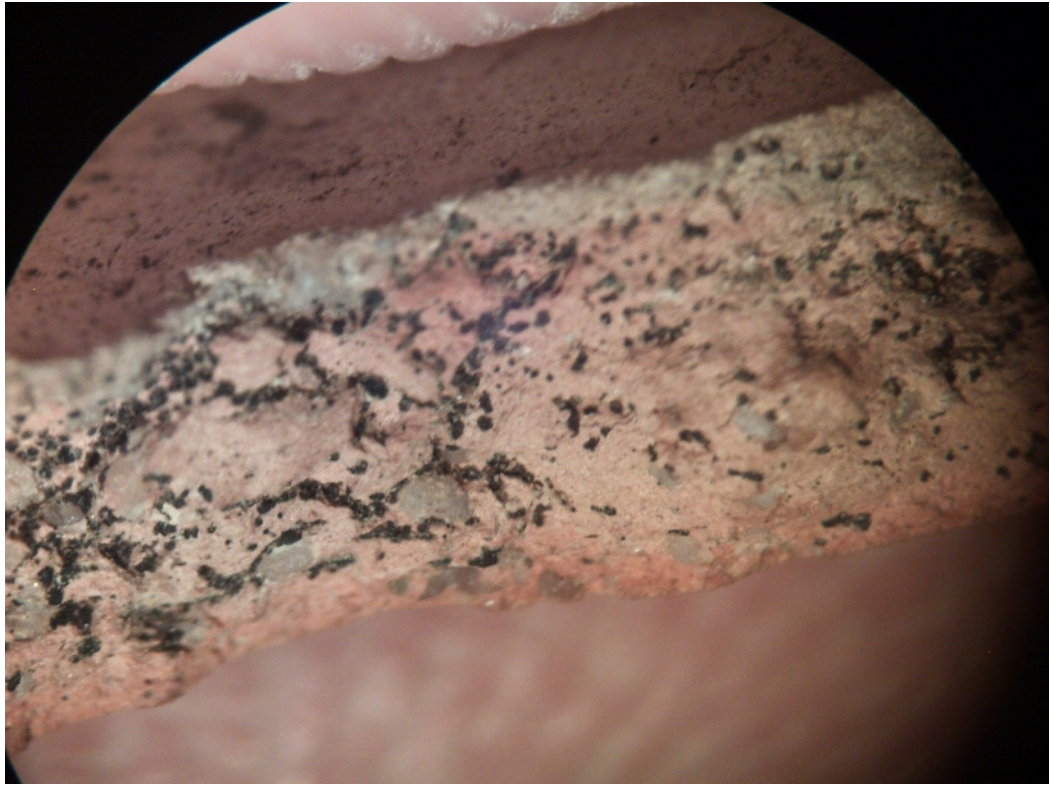


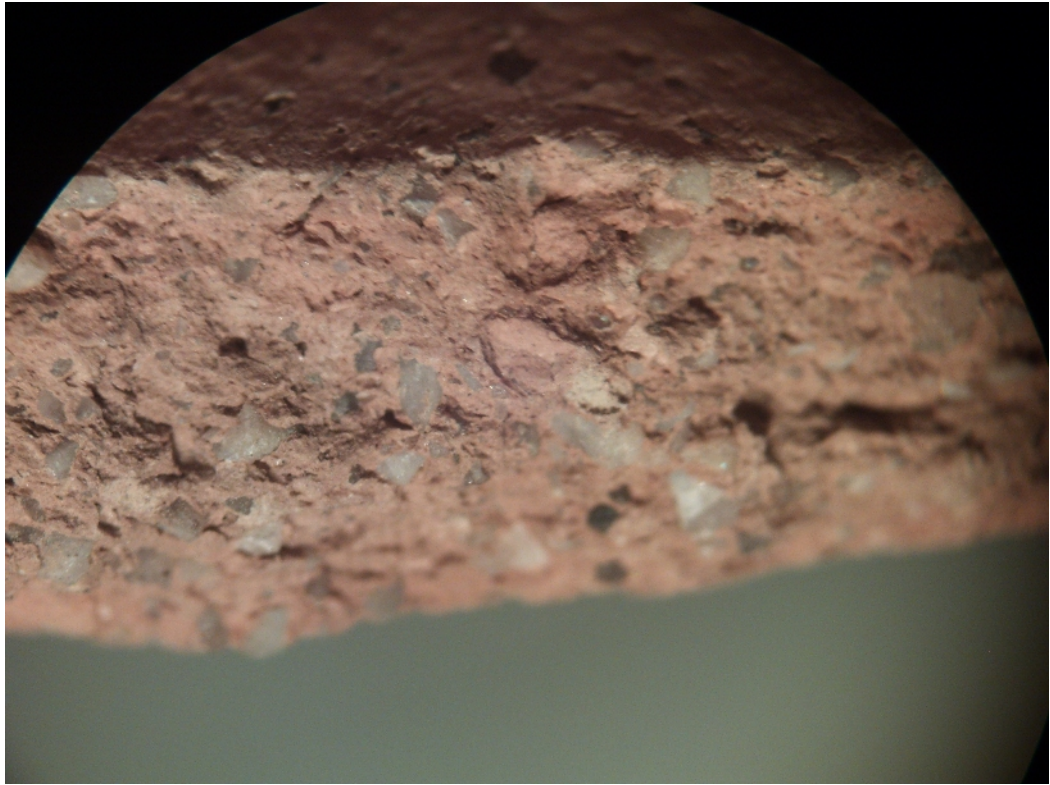
Parker Buff

Three hand-drawn maps of land parcels, each with a north arrow pointing towards the top of the page.

- Top Map:** Labeled "Heavy Gauge Temper" and "all three sheds". The central area is marked "SL-112 # 129". Boundary measurements include 324' (top), 300' (left), 300' (bottom), and 300' (right). A measurement of 121' is shown on the left side.
- Middle Map:** Labeled "BIB". The central area is marked "SL-112 # 125". Boundary measurements include 300' (top), 300' (left), 300' (bottom), and 300' (right). A measurement of 121' is shown on the left side.
- Bottom Map:** Labeled "med-gauge temper". The central area is marked "SL-112 # 129". Boundary measurements include 300' (top), 300' (left), 300' (bottom), and 300' (right). A measurement of 121' is shown on the left side.





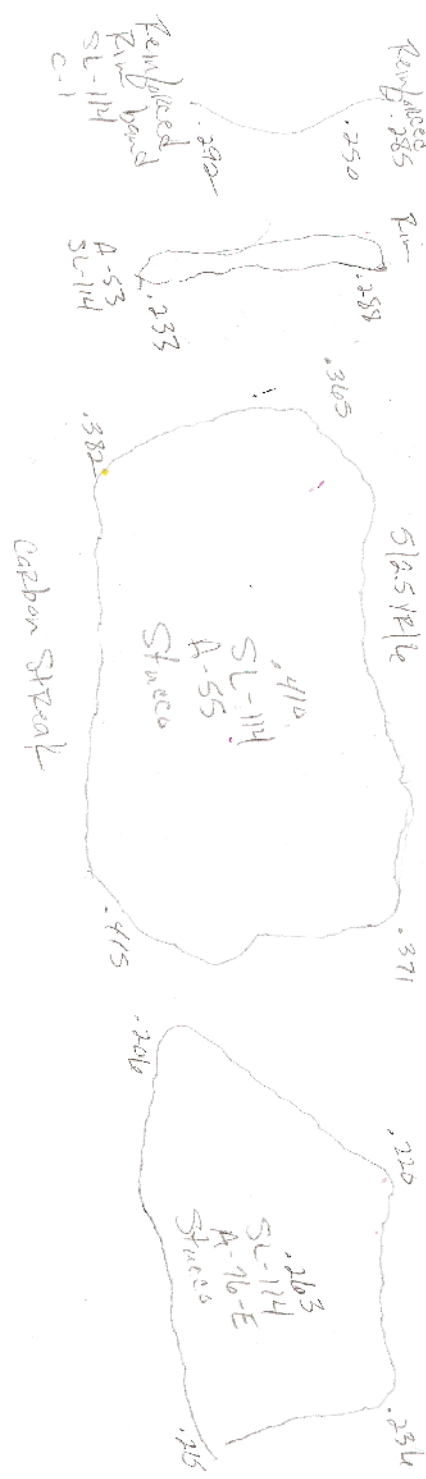


Palomas Buff

Palomas Buff PII-III

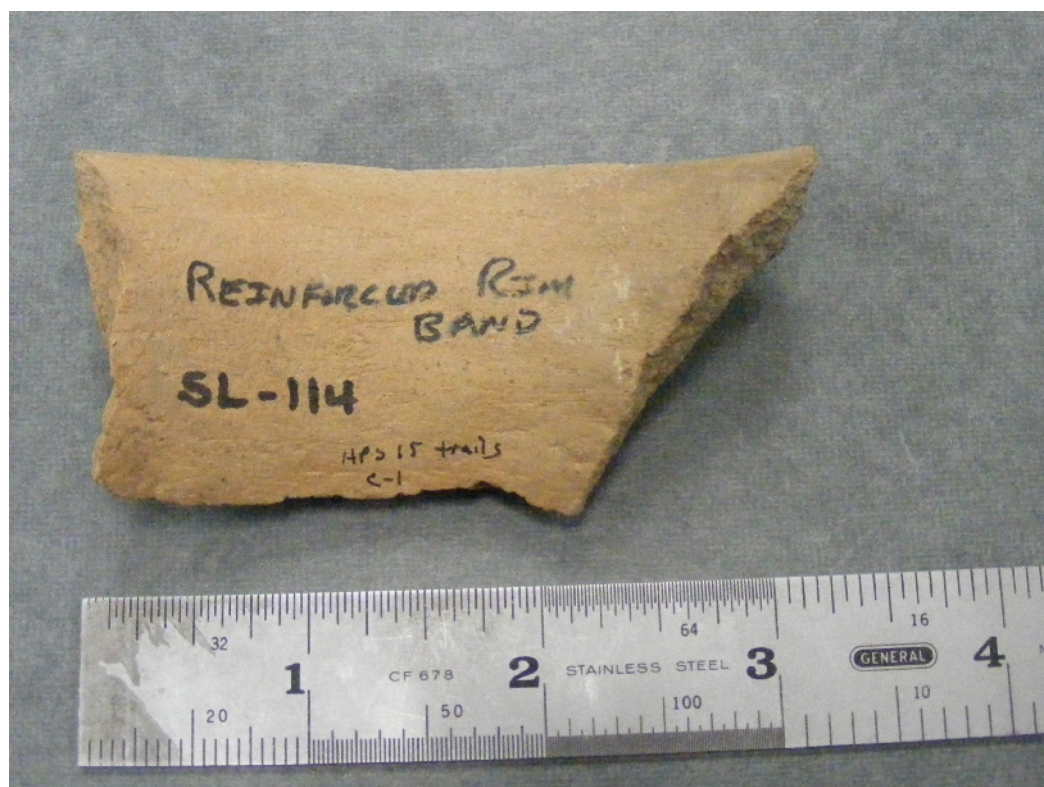
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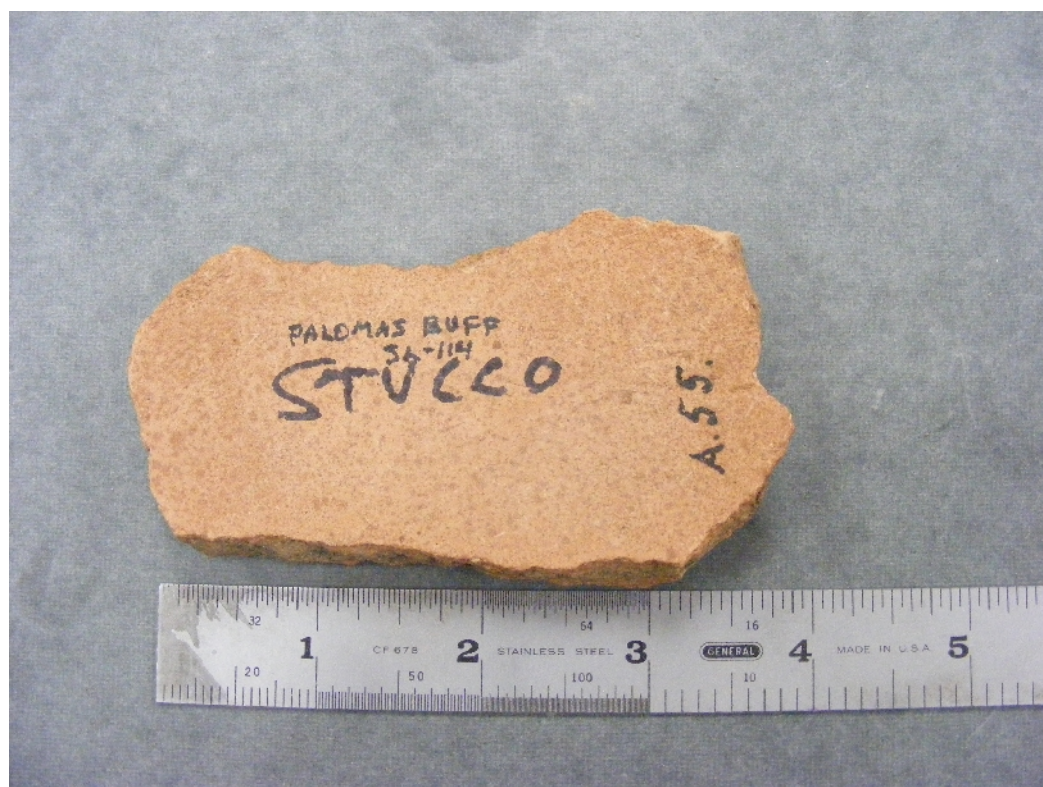
Number of Shards:											
Association:	Trail:	Yes	No	Munsell Color:	Inaglio:	Yes	No	Thickness:	Edge:	Center:	
Orientation of Trail:	North	South	East	West	NE	NW	SE	SW	Petroglyphs:	Yes	No
Temper Type:	Quartz-Mica			Paste and Temper:			Grain Size: Coarse				
Vessel / Rim Forms:											
Surface Treatment:	Plain			Paint			Slucos			Scraped	
Decoration type:											
Patination:											
Notes:	Reinforced Rim bands - Feature Oxidizing fire (see clouds) wide variation in colors - Heavy Temper some light tempered (very Buff color)										



















Topock Buff

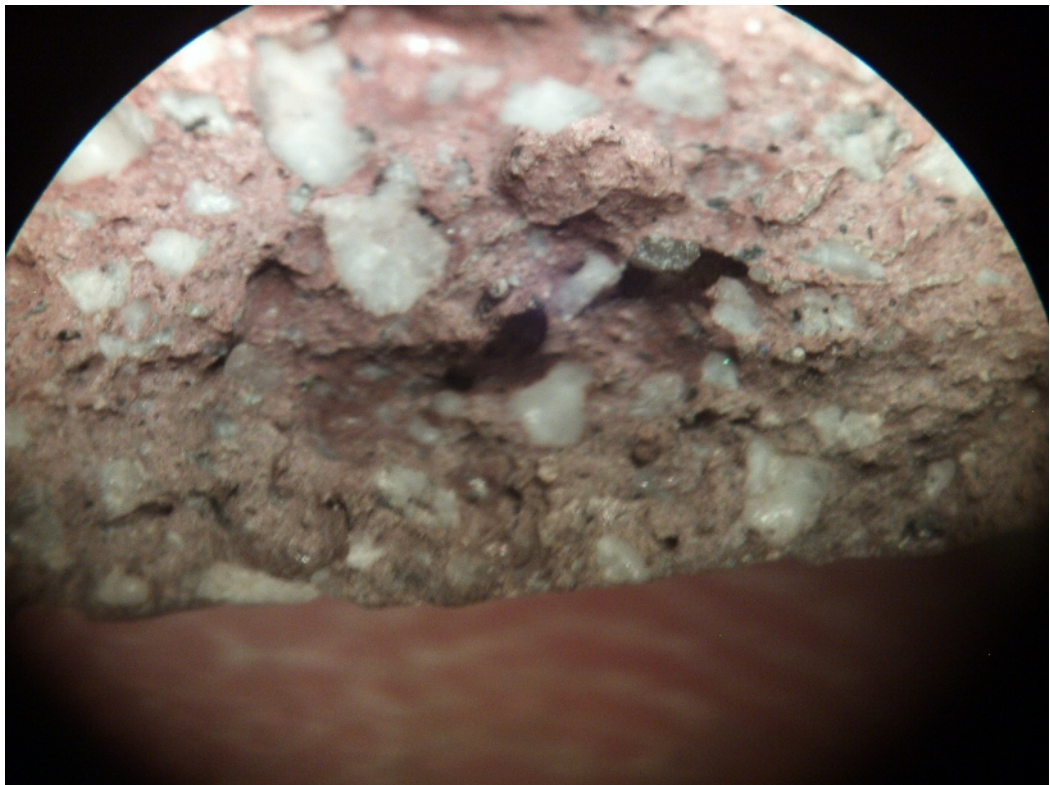
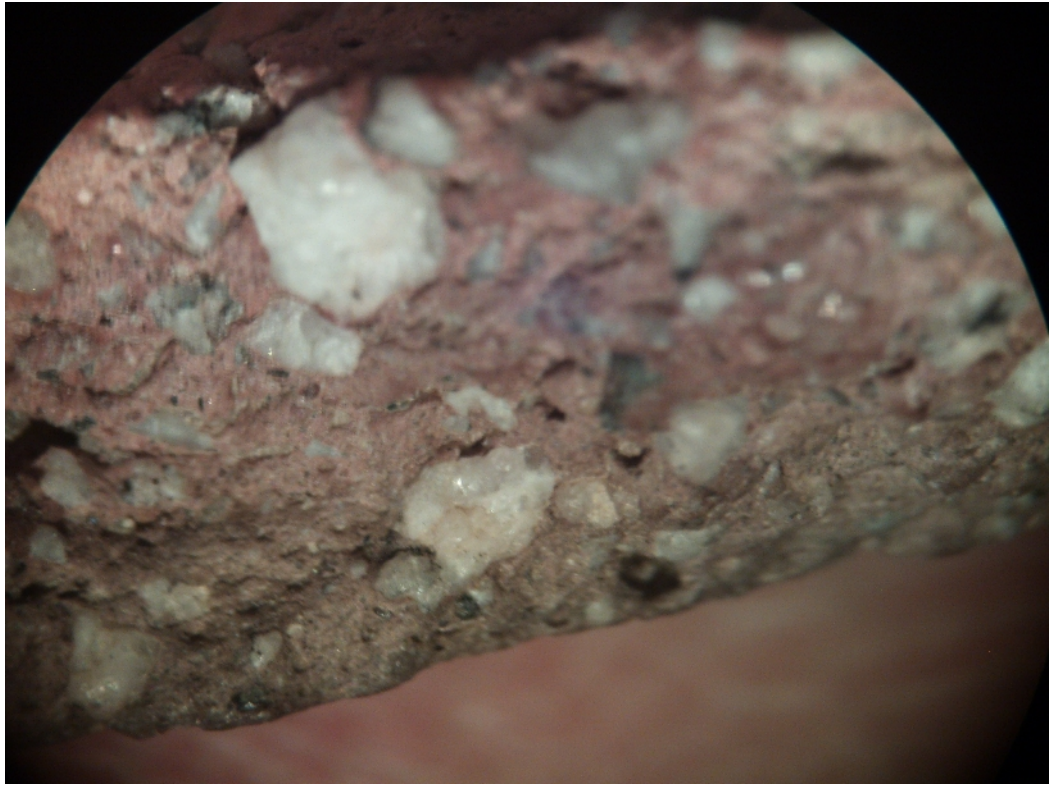
176

Pottery Information Sheet											
Date:	Location: UTM										
Number of Sherds:	Munsell Color:		Thickness:		Edge:		Center:				
Association:	Trail: Yes No		Intaglio: Yes No		Petroglyphs: Yes No		Village		Temp Camp		
Orientation of Trail:	North South East West		NE NW SE SW								
Temper Type:	Paste and Temper:		Grain Size:								
Vessel / Rim Form:											
Surface Treatment:	Plain		Paint		Slucop		Scraped				
Decoration Type:											
Patination:											
Notes:	extremely rough finish - Heavy with quartz temper throughout sherd										







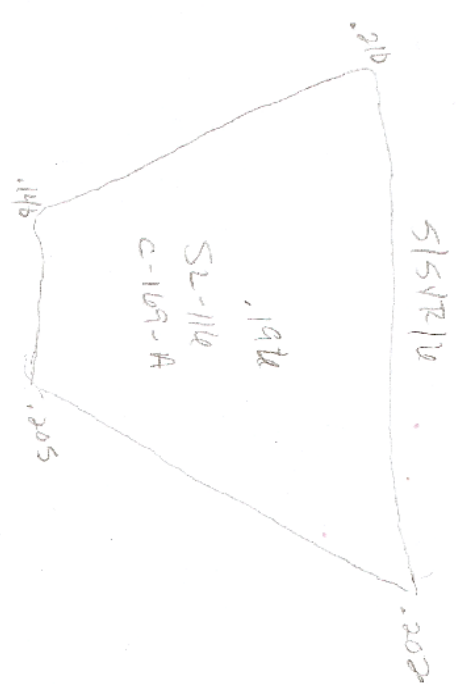


Colorado Buff

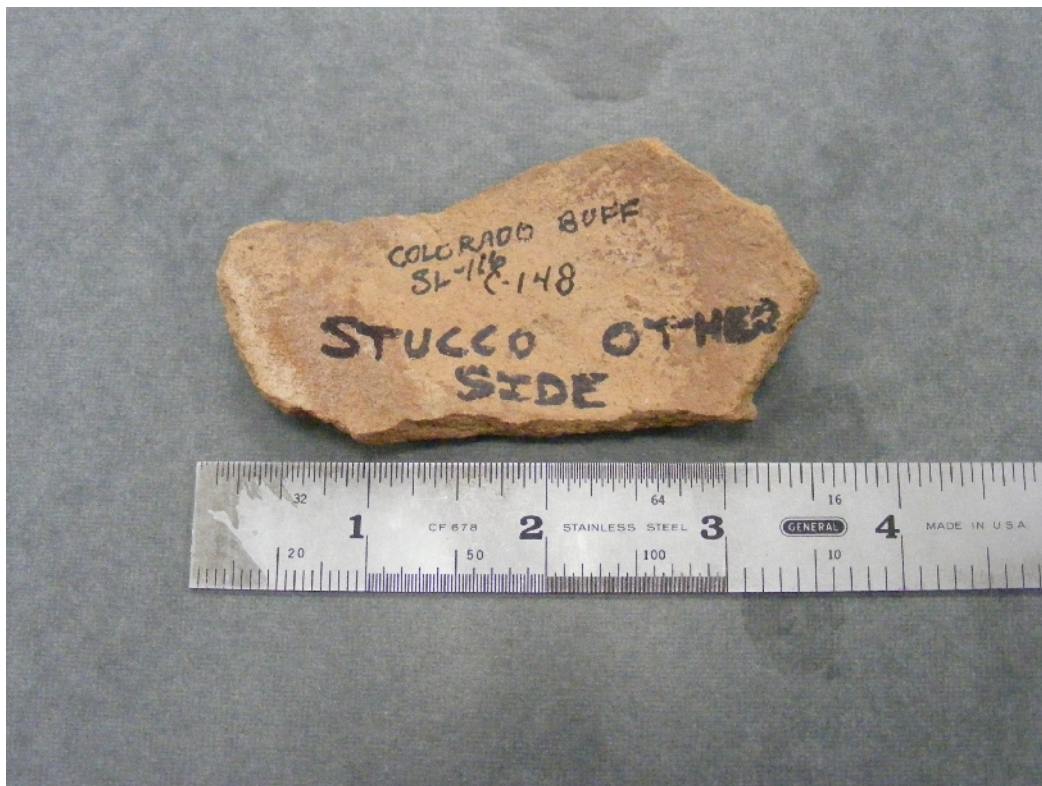
Colorado Bull

Pottery Information Sheet													
Date:	Location: U.I.M.												
Number of Shards:	Munsell Color:			Thickness:			Edge:			Center:			
Association:	Trail	Yes	No	Inglis:	Yes	No	Petroglyphs:	Yes	No	Village	Temp Camp	Other	
Orientation of Trail:	North	South	East	West	NE	NW	SE	SW					
Temper Type:	Paste and Temper:						Grain Size:						
Vessel / Rim Form:													
Surface Treatment:	Plain			Paint			Stucco			Scraped			
Decoration Type:													
Palmarior:													
Notes:	NE Carbon Streak - wide variation in color Bull is purple very fine delicate ware												

Reserve Run
pots like a bottom up



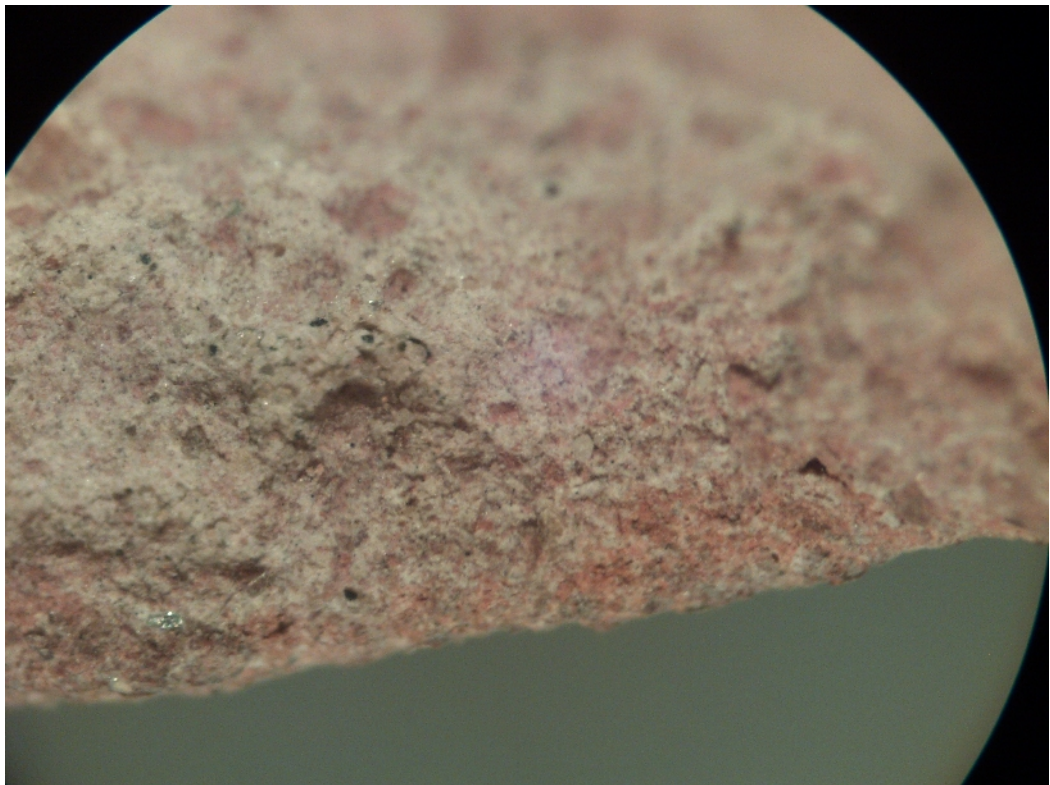
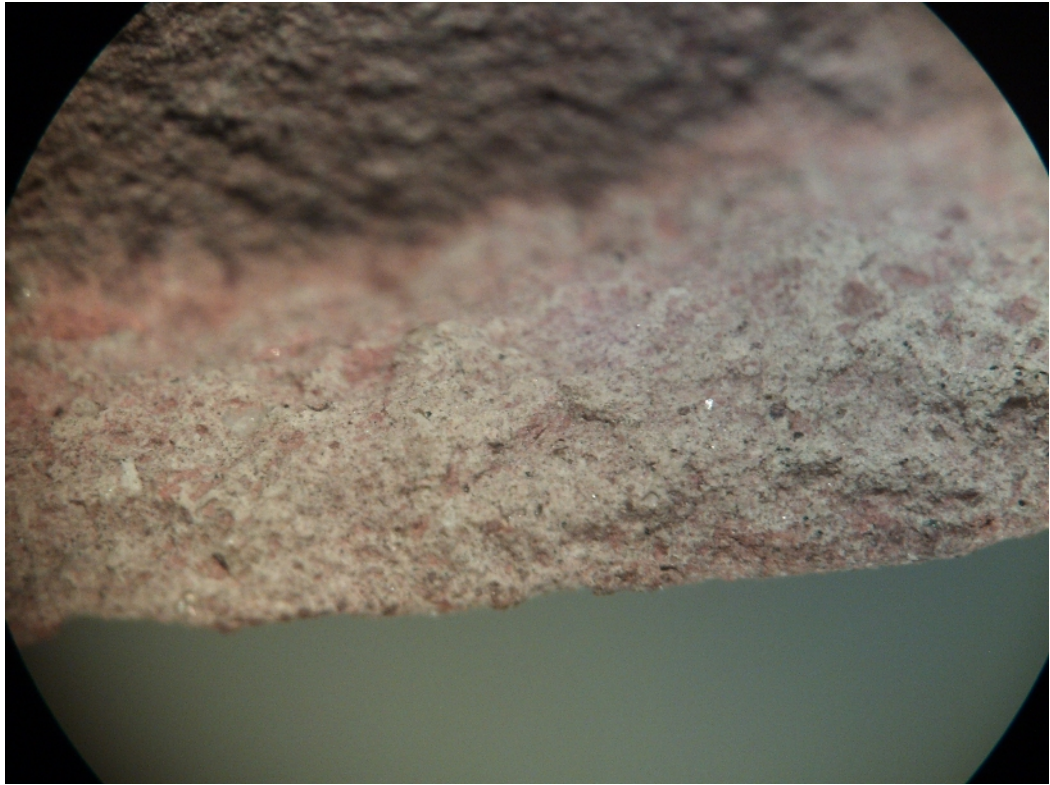












Appendix C

Screen Shots from Searchable Database

Pottery Typology From Michael Waters based on the notes of Malcolm J. Rogers - Criteria for typing ceramics are rim forms, vessel shapes, and diagnostic traits introduced, continued, discontinued during each period. Distinctions in temper given secondary importance.																		
Patayan I (AD 700-1000) Sites primarily in NW Papagueria along Gila and Colorado Rivers - Ceramics made using hemispherical casting and basket molding exhibit red slip, burnishing, rim notching, and punctuate and incised decoration, chimney-neck rims, distinctive Colorado Shoulders, and lug and loop handles on jars																		
Patayan II (1000-1500) Movement of ceramics from Western Papagueria into S. Nevada, Lake Cahulla, Phoenix Basin, Puerto Penasco, frequently found in Hohokam Classic period habitation sites - New developments include recurved rims, stucco finish, new vessel forms - also an increase in fine-lined geometric designs																		
Patayan III (1500-1900) Continuation of Patayan II traditions - new traits included high-necked small mouthed olla and reinforced rim bands																		
Pottery Name	Age	Synonyms	Pottery Range	Rogers	Schroeder	Notes	Characteristics	Firing	Rim	Wall	Surface Color - Treatment	Temper	Vessel Forms	Decoration	Fracture	Type Site	Core	
Black Mesa Buff	Patayan I; 700-1000 A.D.	Archaic pink, Brick, or Drab ware		precursor of Tumco Buff - same range as Black Mesa Gray - no temper, only microscopic inclusions of water rounded quartz, feldspar, lithic grains, occasional small shell and unpulverized clay fragments	Included this type with Tumco Buff -		Large Vessels constructed by coiling and shaped by paddle and cobble anvil or fingers - bases molded - small vessels and scoops molded - Clay: Sedimentary riverine -clays poorly prepared	fired with poor control and access to air - well to completely oxidized - specimen can show full range of oxidation - core commonly bluish-black	direct - lips of large vessels and bowls occasionally notched - slight tapers noted sometimes on jar rims	thick-med	rough to wiped smooth by hand or mop - neck either pinched, padded, or coiled - coils smoothed by hand or padded -	clay-made from crushed pot sherds or incompletely crushed clays; little or no mineral temper	Colorado Shoulder - Jar types 1 - bowl types 1, 3 and scoops - symmetry poor but improves	rim notching, more common on jars than on bowls and to a minor degree punctuate, incised, thumbnail patterns on necks of jars - rarely vessels possess roughly burnished exterior; usually bowls - Very rare examples of unobliterated neck coils have been found on bowls and jars. Opposed lug handles occur rarely on jars and bowls. Other eccentric forms occur	Medium to hard; breaks to form a straight margin	SDM C-1 Black Mesa Indian Pass		
Schroeder Black Mesa Beige	Post - 1150 A.D. to ?			this type not described by Rogers - Rare	This type set up in spite of the fact that only 10 sherds were recovered since it differs from Tumco Buff in obvious polishing marks		Probably same as Tumco Buff except polished surfaces - found only near Painted Rock -									Arizona S:16:3 - Type Specimen: LM98		
Black Mesa Red-on Buff	Patayan I A.D. 800-1000		Same as Black Mesa Buff with a more restricted trade range			This type is the decorated equivalent of Black Mesa Buff. It is relatively uncommon type, and the red was variety is even rarer							Jar type 4; Bowl types 1,2; decorated vessels are usually medium-sized	Vessels were probably painted with the fingers. All decorations are broad line elements that are never symmetrically distributed but are concentrated on some portion of the vessel. Vessel surfaces were sometimes wiped after painting, thus smearing the design, but surfaces were usually wiped before decoration. A rare variant is a fugitive red wash applied to the vessel before firing. If is confined mostly to bowls. This technique was more rarely applied to scoops. Burnishing is very rare. The wash, applied with the hand, is uneven and does not cover the entire surface of the vessel. Decorated vessels are occasionally rim notched		SDM C-1 Black Mesa Indian Pass		
Tumco Buff	Patyan II A.D. 1000-1500	Brick ware - Tolbard Buff - Tumco Red on Buff - Tumco Stucco	Blythe to Gulf of California - Origin near Yuma - wide distribution of type; east Yuma Co. line - west Laguna Salada Baja CA -south to delta, Sierra Pinacate - north to Mojave sink	No temper, only inclusions of a few very fine, rounded quartz and feldspar grains - Rogers included Picacho Gray subtype of Tumco as outgrowth of BM - no temper	NO TEMPER - Inclusions - Sherd and occasional small quantities of small subangular and angular quartz, lithics, shell - sherd color ranges from gray to tan - Schroeder has Stucco ware; presence of quartz less common than in Tumco Buff	Types probably refinement of Black Mesa Buff - Early transition specimens are difficult to distinguish - Tumco Distinguished by recurve rim, hard finished, buff color, lack of temper - Waters combined La Paz, Blythe Buff and Picacho Gray with Tumco - Schroeder combined Tumco Buff and Hedges Buff into one type	Coiled construction - shaped by paddle and anvil - small vessels molded - Clay :Sedimentary riverine - Colorado River near Yuma - Southwestern Lake Cahulla shoreline -	well oxidized in most cases, suggesting firing with prolonged access to air	recurve - roughly flattened lips	medium - uniform thickness throughout vessel	smooth / Stuccoed when used for cooking - treatment same as Tumco; deep wide-mouth bowls are principle forms but occasionally shallow bowls given stucco coat- faint wipe marks - large vessels display anvil marks;interior especially the neck - COLOR- pink to light buff to gray; thin cream colored scum coat may be present - human facial features on scoops	clay -made from crushed pot sherds or incompletely crushed clays; little or no mineral temper - better finished than Black Mesa - rarely shell temper found - mica, hornblende, sand, clay	Jar types- 1,2; bowl types 1 ; scoops	Applied human facial features on scoops	Medium to hard. Breaks to form sharp margins	SDM C-86 Imperial Valley, CA		
Schroeder Tumco Buff	Pre 900 A.D. -post 1400 A.D.		Mainly from center of Colorado River Agency south to Yuma - probably as trade or trail breakage up the lower Gila.	Rogers reports range from Blythe to delta with trade up the Gila and down to Tinajas Altas. Lists notched rims, punctate patterns on neck, some incising, thumbnail decoration, notes additional forms: pipe, handled olla, canteen, a shoulder on jars	Sherd tempered pieces representative of Yuma area - Occasional rounded/angular quartz w/ sherd temper Blythe area - Occasional rounded quartz/sherd temper in the areas west of Yuma/Blythe. Tumco north of R:6.5 other than sherd temper alone	Rogers: variation separate types based on paste refinements - Coarser sherds common between Nortons landing - Yuma - Finer common on trails from Ehrenberg to Gila River - Rogers considers finer refinement of coarse variety	Paddle and Anvil construction	uncontrolled atmosphere - usually favoring oxidizing	round and flat with exterior or interior tucker, slight outflare rim occasional, rim line often wavy	medium to thin	Finish: wiped and smooth, lustrous surface occasional, cream wash rare. Fire Clouds: absent - Surface Color: pink-buff to tan to gray, latter in reduced specimens, interiors often smudged	Paste: usually clean w/o apparent inclusions, hard appearing- Texture: coarse to fine depending on reduction of clay; coarse specimens usually exhibit shrinkage areas, voids in core - Temper: sherd, small quantities of quartz of varying sizes both angular/subangular - size of fragments varies with texture of core	Bowls-hemispherical, Jars- low and high necked seed jars, saucers, scoops.	none	shattering	Arizona R:14:2 - Type Specimen: LM95	gray - tan to pink-buff, occasionally black - Carbon streak common	
Tumco Red-on-Buff	Patayan II A.D. 1000-1500		Greatest concentration is in the Colorado River Valley between Blythe and the Delta. It is intrusive as far west as the east Lake Cahulla shoreline; east to the eastern boundary of Yuma county; south to the Sierra Pinacate; north to Mojave Sink, San Bernardino County, CA			This type is the decorated equivalent of Tumco Buff. The decoration of three sherds of a single Tumco Red-on-Buff vessel found on a trail from the Gila to the Colorado River resembles Hohokam designs of Classic period Casa Grande Red-on-Buff A.D. 1200-1400	Same as Tumco Buff except for Forms-paint-decorations						Jar type 2; Bowl types 1,2	The type was made over a long period of time and shows variability in both form and decorations. In early pieces paint is dark maroon and thick. Lines broad, some applied with the finger. Early specimens, which are rare, elements are few and simple; filled angle is most common element. Later specimens, which are more oxidized, paint is brownish red to tan. Some very rare specimens of red-on-red, black-on-red, and black-on-buff varieties have been found		SDM C-26 Palo Verde		
Schroeder Tumco Red-on- Buff	Pre 900 A.D. -1150 A.D. plus		Same as Parker Red-on-Buff on south range but does not extend above Bill Williams River as does Parker Red-on- Buff	Rogers notes list human, animal and solid triangle designs - considers broad line decoration as early mode of decoration, broke paste variations down as in Tumco Buff		Survey material does not indicate difference in decorations or elements between this type and Parker Red-on-Buff - Only difference with Parker Red-on-Buff temper - may be clays were imported or downriver people moved upriver	Same as Tumco Buff except for Forms-paint-decorations							Medium and occasional broad lines - Jars - lines used in parallel, verticle lines jars - neck pendant from rim, dots, solid areas: painted rims, paint occasionally spilled on interiors - Bowls lines in parallel, chevrons, dots, solid areas, medium/ closely spaced verticle lines on exterior; rim painted - Paint: red to brown-red		Arizona R:3:1		
Colorado Red	Patayan I; 700-1000 A.D.	Colorado Red sub-type I Fugitive Red	Greatest concentration lies on AZ side of Col. River between Palo Verde valley and Delta & up the lower Gila River - east to Yuma Co. line - west to L. Cahulla - south northern boundary of delta Sierra Pinacate Sonora	Thin wall finer paste with more mica was called Parker Variant - Fugitive Red early Y I - Col. Red late Y I - Late Y I - and all Y II		May be the descendant of the thin red washed variety noted in Col. Red-on-beige description - represents refinement of many techniques	Same as Colorado Beige Except- finish, color, form, paint, decoration		direct	thick-med	Red clay slip which is always burnished - large mouth burnished on both surfaces - small only exterior - bowls slip exterior only - surface color - brown to red colored clay slip -	variable	Jar types 1,2,4; bowl types 1,2,3 and scoops - Colorado Shoulder: more exaggerated along lower Gila River	paint same as Col. Red-on-beige - decoration rare other than slip - Slip color is a turkey red with tan to chocolate brown areas where the slip is unoxidized. A rare red-on-red decoration exists and has been seen a few times by Waters		SDM C-1 Black Mesa Indian Pass		
Schroeder Colorado Red	Post - 1150 A.D. into historic times		Same as Colorado Beige			Some larger temper sherds included in this type, more gritty core texture, gray core, and maroon-red smoothed slipped surface. This variation may be different type or reduced specimen of Colorado Red with different temper	Same as Colorado Beige except: finish,forms,rims,decorati on	Mainly rounded with rounded instead of angular exterior tucker, flat rim with exterior tucker rare			Slipped with red paint, usually polished, otherwise smoothed - Reduced specimens exhibit maroon-red color-interior usually buff to pink-buff - Fire Clouds occasional, chocolate-brown in color		Bowls and Jars - Shoulders on Jars	one sherd found with folded rim - another with coil added below rim (applique)		Arizona R:2:2 - Type Specimens: LM88		
Colorado Beige	Patayan I A.D. 700-1050	Beige Ware - Parker Variant 3rd type called Biscuit Beige	Southern end of the Colorado River - some intrusive examples found across a wide geographic area - Along the Colorado River north of Blythe to Gila River and east along Gila River - Origin between Palo Verde and Blythe - Dominant on AZ side of river - Intrusive west to Lake Cahulla south to Colorado Delta, Sierra Pinacate Sonora; east to eastern Yuma county border	Variable - Crushed quartz to coarse quartzose with some magnetite 30-50% - late-Colorado Beige II quartz is finer than I and more angular 10-30% Mid to late Yuma I -early Y II	P III- similar to Parker Buff except for occasional burnishing - Temper consisted of relatively abundant quantities of angular and subangular quartz,hornblende,feldspar,mica - color ranged from brown-buff to cream to gray-brown - clay was crumbly	Easily distinguishable by its typical beige color, softness, apparent weight, crumbliness, and abundant temper	Large Vessels constructed by coiling and shaped with paddle and anvil - small jars, scoops molded and padded - Clay - Sedimentary riverine -clays poorly prepared	Vessels fired with access to air without much control - most vessels well oxidized	Direct	thick-med - in bowls and jars bases may be twice as thick as walls	burnish/crème slip -Variable roughly smoothed to rough - wipe marks- coarse particles of the temper show through the surface - interiors of jars display anvil marks - surface color - beige to brown-gray - exterior surfaces occasionally thin cream-colored scum coat	variable -ranging from 5-55% - Rounded quartz sands, feldspar, mica ranging in size from fine to large - occasionally freshwater snail shells	Jar type 1,3,4 - bowl type-type 1,2,3 - vessel symmetry improves with time	rim notching - incised designs - burnishing common	Soft to medium. Edges crumble easily, and sherds have a dull sound when struck. This type has the least strength of any Patayan type	SDM C-1 Black Mesa Indian Pass		
Schroeder Colorado Beige	Post - 1150 A.D. into historic times		Between Bill Williams river and central portion of Colorado River Agency			This type is similar to Parker Buff in all respects except for the use of polishing	Paddle and Anvil construction	Oxidizing atmosphere	round and flat - no rim tuckers	medium to thin	fairly well polished - Color: brown-buff to cream, often gray brown with orange interior surface. Cream colored sherds appear to be slipped - Fire clouds rare	Paste: hard contains small to fine angular quartz in varying quantities - Texture: coarse to medium - Temper: medium to abundant subangular to angular quartz of varying sizes, hornblende in quartz not common, some plagioclase feldspar, mica rare	high-necked jars and hemispherical bowls. Shoulder on jars	none		Arizona L:16:1 - Type Specimens: LM89	Tan to orange-pink, reduced specimens gray - Carbon Streak Absent	
Coloradro Red on Beige	Patayan I A.D. 800-1050		Confined almost entirely to the lower end of the Colorado and Gila Rivers with a restricted east-west range, this type most commonly occurs on the Arizona side of the river. It has been found as far north as Parker and south as Sierra Pinacate, Sonora			This is the decorated equivalent of Colorado Beige and is the most common decorated Patayan I Pottery type. The paint is an improvement over the fugitive red used on Black Mesa Red-on-buff. The Colorado Beige and Black Mesa Buff specimens with a thin red wash may have been pioneer efforts, which led to a long-lived Patayan ceramic tradition of an all-over red finish.The perfection of this technique culminated in the highly burnished Colorado Red. The red wash decoration was used on many different types but with diminishing frequency into historic times		Better oxidized with a true beige color	Rim notching - Red colored rim is common - loop handles - Colorado shoulder	Colorado Shoulder - Loop handles	Generally burnished, but some vessels are merely smoothed. The burnishing is roughly done. Bowls are burnished on the interior and exterior. Paint - A thick red paint is used. The color is due to an iron oxide inherent in or added to the fine-particle clay. The pigment appears to be identical to that of Colorado Red.		Jar types 1,2,4 - Bowl types 1,2	Curvilinear, some geometric, and occasional zoomorphic elements drawn in thick red paint. Lines are broad, finger painting technique may be used. vessels usually burnished after paint; some prior. Finger dots of various size most common PI design. Early designs asymmetrically placed on vessels - later some degree of symmetry		SDM C-86		
Schroeder Colorado Red-on-Beige	Post - 1150 A.D. to ?		Same as Colorado Beige, and as trade to Painted Rock area			Appears to be development out of Parker Red-on-buff, but is rare	Same as Colorado Beige Except- finish, rim, form, paint, decoration											

Pottery Name	Age	Synonyms	Pottery Range	Rogers	Schroeder	Notes	Characteristics	Firing	Rim	Wall	Surface Color - Treatment	Temper	Vessel Forms	Decoration	Fracture	Type Site	Core
Colorado Buff	Patayan III A.D. 1500-1850		Origins of southern subtype along Colorado River - west of the Salton Sea at San Sebastian Wash	Coarse to medium crushed quartz, higher percentage of hornblende and mica than Pyramid Gray. This temper is also more variable and included reddish quartz - 30-50% - Y II-early III	May be inclusions - quartz, feldspar, shell - fine subrounded- subangular 1-10% - 15-50%	Waters considers Colton Topoc Buff a variety of Colorado Buff	Coiled Construction - shaped by paddle and anvil - CLAY - Sedimentary (riverine and lacustrine)	With access to the air; most specimens are highly oxidized	Recurve - with finely flattened lips of reinforced rim bands. Rim line is straight	Medium to thin. Uniform thickness throughout.	well smooth with faint wipe marks left by mops. Large vessels display anvil marks on the interior surfaces. A thin cream-colored scum coat is common along the river regions; in the desert a thick scum coat is common. Stucco treatment on bowls is also common along the river and in the desert - COLOR - usually pinkish buff to tan	Occasionally a freshwater mollusk shell or bone, carbonized twig impressions. Vugs occur in the desert materials. Inclusions can vary in amount from 1-10 percent. Generally very fine (very even grained) Fine grains of subangular to subrounded quartz, feldspars, and other opaque spars.	Jar type 2,3 and 4; bowls types 1 and 3 and scoops. Jar type 3 very common in the California desert	Rarely polished. Techniques such as rim notching, unobliterated coils, scoops with effigy heads, fingernail impressions, incising, punched holes, handles, appliques and legs are rare in the desert regions of California and none of these was used along the river	Medium to hard; breaks to form straight margins	SMD C-27	
Salton Buff	Patayan II A.D. 950-1500		Focus 12m shoreline of L. Cahulla - Occurs as trade east into Col. River area; rarely across river in AZ	Temper consists of rounded pellets of colored feldspar that may be wash sands or anthill debris - Occasional pieces of Anodontia Shell - Added El Rio Buff to this type later	Fine well-rounded quartz, feldspar, silica, shell - 15-50%	May - Type split into 3 types in the Salton Series - Salton Buff, Cahulla Buff, Ocotillo Buff - May's Salton Buff Closest to Rogers' - Temper coarse, subangular to freshly crushed angular white quartz sand - some deliberately crushed and sorted to same size as angular sand pieces - could span late P I - P III distinguished by hardness, tempering	Coiled construction - shaped by paddle and anvil - small vessels molded - CLAY - Sedimentary Lacustrine	Fired with access to air; most specimen well oxidized	variable - Late P I direct rim - some rim notching - P II recurved rims - P III reinforced rim bands	med-thin	rough/grains - Wiping common - most sandblasted - occasional cream-colored scum coat - has a stucco variety - COLOR ranges from buff to red	round Qz - Well rounded coarse beach sands, ranging from 15-50% - 90% is quartz and feldspar remainder black and red Jasper - Shreds from Western shoreline of Salton Sea tempered with fine-grained sands, Eastern Shoreline medium to large temper - Fragments of freshwater mollusk shells	Jars, bowls most common - scoops	Rim notching (Late Patayan I probably)	Very hard and breaks to form a sharp margin	SDM C-16	
Colorado Red-on-Buff	Patayan III A.D. 1500-post 1900		Origins of southern subtype along Colorado River - west of the Salton Sea at San Sebastian Wash			This type is the decorated equivalent of Colorado Buff. During this period the amount of decorated ware increased. Design elements are geometric along the river and geometric and zoomorphic in the desert. The Chemehuevi decorated some Colorado Buff vessels with a black paint in the CA desert region. Colton's Topoc Red-on-Buff and Needles Red-on-buff are varieties of Colorado Red-on-buff							Jar types 2,3,4 - bowl types 1,2	Vessel designs are symmetrical. The decorations are fine-lined and geometric, although some medium to thick lined decorations occur. Painting was done with a brush. Rare examples of red wash, red-on-red, black-on-red and black-on-buff exist.		SDM C-27	
Parker Buff	Patayan II & III A.D. 1000-post 1900	La Paz Stucco - Parker Red and Parker Red on red	Parker Valley origins - ranges from Bill Williams River to Yuma area (WR) North of Needles Mohave Valley to North of Ehrenberg - north end of Palo Verde Valley	Temper consists of medium to fine grained subangular to angular crushed white feldspar and quartz w/ some hornblende - same as Col. Beige, becomes finer in Y III		noticeable amounts of mica on the surface-Ft. Mohave variety - refinement in technique during P-II - Harner - Ft. Mohave variant - temper consists of small white, angular and subangular feldspar and a small amount of rounded quartz particles - some mica - found at Ft. Mohave in Mohave Valley	Coiling shaped by paddle and anvil - CLAY: Sedimentary riverine	well oxidized throughout	recurve - early roughly flattened margins in time refined and smoothed	med. With uniform thickness - thin and thick walled vessels occur	wiped with mop, temper never shows through - cream-colored scum coat- may have stucco cooking variety - COLOR : pink to gray	Medium - fine grained, subangular to angular crushed white feldspar and quartz with some hornblende - temper in med. - relatively abundant amounts	Jar type 2; bowl type 1,2,3 and scoops	None	Medium, sharp margin when broken	SDM A-39	
Shroeder Parker Buff	pre 900-post 1900		From north of Needles to Ehrenberg on the river. Occurs sporadically to the south of Ehrenberg and up the lower Gila River, but never common	This type ranges east to Kofa Mnts - west to Chuckwalla Mnts. - Scoop additional vessel form - coarse temper type considered early - finer and less tempered late		occasional occurrence of small sherd temper fragments may represent hybrid Palo Verde series	paddle and anvil construction	uncontrolled atmosphere usually favoring an oxidizing atmosphere. Over-fired specimens(rare) exhibit shrinkage areas inn core	Usually direct; some indicate slight outflareson bowls and Jars - round and flat - rare folded rim giving double thickness- pinching marks not obliterated	Thick or thin walls rare - usually medium to medium thin	wiped and smoothed. Some sherds present of subangular and angular quartz of varying sizes, hornblende often inherent in quartz, some plagioclase feldspar, mica rare and mainly in northern part of range, best described as representative of granitic rubble - in some southern specimens gray or tan sherd fragments are visible, but clay is usually well reduced	Bowls, jars, seed jar, and saucers Jars both high and low neck, small and wide mouth. Shoulders rare	None other than rim treatment.	crumbling	AZ L:16:1 Type Specimens: LM85	Orange, pink-buff, terra cotta, or tan; gray in reduced specimens - Carbon Streak absent	
Topoc Buff	Patayan II A.D. 1000-1500 - PIII 1150-1550		Although this type is most common in the Mohave Desert region it was probably imported there,origins in Colorado River Valley south of Black Canyon. Clay is typical of the sedimentary river region clays. It is found west of the western boundary of San Bernardino County, CA; south to the Chemehuevi Valley; and east to Sacramento Wash AZ	Coarse to medium crushed quartz, higher percentage of hornblende and mica than Pyramid Gray. This temper is also more variable and included reddish quartz - 30-50% - Y II-early III	Corresponds to Rogers' Colorado Buff - found in the vicinity of the Bill Williams River on both sides of the Colorado River	Waters believed Topoc and Pyramid Gray same type	Coiling shaped by paddle and anvil - CLAY: Sedimentary riverine	Access to air; most vessels well oxidized	most belong to earlier direct rim/rounded lips - late group: recurve rims, flattened lips	variable - thickness depends on form and age - thick walled, direct rim, rounded lips - thinner walled, recurved rims, flattened lips	rough coarser temper particles visible through time exterior surfaces - smoothness varies w/ coarseness & amount of temper- exterior surface may have cream-colored scum coat - stuccoing is used - COLOR - ranges from buff to slate gray -	variable - Ranges from 30-50% coarse to med. Grained subangular to subrounded clear to white quartz with some feldspars, black hornblende - occas. micas occur adhering to feldspars and quartz	Jars, bowls - scoops	Rare rim notching, thumbnail incisions on necks - Bowls sometimes smudged interior	Medium to hard. Breaks to form semi-sharp margins	SDM M-77	
Schroeder Topoc Buff	Post - 1150 A.D. to ?		Found sporadically from Needles to Ehrenberg			Sherds with large sand temper usually have small quantities of temper, those with medium sand temper usually exhibit medium quantities of temper, those with small sand temper usually contain abundant temper	As described by Colton (1936) in all aspects except temper, core, forms				Gray and roughly smoothed; fugitive red wash rare - buff to warm gray surface	small to large rounded/subangular arroyo sands in small to abundant quantities. Sands of varying colors	Jar only?			Arizona L:16:1 Type Specimens: LM102	Shrinkage areas occasional - Carbon Streaks Rare
Topoc Red-on-Buff	Patayan II A.D. 1000-1400	Same as Topoc Buff except forms- paint				This is the decorated equivalent of Topoc Buff	Same as Topoc Buff expect decoration				Red Paint	white quartz with some feldspars and black hornblende - occasionally micas found	Jars and bowls, the latter decorated on both exterior and interior surface	Well executed brush work. Medium to fine-lined decorations. Rare examples of red wash, red-on-red, and incised vessels with a red on buff decoration have been noted.		SDM M-11	
Palomas Buff	Patayan II & III A.D. 1000-1850	Dome Buff	Lower Gila River - Dome Mnt., Agua Caliente along Gila River- South to Sierra Pinacate - North to Gila, Kofa Little Horn Mnts. - Confined entirely to AZ.	made between A.D. 1100-1500 in the KOP, A. Little Horn, Tinajas Altas Buff Varieties- PII 20-30% later amount of temper reduced to 10-20%. Temper consists of rounded subangular pellets gathered from ant hill - predominantly white and red feldspar, little mica and hornblende	Temper consists of medium to abundant quantities of small subangular to subrounded sands, and occasional medium to large rounded sands, feldspar, quartz, lithic, mica, and occasional volcanic sands- Schroeder III characteristics, gray color, softness, abundant rounded white feldspar and quartz temper	Waters- Schroeder and Rogers catch all category - encompassed all Lower Colorado Buff Ware in Western AZ that did not fit into other categories - Distinguished by P II, color, softness, abundant rounded white feldspar and quartz temper	Coil shaped - thinned by paddle and anvil - CLAY: Sedimentary riverine	Uncontrolled oxidizing atmosphere- specimen usually oxidized but occasionally fully oxidized	recurve, straight roughly flattened lips - P III reinforced rim bands	medium thickness	soft - Stucco - Red-on-buff Early specimen are roughly smoothed with the temper particles - later specimen smoothed with mop; cream-colored scum coat - stucco cooking variety - COLOR: gray to buff - some tan to buff	variable - Coarse to medium grained subangular to subrounded clear, & white quartz with some feldspars, lithic sand grains with mica - ranges from 10-35%	Jars, bowls, and scoops	None	Commonly very soft, the hardness did not increase with time. Breaks to form a crumbly edge	SDM A-113 Texas Hill	
Schroeder Palomas Buff	Post - 1150 A.D. or later to?		Lower Gila River ?		Schroeder has a stucco variety as well (rare)	considerable variability in temper - some sherd contain temper that appears similar to the cluster variety of Bila Bend Plain only the material is fine and not in cluster form - set up as catchall for lower Gila River types by Rogers.	paddle and anvil construction	uncontrolled oxidizing atmosphere	round and flat	medium	smoothed and wiped, occasionally gritty. Cream surface due to wash? (Rare) Fire Clouds: absent - Surface Color: buff to pink-buff, warm gray	Paste: gritty, due to small temper - Temper: abundant small subangular to rounded sands, occasionally medium to large rounded sands	Jars and bowls ?	none	semi-shattering	Arizona S:16:3 - Type Specimens: LM100	Pink-buff to gray - Carbon Streak: absent
Palomas Red on Buff	Patayan II - III A.D. 1000-post-1900		Generally the same as Palomas Buff, but more restricted			This is the decorated equivalent of Palomas Buff; it is an uncommon type	Same as Palomas Buff except for form, paint, decoration, and range	Uncontrolled oxidizing atmosphere. Specimens usually unoxidized but occasionally fully oxidized	Recurved rims with straight roughly flattened lips which with time were refined. Reinforced rim bands appear during the beginning of and through the Patayan III period	Medium thickness	Early specimens are roughly smoothed with a mop and often have a cream-colored scum coar. This type has a stucco cooking variety	Ranges from 10-35 percent. Consists of rounded to subangular feldspar, quartz, and opaque lithic sand grains with some mica	Jars and bowls, the latter decorated on both exterior and interior surface	Paint: possibly an ochre mixed with a fixative, producing a dull red color - Usually brush work with poor execution. Elements are offset and asymmetrical; most are broad-to-medium-lined decorations	Commonly very soft, the hardness did not increase with time. Breaks to form a crumbly edge	SMD A-113 Texas Hill	-