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Fremont Ceramic Designs and Their Implications

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ABSTRACT

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Although Fremont ceramic design styles have the potential to tell archaeologists a great deal about Fremont social interaction and boundaries, they have never been studied in detail. In the Fremont world, painted designs appear almost exclusively on the inside of bowls produced in two different regions of Utah. The first is the Snake Valley production zone in southwestern Utah where Snake Valley Black-on-gray was produced; the second is the Emery production zone in central Utah where white-slipped Ivie Creek Black-on-white bowls were produced. The similarities in designs on the two main types of Fremont painted bowls indicates regional interaction and exchange of both materials and ideas between the two production zones, while the differences suggest regional distinctions existed within a larger Fremont complex.

Keywords: Native Americans, Fremont, Utah, painted bowls, Snake Valley Black-on-gray, Ivie Creek Black-on-white

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TABLE OF CONTENTS

LIST OF FIGURES

Unless noted otherwise, all figures were produced by the author.

LIST OF TABLES

1 Introduction

As a whole, Fremont culture is poorly understood. Basic definitions and chronologies have never been firmly established, and more complicated questions of sociopolitical organization are only now being asked. Most of the major research on the Fremont conducted in the last half of the twentieth century focused on detailed studies of regional variation and culminated in the conclusion that too much variation in material traits and subsistence was present in the data to see the peoples living north of the Virgin and Colorado Rivers between A.D. 300 and 1300 as any sort of cohesive group. Some archaeologists in the past few decades have worked to change this proposing new models that account for the stylistic similarities in many artifact types across the Fremont region while still acknowledging the variation (Janetski et al. 2011; Janetski and Talbot 2014).

As part of this model Janetski et al. present painted ceramics as one of a group of distinctive widespread Fremont stylistic artifacts. The results of this thesis support the conclusion that a distinctive Fremont painted ceramic design style existed sometime between A.D. 1000 and 1300. Variations are present in the details of the designs produced in different regions, but the variation still falls within the parameters of an overarching design style. The similarities in designs on the two main types of Fremont painted bowls indicate regional interaction and exchange of both materials and ideas between the peoples living in the two production zones, while the differences suggest regional distinctions within a larger Fremont complex.

Fremont painted pottery is distinctive from painted types produced in surrounding areas (Richards 2014). Despite this, however, the painted designs have never been thoroughly studied, and no formal large scale classification of Fremont painted designs has been established. A few

site reports include small sections listing common design elements or layouts found on the vessels, but these are mostly just copied from one or two primary sources. This thesis therefore represents the first large-scale analysis of the designs painted on Fremont ceramics.

The initial focus of this project is to create a detailed description of the designs found on the two main types of Fremont painted bowls, Snake Valley Black-on-gray and Ivie Creek Black-on-white. The design layouts and symmetries of these bowls were identified as well as design elements and larger portions of the design referred to as design units. These were recorded for every known whole or mostly complete Fremont painted bowl and a selection of sherds. From these data a description of a distinctive Fremont ceramic design style was compiled, with a discussion of the Snake Valley and Ivie Creek specific variations. Using the data collected w.

The remainder of this chapter provides an overview of the history of Fremont research, what current research suggests about the Fremont, and a discussion of Fremont ceramics and the previous work that has been conducted on Fremont painted ceramic designs.

HISTORY OF FREMONT RESEARCH

The Fremont lived in the far eastern reaches of the Great Basin and the northern Colorado Plateau beginning sometime in the first few centuries A.D. until around A.D. 1300 (Figure 1.1); however, creating a more succinct definition of "Fremont" has been a problem for archaeologists for over a century. The culture was first named by Noel Morss who excavated sites along the Fremont River, and since that time the way the Fremont have been viewed, defined, and studied has changed many times.

Some of the earliest Fremont excavations occurred during a time when American archaeologists were concerned with creating regional connections and chronologies (Janetski and Talbot 2000). As a result some of the earliest definitions of the Fremont culture compared it to the rest of the

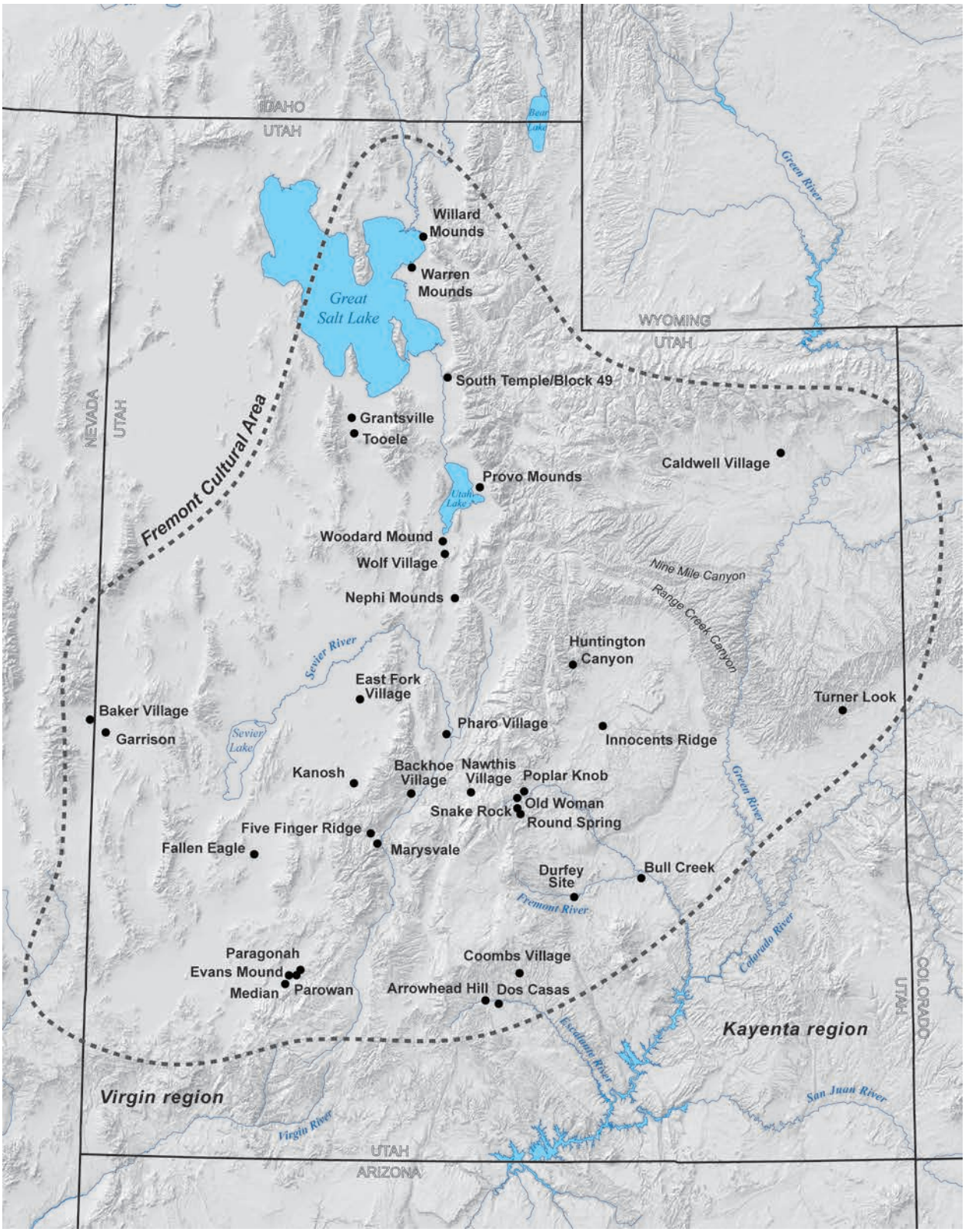


Figure 1.1. Map of the Fremont region. Adapted from Ure 2013 Figure 12.

Puebloan Southwest, identifying the Fremont as an agricultural and hunting society with pottery, elaborate clay figurines, unique moccasins, coiled basketry, and distinctive anthropomorphic pictographs, but lacking many Puebloan traits such as cotton and turkeys (Morss 1931:76–77). Many of the early Fremont archaeologists made reasonable connections between Fremont sites and those found in other areas of the American Southwest, suggesting that the Fremont culture was influenced and shaped by Puebloan cultures. Morss (1931: 77–78) wrote:

> So far as they can be evaluated, the influences which molded the Fremont culture appear to have been Southwestern…. There is little evidence that they were much affected by Plains culture. Nor… can we find any close connection with the primitive, non-agricultural cultures of the Great Basin…. Such traits in common as fur, cloth, twined matting, and the trap made of two sticks are doubtless survivals from the Basket-maker I period.

Neil Judd (1926:152) made similar observations when writing about the ruins at Beaver and the Parowan Valley, stating "it is Puebloan in fact; it is definitely and directly related to those pre-Pueblo and Pueblo cultures represented by the prehistoric ruins of northern Arizona, New Mexico, and Colorado."

As a result of these similarities the Fremont region was referred to as the Northern Peripheral Area or the Northern Periphery of the Southwest by Alfred Kidder, Julian Steward, and others (Janetski and Talbot 2000:2, Kidder 1962). Some archaeologists saw this term as derogatory; although clearly not all archaeologists viewed the Fremont that way as Morss (1931:78) countered this view saying that "the originality shown in many details of their culture makes it difficult to

think of the Fremonters as merely a backward Southwestern tribe." Despite this, Jack Rudy, among other archaeologists of the 1950s felt that the term presented the Fremont "as a subordinate, late and diluted Anasazi manifestation" (Jennings et al 1956:103; see also Wormington 1955; Rudy 1953). David Madsen and Steven Simms (1998:268) describe the Fremont as having been seen as a "poor man's Anasazi" and "the country bumpkin cousins of the Anasazi." Jesse Jennings reacted to the term by downplaying Southwestern influence on the Fremont culture, focusing instead on the absence of many Southwestern traits and stating that the region developed with "apparently minor influences from the Anasazi region" (1956:103). He firmly advocated that the Fremont were a Desert culture who adopted some Anasazi traits. One of the unfortunate consequences of trying to establish the Fremont as something other than simply the northern periphery of a more "advanced" culture was a pull away from Southwestern archaeology all together (Janetski and Talbot 2000:6), including terms that denoted a connection with Southwestern groups such as "Puebloid" and "Utah Anasazi" (Marwitt 1970).

After Fremont archaeologists pulled away from the Southwest, Fremont archaeology became more introspective (Janetski and Talbot 2000:4). Archaeologists began to examine Fremont sites more closely in an attempt to create explanations of the similarities and differences that they observed independent of human development in the Southwest. One of the most influential attempts was John Marwitt's argument that the material traits found across the Fremont cultural region were too varied across space and time to create a succinct definition of Fremont. Marwitt suggested that instead archaeologists should consider the Fremont in terms of regional variants with local temporal phases (Marwitt 1970), and while he did acknowledge that some of these variants were influenced by different Anasazi groups, he still promoted the idea that the connection was no more than cultural influence on a Desert culture that developed in-situ.

Marwitt's ideas, however, were soon rejected by archaeologists who felt that simply looking at lists of material traits was insufficient and counterproductive since it only considered a few

diagnostic artifacts and in many cases ignored temporal variation (Hogan and Sebastian 1980; D. Madsen 1980). New definitions of the Fremont emerged based on behavioral characteristics, mostly subsistence, rather than material traits (D. Madsen 1979a, 1980). David Madsen (1979:718) argued that "if a comprehensive Fremont culture cannot be defined by trait lists or through more reliable mechanisms such as similarities in subsistence economy, then the only valid conclusion that can be drawn is that no such entity exits." By rejecting the idea that a definition of "Fremont" existed he was able to use the differences in the subsistence strategies that he observed to suggest that the Fremont region contained three distinct cultural groups, Sevier, Fremont, and an unnamed Plains-related group, each possibly developing from a distinct origin. He argued that the Sevier culture, located in the eastern Great Basin, was characterized by the utilization of marsh resources supplemented by maize agriculture, and likely developed in situ. The Fremont culture, present on the Colorado Plateau, was characterized by a reliance on maize agriculture which was supplemented by hunting and gathering, and possibly had Anasazi origins. The third group referred to agricultural groups north of the other two, which Madsen saw as possibly having Plains origins (D. Madsen 1979a). Janetski and Talbot (2000:5) point out that a key difference between Marwitt's and Madsen's variants (beyond the use of trait lists for the former and behavior for the latter) is that Madsen's focus "was on strategies that shifted as one moved across the landscape depending on the changing availability or resources. Earlier schemes conceived of Fremont variants as bounded patterns extending over large regions."

Studying the Fremont in terms of variation and subsistence dominated Fremont research for the next few decades. Simms became a proponent of Fremont adaptive diversity and suggested three subsistence strategies. The first was horticulture supplemented by local wild plant resources, the second was a variable lifestyle where individuals practiced horticulture, but would become mobile hunter-gatherers if their crops were not sufficient, and the third was horticulturalists who occupied the same region as full time hunter-gatherers (Simms 1986). D. Madsen (1989)

eventually suggested that individuals may not have simply practiced just one subsistence strategy in their lives, but may have switched between all three options.

Along with the ideas of behavioral diversity came a new way to define the Fremont— a rejection of trying to define them. Both Madsen and Simms came to the conclusion that trying to create a definition of "Fremont" was both counterproductive and stereotypical. It gave archaeologists the false hope that by somehow managing to define the Fremont they would then understand them (Simms 1990:1). It was also contrary to the idea of variation that Simms and Madsen were trying to promote. "The Fremont, in sum, was a complex of farming and foraging behaviors that cannot be readily understood through efforts to categorize them. The very act of doing so tends to obscure the nature of these behaviors and the way they were intertwined" (Madsen and Simms 1998:324).

Fremont archaeology during this time looked more to theories and interpretation common in the Great Basin than in the greater Southwest, and archaeologists were so focused on finding variation in the archaeological record that they missed the broader regional trends. While researching the variation among Fremont sites is important to understanding what Fremont means, archaeologists have recently presented the need for a more balanced approach to interpreting Fremont sites. In the Clear Creek Canyon synthesis volume Joel Janetski and Richard Talbot suggest including a broader approach in archaeological interpretation and warn that "without a balance in our research, understanding of the totality of the social system will escape us" (2000:7). They also call for archaeologists to "recast the Fremont tradition as an aspect of the larger Southwestern farming pattern that bulged northward crossing the Colorado and Virgin Rivers, endured for several centuries and then pulled back" (2000:7). This call to action, along with Talbot's (2000a) book chapter *Fremont Farmers,* marked the beginning of an effort to reintegrate the Fremont into the Southwest. In the chapter Talbot examines Fremont farming, community organization, style, and trade in relation to their Southern neighbors to conclude the "Fremont culture change and adaptation were active and internally diverse but no more so than would be expected for a cultural tradition

spanning 1,400 years and over 60,000 square miles" and "Fremont socioeconomic foundation and historical trajectory are distinctly southwestern, and Fremont people actively participated in interregional trade networks" (2000a:288).

Unfortunately the decades spent trying to invalidate the connection between the Southwest and its "northern periphery" took its toll on theoretical development in Fremont archaeology. The strictly ecological models that have been used to describe Fremont diversity for decades are more commonly used by Great Basin archaeologists studying hunter-gatherer sites than horticulturalists, and as such do little to sufficiently explain the archaeological evidence. The concept of adaptive diversity presented by Madsen and Simms, which suggests that Fremont individuals probably switched subsistence strategies throughout their lives, is poorly supported by ethnographic or archaeological evidence, and is more of a product of optimal foraging models common in hunter-gatherer studies than the cultural material of the region (Allison 2008). This focus on behavioral ecology has left many important questions about Fremont social change unanswered and in some cases unasked. Allison (2008:23) states

> I am skeptical that behavioral ecology alone can make much progress on [social] issues, however. Understanding human social behavior requires social theory that includes explicit concepts to characterize social interaction, and these concepts are lacking in behavioral ecology and other evolutionary approaches

Allison continues the tradition started by Janetski and Talbot arguing that Fremont archaeologists should stop relying solely on theoretical approaches developed in the Great Basin, and that they "would benefit from increased awareness and use of the theoretical and methodological approaches prevalent among those who specialize in the archaeology of Southwestern farmers" (2008:24).

Since then some archaeologists have begun to view the Fremont differently and incorporate them more into the greater Southwest (see Allison 2014a; Lekson 2014; Richards 2014; Talbot 2014). A series of papers have been presented in recent years discussing what architectural variability suggests about Fremont social organization (Allison et al. 2012; Johansson et al. 2012; Richards et al. 2013; Ure and Stauffer 2010), and how looking at architectural parallels in the greater Southwest can give insight into the interpretation of architecture at Fremont sites (Johansson 2014). Michael Searcy and Richard Talbot (2014) have studied Fremont sites on the borderlands of the region, where expressions of identity are likely to be the strongest, to explore an overarching Fremont identity, while still acknowledging the importance of considering regional variation. Janetski and Talbot (2014) expand on an argument made by Janetski et al. (2011) where they suggest a model that combines a big picture view of the Fremont, but also considers the regional variation. They argue that the "Fremont complex is best thought of as an interaction sphere stylistically distinct from the Anasazi and neighbors to the east, west and north" (Janetski and Talbot 2014:48), and that it is best seen as a "tribal society," which often have smaller local identities within a larger group identity. They present an example from the Great Lakes region where the "tribal level is marked by style expressed in material goods, especially ceramics, while macroregions are characterized by aggregation sites located in areas with abundant resources to support large gatherings" (Janetski and Talbot 2014:23), suggesting that similar patterns are found in the Fremont region. While there are obvious problems of oversimplification when using the classificatory terms of "band," "tribe," "chiefdom," and "state," I think the general concept that Janetski et al. propose is worth exploring and testing. The authors encourage researchers to test this model, hypothesizing that the data will show "the overarching presence of overt and passive style, while identity is articulated in subtle variation in the style expressed in various media" (2011:47).

Defining the Fremont

Despite the difficulty of creating an agreed upon definition of the Fremont, the following is a (by no means comprehensive) discussion the term "Fremont" and how it will be used in this thesis. The term "Fremont" refers to groups of people who lived in pit and surface structures and practiced horticulture across much of the state of Utah and portions of western Colorado and eastern Nevada until around A.D. 1300. The question of when the Fremont complex began is not well documented due to a lack of excavations of early sites and reliable dates, but radiocarbon dates indicate that farming was present in the region in the first few centuries A.D. (Geib 1996; Wilde and Newman 1989; Talbot 2000a; Allison 2014b). Many important changes occurred in the region during the time when it was occupied by farmers. Unfortunately issues of Fremont chronology and time periods have not been commonly addressed in the literature, and what has been done is generally buried in site reports and not prominent in the academic literature (with the exception of Talbot 2000a). The following reviews a general overview of Fremont time periods as proposed by Talbot (2000a) and James Wilde and Reed Soper (1999). Allison has questioned this chronology and is working to refine it (Allison 2014b). I review Talbot's and Wilde and Soper's chronology here because it is the most prominent chronology in the literature, and will provide a basic temporal context for my dataset. These temporal distinctions should not be seen as absolute, but as a basic framework that should be tested and refined. More dates need to be run, more artifacts need to be analyzed, and more sites (especially earlier one) need to be explored.

Talbot (2000a:280–281) and Wilde and Soper (1999:3–7) identify early (A.D. 1–500), middle (A.D. 500–900), and late (A.D. 900–1350) periods for the Fremont, which has become the most commonly used chronology for the region. According to these authors the early period is marked by the first evidence of corn in area, at sites such as the Elsinore Burial site and Steinaker Gap. The Elsinore Burial included a woman and over 200 corn cobs and cob fragments (Wilde and Newman 1989). The burial itself dates to around A.D. 30–70; however, the corn has been dated

to the second half of the third century A.D. (Allison 2014b). Stable isotope analysis of the remains revealed that about 50 percent of the individual's diet came from corn (Talbot 2000a:280). One of the only other maize-yielding sites to date to the Early Period, Steinaker Gap, dates to the A.D. 200s (Allison 2014b) and included two irrigation ditches and burials with individuals whose diets consisted of 40-50 percent corn (Talbot 2000a, Talbot and Richens 1996). Other characteristics of this early period include the use of Rosespring corner-notched projectile points (Holmer and Weder 1980) and temporary dwellings or shallow basin-like, circular pitstructures (Richard Talbot personal communication, 2014). Most storage features were either off-site cists or subterranean pits (Yoder 2005). Unfortunately few early Fremont sites have been excavated, making it difficult to sufficiently describe this period.

Many of the characteristics of the early Fremont period were still present in the middle Fremont such as horticulture, circular pithouses, Rosespring projectile points, and off-site or subterranean storage. However, many new artifact types appear in the archaeological record as well as a diversification of existing types. Pithouses were deeper and better made, indicating more permanent settlements (Talbot 2000a). Ceramics became more common and appear to have been an established tradition by A.D. 600 at many sites in the region; however vessels with surface decoration were not common for a few hundred more years (Wilde and Soper 1999). Towards the end of the middle period projectile points diversified to include side-notched types (Holmer and Weder 1980). Other artifact types found include Utah style metates, Fremont style moccasins, and one-rod-and-bundle baskets (Wilde and Soper 1999).

Allison argues that the data indicate the changes and diversification that Talbot and Wilde and Soper attribute to the middle Fremont period all likely occurred at the very end of the period as a transition into the late period (Allison, personal communication 2014). He has also argued that a middle period may not have existed at all and Fremont chronology should only have an early and late period (Allison, personal communication 2014).

The most dramatic changes in the Fremont cultural area started at the beginning of the late period, around A.D. 900–1000. During this period many of the characteristics that are typically associated with the Fremont became established. Small hamlets and clusters of pithouses were replaced by villages. Some of the larger villages likely had more influence in the region, and possibly operated as trade centers for surrounding smaller settlements (Janetski 2002). Architecture in Fremont settlements during the early and middle periods remained relatively unchanged; however, in the late period new architectural styles were introduced. Shallow, circular pithouses were replaced by deeper subrectangular ones in most areas (Talbot 2000b:172). In many places off-site granaries were replaced with on-site surface storage structures (Yoder 2005). Adobe, masonry, and jacal architecture were intermittently present after A.D. 900, though coursed adobe is the most common of the three techniques (Talbot 2000b:171). Although little is known about the socio-political organization and complexity during the earlier Fremont periods, it is safe to say that socio-political complexity increased during the late period. Village organization was planned, with specific areas set aside for communal use. Unusual and large structures may have served as communal gathering places and even the houses of village leaders (Richards et al. 2013).

Artifact types also diversified during this period. More projectile point types are present at sites (Holmer and Weder 1980). Exotics such as shell beads and turquoise are more abundant in the archaeological record. Corrugated ceramics were present for a short time beginning around A.D. 1050 (Richens 2000:53). Painted ceramics appeared in this time period as well, although little research has been done to determine when they were first produced. The literature generally cites Rex Madsen who suggested that Snake Valley Black-on-gray first appeared around A.D. 900 and lasted until A.D. 1200; however, R. Madsen (1977:5) does not provide evidence as to why he chose these dates. Richens (2000:54) suggests a later date of A.D. 1300 for the end of painted ceramics but does not comment on the early appearance. Some archaeologists are questioning this early date (James Allison, personal communication 2014). R. Madsen cites the appearance of

Ivie Creek Black-on-white as A.D. 700, although he provides no citation for this date and it is also being questioned (see below). Other ceramic decoration (applique, incising, grooving, etc.) is also thought to mostly date to the late period.

Archaeologists have only recently tried to explain the dramatic transition to the late period, which can best be done in the context of the greater Southwest. Stephen Lekson (2014) and Allison (2014a) have both believe that the transition is a consequence of or reaction to the expansion of the Chacoan system which was gaining power in the A.D. 1000s.

The late period is important to understanding how archaeologists define the Fremont. As discussed above, many of the early definitions included trait lists, which are still used by many today. However diagnostic traits such as diversified architectural forms and ceramic types are only present in the late Fremont period. Many of the definitions of Fremont in the literature describe the material culture only as it was during the dramatic period of change between A.D. 900 and 1300. The late period can be seen as the classic period of Fremont culture when settlements were the largest, socio-political organization was the most structured, and artifact categories included all of the objects that are seen as "classically" Fremont. Since it is the only time when we can securely say that painted ceramics were produced, the term "Fremont" as used in the rest of this thesis will refer to the late period.

FREMONT CERAMIC RESEARCH

In general, Fremont vessels were constructed by coil and scrape and fired in a reducing atmosphere. They occasionally have an exterior fugitive red wash and, on rare occasion, have fugitive red on the vessel interior. The history of defining Fremont ceramics has been almost as confusing as the history of defining the Fremont. Fremont ceramic classifications have been developed over time by Morss (1931), Judd (1926), Steward (1936), Rudy (1953), Wormington

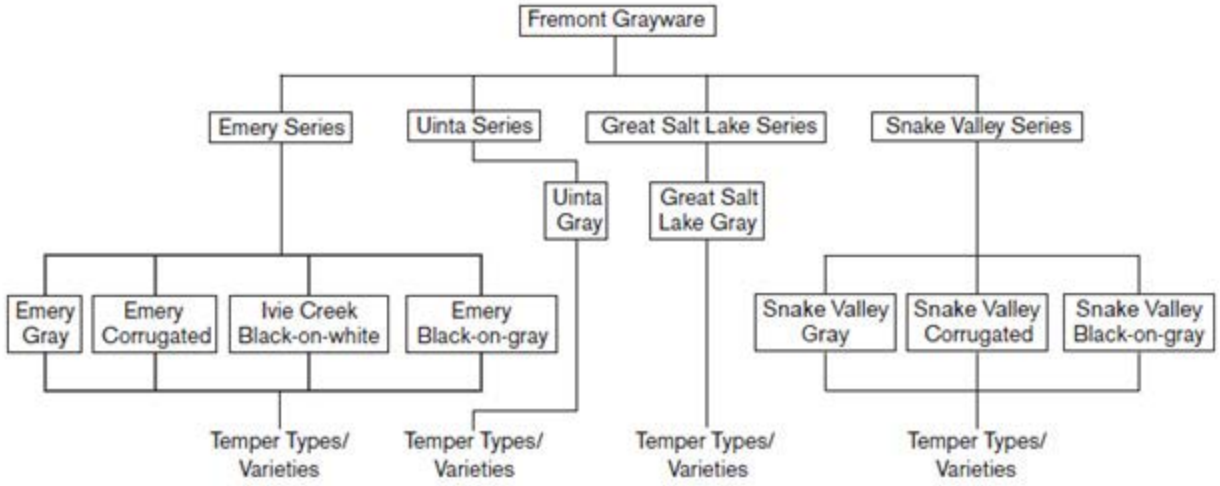


Figure 1.2. Watkin's three tier classification of Fremont ceramics. From Watkins 2009 Figure 3.

(1955), Gunnerson (1969), D. Madsen (1970), and R. Madsen (1977) among others. R. Madsen's ceramic typology is one of the most commonly cited and uses a two tier system including three different ceramic traditions or wares: Desert Gray Ware, Promontory Gray Ware, and Ivie Creek Black-on-white ware (R. Madsen 1977; Watkins 2009); although most people generally do not see Ivie Creek Black-on-white as a separate ware and Promontory Gray Ware is now thought to date to a post-Fremont occupation of the region (Watkins 2009). Within these three wares nine ceramic types were identified based on temper and surface treatment including: Great Salt Lake Gray, Uintah Gray, Sevier Gray, Emery Gray, Ivie Creek Black-on-white, Snake Valley Gray, Snake Valley Black-on-gray, Snake Valley Corrugated, and Paragonah coiled.

Due to some inconsistencies that remained in the established typology Watkins (2009) has suggested a three tiered classification system similar to that used in other regions of the Southwest, but still used many of R. Madsen's ceramic type classifications. In this system Watkins assigned all Fremont ceramics to a Fremont Gray Ware. Fremont Gray Wares are further separated into ceramic series based on temper (Figure 1.2). Watkins identified four temper series (Figure 1.3).

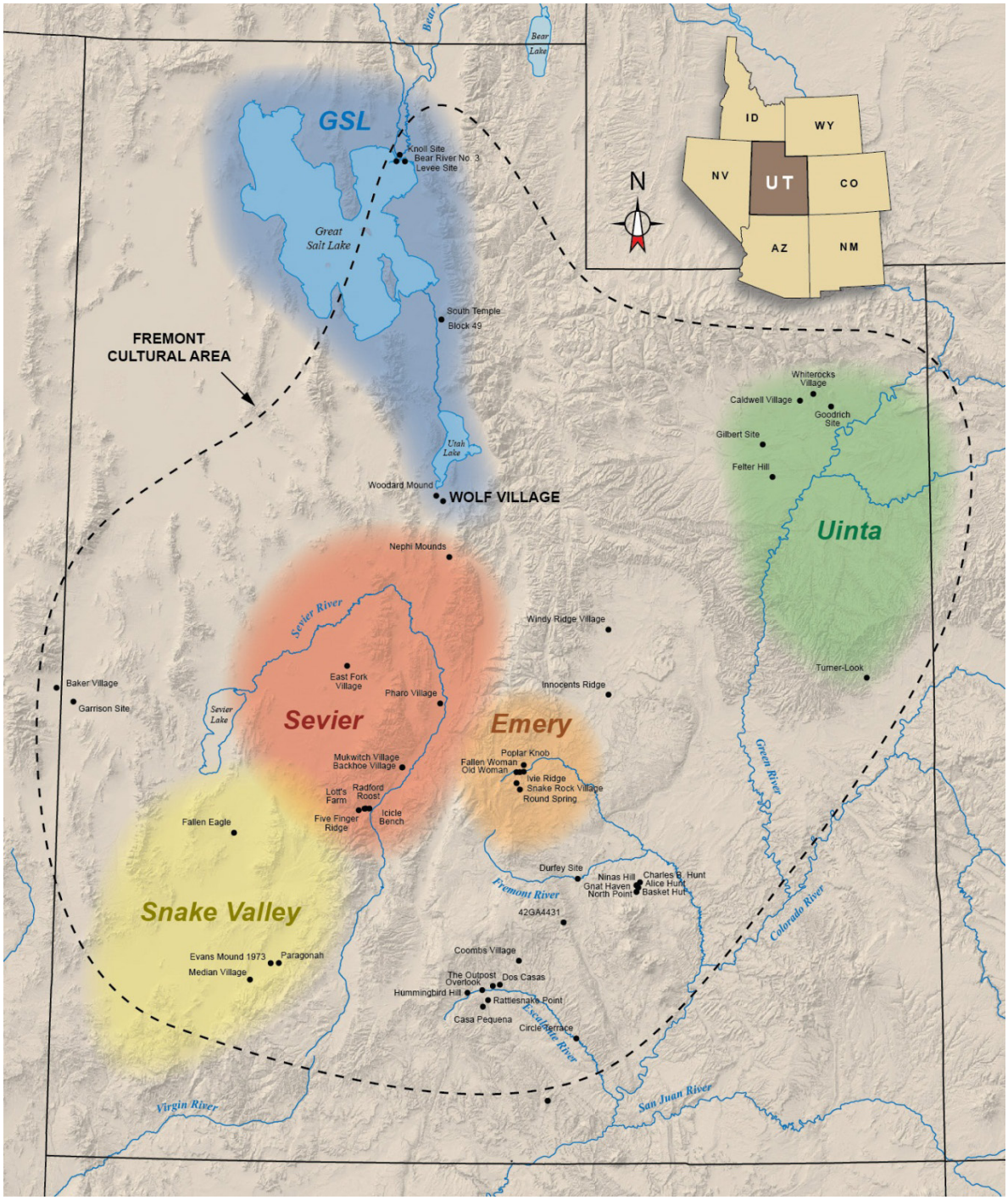


Figure 1.3. Map of Fremont ceramic production zones. From Ure 2011.

One series, Great Salt Lake, is thought to have been produced across northern Utah in the areas around the Great Salt Lake and Utah Lake. Great Salt Lake temper is highly variable making it difficult to define. Richens has characterized the temper as fine to coarse quartz sand/rhyolitic to

dacitic volcanic glass, white to translucent andesite tuff and copper/brown mica (see Richens 1992). The other series generally have less temper variation. Uinta Series, produced in the Uinta Basin, has crushed calcite or limestone temper. Emery Series is characterized by four temper varieties with crushed dark or gray igneous rock comprising the dominant temper type (Geib and Lyneis 1996). Watkins categorized the Sevier ceramic temper group as a temper variant of the Emery Series since it is difficult to distinguish between the two; however, many archaeologists treat it as its own temper series. Sevier typically is limited to dark gray vesicular basalt temper, while Emery series exhibits a range of shades of gray igneous rock as tempering material. Snake Valley Series is characterized by its finely crushed quartz, feldspar, and biotite mica temper (Watkins 2009). Most Snake Valley sherds fall nicely into that definition; however, some temper varieties exist that include small pink and white inclusions.

In Watkin's three-tiered system the last tier, type, is determined based on the surface finish of the vessel. The majority of the Fremont vessels are polished on the exterior surface and some exhibit exterior surface manipulation including applique and incising which are considered variations of a plain gray type. Watkins suggests additional types for the Emery and Snake Valley Series (157). He includes the additional categories of Snake Valley Corrugated and Snake Valley Black-on-gray in addition to the plain gray type of the Snake Valley Series. He also includes Emery Corrugated, Ivie Creek Black-on-white, and Emery Black-on-gray, in addition to the plain gray type of the Emery Series. Watkins mentions the need to create additional types as research warrants, including a possible Great Salt Lake Red-on-gray type mentioned by Allison (2002) for the Salt Lake Airport site. I suggest that Great Salt Lake Red-on-gray be made a formal type of the Great Salt Lake Series due to its presence at the Salt Lake Airport site (Allison 2002), the Provo River Delta sites (Mooney 2014), and its prevalence at Wolf Village on the south side of Utah Lake in Goshen, Utah (Freeman 2013). A distinct style of design has been found on these sherds that is very different from the black-on-gray/white styles that dominate Fremont painted wares. This

type will be briefly discussed later. It should also be mentioned that red-on-gray vessels/sherds of various types have also been identified at several sites. A few sherds of a Great Salt Lake Black-on-gray have also been identified, although they are extremely rare (Lane Richens and Joseph Bryce personal communication 2013).

The majority of Fremont vessels are one of three forms: jars, bowls, or pitchers. Other minor forms such as seed jars, mugs, canteens, and bi-lobe and tri-lobe bowls and jars do occur, but they are quite rare. Black paint on Fremont vessels was almost exclusively reserved for the interiors of bowls; however, at least one Snake Valley (Meighan et al 1956:29) and one Ivie Creek (Snake Rock collection, National History Museum of Utah) sherd have been found with paint on both the interior and exterior of the bowl. Jar exteriors were also occasionally painted, and there are a few examples of tick marks or a single line around the interior of a jar rim. Most painted bowls have simple curvature with no inflections, but unusual painted bowl forms do exist. Recurved bowls are most common in Snake Valley assemblages, but at least one Ivie Creek example has been found. Occasionally, indented Snake Valley bowls have been found which have circular protrusions around the side of the vessel. A few examples of painted Snake Valley bi- and tri-lobed bowls have also been found.

Snake Valley Black-on-gray was produced in the Parowan Valley but was widely distributed across the Fremont region. According to distribution maps created by Watkins (2006; Janetski et al. 2011), Snake Valley Black-on-gray was present at most village sites dating to the late Fremont period (Figure 1.4). According to distributions maps for Ivie Creek Black-on-white, the production zone is suspected to have been relatively small. The maps show the densest concentrations of the type around at least three sites, Snake Rock, Pharo Village, and Round Spring, which has been suggested to have been the production zone for the type (Watkins 2009). Ivie Creek Black-on-white bowls were not were not as widely distributed as Snake Valley Black-on-gray, but they have been found as far north as the Great Salt Lake and as far west as Baker Village in Nevada (Janetski

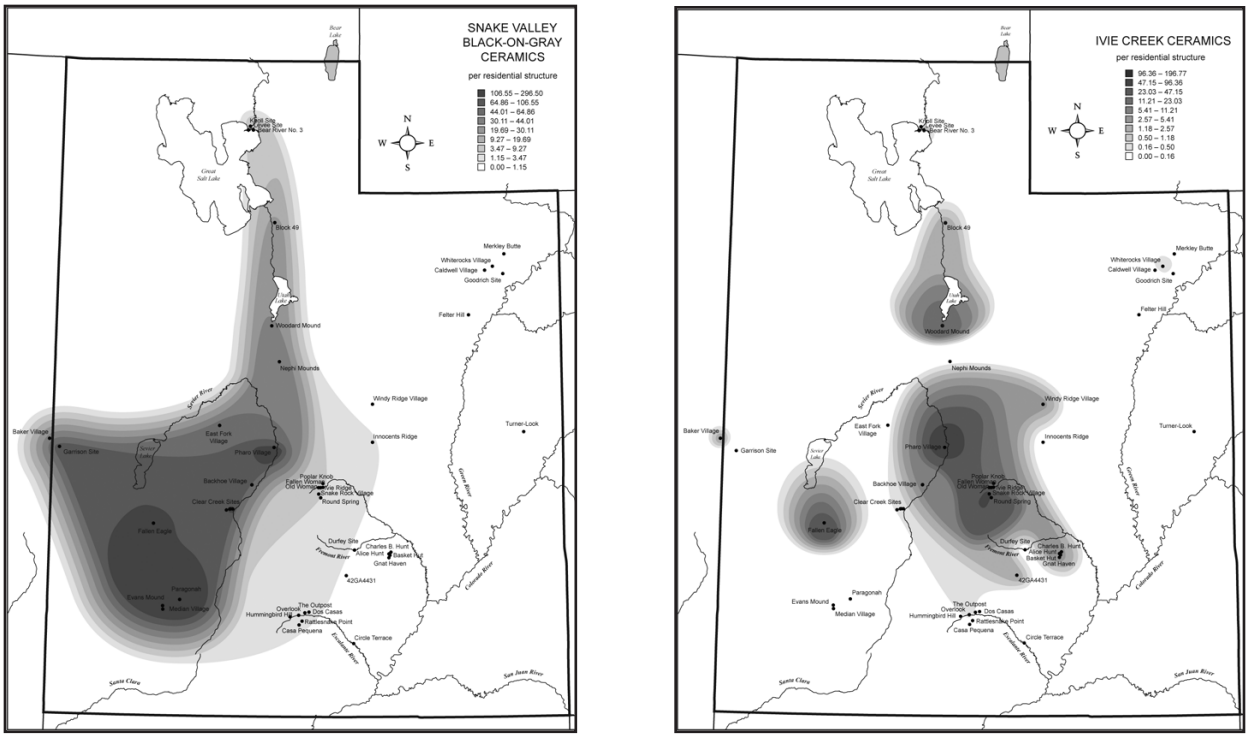


Figure 1.4. Distribution maps of Snake Valley Black-on-gray and Ivie Creek Black-on-white expressed in number of sherds per excavated structure. From Janetski et al. 2011:fig 2.8.

et al 2011). The only Fremont region where Fremont painted ceramics are lacking is the Uinta Basin, where Fremont painted ceramic counts are negligible.

One of the most pressing problems of Fremont ceramic studies is the lack of understanding temporal change. Many Fremont sites have never been satisfactorily dated, which significantly hinders examining change in ceramic styles. The information that generally circulates in the literature proposes that Fremont ceramics became common on sites around A.D. 600 (Geib 1996:103). R. Madsen states that Ivie Creek Black-on-white bowls were being produced between A.D. 700 and 1200, but he does not provide a specific citation or evidence to support these dates. The A.D. 700 date seems suspiciously early especially since three of the sites where Ivie Creek Black-on-white is thought to have been produced probably date between A.D. 900 and 1275 (Metcalf et al 1993; Aikens 1969; and Marwitt 1968); although these dates are also in question

since they are based on a few radiocarbon dates on wood and relative dates based on intrusive Anasazi ceramics. R. Madsen, among many others, suggests that Snake Valley Black-on-gray was produced between A.D. 900 and 1200, but again does not provide an explanation as to why he chose these dates (1977:5). As mentioned above Richens (2000:54) extends this range to A.D. 1300. Since it is unclear why R. Madsen chose the dates he did for the beginning and end of the Snake Valley Black-on-gray and Ivie Creek Black-on-white traditions many archaeologists, me included, are skeptical of these dates and use them warily since they are the only dates cited in most of the literature. Unfortunately, very little information is known about when the bowls examined for this thesis were made, but they likely all date to the late Fremont period. This makes a thesis focusing on design styles difficult as the designs almost certainly changed over the 400 year period. In this thesis Fremont designs are discussed in a general sense as though they did not change through time, because sufficient data to consider temporal change is not available.

Painted ceramic designs

Painted designs on Fremont bowls have been superficially discussed in a number of publications, each generally propagating the ideas of the last publication instead of challenging or adding to them. The earliest mention of the painted Fremont designs was by Neil Judd (1919:19) who mentioned that "on these [ceramics] are figured many of the geometric patterns common to the northern part of the prehistoric Pueblo area." Morss (1931:45) also mentioned the painted designs noting "black-on-white sherds are both slipped and unslipped. The designs may probably be classed as Pueblo II, being apparently limited to simple arrangements of lines with bordering triangles or squares and occasional scrolls."

Rudy (1953) was the first to discuss the design layout of Snake Valley Black-on-gray when describing the designs stating that "the designs occur in repeated panels which are usually enclosed

in one or two circling lines around the tops and bottoms of the bowls" in addition to making a list of six common design elements. Rudy also made a connection between Fremont bowls and Pueblo I and II types found in Northern Arizona but provided no specific parallels. Lister et al. (1960:231–232) provided the first definition of Ivie Creek Black-on-white as a specific ceramic type. They describe the designs as having a formalized layout with one or two encircling lines below the rim above a paneled band. They note that "curvilinear elements" as well as open and interlocking scrolls were the most common designs and that "polka dots, squares, circles, checkerboards, bowknots, stepped rectangles, pinnate lines, cross hatching, parallel hatching" were also common. Lister et al. appear to be the first to make a comparison between specific Puebloan pottery design styles and Fremont designs, stating that Fremont designs are similar to those of Black Mesa, Sosi, Dogoszhi, and Flagstaff styles, as well Cortez and Mancos. They, however, provide no specific details as to how they arrived at those conclusions, and provide they no images of Ivie Creek Black-on-white bowls or sherds that have designs similar to those listed above.

D. Madsen (1970:54–55) was among the first to propose specific Southwestern parallels for Snake Valley Black-on-gray. Using the ceramics from Median Village in the Parowan Valley, Madsen suggested that Fremont designs were heavily influenced by other design types in the Southwest. He considered interior rim banding to be a basic Fremont design element, but he considered many of the other elements to be a mixture of Black Mesa, Sosi, and Mesa Verde. He even stated that 90 percent of the design elements are Black Mesa, 8 percent are Sosi, and 2 percent are Mesa Verde; however, he does not describe how he came to these conclusions or what he considers to be a Black Mesa design element opposed to a Sosi one.

R. Madsen probably gives one of the most commonly referred to definitions of Snake Valley Black-on-gray and Ivie Creek Black-on-white designs stating about Snake Valley Black-on-gray

> Painted elements are found in various combinations, frequently occurring in one or two encircling lines around the tops and bottoms of the bowls. Frequently symmetrical, designs tend to be linear and are usually positive in balance. Solid elements occur in the form of triangles, stepped elements, and checkerboards. Scrolls, dots, pendant dots, and hatching are also found. The design elements are primarily of Pueblo II types found most commonly in the Virgin and Kayenta Anasazi areas of northern Arizona (primarily Sosi, Dogoszhi, and Black Mesa styles). These design elements appear to have been borrowed by Fremont potters and recombined in distinctive design patterns [1977:5–6].

He describes Ivie Creek designs as:

> Painted elements are found in various combinations, usually symmetrical and positively balanced, which frequently occur in repeated panels that are often enclosed within one or two encircling lines around the tops and bottoms of bowls. Common elements include curvilinear solids, open or interlocked scrolls (frequent), parallel lines, dots (arranged along lines, in squares, in outlined panels, or at random), squares, triangles, circles, steps, checkerboards, hatching, ticked lines, and cob-like projections or pendant dots from linear and solid elements. The design elements are primarily of Pueblo I and Pueblo II inspiration, stemming from the Kayenta and Mesa Verde Anasazi areas. These elements, commonly found on Chapin, Piedra, Black Mesa, Sosi, and Dogoszhi Black-on-white, were apparently borrowed from these Anasazi regions and reworked into distinctive Fremont design patterns [1977:35–36].

Fremont designs have also been briefly discussed in many other publications, each one repeating a variation of what was presented in the last. A variety of Southwestern parallels has been suggested in these publications including: Black Mesa, Sosi, Dogoszhi, Flagstaff, Cortez, Garfield, Mancos, Deadman's, and Walnut among others, but no specific details as to how the designs are similar are given (see Aikens 1967:19–21; D. Madsen 1979b:82–83; D. Madsen 1986:207, Fig. 3 caption; and Marwitt 1968:35–37).

To date, the most notable attempt at a design analysis was a paper presented at the Great Basin Anthropological Conference by Charmaine Thompson and James Allison in 1988. This paper presented the results of a design element analysis of Snake Valley Black-on-gray sherds from the Parowan Valley and Virgin Anasazi sherds from nearby Virgin Anasazi sites in the St. George Basin in an attempt to test Marwitt's contradictory statements that "[Fremont] trade and other contacts with the Southwest do not seem to have been particularly close" (Thompson and Allison 1988:161) and "Parowan Fremont shows a significant amount of influence from the Virgin branch Anasazi located to the south" (Thompson and Allison 1988:165). The authors recorded the occurrences of wide and narrow lines (greater or less than 3 mm), triangles, miscellaneous solids, scrolls, hachures, design layout, and unusual designs and compared them to the Virgin Anasazi sherds. They made some interesting observations such as Fremont bowls almost always have rim line below the rim and occasionally on the rim and often have a second line parallel to the rim line. Fremont bowls also use a mixture of both wide and narrow lines on the same vessel. They suggested that most of the Fremont design elements fell into one of the above categories but show that of the identifiable non-line elements triangles, stepped solids, and scrolls were the most common. Thompson and Allison concluded that there are significant differences in the design elements from the two regions, pointing out that Fremont potters used more design elements then Virgin , and one of the most common elements on Fremont pottery, the interlocking scroll, is all but absent from Virgin Anasazi bowls. Thompson and Allison suggested that despite the close

proximity of the Virgin and Kayenta regions to the Parowan sites, Red Mesa Black-on-white, an eastern Anasazi type, is a more appropriate comparison.

The background provided in this chapter is meant to demonstrate the need for some concept of the Fremont that encompasses regional similarities and not just variants. The Fremont also need to be placed in the sphere of the greater Southwest in order to more fully understand the material culture and temporal transitions. This thesis attempts to do both of these things by first characterizing an overarching Fremont design style while still recording regional variation and second by applying methods for analysis and interpretation commonly used in other regions of the Southwest.

2 Theories of Style

The concept of style in archaeology has evolved as theoretical developments have changed how archaeologists interpret the archaeological record. The view of style has transformed from being seen as simply a passive marker of the interaction of social groups to playing a more dynamic role in social construction, a choice made by a social agent and a way of communicating important information about society and identity (Gebauer 1987).

Initially style was used by cultural historical archaeologists as a way to identify cultural groups and track the diffusion of traits. This normative approach was based on the idea that "broad cultural areas [were] thought to be characterized by a single norm or idea concerning stylistic behavior" (Gebauer 1987:224). New styles were thought to be adopted throughout a region as groups interacted with each other and the new style was transmitted through learning; therefore, social interaction could be tracked by studying the diffusion of artifact styles. During this time style was used as a way to create boundaries and chronologies for cultural groups. It was assumed that groups would adopt new styles as soon as they were learned. The theory of diffusion did not consider the effect that social and ideological contexts of style production have on the distribution of specific artifact styles, instead it removes the artifact from its social context (Gebauer 1987:224). Diffusion and normative theory catalog change in the archaeological record, but does little to explain it.

With the increasing popularity of New Archaeology in the 1960s, which focused more on explanation (rather than description) of the archaeological record, theories about style began to

change from simply cataloging the boundaries of certain styles to interpreting why specific patterns of style distribution occurred. Social interaction theory was developed during this period to try to identify social organization through variation in design styles. This theory assumes that stylistic similarity and variation is a direct reflection of spheres of social interaction; therefore social units can be identified by looking at clusters of stylistic traits (Gebauer 1987:224). Archaeologists such as William Longacre (1970) and James Hill (1970) used this theory to explain the frequency of certain design elements painted on pottery as a reflection of post marital residential patterns.

Archaeologists during the late 1970s and 1980s argued against social interaction theory, pointing out major flaws in the basic assumptions of the theory. In 1977 Martin Wobst stated that "stylistic analysis has become a boring routine which rests on shaky foundations" (Wobst 1977:317). Social interaction theory as used by Longacre (1970) and Hill (1970), for example, assumed that women reproduced the stylistic designs that they learned from their mothers, but ignored that women learn designs from other sources as well. The theory also did not take into account that social, political, or religious factors may affect the designs chosen for reproduction. These studies also assumed that ceramics found in individual structures were produced in those structures and not traded among households or villages (Plog 1978:148–153). Other archaeologists have noted through ethnographic research that design styles do not necessarily reflect interaction, contrary to the basic tenets of social interaction theory. Some designs may cross very distinct social boundaries while others may have a bounded distribution even though interaction is common across that boundary (Gebauer 1987:225).

As archaeologists began to criticize the passive nature of social interaction theory they began to suggest that style played an active role in society as a way of expressing individual and social identity: style was used specifically to communicate information to individuals who viewed objects embedded with it (Gebauer 1987:225). One of the earliest proponents of style being used as a form

of communication was Wobst (1977), who argued that (instead of contrasting style with function) style has a function—to communicate information.

Material culture is an important part of human life and requires energy expenditure during creation, so it makes sense to encode messages in the style of material goods thereby helping to decrease the energy required to convey those messages to certain groups (Wobst 1977:322). Wobst focused on energy expenditure to determine which groups were communicating what information to which other groups. He suggested that if the information receiver was too closely connected to the information emitter, then relaying the message through style would not be cost efficient since it would be much easier to simply relay the message in person. Wobst (1977:323) stated that "there are few messages which would not be known already, or which could not be communicated at lower cost in other modes of messaging, in the context of the household." However, if the receiver were too socially removed from the emitter, then there is a chance that the receiver will not be able to decode the message, also making it a non-cost effective way to convey a message. He therefore concluded that messages encoded into the style of material goods are most likely used to convey information to individuals at a medium distance from the emitter, and therefore are likely to be highly visible.

Because of the limitation of efficiently conveying a message through style, only certain types of messages are likely to be conveyed; while "potentially any message could be expressed in this mode, only simple invariant and recurrent messages will normally be transmitted stylistically" (Wobst 1977:323). These messages include religious and political affiliations, personal rank or social status, and emotional state, among others (Wobst 1977). While Wobst argued that style should be used as more than a marker of chronological and cultural changes in prehistoric times, his focus on cost efficiency limited his scope of what types of messages could really be expressed through style.

Since his development of information exchange theory, many archaeologists have critiqued and refined his hypothesis. Wobst argued that only simple messages would be conveyed stylistically; however, ethnographic research has shown that very complex messages are also transmitted through style. "In general, researchers agree that the use of style is more complex than would be expected if efficiency were the only consideration…inefficiency or excess can convey important information, particularly information about power or status" (Hegmon 1992:520). Michelle Hegmon and others also argued against Wobst's argument that messages will be highly visible, having found that sometimes subtle variation can convey a message to those who are close to the emitter, "material visible only in private is more likely to convey messages about ritual or belief systems, whereas highly visible material often indicates group or ethnic boundaries" (Hegmon 1992:521).

Another weakness of the information exchange theory is that it ignores how style is produced and transmitted across space and time, which was the primary goal of the social interaction theory. Since information exchange theory was presented as a contrast to social interaction theory, it is understandable that Wobst and others ignored this aspect of style; however, archaeologists soon realized that the information gained about social structure and interaction networks from both theories was useful in constructing a usable theory of style (Kintigh 1985). Keith Kintigh (1985:38) argued that "while the two theories have been contrasted they are not completely contradictory, nor do they produce entirely contradictory expectations."

Although information exchange theory was one of the first to consider style as an active part of culture, it did so "in the sense that [style] functions in a cultural system; however, the theory gave little consideration to the active role of the people who create and use the style" (Hegmon 1992:522). Archaeologists have since broadened the ideas presented by Wobst to include different types of style and consider style as an action of human agents (Hegmon 1992:522). Different types of style are not mutually exclusive and may occur in the same object. What types of style can be

identified in objects partly depends of how "style" is defined, and many definitions exist. Polly Wiessner defined style as "formal variation in material culture that transmits information about personal and social identity" (1983:256). Based on this definition she suggested that the only way to understand how style was used in the past is to better understand the basic principles of style in the present. Using ethnographic studies she argued that style is a way of identifying oneself in comparison to others:

> style… has a behavioral basis in the fundamental human cognitive process of personal and social identification through stylistic and social comparison. In this process, people compare their ways of making and decorating artifacts with those of others and then imitate, differentiate, ignore, or in some way comment on how aspects of the maker or bearer relate to their own social and personal identities [Wiessner 1985:161].

Unlike Wobst's information exchange theory, Wiessner acknowledged that stylistic comparison happens among individual who have limited contact as well those who interact every day; however, she suggests that the type of style being expressed is different in the two situations. She proposed two types of style, which she called "emblemic" and "assertive."

Emblemic style is "formal variation in material culture that has a distinct referent and transmits a clear message to a defined target population about conscious affiliation or identity" (Wiessner 1983:257). This type of style is generally used to signal group identity, including representative emblems (e.g., flags), to outsiders. This type of style could be used to signal and maintain social boundaries. In the archaeological record this type of style should be present across the region that it represents. Emblemic style corresponds more with the information exchange theory since it is

used to send a message to people at a moderate distance, and does not necessarily reflect social interaction as is suggested in the social interaction theory.

Assertive style is "formal variation in material culture which is personally based and which carries information supporting individual identity" (Wiessner 1983:258). This type of style can cross-cut the social boundaries represented through emblemic style, and is more likely to show interaction as is suggested in the social interaction theory.

James Sackett (1977, 1982) defined style as "a highly characteristic manner of doing something that by its very nature is peculiar to a specific time and place" (1982:64). He discussed two different ways to interpret style: isochrestic, his new approach to style analysis, and iconological, the current method of style analysis at the time. His ideas of how to interpret style in the archaeological record were in many ways a response to the idea in archaeology that style is the opposite of function. Style had often been contrasted to function using the logic that the utilitarian component of an object has a clear function; any portion of an object that is non-utilitarian is therefore a stylistic component of that object. The two complement each other, but they are distinct and identifiable parts of an object (Sackett 1977). Sackett argued against this view saying that, especially for highly utilitarian objects such as projectile points, "it seems entirely reasonable to expect chance alone to dictate that most of those that are stylistically significant are at the same time functionally significant in the techno-economic sense" (Sackett 1985:157). Style is a part of function and they should not be considered separate attributes; for example, a seemingly utilitarian object may simultaneously carry meaning about an individual's social standing and ideological beliefs. The isochrestic approach to style examines the choices artisans made given the large range of functionally equivalent choices. Sackett argued that a large range of options exist that have functionally equivalent outcomes:

> style enters the equation when it is recognized that the choices artisans make among the range of options potentially available to them tend to be quite specific

> and consistent, and that these are dictated largely by the craft traditions within which the artisans have been enculturated as members of social groups. In other words, there are in material culture highly specific patterns of isochrestic variation that are socially bounded and that therefore may be regarded as idiomatic or diagnostic of ethnicity [Sackett 1985:157].

The isochrestic variation is a way to identify ethnicity, but is not concerned with explaining the significance of any given stylistic attribute.

Sackett stated that iconological style "ought to be narrowly equated with specific elements of nonutilitarian formal variation which function symbolically as a kind of social iconology to identify human groups" (1982:80, emphasis in original). The iconological approach is often used on highly decorative artifacts such as pottery to explain variation in terms of social interaction or intentional information exchange. While Sackett acknowledged that this approach to style can be useful in interpreting obviously non-utilitarian artifacts, it is not a useful concept for considering variation in utilitarian artifacts such as lithic tools. He suggested that examining tools in terms of isochrestic variation is more practical since the variation is more likely to be a result of chance and tradition rather than an active choice being used as an emblemic message.

Ian Hodder, while agreeing to some extent with Wobst that style transmits social information, and Wiessner that style allows people to express identity through comparison to other groups and individuals, argued that these explanations are too simplistic (1990:44). Style has an even more active role in society than simply being purposefully embedded in objects to transmit information since "material culture transforms, rather than reflects, social organisation according to the strategies of groups, their beliefs, concepts, and ideologies" (Hodder 1982:212). The dialectic between style and interpretation plays an important transforming role in society (Hodder 1990). Hodder presented a broader definition of style, defining it as a "'way of doing' where 'doing'

includes the activities of thinking, feeling, being" (1990:45). This broad definition is meant to encapsulate that everything, even non-cultural things, has style since "everything has a function, and equally everything is done in some manner" (1990:45). What was important to Hodder was interpreting individual events in reference to a "general way of doing," meaning that style is impossible to interpret outside of its context. Style is not objective; it is given meaning though its relationship with the generally accepted way of doing a particular task.

Through his ethnographic field work in Kenya, Hodder looked at the active role of different objects in the social structure. He "considers how calabash containers and their decoration—which are made and used by women—represent symbolic and structural contrasts between milk and blood, or women and young men. He links these contrasts to the structure of social relations" (Hegmon 1992:525). Hodder also found that while some material objects could be used as boundary markers, others cross-cut cultural boundaries. Specifically, Hodder saw how "regional material culture tribal boundaries in the Baringo district [were] maintained and re-enacted from day to day in the trivia of pots, trinkets, stools, eating bowls and cooking hearths. This repetitive symbolic action constitute[d] and reconstitute[d] the regional dichotomies where interaction between tribes is frequent and the movement of people across borders common" (Hodder 1982:84). How an artifact is used certainly depends on its context, therefore material culture needs to be considered as part of the "whole."

Hegmon dealt with issues of style in her analysis of ninth century painted ceramic design styles in the northern Southwest (1990, 1995). She adapted Hodder's definition and defined style in her analysis as "a way of decorating pottery with painted designs" (1995:9). Like Hodder, she argued that design style cannot be considered separately from other aspects of a society. Since it is nearly impossible to interpret what specific designs may have meant to a particular prehistoric society, looking at differences and similarities of design styles at different levels (e.g., design elements

versus design layout and symmetry) in conjunction with the social contexts in which they are found can lead to a broad understanding of the meaning of prehistoric design styles (1995:242–243).

Design Symmetry

Dorothy Washburn has argued that archaeologists need to look beyond traits specific to certain artifact types (such as vessel form or specific painted motifs) and focus more on attributes that crosscut artifact types such as symmetry, orientation, color, etc. (1989, 1999; Washburn and Crowe 1988). She suggested that archaeologists can do more than simply describe human behavior if "they can link the biologically hard-wired adaptations accrued over the millions of years of primate and hominid evaluation to the ways human beings use these evolved capabilities to perceive, process, and experience stimuli and to respond to it in ways we have described as 'cultural" (1999:547). Perception is the "way organisms visually receive, organize, and structure information from the environment" (Washburn 1999:550). Humans search for certain "enduring properties" when they view the world; one of these properties is symmetry. Symmetry is so important in perception that we even sometimes see things as symmetrical that are not. She proposed that symmetry reflects the structure of the culture creating it (1989, 1999, 2011). By understanding symmetry archaeologists can begin to understand why certain aspects of objects display cultural identity. She has shown that individuals are drawn to symmetries that are familiar to them, such as those commonly displayed on pottery or textiles, whether or not the actual motifs being used in the designs are familiar (Washburn 1989). She stated that "decorative traditions that display consistency in structure over time and space can be assumed to have been generated by members of a cohesive cultural group who shared the same principles and practices for living" (Washburn 2011:277). Considering design symmetries provides a more objective way to consider design and potentially how it is linked to the society that created it.

CONCLUSION

Style is used in many different including to communicate information, signal identity, reinforce social structure, and create and maintain social boundaries. Style also has different levels of meaning. The meaning of the designs on a bowl is likely very different in the context of a single household compared to the context of an entire village or when viewed by an outsider. The meaning of style is difficult to understand without first understanding the context in which it was used. As DeBoer (1990:82) has stated, "in wringing meaning from style…archaeologists are at a disadvantage; they were never the intended receivers of the messages style may carry."

Understanding the particular messages expressed through the designs painted on Fremont bowls and how these messages were transmitted and used at the household and village levelas well as across the larger Fremont region is difficult if not impossible, because modern archaeologists are so far removed the original context. However, as archaeologists gain a stronger and more comprehensive understanding of the Fremont, we will be able to better understand the role painted ceramic designs played in the Fremont regional system. A few recent studies have begun the attempt to understand the social and political practices of the Fremont at a village level (Richards et al. 2013), but our current knowledge is still very limited. There is, however, some data about inter-village exchange and interaction within the Fremont regional system (Janetski 2002, Janetski et al. 2011, Janetski and Talbot 2014) that may help recreate the larger context in which Fremont painted bowls were used. Within this broader context the design styles suggest interaction, exchange, and maintenance of social boundaries in the Fremont regional system.

3 Dataset and Methods

DATASET

The dataset for this project includes the designs painted on all known complete, reconstructed, and mostly complete Fremont painted bowls. Complete Fremont painted bowls are extremely rare and even large bowl fragments and reconstructed vessels are not very common. The dataset of whole bowls was supplemented by a sample of sherds from the Parowan Valley and Snake Rock Village (Figure 3.1).

The majority of the whole bowls for this project come from two areas, the sites in the Parowan Valley and Snake Rock Village in central Utah, and the bowls that were not recovered from these sites were likely produced at or near them.

The Parowan Valley

The Parowan Valley is thought to have been the largest known cultural center in the Fremont region. The Parowan Valley sites are located on an alluvial plain in Iron County in Southern Utah and include the sites of Parowan (42IN100), Paragonah (42IN43), and Summit/Evans Mound (42IN40) (Figure 3.2). The sites were occupied between A.D. 900 and 1300 with the most intensive occupation between A.D. 1000 and 1300. Although Snake Valley pottery was probably also produced elsewhere in the region, it is thought to have been produced most prolifically at these three sites (Watkins 2006).

In the 1800s it was reported that hundreds of mounds dotted the Parowan Valley. Only small portions of the sites have been excavated due to a lack of resources, and many of them have been

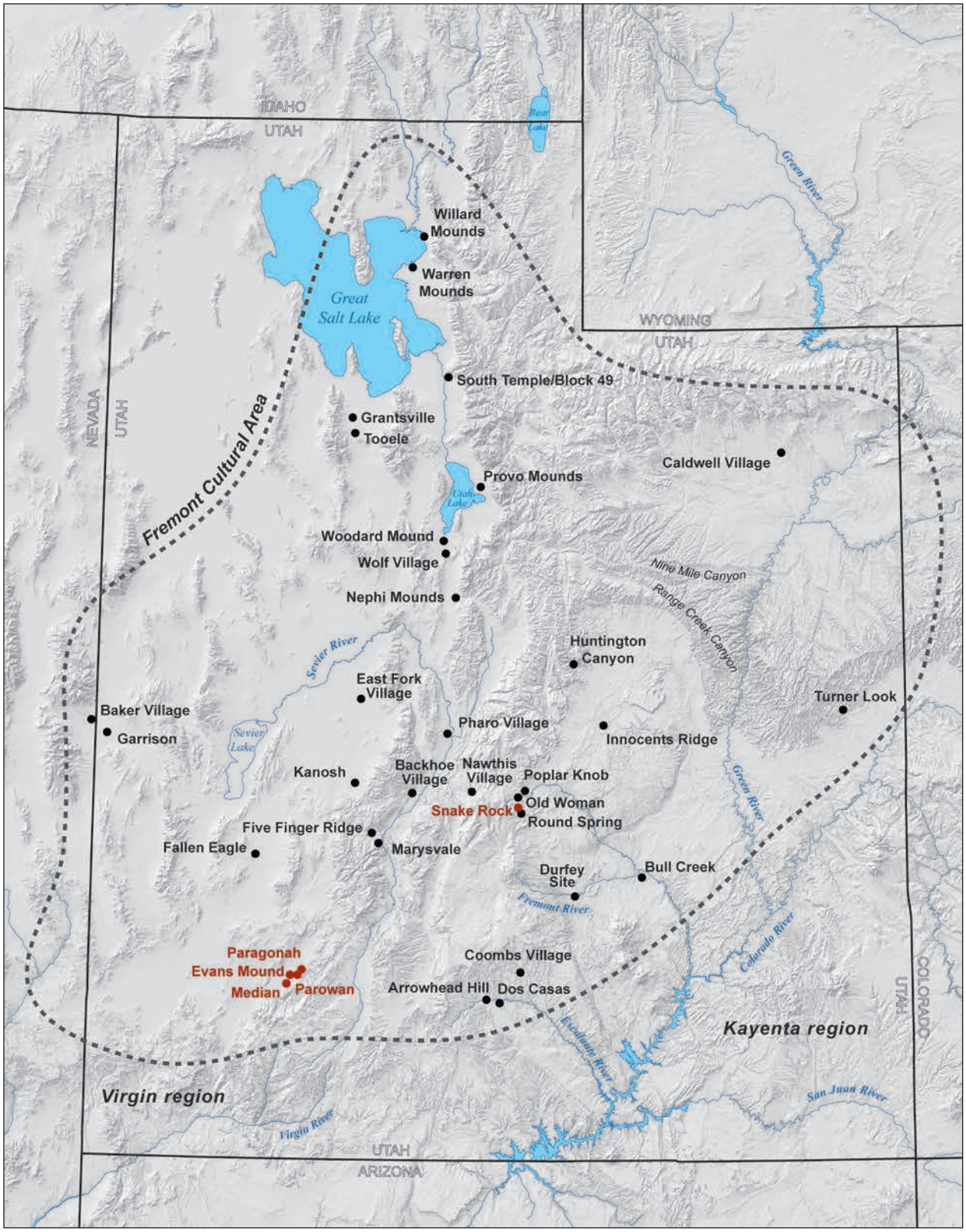


Figure 3.1. Map of the Fremont region with the Parowan Valley sites and Snake Rock Village highlighted. Adapted from Ure 2013 Figure 12.

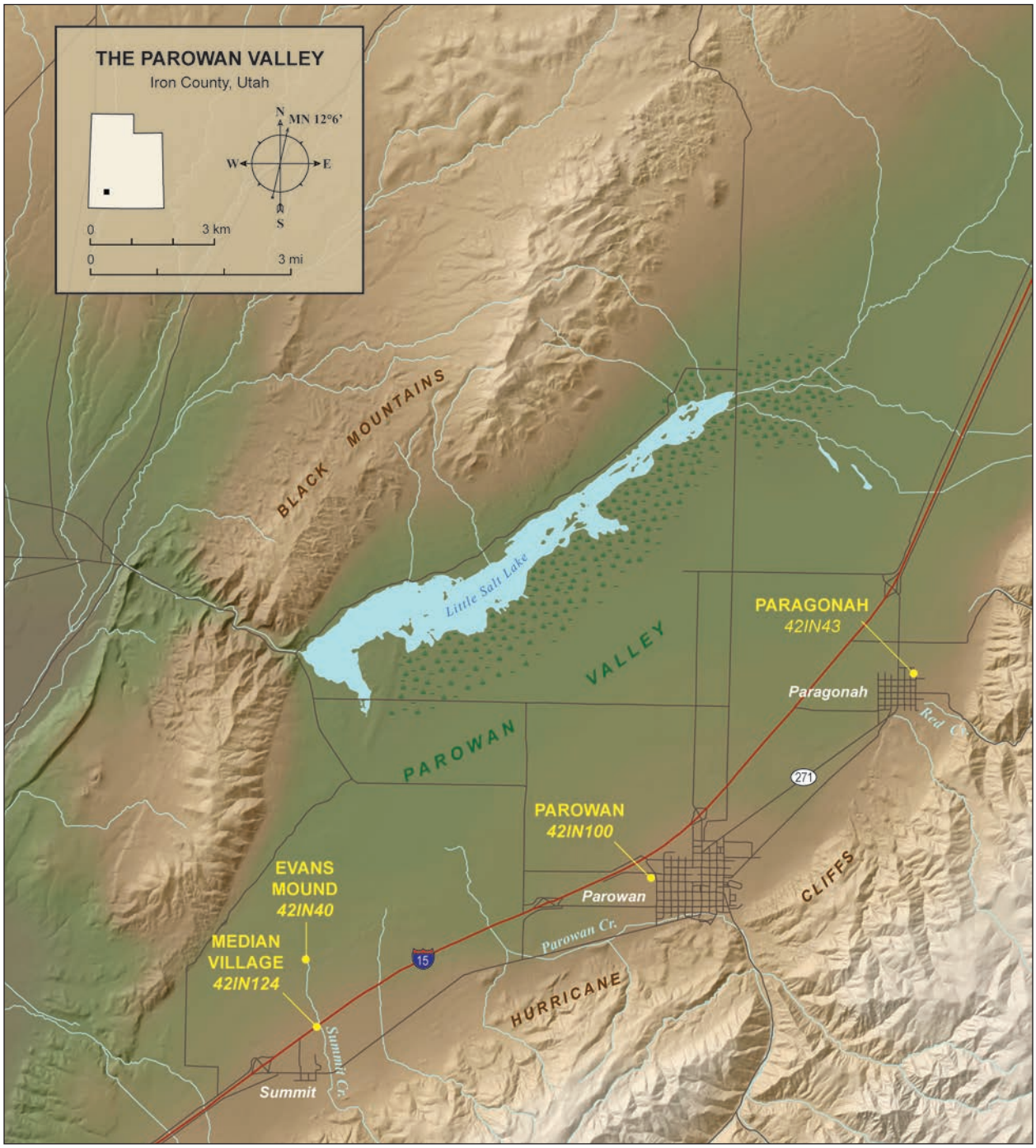


Figure 3.2. Map of major Fremont sites in the Parowan Valley, Utah. From Stauffer 2011:Fig.1.1

largely destroyed by plowing and development. Excavations to date have revealed 86 structures at Paragonah, 67 at Summit, and at least 13 at Parowan. Talbot has estimated that as few as 750 and as many as 1500 people may have lived in the Parowan Valley at its height (Ure 2013:120)

The first known excavations in the Parowan Valley occurred over 130 years ago, and the sites have been revisited by archaeologists many times since. The most intensive excavations were completed by the University of California, Los Angeles' (UCLA) field school from 1954-1964. Southern Utah University (SUU) and the University of Utah have also excavated in the Parowan Valley (see Ure 2013). The collections from UCLA's and SUU's excavations make up the Parowan Valley Archaeological Project (PVAP) collections currently being studied and housed at the Museum of Peoples and Cultures.

Snake Rock Village (42SV5)

Snake Rock is a Fremont village site located in central Utah in Sevier County near the mouth of Ivie Creek Canyon and is thought to be one of at least three sites where Ivie Creek ceramics were produced.

The site was not completely excavated, but a total of 26 structures were dug at Snake Rock including 13 pithouses, 4 above ground structures, 1 subterranean storage structure, and 8 tipi ring structures (Figure 3.3). There is no evidence that the tipi rings are contemporaneous with the other structures, but the authors noted them as Fremont due to a lack of non-Fremont cultural material at the site (Aikens 1967:3); however, if the interpretation of the features as tipi rings is correct then I am skeptical of their contemporaneity with the Fremont material because tipi rings are not present at any other Fremont site. The author's lack of stratigraphic evidence, radiocarbon dates, and use of negative evidence in the association of the "tipi rings" with the Fremont structures also makes me skeptical that they are contemporaneous.

Based on stratigraphic evidence, two occupations were noted at Snake Rock, but neither one has been satisfactorily dated. A juniper post from Structure 9, belonging to the second occupation, returned a date of 1965±80 B.C., which as Aikens (1967:2) says "conflicts strongly with the

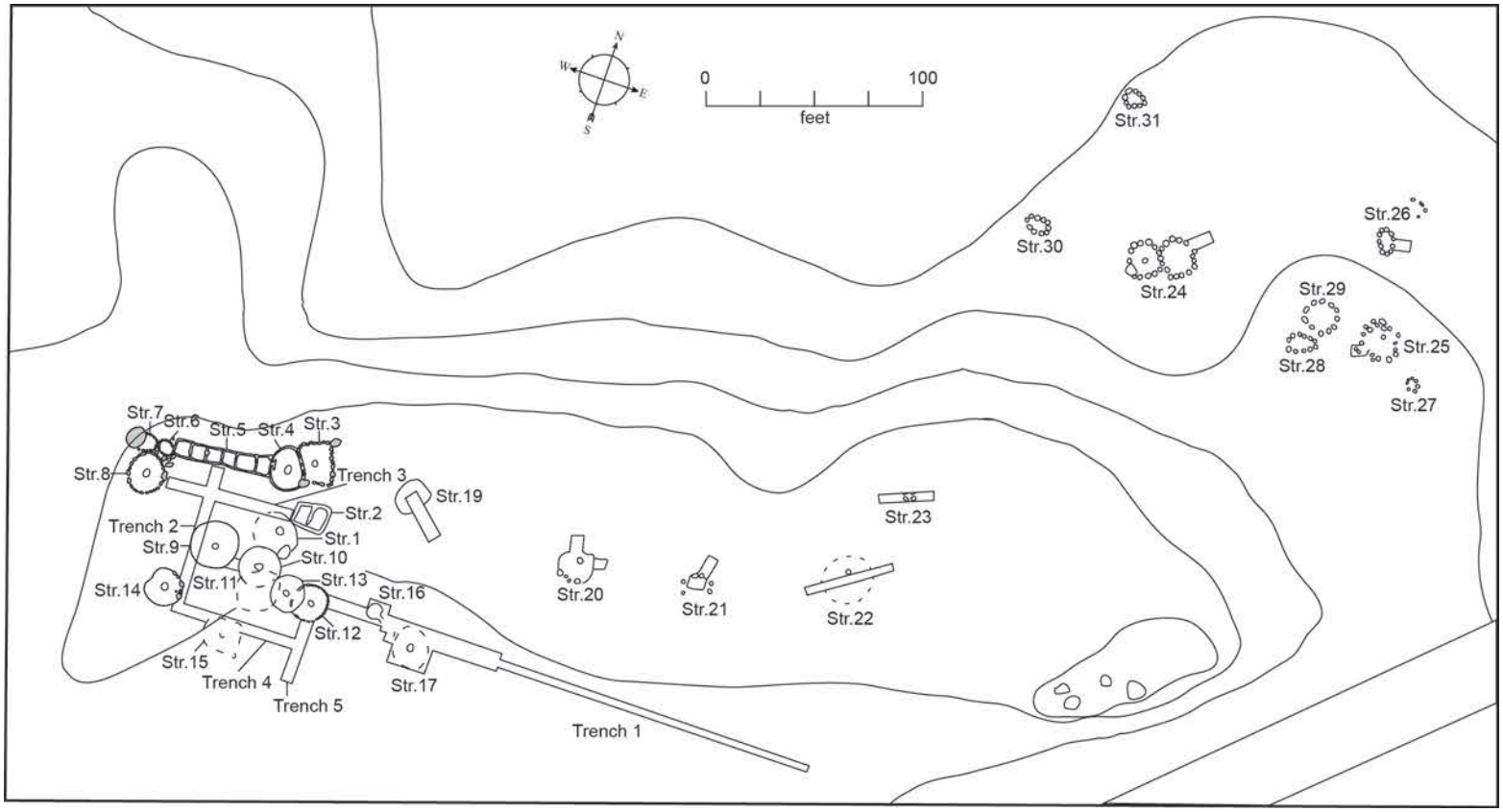


Figure 3.3. Map of Snake Rock Village. Redrawn from Aikens 1967 Figures 4 and 5.

cultural evidence for the age of the site and must be considered grossly in error." A second date was run on the same sample which returned a date of A.D. 445±95, which also seems too early for the cultural material. Aikens estimated the occupation of Snake Rock Village to be between A.D. 1075 and 1275 based on intrusive ceramics from Coombs Village. James Allison has recently run radiocarbon dates on corn from Snake Rock Village which suggest that the main occupation of the was in the A.D. 1000–1100s. The new dates also suggest that structures from the two different occupations that Aikens mentions were actually likely occupied contemporaneously (James Allison personal communication, 2014). Excavations at Snake Rock occurred in two phases. James Gunnerson first excavated at the site in 1956 and 1957 and dug a 75 ft by 3 ft trench. Few notes were kept from Gunnerson's excavations, and no Field Specimen (FS) log was kept. This made finding the proveniences of the artifacts recovered in those years extremely difficult. Aikens continued excavations at the site in 1964 when he expanded Gunnerson's original trench and added excavation units where it seemed necessary to explore possible structures (Aikens 1969:3). Aiken's notes are more detailed and include a FS log.

According to the Snake Rock report (Aikens 1969) 31,232 Fremont sherds were recovered from all excavations at Snake Rock, 2,918 of which were Ivie Creek Black-on-white.

Whole Vessels

The analysis for this thesis project includes every known whole or mostly whole Fremont painted bowl. The bowls are housed at 10 different museums (Table 3.1), although the majority of them came from excavations in the Parowan Valley in Southern Utah. Some of the Parowan Valley collections are on loan to the Museum of Peoples and Cultures (MPC) at BYU from the Fowler Museum at the UCLA and the repository at SUU. Additional collections from the Parowan Valley are located at the Natural History Museum of Utah (NHMU). Bowls from other collections were also analyzed at the NHMU and the Museum of Peoples and Cultures at BYU.

Table 3.1. Counts of whole vessels types and their locations.

Museum	Snake Valley	Ivie Creek	Unknown	Sevier
Anasazi SP	–	9	–	–
Church History	1	–	–	–
Fremont Indian SP	4	3	3	–
Hutchings Museum	–	3	–	–
Fowler Museum at UCLA*	33	1	–	–
Museum of Peoples and Cultures	2	1	–	–
Museum of the San Rafael Swell	1	1	–	–
Peabody Museum	3	–	–	–
Natural History Museum of Utah	15	16	1	1
Prehistoric Museum of Utah	–	2	–	–
Smithonsian	7	2	–	–

*This collection (PVAP) is currently on loan to the MPC from the Fowler Museum

Unfortunately, six bowls from the NHMU are missing. Three of these bowls are from the Grantsville site excavated by Julian Steward. The design analysis of these vessels was completed using photographs published by Steward (1936) and drawings in R. Madsen 1977. R. Madsen identified all three of the vessels as Ivie Creek Black-on-white, but no measurements such as rim diameter, height, or weight were documented. Drawings of two of the three other missing bowls were published by D. Madsen in an Antiquities Section Selected Papers on Backhoe Village (1977). The bowl measurements and temper identification were taken from the publication, although the weights were not available. The design analysis was completed from the drawings. The last missing bowl, from the University of Utah's excavations in the Parowan Valley, had been previously examined and photographed by Scott Ure of BYU who took all bowl measurements with the exception of weight, and the design analysis was completed from the photograph.

Additional bowls were located at Fremont Indian State Park. These vessels have been previously analyzed by Lane Richens, and his temper identifications were used. The bowls from this museum, all excavated from Five Finger Ridge, included a locally produced painted ware, which does not fit into the current classification for Fremont ceramics. Four bowls from Fremont

Table 3.2. Table showing the completeness of "whole" vessels by type.

Completeness	SVBG	ICBW	UNK	Totals
1/2	15	5	–	20
1/3	11	2	–	14
1/4	9	2	–	11
2/3	8	8	–	16
3/4	8	8	1	17
Almost Whole	10	6	1	17
Whole	4	10	1	15
Totals	65	41	3	109

Indian State Park are also missing and were analyzed from drawings. Measurements for these bowls were taken from the Five Finger Ridge report (Richens 2000).

Nine Fremont bowls were also located at Anasazi State Park. Lane Richens completed the temper identification and Scott Ure took bowl measurements. The designs were analyzed from the photographs taken by Ure. Additional vessels are located at the Smithsonian Institute, the Peabody Museum at Harvard, the Hutchings Museum, the Prehistoric Museum of Utah, the Museum of the San Rafael Swell, and the Church History Museum of the Church of Jesus Christ of Latter-day Saints. The bowls at the Museum of the San Rafael Swell were examined in their display cases, so no measurements were taken.

I was only able to locate 109 whole Fremont painted bowls. The bowls included in the "whole" vessel analysis are mostly partial bowls with more than ¼ of the vessel remaining. These vessels are referred to as "whole" bowls throughout this thesis. Only nine Ivie Creek and four Snake Valley bowls are actually complete or reconstructed completely (Table 3.2).

The majority of the bowls in this study are Snake Valley Black-on-gray (65) or Ivie Creek Black-on-white (38). Three Sevier Black-on-gray bowls are present in the collection, but they are included with the Ivie Creek vessels, bringing the count of Ivie Creek Black-on-white bowls to 41. Three additional bowls from Five Finger Ridge have unusual temper and were likely locally made

at or near the site. These bowls were considered separately from the Snake Valley Black-on-gray and Ivie Creek Black-on-white vessels.

Sherds

Whole vessels provide the most complete design data, but since there unfortunately are relatively few whole vessels the data was supplemented by sherds. Data about complete designs is generally not available on sherds, but data about smaller portions of the design such as the design elements and lines widths can be gathered from these smaller fragments. The sherds analyzed were from sites in or near the production zones for the two major types of Fremont painted pottery. Snake Valley Black-on-gray sherds from sites in the Parowan Valley and Ivie Creek Black-on-white sherds from Snake Rock Village were analyzed.

Design analysis was completed for 1,694 Snake Valley Black-on-gray sherds from the PVAP collection on loan to the MPC at BYU. The collection comes from excavations at Paragonah (42IN43), Parowan (42IN100), and Summit (42IN40) and includes over 17,000 painted rim sherds and an unknown number of painted body sherds. A complete analysis of the collection was impractical my thesis project. A sample of sherds from the floor-zone of structures was selected for analysis. The UCLA PVAP excavations (where the majority of the sherds are from) were completed in five by five feet grids and six inch levels. "Floor zone" sherds include any sherds found in a five by five foot grid and six inch level directly above a floor, so some of the sherds may have been found outside of but in the same grid as a structure. Unfortunately, this is the best provenience information available. The sherds from these contexts were chosen in part to ensure the sampled sherds had some meaningful context and in part because it coincided with the research aims of the Offic of Public Archaeology (OPA)in regards to the PVAP project. OPA received a grant from the Utah Transportation Authority that covered the costs of a design analysis of PVAP painted sherds. The number of Snake Valley Black-on-gray sherds analyzed is much higher than

Ivie Creek Black-on-white sherds analyzed for this reason. Two Ivie Creek sherds and one Ivie Creek bowl were found in the PVAP collection and analyzed.

The ceramic analysis for the PVAP project had a wider scope than just a design analysis. The project also included the analysis of 44,727 sherds, 22,145 of which were painted. The sample included all sherds found in floor-zone contexts and all rim sherds in the collection. A design analysis was only completed for the painted floor-zone sherds and not the painted rim sherds; however the data gathered from the painted rim sherds (e.g. rim diameter, presence of fugitive red, form, etc.) will be used when discussing the general characteristics of painted sherds.

One-hundred-and-fifteen sherds were analyzed from the Snake Rock site (42SV5), one of three sites where Watkins (2009) suggests Ivie Creek Black-on-white was produced. One-hundred-and-eight of these sherds are Ivie Creek Black-on-white, the other seven are Snake Valley Black-on-gray. All of these sherds were part of the Snake Rock collection at the NHMU. The initial goal was to complete a design analysis of all painted sherds from floor zone contexts, but due to the state of the notes and the collections this proved to be difficult. The collections were organized by sherd type and not field specimen (FS) number making it difficult to find specific artifacts belonging to specific features. All sherds with FS numbers corresponding to floor zone contexts were analyzed; however only a few sherds supposedly from floor zones were actually located in the collection, and large sherds from other proveniences with complete design elements were used to supplement the data.

METHODS

Design analysis has a long history in the American Southwest. The most commonly used methods are hierarchical ones, first made popular by Charles Amsden (1936) and refined by many later archaeologists. Amsden was trying to create a system to record designs that could be used by archaeologists anywhere in the Southwest and would produce data that could be compared across

design styles. He established the hierarchical system by looking at overlapping lines on vessels to determine what was drawn first. He identified three stages to painting a vessel, the first step is defining the design field, where the painted design will go, the next step is subdividing the design field, and the final step is using various design elements to fill the space (Amsden 1936:6–7).

Amsden argued that as long as the classification categories were chosen well then the analysis "should be largely free of human bias or error" (1936:36). Unfortunately, objectively identifying and quantifying painted designs on pottery has proven to be difficult. Identifying design layouts, motifs, and elements has often proven to be a subjective task that is difficult to replicate from analyst to another. E. W. Jernigan (1986), among others, has argued against this system and proposed a new one, unfortunately with its own set of problems. Despite its flaws, a hierarchical system of analysis was used in this study. Design layouts and symmetry as well as design units and elements were all identified (as described below).

A basic ceramic analysis was also completed for all sherds and vessels in the study. This analysis included identifying ceramic series, vessel form, weight, exterior and interior surface finishes, the presence of a fugitive red wash, modifications such as drill holes or ground edges, and the rim diameter of all rim sherds with more than 10 percent of the rim remaining. These same characteristics, with the exception of weight, were recorded for all 44,727 sherds analyzed as part of the ceramic analysis of the PVAP collection.

Design layout

The first aspect of design to be considered was the design layout, which has been defined by Allison as "major spatial subdivisions of a design field, which provide a framework around which the rest of the design is organized" (Allison 2010:69). Various publications provide a list of design layouts common in different regions of the Southwest at different times (Amsden 1936; Colton 1953;

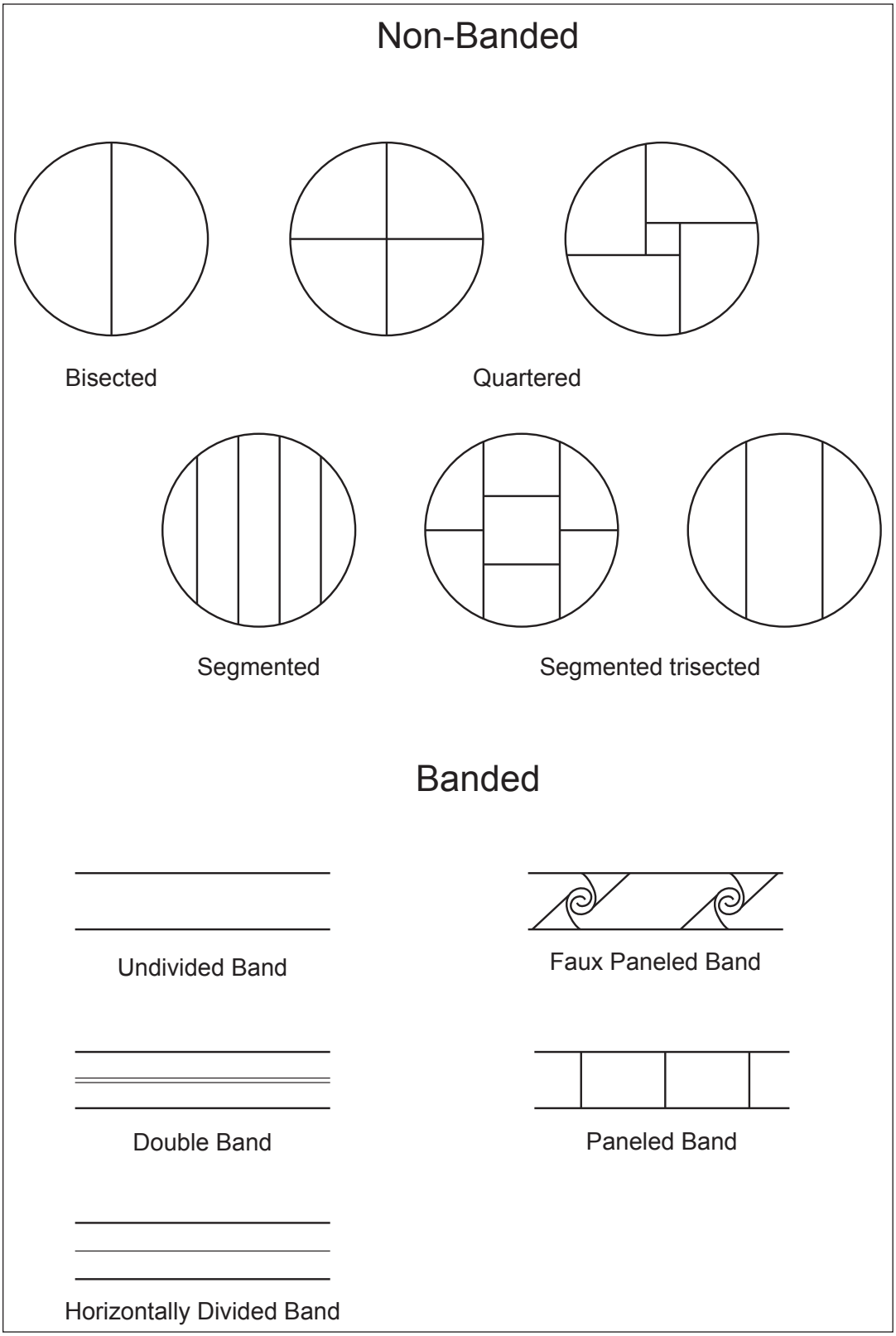


Figure 3.4. Design layouts common on Fremont bowls.

Crown 1994 among others). One of the most basic divisions in design layout is between banded and non-banded designs. Most Fremont designs fit into one of 10 layout categories (Figure 3.4).

Design symmetry

Symmetry is another important consideration in this study. Dorothy Washburn has discussed the importance and significance of symmetry studies in multiple publications (Washburn and Crowe 1988; Washburn1999, 2011). She sees symmetry not only as another tool in recording and analyzing designs, but also as a salient attribute of designs that have been "imbue[d] with culturally meaningful metaphors" (1999:558).

Washburn identifies three basic types of design symmetry that can move along a plane in one of four basic rigid motions: reflection (where an object is reflected across a line), translation (where an object is shifted along a line), rotation (where an object is rotated around a fixed point), and glide reflection (where an object is shifted along a line and then reflected across that line) (Figure 3.5). These basic motions are used to make designs that can exhibit three basic types of symmetry: one-dimensional (where the pattern moves continuously along one plane), two-dimensional (where the pattern can move continuously along two planes), or finite (patterns that do not move continuously along a plane) (Washburn and Crowe 1988:44–55) (Figure 3.6).

Washburn and Crowe identify different motions possible in the three types of symmetry and include a coding system, which was used in this analysis. Seven different types of one-dimensional symmetry are possible, four of which are found on Fremont bowls. A "p" (indicating one-dimensional symmetry) followed by a series of numbers and letters are used to record if the design has vertical reflection, horizontal or glide reflection, or can be rotated 180 degrees. Figure 3.7 illustrates each type of one-dimensional symmetry along with its corresponding code. Washburn also describes 17 types of two dimensional symmetry; however, because two-dimensional symmetry is so rare on Fremont vessels, designs were simply marked as two dimensional, and the specific type was not

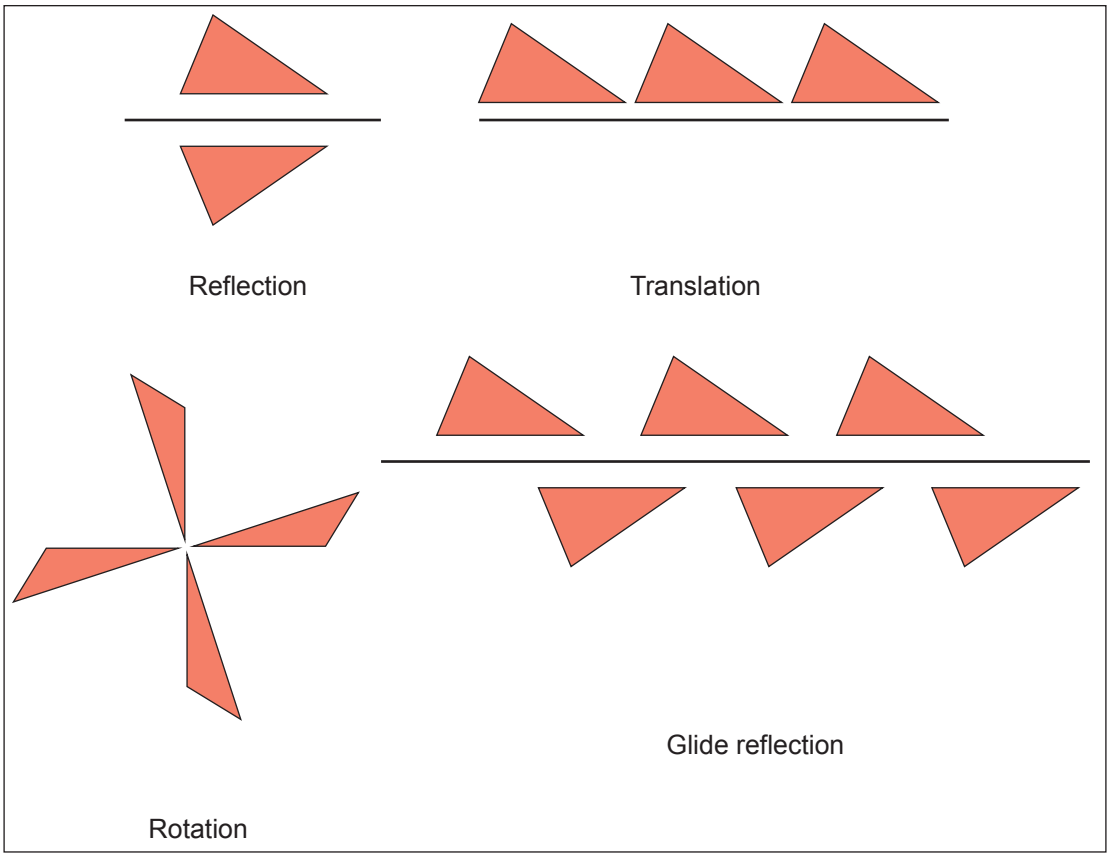


Figure 3.5. The four basic rigid motions that an object can move along a plane.

recorded. Designs with finite symmetry are patterns that exhibit symmetry, but cannot be perceived as extending infinitely along any plane. These designs exhibit either cyclical (rotational) or dihedral (reflection) symmetry. Rotational symmetry is recorded with a "c" followed by the number of times the design can rotate around the bowl. Dihedral symmetry is recorded with a "d" followed by the number of reflection lines. A symmetry analysis was conducted for the design layouts.

Design units

A design unit, as used in this study, is based on Allison's concept of design units used in the Animas-La Plata ceramic analysis (2010), which was adapted from E. Wesley Jernigan's concept of design schemata (1986). Jernigan argued against using a hierarchical system for the classification of ceramic design stating that the terms "layout," "motif," and "element" are poorly defined

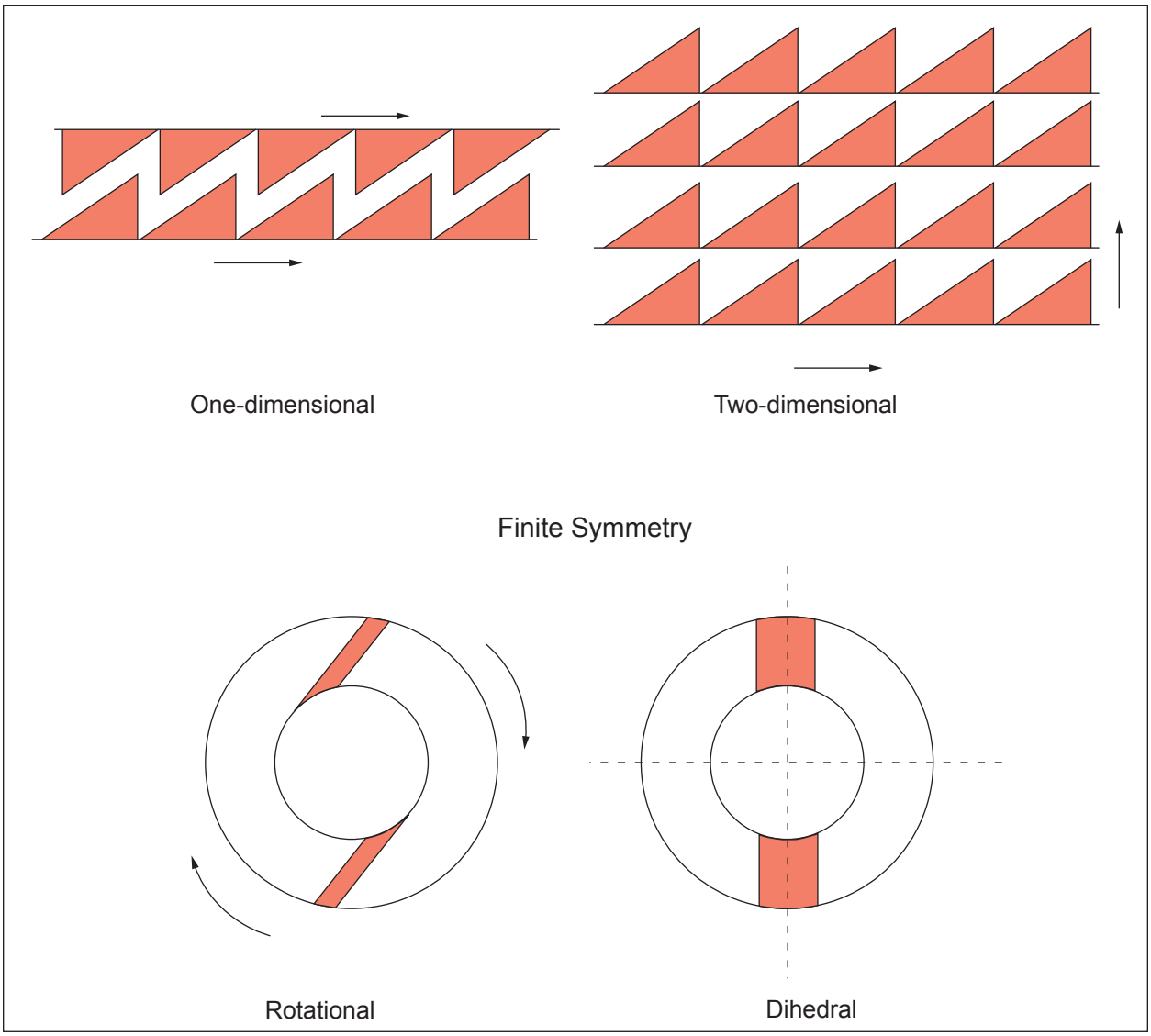


Figure 3.6. The three basic types of symmetry.

making them impossible to identify consistently. He also argued that the system implies an emic knowledge of design styles to be able to identify what the artisans considered a layout, motif, or element or what they would have drawn on a vessel first. He instead proposed the concept of a non-hierarchical system which identifies "schemata" on a vessel. A schema is "a configuration or pattern of configurations for which we have evidence that the configuration or pattern was conceived as a distinct unit by the makers of the style" (1986:9). In this system schemata are identified through their repetition in an assemblage, and each schema is analyzed on the same level as the other schema

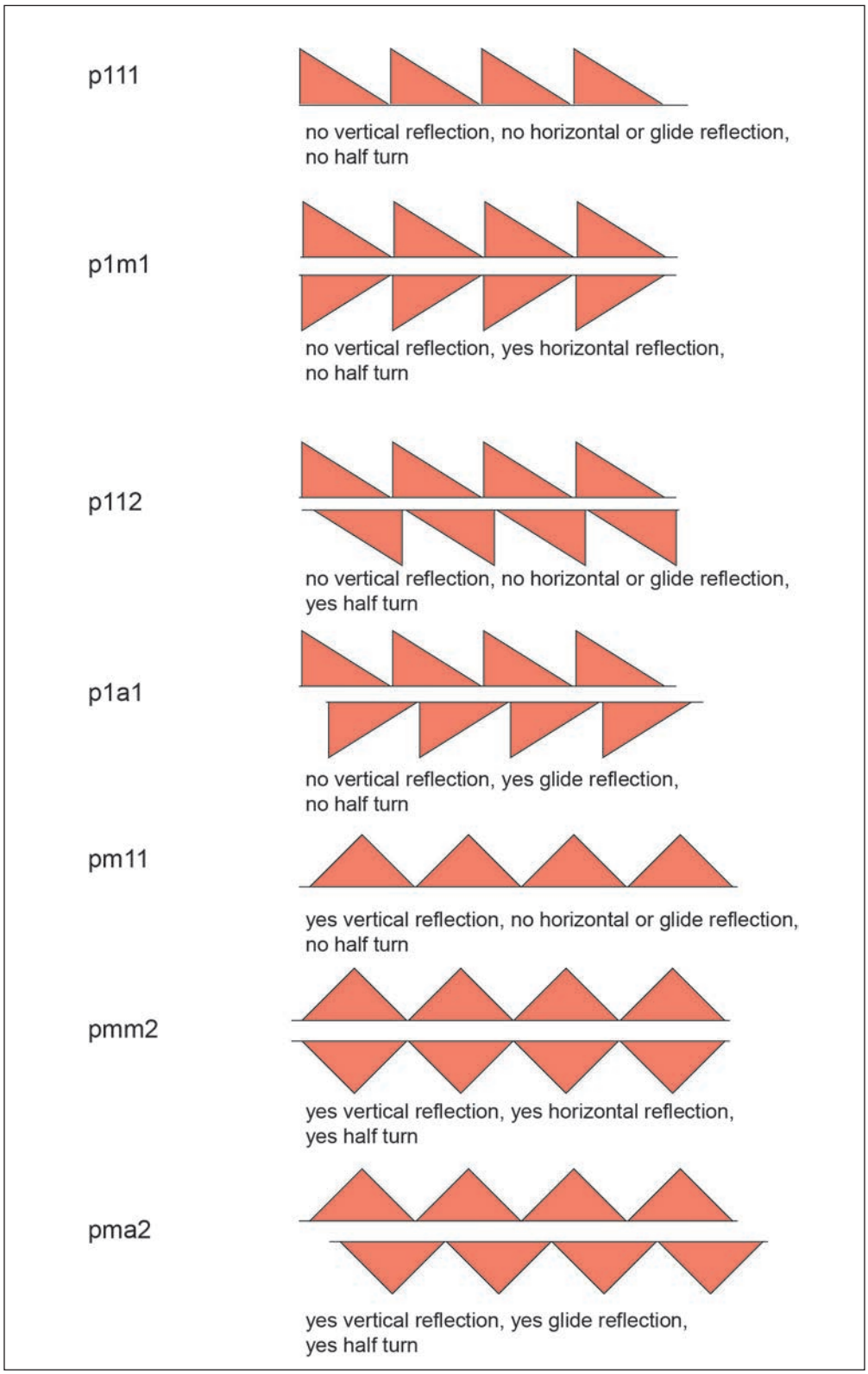


Figure 3.7. The seven types of one-dimensional symmetry.

and can therefore be compared to each other. For example the framing lines of a band would be considered a schema as would the parallel lines dividing the band into panels and the row of triangles in between each panel line. In this way the framing lines, the parallel lines, and the row of triangles would be compared to each other and there is no assumption that one was drawn before the other or that the parallel lines were drawn to create panels, they are simply part of the design. The idea is that by looking at a large assemblage of vessels the analyst can identify designs that repeat on multiple bowls and hopefully begin to identify the designs that the artisans considered part of their design style. Allison used portions of Jernigan's ideas to identify what he calls "design units" on the ceramics from the Animas-La Plata Project as a way to bridge the design gap between a layout and an element. He defined design units as "a segment of the design containing contiguous or closely spaced elements" (2010:85). Design units, as Allison puts it, are also "less theoretically laden" than schemata, which propose to be an emic view of prehistoric design.

This analysis uses Allison's definition to attempt to identify designs on a larger scale than the design element. It was often difficult to consistently determine what should be a considered a design unit. Different categories were created and recorded for each variation of design, and design unit designations were double checked for consistency; however, determining what should be considered a design unit was still a difficult, and unfortunately, sometimes inconsistent task. Recording each variation of a design, while thorough, did not provide useful data. Each design unit only repeated one or two times. The designs were eventually lumped into categories based on the structure of the design. Smaller details of the designs such as design fill were ignored. In many cases triangles and stepped solids were used interchangeably in the designs. Lumping the data based on design unit structure provided more useful and patterned data. Both the split and the lumped design units were recorded using a two letter code, the first as "design unit" and the second as "type of design unit."

Design elements

The final step of the design analysis was to identify design elements. The analysis and recording of design elements has a long history in the southwest and has evolved considerably over the past sixty years (Allison 2010; Colton 1953; Hegmon 1995; Hill 1970; Longacre 1970; Plog 1980). I have based my system of analysis on one used by Allison for the Animas-La Plata ceramics, which he adapted from Hegmon's analysis of painted ceramics from the central Mesa Verde region and Black Mesa (1995). Design element analysis is useful because elements can be identified on sherds that are much too small to identify other aspects of design such as layouts or design units. The basic design elements on a sherd/vessel were recorded along with the characteristics of that element. The first characteristic was the presence of any secondary elements such as tick marks or fringe dots. Next the composition of the element was recorded. Most elements had a solid fill, but other compositions such as dots or hachuring were also present. The number of times the element repeated on a sherd/vessel was also recorded as well as how the element was used in the design (e.g. was it in a single line, in two lines offset facing each other, in a corner, etc…). This last category most commonly applied to triangles, but was recorded for other elements as well.

Additional information was recorded for lines. The type of line was recorded as was the minimum, maximum, and mode of the line width. The distance of the line below the rim was also recorded for all rim lines.

This analysis uses a hierarchical system where design layout and layout symmetry were identified as well as design units. Design elements and associated attributes such as secondary elements and composition were also be recorded along with line width measurements. The dataset for the analysis includes all known whole Fremont bowls as well as a selection of sherds from Paragonah, Parowan, and Evans Mound in the Parowan Valley and Snake Rock Village in central Utah. The following chapters presents the results from this analysis as well as interpretations of why these patterns are seen in the archaeological record.

4 Results and Analysis

Data was recorded for both the design attributes and basic ceramic attributes of painted Fremont vessels. The first section of this chapter discusses non-design attributes such as vessel dimensions and form, while the second section discusses the results of the design analysis. The final section of the chapter consists of a comparison of designs found on Snake Valley Black-on-gray and Ivie Creek Black-on-white bowls.

NON-DESIGN TRAITS OF FREMONT PAINTED BOWLS

The data for Snake Valley Black-on-gray vessels in this section is supplemented by data collected from 22,145 painted sherds and 22,582 non-painted sherds as part of the Office of Public Archaeology's analysis of the Parowan Valley Archaeological Project (PVAP) materials.

Surface finish

Fremont painted bowls, like many Fremont vessels, are polished. Snake Valley Black-on-gray vessels are unslipped. Ivie Creek Black-on-white is characterized as having a white slip on the interior of an Emery series vessel; however, around 17 percent of the painted Emery series vessels in this study were unslipped, but were analyzed with the Ivie Creek Black-on-white instead of as a separate Emery Black-on-gray type.

Fremont vessels occasionally have an exterior fugitive red wash, which is much more common on painted vessels than plain ones. A fugitive red wash was noted on 6.6 percent of non-painted

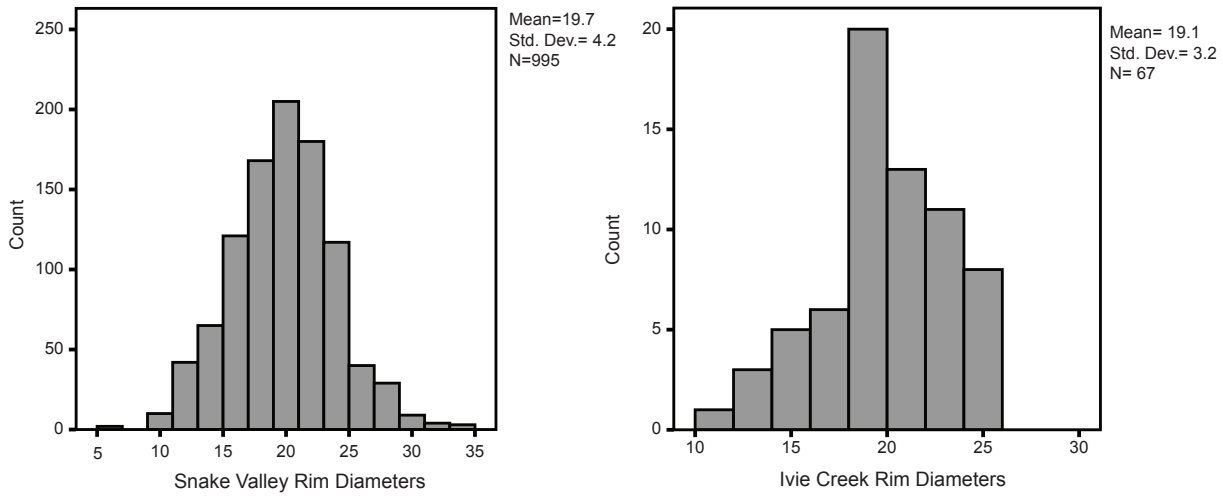


Figure 4.1. Histogram showing rim diameter measurements.

Snake Valley sherds in the PVAP analysis, compared to 28 percent of painted Snake Valley sherds/bowls. The data is not available for presence fugitive red on non-painted Emery series vessels, but is present on 24.6 percent of the bowls/sherds in this dataset.

Bowl dimensions

The rim diameter of all bowls (with the exception of the missing Grantsville bowls at the NHMU and the bowls at the Museum of the San Rafael Swell) and all sherds containing 10 percent or more of the rim was measured. Nine hundred and ten additional rim sherds from the PVAP collection were also measured. In total rim diameter measurements were available for 995 Snake Valley Black-on-gray sherds/bowls and 67 Ivie Creek Black-on-white sherds/bowls. The mean rim diameter for Ivie Creek Black-on-white bowls is 19.7 cm and Snake Valley Black-on-gray bowls is 19.1 cm. The biggest difference between the two types is the range of diameters. Snake Valley Black-on-gray bowls range from 5 to 34 cm in diameter, although there is a drop off in bowl diameter after 24 cm. Ivie Creek Black-on-white bowls only range from 10 to 24 cm, but this is probably due to sample size (Figure 4.1).

Table 4.1. Counts and percentages of painted vessel forms by type.

Forms	Snake Valley		Ivie Creek	
	Counts	Percentages	Counts	Percentages
Bowl	21,829	98.68	134	94.37
Jar	250	1.13	8	5.63
Unknown	33	0.15	–	–
Bi- or Tri-lobe bowl	8	0.04	–	–
Totals	22,120		142	

Bowl heights were measured for 32 Ivie Creek Black-on-white and 45 Snake Valley Black-on-gray bowls. The difference in mean bowl height was less than a centimeter with Ivie Creek Black-on-white at 8.2 cm and Snake Valley Black-on-gray at 7.6 cm.

Form

Snake Valley

As has been stated before, almost all Fremont painted vessels are bowls. As with the other basic ceramic attributes, the largest dataset for forms of painted ceramics is the PVAP collection, which mostly provides data for Snake Valley ceramics. Over 98 percent of all painted sherds analyzed as part of the PVAP project are bowls, a little over 1 percent are jar sherds and the remaining sherds are unknown types and one unusual type (bi- or tri-lobe bowls) (Table 4.1).

Different forms of Snake Valley bowls are found in the PVAP collection (Table 4.2). The most common type is a hemispherical bowl, which represented 99.5 percent of all bowls (Figure 4.2*a*); however three recurved bowls and numerous sherds of recurved bowls were also found in the collection (Figure 4.2*b*). D. Madsen (1970 Figure 44b) reported that a double recurved bowl was found at Median Village; although none were seen in this study. A few examples of bowls with indentations around the side of the bowl have were also found, and have been called indented bowls (Figure 4.2c). Interlocking scrolls were often drawn in the indentations; although the best

Table 4.2. Counts and percentages of painted bowl forms by type.

Forms	Snake Valley		Ivie Creek	
	Count	Percentages	Counts	Percentages
Bowl	21,717	99.45	133	99.25
Recurved Bowl	88	0.40	1	0.75
Mump Bowl	23	0.11	–	–
Bi/tri-lobe bowl	8	0.04	–	–
Recurved mump bowl	1	0.00	–	–
Totals	21,837		134	

example in the collection (pictured) has brackets drawn around the protrusion, but an empty space left in the center of it.

Eight painted bi- or tri-lobe bowl fragments were also found (Figure 4.2*d*). Most of these were center pieces; however a few wall sherds that flared out into the interior of two lobes of the bowl were also found. Bi- and tri-lobe bowls have not been reported at other Fremont sites, but a trilobe jar was found at the Bullcreek site (Lohse 1981). Meighan (1956:fig. 11) illustrates one of the wall sherds of a painted multilobed bowl, which is included in this sample.

The majority of the painted jars found in the sample are painted on the exterior; however a few have ticks or a single line running around the interior of everted rims (Figures 4.2*e,f*).

Ivie Creek

Over 94 percent of all Ivie Creek sherds/vessels examined are bowls. Eight jar sherds are included in the sample. Fewer vessel forms were found in the Ivie Creek assemblage than were documented in the Snake Valley collection; although the sample size for Ivie Creek is much smaller. All of the bowls are hemispherical, with the exception of one recurved bowl (see Tables 4.1 and 4.2).

Figure 4.2. Different Fremont painted vessel forms: a) hemispherical bowl, courtesy of Smithsonian Institute, A132976; b) recurved bowl, courtesy Smithsonian Institute, 288484; c) indented bowls, courtesy of the Fowler Museum, 433.226; d) bilobe bowl, courtesy of the Fowler Museum, 37.12568; e) painted jar exterior, courtesy of the Fowler Museum, 333.8673; f) painted jar interior, courtesy of the Fowler Museum, 433.806.

DESIGN ANALYSIS

The next step in the analysis was to record the designs painted on the bowls and sherds. This section presents the design data beginning with the design layout.

Design Field

The design field refers the area of the vessel that is painted. Although some painted jar sherds were analyzed, only the painted designs on bowls will be discussed here. The jars will be briefly discussed separately.

By far the most common design field is the interior side walls of the bowls just under the rim; however 17 percent of the vessels have designs that covered the whole interior of the bowl.

Layout

The first attribute to be considered in this analysis was the design layout or the way the design field was divided on a vessel. Nine different layouts were identified in the assemblage (not including six bowls with "other" layouts) (Figure 4.3, Table 4.3). Of these nine layouts only eight were present on Snake Valley Black-on-gray bowls and seven on Ivie Creek Black-on-white.

Bands

As is suggested by the design field, the most common type of layout on Fremont bowls is a band. 33 percent of the bands were divided into panels, 27 percent were divided by interlocking scrolls (faux-paneled bands), 26 percent of the banded designs did not have any further division of the design field, and the remaining 14 percent were broken up in other ways (Table 4.4).

Paneled bands

Paneled bands occur when lines perpendicular to the upper and lower framing line of a band are used to divide a band into panels. This type of layout is present on 20 Snake Valley Black-on-gray and 8 Ivie Creek Black-on-white bowls (Figures 4.4 and 4.5). Panels on Snake Valley Black-on-gray bowls are most commonly created using two or three parallel lines to create each panel; although a few panels were defined with four parallel lines. Most bowls of both types had

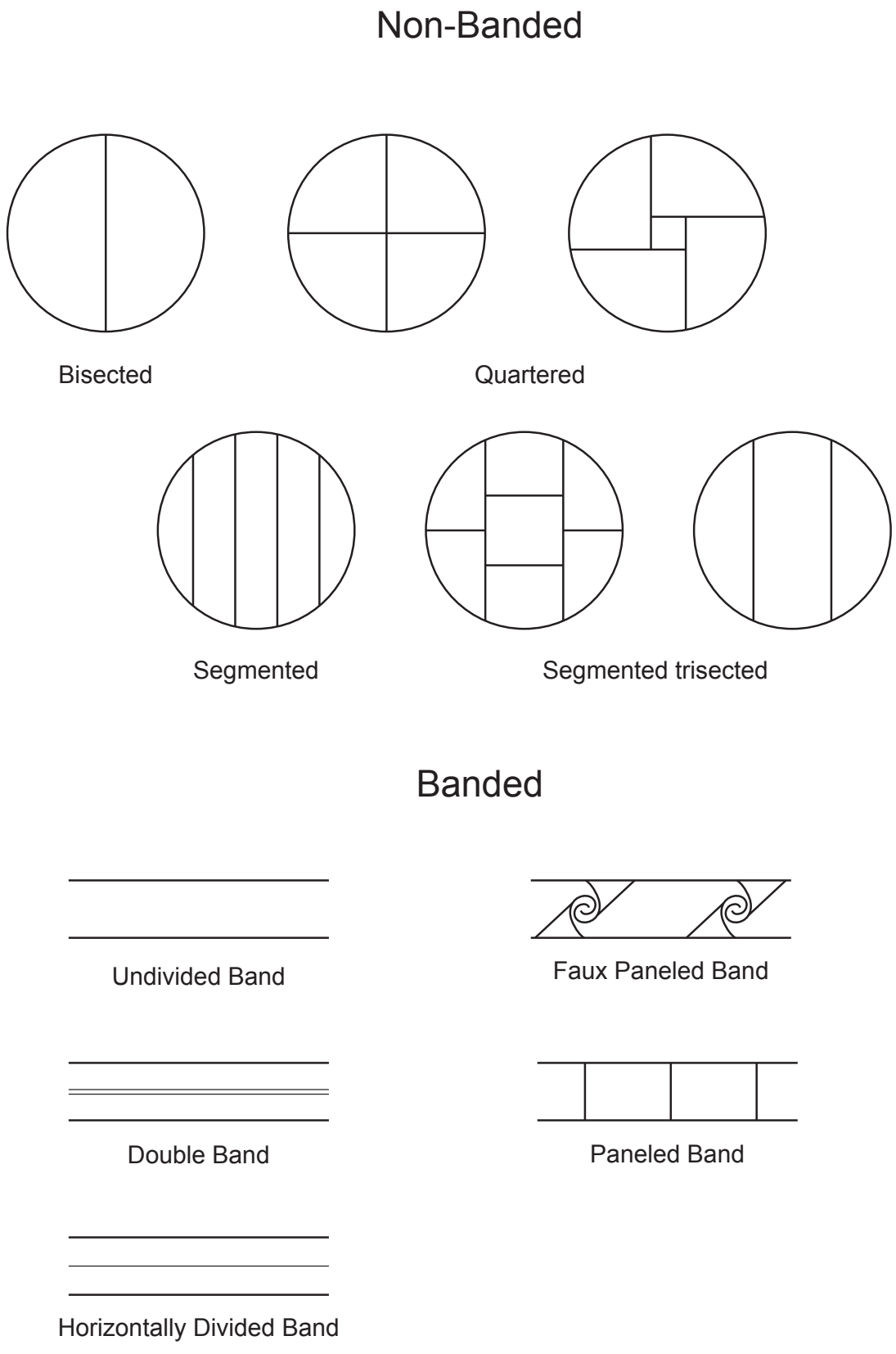


Figure 4.3. Design layouts present on Fremont painted bowls.

Table 4.3. Design layout count and percentages by type.

Layout	Snake Valley		Ivie Creek		Total	
	Counts	Percentages	Counts	Percentages	Counts	Percentages
Paneled	20	30.8	8	20.0	28	26.7
Undivided	12	18.5	11	27.5	23	21.9
Faux-paneled	11	16.9	15	37.5	26	24.8
Double	6	9.2	1	2.5	7	6.7
Horizontally Divided	1	1.5	–	–	1	1.0
Other banded	1	1.5	–	–	1	1.0
Unknown banded	2	3.1	–	–	2	1.9
Segmented Trisected	6	9.2	–	–	6	5.7
Segmented	3	4.6	1	2.5	4	3.8
Quartered	1	1.5	1	2.5	2	1.9
Bisected	–	0.0	1	2.5	1	1.0
Other	2	3.1	3	7.5	5	4.8
Totals	65		41		106	

Table 4.4. Banded layout counts and percentages by type.

Layout	Snake Valley		Ivie Creek		Total	
	Counts	Percentages	Counts	Percentages	Counts	Percentages
Paneled	20	37.7	8	24.2	28	32.6
Undivided	12	22.6	11	33.3	23	26.7
Faux-paneled	11	20.8	14	42.4	25	29.1
Double	6	11.3	1	3.0	7	8.1
Horitzontally Divided	1	1.9	–	–	1	1.2
Other	1	1.9	–	–	1	1.2
Unknown	2	3.8	–	–	2	2.3
Total	53		34		87	

four panels on a band. Either triangles or stepped elements were appended to the panel lines in either all four or opposing corners of the panel on all but two bowls. One of the bowls that does not conform to this pattern is a unique design with three larger panels containing a checkerboard fill alternating with three smaller panels containing an isolated interlocking scroll (Figure 4.4*g*). The other bowl has four rows of offset triangles facing each other in each panel (Figure 4.4*m)*.

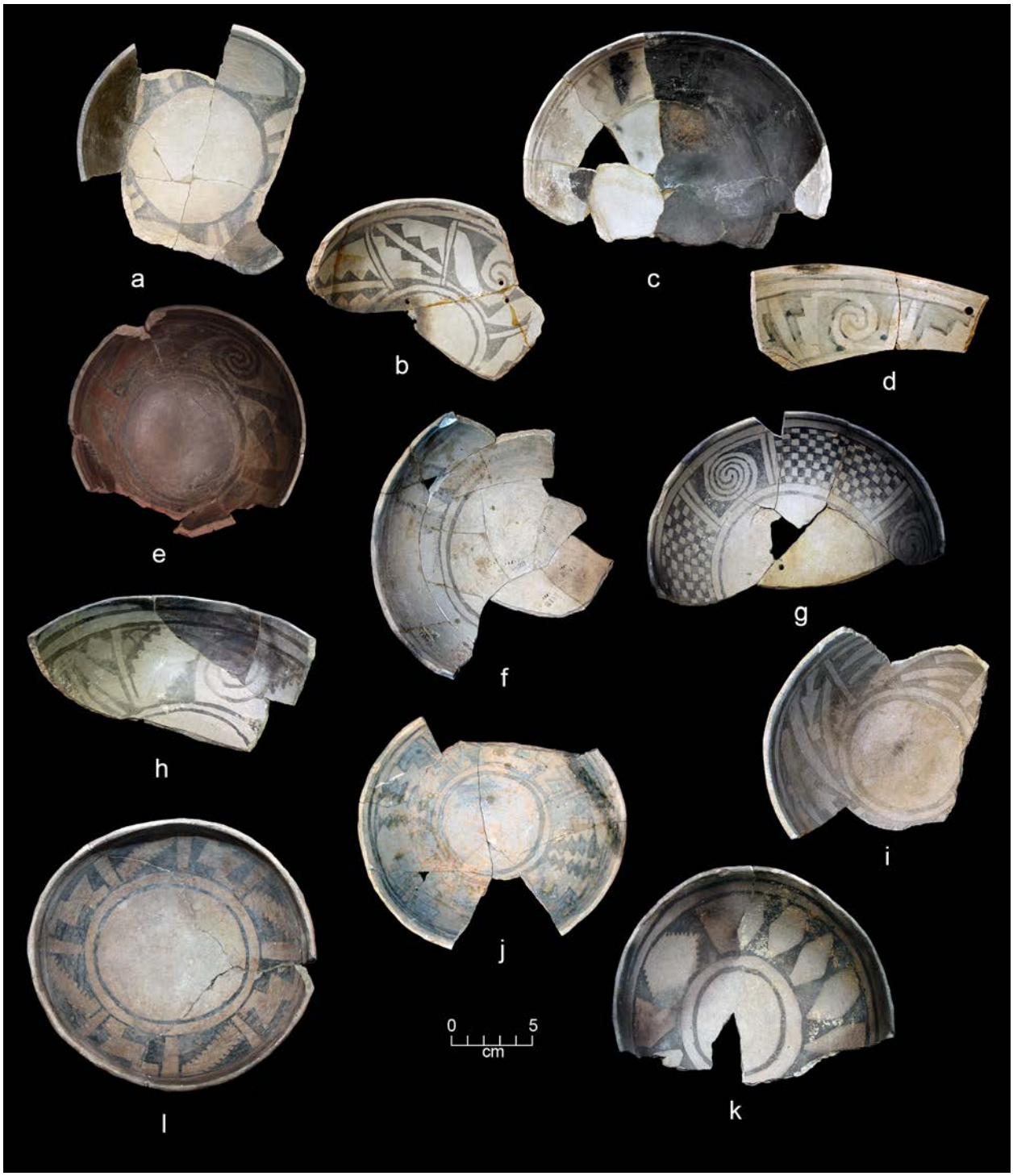


Figure 4.4. Snake Valley Black-on-white bowls with panel banded designs. Vessels (a), (c), (f), (h-j) courtesy of the Fowler Museum (31.820, 37.13317, 125.1928, 37.1195, 125.2971, and 125.11172.3105); (b) and (d) courtesy of the Smithsonian National Museum of Natural History (A303204 and A303210); (e), (g), and (k) courtesy of the Natural History Museum of Utah (UMNH Nos. 4646.1193, 24300.349, and 4543.953); (l) courtesy of the LDS Church History Museum (20-315).

Figure 4.4. Continued (*p, q* not to scale). Vessels (m-n) courtesy of the Natural History Museum of Utah (UMNH No. unknown, 24135.190); vessels (o-p) courtesy of the Fowler Museum (31.1311, 125.1444); vessel (q) courtesy of the Museum of the San Rafael Swell (53); vessels (r) and (t) courtesy of Fremont Indian State Park and Museum (7054.1 and 5763.11); vessel (s) courtesy of the Smithsonian National Museum of Natural History (A288608).

Figure 4.5. Ivie Creek Black-on-white bowls with paneled band layouts. Vessel (a) courtesy of the Smithsonian National Museum of Natural History (134522); vessel (b) courtesy of the Prehistoric Museum of Utah (A-294); vessels (c) and (e) courtesy of the Anasazi State Park Museum (8291 and 8292); vessel (d) courtesy of the Natural History Museum of Utah (11281); vessel (f) from Madsen and Lindsay 1977: fig. 33c; vessels (g-h) courtesy of Fremont Indian State Park and Museum (7048.1 and 2530.23).

Six of the Ivie Creek Black-on-white bowls with paneled banded layouts have two parallel lines dividing each panel. The other two have three parallel lines. The designs in the bands are similar to the Snake Valley Black-on-gray vessels in that all but three bowls had either triangles or stepped elements in either all four or opposing corners of panels, and two of the remaining vessels had triangles near the opposing corners of the panel. The last bowl had an unusual design with angled lines, dots, triangles, and stepped elements (Figure 4.5*b*).

One locally produced type found at Five Finger Ridge was also decorated with a paneled band. The design elements are similar to those found on other paneled bands.

Undivided bands

Undivided bands are bands that do not have any structural lines that further divide the space on the design field, and are present on 12 Snake Valley Black-on-gray and 10 Ivie Creek Black-on-white bowls.

A variety of different designs filled in the space on the Snake Valley undivided bands (Figure 4.6), the most common of which is two rows of offset triangles facing each other (*f, i, j, k*). The triangles were all drawn differently, and all but one had an additional zigzag line drawn in the negative space created by the offset triangles. The only other design that is repeated on more than one vessel is a z-scroll design (*c, e*). The z-scroll design will be discussed in more detail below, but briefly consists of a continuous squared interlocking scroll where each individual scroll connects with the ones on either side of it (*c, e, i*). The remaining five bowls have a variety of designs including rows of interlocking scrolls, lines with dots appended to them, encircling lines, concentric boxes, checkerboards, and an odd T-shaped design (*a*).

The most common type of undivided band on Ivie Creek Black-on-white bowls is the z-scroll design, present on four bowls (Figure 4.7 *b, f, h*). Two bowls have two rows of triangles offset

Figure 4.6. Snake Valley Black-on-gray bowls with undivided band layouts. Vessels (a-f), (h), and (k) courtesy of the Fowler Museum (333.8667, 37.11762, 395.3401.1213, 125.9463, 509.1065.2313, 433.9685.3146, 125.7811.2205, and 37.11791); vessel (g) courtesy of the Museum of Peoples and Cultures (1998.237.2574.42); vessels (i-j) courtesy of the Natural History Museum of Utah (UMNH Nos. 24315.341 and 24366.883); vessel (l) courtesy of the Smithsonian National Museum of Natural History (A288487).

Figure 4.7. Ivie Creek Black-on-white bowls with undivided band layouts (*j* and *k* not to scale). Vessels (a) and (d-f) courtesy of the Anasazi State Park Museum (7963, 8247, 8251, and 8255); vessels (b-c) courtesy of the Natural History Museum of Utah (UMNH Nos. 24575.188 and 2276.70); vessel (g) courtesy of the Smithsonian National Museum of Natural History (A292030); vessel (h) courtesy of the John Hutchings Museum of Natural History (1956007); vessel (i) courtesy of Fremont Indian State Park and Museum (9408.1); vessel (j) courtesy of the Museum of the San Rafael Swell (no catalog no.); vessel (k) from Madsen 1977: fig 31.

Figure 4.8. Vessel locally produced near Five Finger Ridge. Vessel courtesy of Fremont Indian State Park and Museum (9371.1).

facing each other (*a, e*), while three vessels have designs creating diagonal lines around the bowl (*d, g*). The last design has triangles in opposing corners of rectangles attached alternatingly to the upper and lower lines of the band (*c*).

One locally produced vessel from Five Finger Ridge also has an undivided band design (Figure 4.8).

Faux-Paneled Bands

Faux-paneled bands occur when panel-like divisions are made not with lines perpendicular to the framing lines, but with interlocking scrolls. These bands appear paneled, but have no true structural lines dividing the space. This design is present on 11 Snake Valley Black-on-gray and 12 Ivie Creek Black-on-white bowls. The interlocking scrolls on faux-paneled bands are either appended to triangles or rectangular brackets. Many of the interlocking scrolls appended to triangles have a row of fringing triangles running along the hypotenuse (Figure 4.9*e, g*). This often gives them the appearance of stepped solids; however in most cases a triangle has visibly been drawn with smaller triangles appended to it.

Figure 4.9. Snake Valley Black-on-gray bowls with faux-paneled band layouts. Vessel (a) courtesy of the Museum of Peoples and Cultures (1967.43.49); vessels (b-c), (e-f), and (k) courtesy of the Fowler Museum (125.1891, 333.8667.1054, 333.7139.5706, 37.10784, and 125.7814.2205); vessel (d) courtesy of the Peabody Museum of Archaeology and Ethnology (37-130-10); vessels (g) and (j) courtesy of the Smithsonian National Museum of Natural History (A132976 and A288609); vessel (i) from Talbot et al. 2000: table 5.2.

Six of the interlocking scrolls on Snake Valley Black-on-gray faux-paneled bands are appended to brackets while the other four have interlocking scrolls with fringing triangles (Figure 4.9). The designs between the interlocking scrolls are a mixture of triangles, stepped solids, rows of solid boxes connected at the corners to create diagonal lines, and concentric boxes.

The majority of the interlocking scrolls on Ivie Creek Black-on-white faux-paneled bands are appended to brackets (10) (Figure 4.10). Two of the bands have scrolls with a row of elongated fringing triangles that look like spikes (*f*), and the last one is attached to a stepped solid. Designs on Ivie Creek Black-on-white faux-paneled bands include stepped solids, triangles, checkerboards, boxes filled with a single dot, rows of dots, ticked lines, and concentric boxes. One bowl has no additional designs filling the space between the interlocking scrolls, and may be better considered an undivided band (*a*).

Double Bands

Double-banded layouts have two bands separated by a gap. Six Snake Valley Black-on-gray bowls and only one Ivie Creek Black-on-white bowl have a double-banded layout (Figure 4.11). Although the dataset is small, there is an association between double-banded designs and recurved bowls. Four of the seven double-banded Fremont bowls are recurved bowls, and there are no known recurved bowls without a double-banded design.

Four of the Snake Valley Black-on-gray double-banded bowls have undivided designs on both bands (*a, d, e, f*). One bowl has a faux-paneled layout on the lower band and a paneled layout on the upper band (*b*). The last bowl has faux-paneled layouts on both bands (*c*). A variety of design elements are present on the double-banded bowls including rows of diamonds, interlocking scrolls with fringed triangles, offset running triangles facing each other, lines, a lattice, stepped solids, and triangles. The only Ivie Creek Black-on-white double-banded bowl (and the only known Ivie

Figure 4.10. Ivie Creek Black-on-white bowls with faux-paneled band layouts. Vessel (a) courtesy of the USU Eastern Prehistoric Museum (A-29); vessel (b) courtesy of the Museum of Peoples and Cultures (2008.27.001.001); vessels (c-e) and (g) courtesy of the Natural History Museum of Utah (UMNH No. 24241.2, 87691.165, 1976.374, and 24300.211); vessel (f) courtesy of the Anasazi State Park Museum (8240); vessel (h) from Madsen and Lindsay 1977: fig 33a; vessel (i) from Talbot et al. 2000: table 5.2.

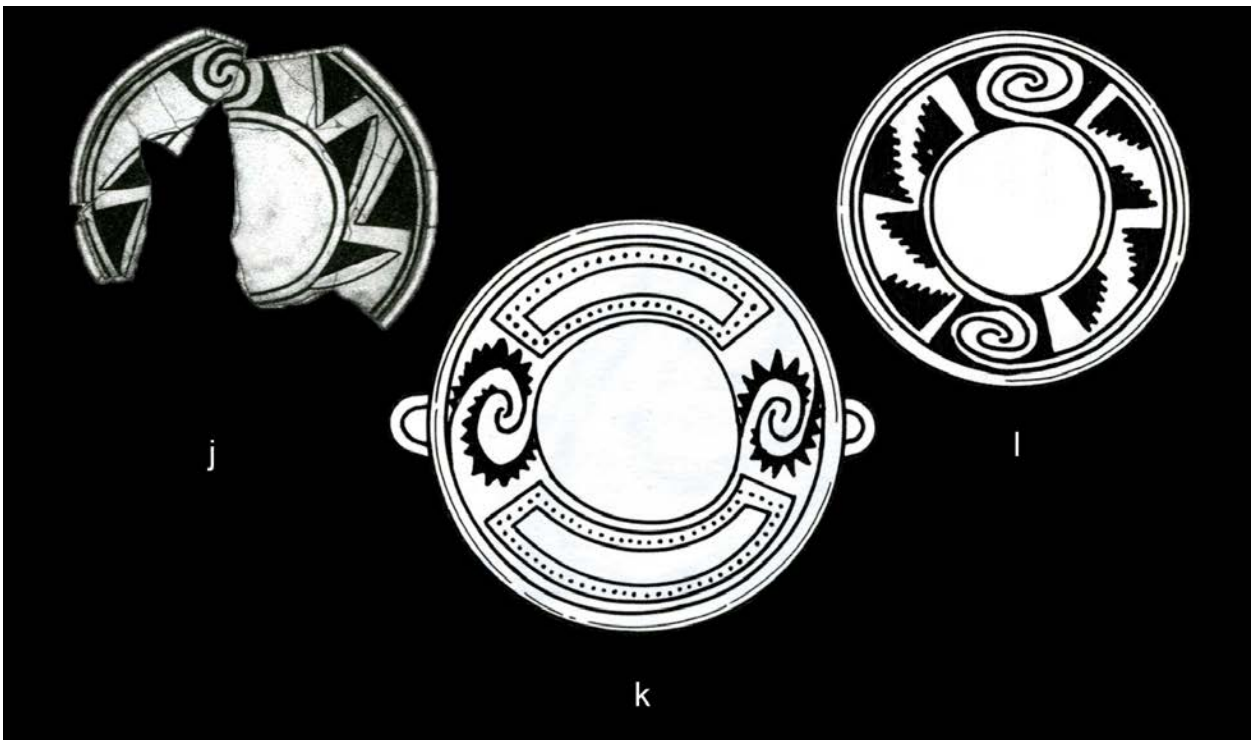


Figure 4.10. Continued. No images to scale. Vessel (j) from Talbot et al. 2000: table 5.2; vessels (l-k) from Madsen 1977: fig. 31.

Creek recurved bowl) has an undivided layout with offset triangles facing each other filled in with dots (Figure 4.11*g*).

Horizontally Divided Bands

Horizontally divided bands have a single line parallel to the rim in the middle of the band dividing it into an upper and lower section. This layout is similar to a double-banded layout, but there is no space separating the two sections. One Snake Valley Black-on-gray bowl and no Ivie Creek Black-on-white bowls have a horizontally divided layout (Figure 4.12). The upper design of this bowl has a poorly executed design of solid triangles facing each other and touching at the tips, which creates negative image of a diamond. The lower section has a similar design, but only a few of the triangles have a solid fill.

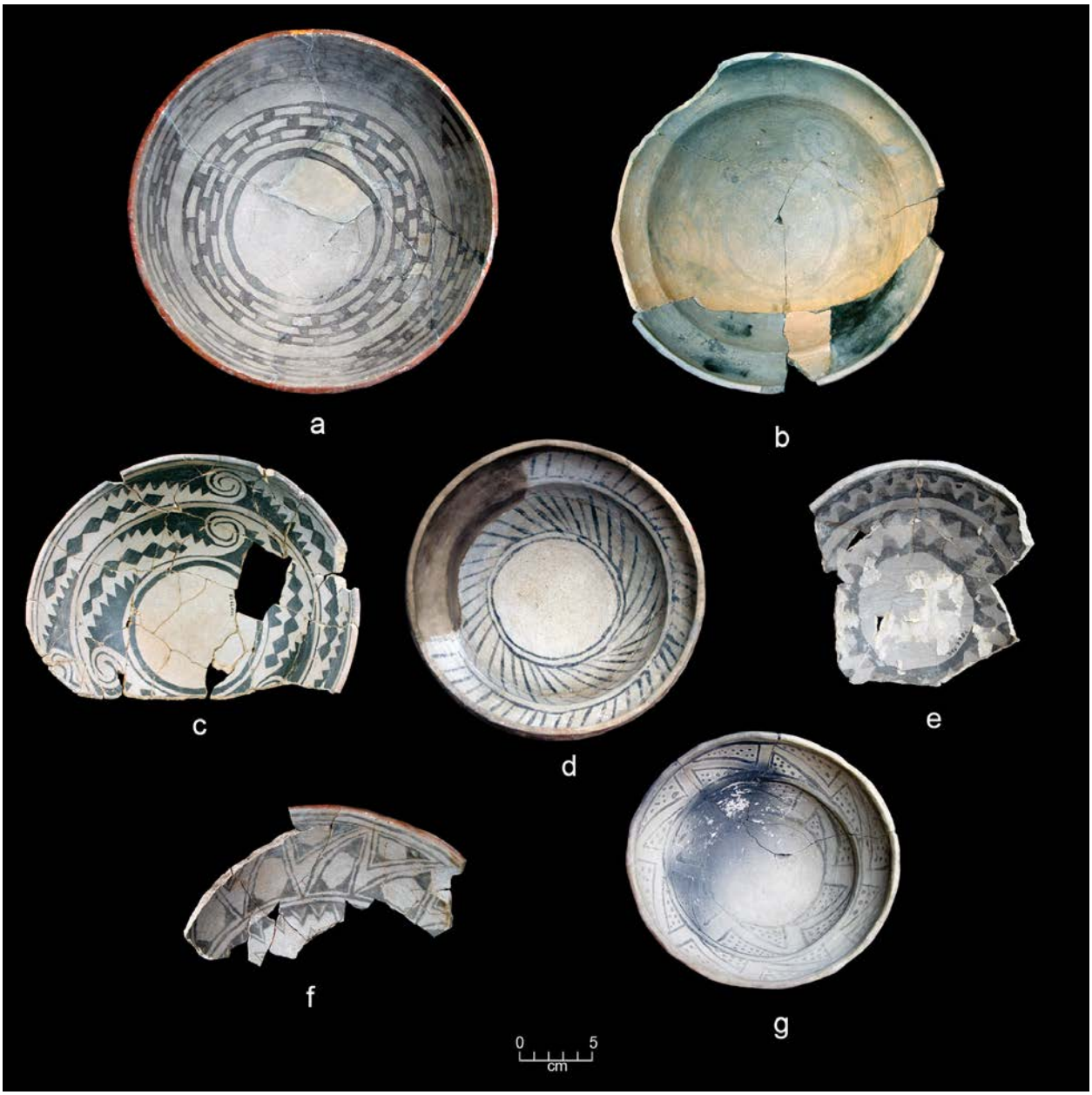


Figure 4.11. Fremont bowls with double-banded layouts: a-f) Snake Valley Black-on-gray; g) Ivie Creek Black-on-white. Vessels (a-c) and (e-f) courtesy of the Fowler Museum (356.4203, 125.3116.5393, 395.4978.5024, 395.4982, and 395.3444.5087); vessel (d) courtesy of the Smithsonian National Museum of Natural History (A288484); vessel (g) courtesy of the Anasazi State Park Museum (7937).

Other Banded Layouts

One Snake Valley bowl has an unnamed layout, which is an unusual mixture of a paneled and a faux-paneled band (Figure 4.13*a*). The design has four rectangles, two opposed rectangles

Figure 4.12. Snake Valley Black-on-gray bowl with horizontally divided band layout. Vessel courtesy of the Fowler Museum (37.14039).

attached to the bottom framing line and the other two attached to the upper framing line. Each has a line attached to the side not attached to a framing line with a triangle lined with fringe dots which connects with the triangle attached to the next bracket.

There are also two large Snake Valley Black-on-gray bowl sherds with banded designs that are difficult to tell how/if they are divided further; although I suspect that they are undivided bands (Figure 4.13*b, c*).

Non-banded Layouts

Although banded layouts are by far more common than non-banded ones on Fremont bowls, non-banded layouts still account for 17 percent of Fremont designs. At least five different non-banded layouts were identified most of which only have one or two bowls falling into each category (Table 4.5).

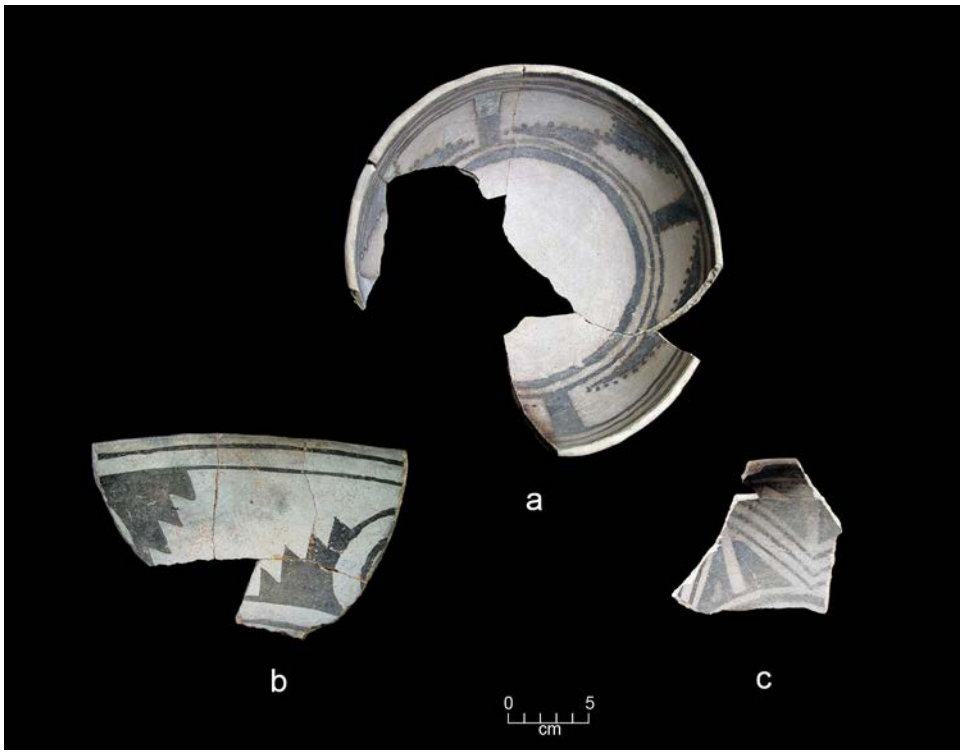


Figure 4.13. Bowls with other or unknown banded layouts. Vessel (a) courtesy of the Natural History Museum of Utah (UMNH No. 24315.361); vessels (b-c) courtesy of the Fowler Museum (125.9217.9035 and 37.11980).

Table 4.5. Non-banded desgin layout counts and percentages by type.

Layout	Snake Valley		Ivie Creek		Total	
	Counts	Percentages	Counts	Percentages	Total	Percentages
Segmented Trisected	6	50.00	–	–	6	33.3
Segmented	3	25.00	1	16.67	4	22.2
Quartered	1	8.33	1	16.67	2	11.1
Bisected	0	0.00	1	16.67	1	5.6
Other	2	16.67	3	50.00	5	27.8
Total	12		6		18	

Segmented Trisected

The segmented trisected layout is the most common Fremont non-banded layout and accounts for half of the Snake Valley Black-on-gray non-banded bowls, but it is absent from Ivie Creek Black-on-white designs (Figure 4.14).

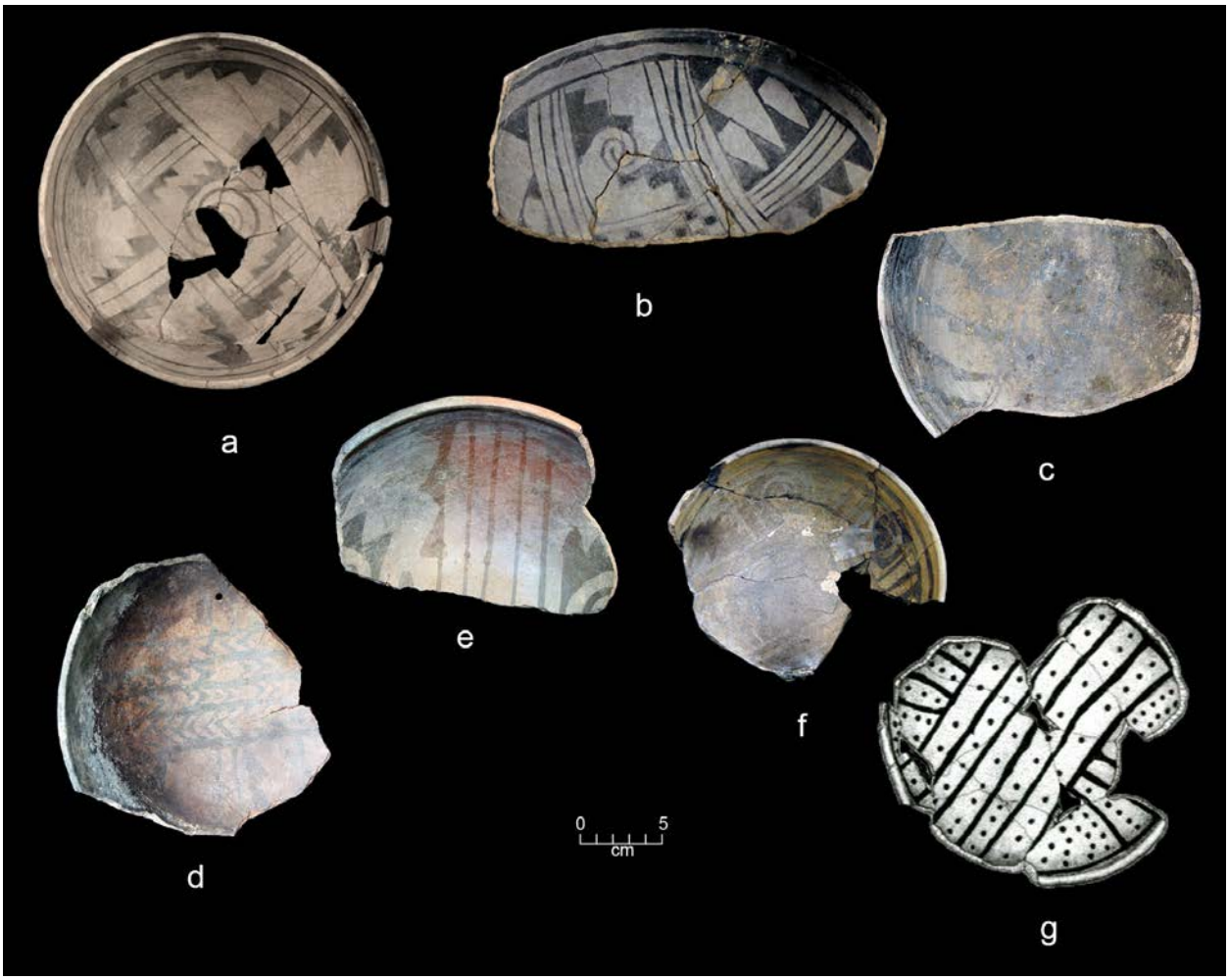


Figure 4.14. Snake Valley Black-on-gray bowls with segmented trisected design layouts (*g* not to scale). Vessels (a-b) and (f) courtesy of the Natural History Museum of Utah (UMNH No. 24390.1209, 1973.154, and 24300.183); vessels (c-e) courtesy of the Fowler Museum (125.11874.3226, 125.11768.3505, 125.2063.411); vessel (g) from Talbot et al. 2000: table 5.2.

Segmented trisected layouts have two sets of structural lines that run across the bottom of the bowl dividing it into three segments. At least three of the bowls have perpendicular lines dividing each of the segments into two or three panels (Figure 4.14*a, b, f*). These panels are filled with a variety of elements including interlocking scrolls, triangles, stepped solids, and checkerboards. The central segment of the remaining three bowls has different designs running from rim to rim (chevrons, interlocking scrolls, or lines), with a variety of designs filling to two side segments.

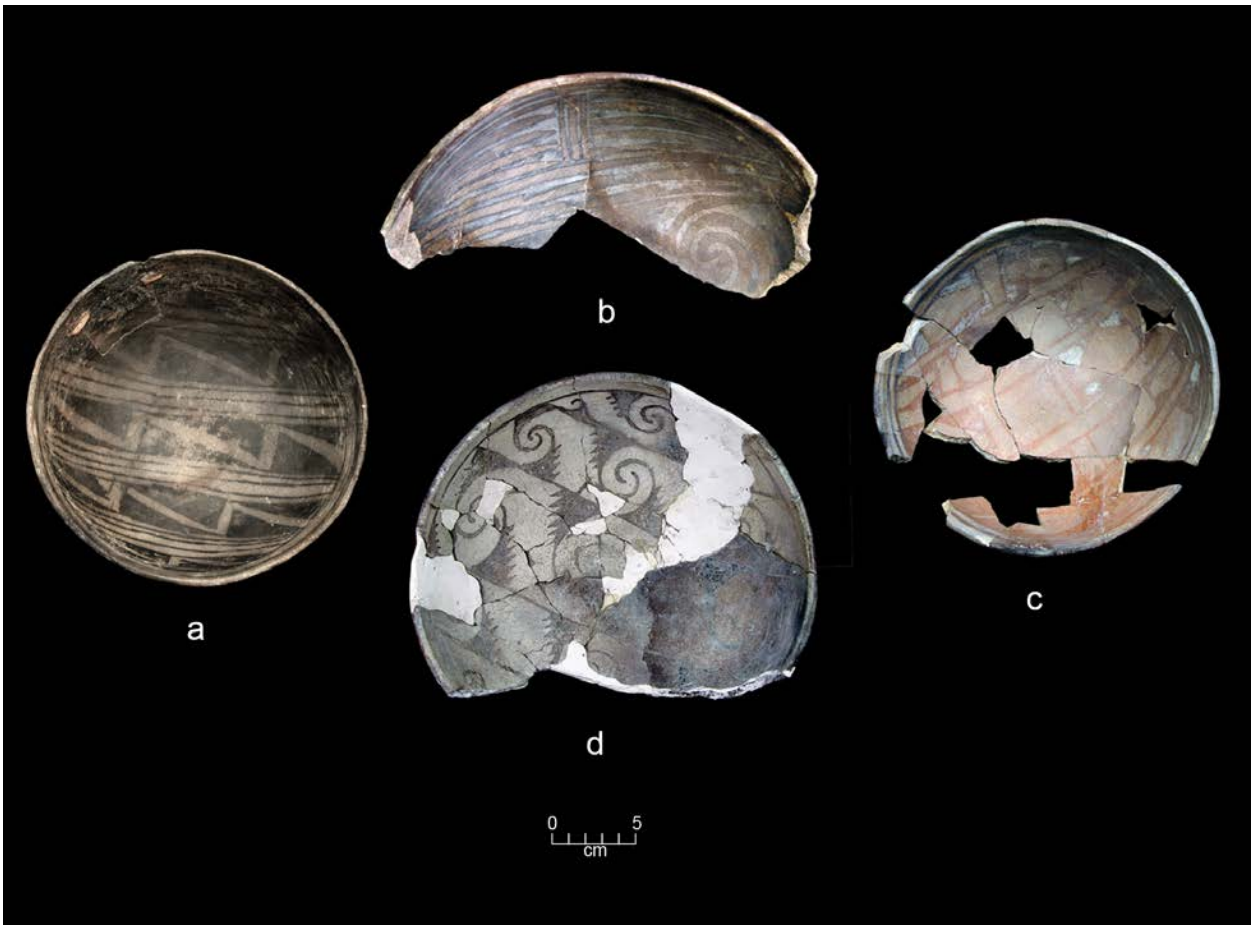


Figure 4.15. Fremont bowls with segmented design layouts: a-c) Snake Valley Black-on-white; d) Ivie Creek Black-on-white. Vessel (a) courtesy of the Peabody Museum of Archaeology and Ethnology (29-5-10); vessels (b-c) courtesy of the Natural History Museum of Utah (UMNH No. 24354.656 and 4673.1247); vessel (d) courtesy of the Anasazi State Park Museum (8253).

Segmented

Segmented designs have a series of parallel lines running from rim to rim separating the design field into long narrow sections. This layout type includes all vessels that are not divided into three segments. Three Snake Valley Black-on-gray bowls and one Ivie Creek Black-on-white bowl have segmented designs (Figure 4.15), although one of the Snake Valley bowls might be a segmented trisected design (Figure 4.15*b*).

The two more complete Snake Valley bowls are separated into five segments (Figure 4.15*a,c*). One of the vessels (*c*) has perpendicular lines that divide each segment into rectangular panels

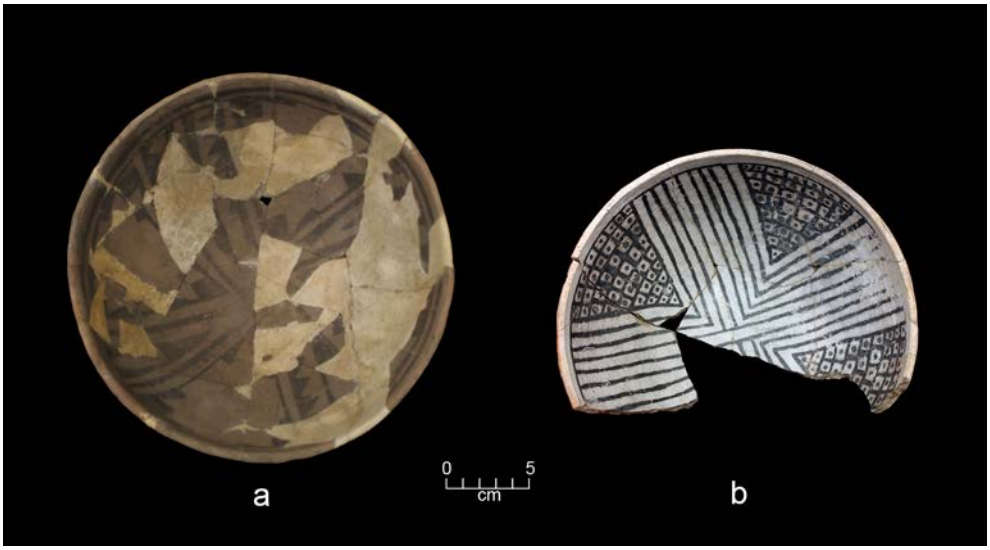


Figure 4.16. Fremont bowls with quartered designs layouts: a) Snake Valley Black-on-gray; b) Ivie Creek Black-on-white. Vessel (a) courtesy of the Peabody Museum of Archaeology and Ethnology (39-130-10); vessel (b) courtesy of the Fowler Museum (31/37).

most of which have triangles in two or three of the corners. Each segment of the other bowl (*a*), which was repaired prehistorically, is filled with offset running right triangles facing each other.

The one Ivie Creek Black-on-white bowl with a segmented design has a single line dividing each segment which is filled with rows of interlocking scrolls attached to triangles with elongated fringing triangles (Figure 4.15*d*).

Quartered

Quartered layouts have structural lines that divide the bowl into four quarters. Only one Snake Valley Black-on-gray bowl had a quartered design (Figure 4.16*a*). One Ivie Creek Black-on-white bowl has a design that was slightly offset quartered (*b*).

Both bowls have a triangle in each quarter of the design, though the fill of the triangle is different on each vessel. The space between the triangles is filled with smaller triangles on the Snake Valley Black-on-gray bowl and with lines on the Ivie Creek Black-on-white bowl. The Ivie Creek Black-on-white bowl has two lines running down the center that divide the bowl into

Figure 4.17. Photograph and drawing of a Fremont bowl with a bisected design layout. Vessel courtesy the Natural History Museum of Utah (UMNH No. 24521.85).

two sections, which is why it could be considered bisected. Two sets of additional lines bisect those lines in slightly different places cutting the bowl into quarters. The nature of the design is quartered, which is why it is considered quartered here.

Bisected

Only one bisected design was found in the collection, and it is on an Ivie Creek Black-on-white bowl (Figure 4.17). The design is similar to the Ivie Creek bowl with the a quartered layout. The design has two parallel lines running through the center of the bowl dividing the bowl in half; however, unlike the quartered design, the rim lines on this bowl end at the parallel lines leaving a slight gap between each half of the design with no rim line, which is why it is considered bisected. The design has two sets of perpendicular lines dividing the bowl into quarters, and each quarter has running triangles along both of the non-rim sides. The design could also be considered quartered, but due to the break in the rim line it was considered bisected.

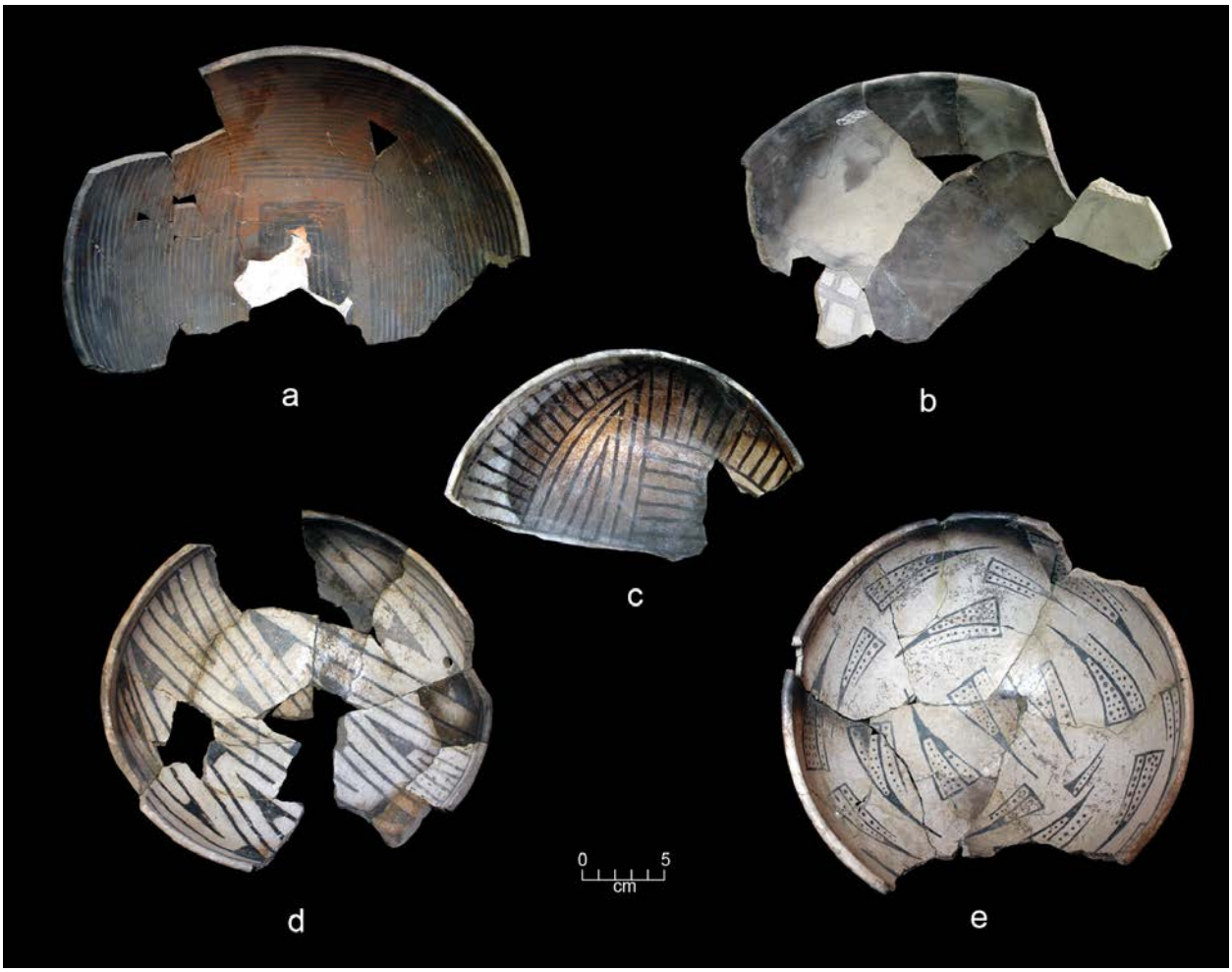


Figure 4.18. Fremont bowls with other non-banded design layouts: a-b) Snake Valley Black-on-gray; c-d) Ivie Creek Black-on-white. Vessels (a-c) courtesy of the Natural History Museum of Utah (UMNH No. 4488.827, 24315.302, 2274.77); vessels (d-e) courtesy of the John Hutchings Museum of Natural History (both catalog nos. 1956007).

Other Non-banded designs

Two Snake Valley Black-on-gray bowls have unusual non-banded designs. One bowl has a series of concentric rectangles starting in the center of the vessel and running up the sides (Figure 4.18*a*). The other bowl has a zigzag rim line and a lattice pattern running from rim to rim through the center of the vessel (*b*). These vessels have no other Fremont parallel.

Three Ivie Creek Black-on-white bowls have unusual non-banded designs. One has a zigzag design covering the entire vessel with concentric triangles filling each of the corners of the zigzag

(*d*). Another is a bowl with right triangles with a solid tip and half filled with dots with a squared scroll attached circling the bowl with three of the triangle designs in the center (*e*), while these two designs are unusual they do utilize common Fremont design elements. It is difficult to understand the design on the last Ivie Creek Black-on-white bowl since it is only partially complete, but it has a series of parallel lines perpendicular to the rim and appears to have four concentric triangle designs running at right angles off of each other in a clock-wise pattern around the bowl interior (Figure 4.18*c*).

Symmetry

Washburn sees symmetry not only as another tool in recording and analyzing designs, but also as a salient attribute of designs that have been "imbue[d] with culturally meaningful metaphors" (1999:558). Washburn adapted a method for mathematically recording the symmetry of crystal structures to record the symmetry of cultural patterns and designs. She describes the three basic types of symmetry that can be expressed on a painted bowl, one-dimensional, two-dimensional, and finite, which includes both dihedral and rotational symmetry (Washburn and Crowe 1988:44-55).

Designs with all four types of symmetry (including the two types of finite symmetry) are present on Fremont bowls, but rotational symmetry is by far the most common and is present on almost half of the bowls (Table 4.6).

Unfortunately, ceramic designs are rarely truly symmetrical. Small mistakes are often made that result in what is technically an asymmetrical design; however, it is important to consider if a design is purposefully asymmetrical or asymmetrical due to poor draftsmanship (Shepard 1948). In many cases one row of dots or triangles may have more repetitions than its symmetrical counterparts, but these designs were still considered symmetrical because the overall concept of the design had symmetry.

Table 4.6. Counts and percentages of different symmetry types by ceramic type.

Symmetry type	Snake Valley		Ivie Creek		Total	
	Counts	Percentages	Counts	Percentages	Counts	Percentages
Dihedral	8	17.0	2	5.1	10	9.4
Rotational	26	55.3	29	74.4	55	51.9
One-dimensional	8	17.0	5	12.8	13	12.3
Two-dimensional	4	8.5	2	5.1	6	5.7
None	1	2.2	1	2.6	2	1.9
Total	47		39		106	

Finite

Dihedral

Dihedral symmetry occurs when a design has reflection lines. Eight Snake Valley Black-on-gray bowls have dihedral symmetry (Figure 4.19). Four have two reflection lines, two have four reflection lines, and the other two have three reflection lines (Table 4.7). Four of the designs are paneled bands and the other three are non-banded designs (*e*,*f*).

Only two Ivie Creek Black-on-white bowls exhibited dihedral symmetry. One is a paneled band with four reflection lines (i) and the other is the bisected design which had two reflection lines (*h*).

Rotational

At least 57 bowls had rotational symmetry, 26 Snake Valley Black-on-gray (Figure 4.20), 29 Ivie Creek Black-on-white (Figure 4.21), and two bowls produced near Five Finger Ridge. The high number of rotational designs is partly due to the connection between rotational symmetry and faux-paneled bands. Since the interlocking scrolls on a single band almost always rotate in the same direction the design can never be reflected. The faux-paneled bands, as they have been drawn on Fremont bowls, can never have dihedral symmetry, and all faux-paneled designs were either categorized as having rotational symmetry, no symmetry, or being indeterminate (many of which

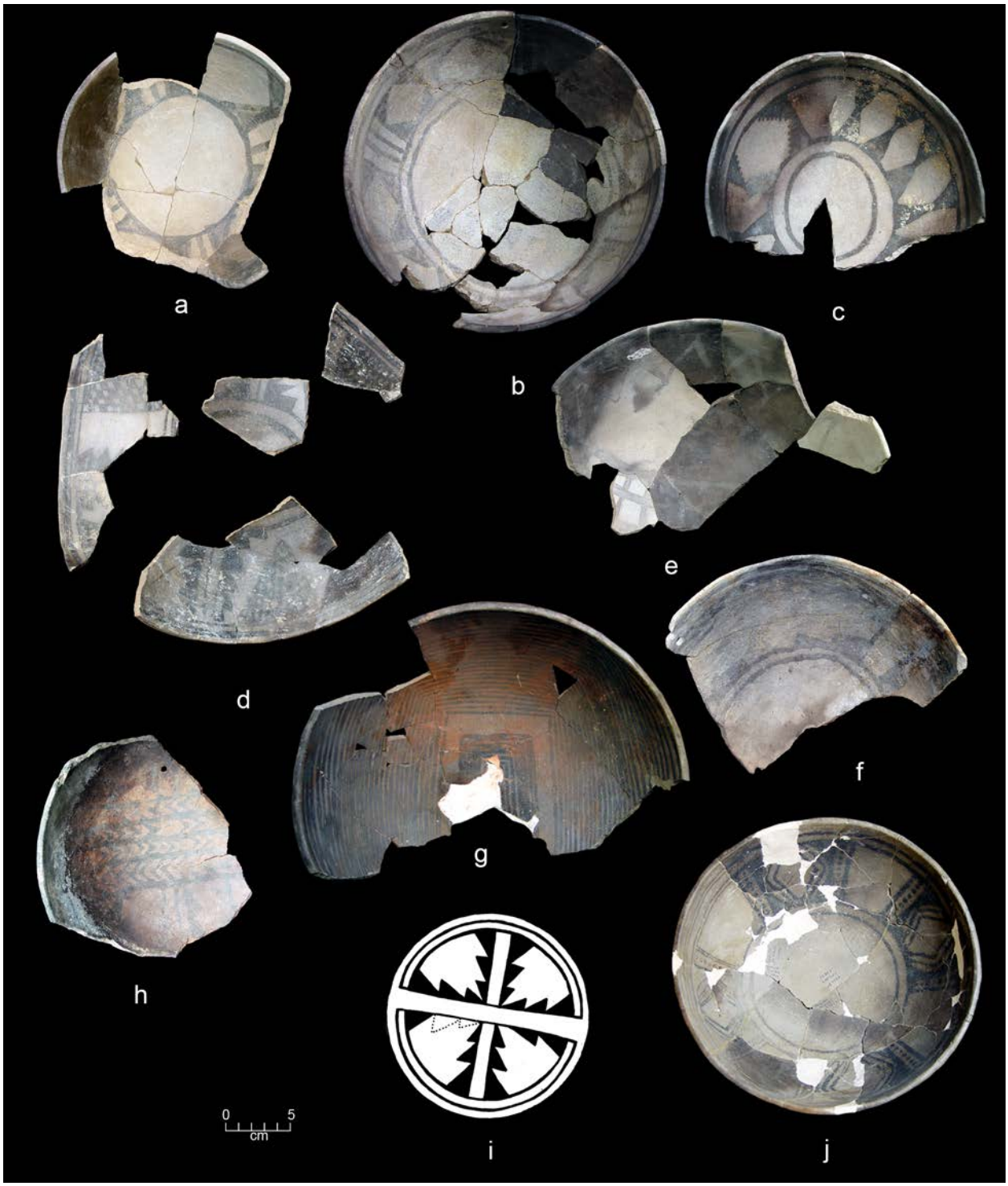


Figure 4.19. Fremont design layouts with dihedral symmetry; a-h) Snake Valley Black-on-gray; i-j) Ivie Creek Black-on-white. Vessels (a), (f), (h) courtesy of the Fowler Museum (31.820, 31.1311, 125.11768); vessels (b-c), (e), (g), (i) courtesy of the Natural History Museum of Utah (UMNH No. 24135.190, 4543.953 24315.302, 4488.827, 24521.85); vessel (d) courtesy of the Smithsonian National Museum of Natural History (A288608); vessel (j) courtesy of the Anasazi State Park Museum (8291).

Table 4.7. Number of reflections on bowls with dihedral symmetry by type.

Number of reflections	Snake Valley	Ivie Creek
One	1	–
Two	4	1
Three	1	–
Four	2	1

Table 4.8. Number of roations on bowls with rotational symmetry by type.

Number of rotations	Snake Valley		Ivie Creek	
	Counts	Percentages	Counts	Percentages
Two	10	45.5	14	50.0
Three	3	13.6	5	17.9
Four	11	50.0	10	35.7
Totals	24		29	

probably have rotational symmetry). All Fremont designs with rotation symmetry could either be rotated two, three, or four times (Table 4.8). Many of the paneled bands also have rotational symmetry either because of the presence of an interlocking scroll in the panel or elements in the opposed corners of a panel making it so the design could not reflect.

The three most common Snake Valley Black-on-gray layouts with rotational symmetry are paneled, undivided, and faux-paneled bands.

The majority of the Ivie Creek rotational designs are faux-paneled bands, with paneled and undivided bands making up all but two of the remaining designs. The two remaining designs have non-banded layouts. The first non-banded bowl has a quartered layout (Figure 4.21*a*) and seems more dihedral in appearance; however, the number of lines in opposing quarters of the vessels are the same, but different from the quarters on either side of it. The structural lines that create the quarters are also slightly offset making it so the design will not reflect. The other is a design with

Figure 4.20. Snake Valley layouts with rotational symmetry. Vessels (a), (c), (d), (e), (h), (i) courtesy of the Fowler Museum (395.4978, 31.1311, 509.1065, 37.10784, 395.3401, 333.8667); vessel b courtesy of the Museum of Peoples and Cultures (67.43.49); vessel (f) courtesy of the Museum of the San Rafael Swell (53); vessel (g) courtesy of the Peabody Museum (39-130-10 18973).

Figure 4.20. Continued. Vessels (j), (k), (m), (r-t) courtesy of the Natural History Museum of Utah (UMNH No. 24315, 4646.1193, 24300.349, unknown, 24390.1209,) 24315.361); vessels (l), (n-p) courtesy of the Fowler Museum (125.11172, 125.9463, 125.11768, 125.1891); vessel (q) courtesy of the Church History Museum (20-315).

Figure 4.20. Continued. Vessels (u-v) courtesy of the Fowler Museum (333.8667, 125.1928); vessel (w) courtesy of Fremont Indian State Park Museum (7054.1).

a large zigzag running through the center of the bowl with smaller triangles nested in each zigzag. The bowl can be rotated around the vessel center point two times.

Two, three, and four rotations are all present on both Ivie Creek Black-on-white and Snake Valley Black-on-gray bowls. Four rotations are most common on Snake Valley Black-on-gray bowls, followed by two rotations, and then three. The number of rotations could not be determined for one Snake Valley bowl. Two rotations are the most common on Ivie Creek Black-on-white bowls, followed by four rotations, and then three (see Table 4.8).

Almost symmetrical

A few of the bowls appeared to have very deliberate modifications that made them not quite symmetrical. All of these bowls would have rotational symmetry with a slight modification of the design. The first six bowls in Figure 4.22 have very visible and seemingly deliberate design

Figure 4.21. Ivie Creek bowls with design layouts with rotational symmetry. Vessels (a) courtesy of the Fowler Museum (31/37). Vessels (b-c) courtesy of the Prehistoric Museum (A-294, A-29); vessels (d), (f), (i) courtesy of Anasazi State Park Museum (8247, 8255, 8292); vessels (e), (h), (j), (k) courtesy of Natural History Museum of Utah (24241.2, 4646.1193, 2276.70, 11281); vessel (g) courtesy of the Smithsonian Institute (A292030)

Figure 4.21. Continued. Vessels (l), (p) courtesy of Anasazi State Park Museum (7936, 8240); vessels (m-o), (r) courtesy of the Natural History Museum of Utah (UMNH No. 1976.374, 24300.206, 87692); vessel (q) courtesy of the Smithsonain Institute (134522); vessel (s-t) from Madsen and Lindsay 1977:fig 33a, c)

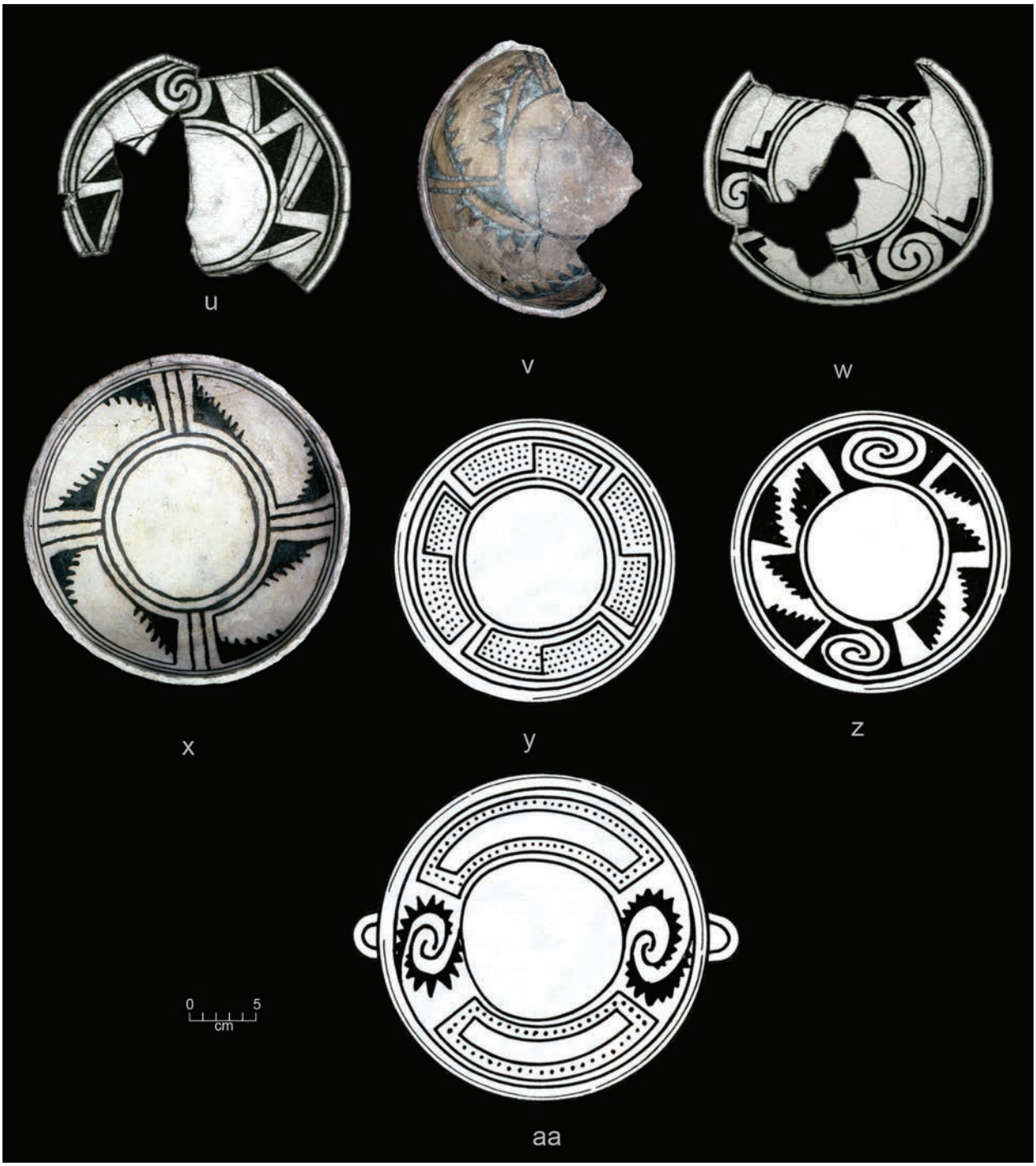


Figure 4.21 Continued (y-aa not to scale). Vessels (u), (w) from Talbot et al. 2000 table 5.2; vessels (v), (x) courtesy of Fremont Indian State Park Museum (2530.23, 7048.1); vessels (y-aa) from R. Madsen 1977 fig. 31.

Figure 4.22. Bowls with design layouts that are almost symmetrical (*e* not to scale). Vessels (a), (d) courtesy of the Natural History Museum of Utah (UMNH No. 24300.206, 24390.1209); vessel (b) courtesy of the Museum of People's and Cultures (2008.27.001.001); vessels (c), (e) courtesy of the Fowler Museum (125.7811, 125.7814); vessel (f) courtesy of the Smithsonian Institute (A292030).

modifications making the design non-symmetrical (*a*-*e*). The first bowl (*a*) has a single diagonal line with double sided tick marks between the interlocking scrolls on the left side and parallel diagonal lines with opposing tick marks and a row of dots on the right. The middle bowl (*b*) has two rows of boxes with a single dot in each in three of the faux-panels created by interlocking scrolls with a diagonal checkerboard pattern in the forth. The diagonal lines between the interlocking scrolls on the last bowl on the top row (*c*) are running in opposing directions. The outer two panels on each side of vessel *d* have elongated stepped solids in differing places. The side panel on the top right

Table 4.9. One-dimensional symmetry counts by type.

One-dimensional	Snake Valley	Ivie Creek
p111	2	2
p112	2	3
pm11	3	–
pmm2	1	–

of the figure has a stepped solid attached to the line parallel to the rim line where as the side panel in the bottom left has stepped solids attached to the lines creating the panel. The next vessel, *e,* has dialongal lines inbetween each interlocking scroll that are facing the wrong direction for it to be symmetrical. The remaining vessel (*f*) is missing two stepped solids in one panel that are present in the other two. This may have been a deliberate choice of the artisan, or they possibly may have run out of room on the bowl. These bowls were all considered as having rotational symmetry for the purpose of this project and are included in the counts presented above.

One- dimensional symmetry

Thirteen of the bowls had one-dimensional symmetry using only four (Table 4.9) of the seven possible types of one-dimensional symmetry (Figure 4.23). Undivided bands (including double-banded designs where each band is an undivided band) are the most common layout with this type of symmetry. These bands are generally filled with smaller repeating design elements such as offset triangles. One dimensional designs that encircle the inside of a bowl are essentially a design that is rotated and repeated around a bowl, and it was often difficult to consistently determine when a design should be considered rotational and when it is more appropriate to see it as a one-dimensional design repeating infinitely. In order to keep the analysis consistent any designs that could be rotated five or more times were considered one-dimensional.

Figure 4.23. Bowls with one-dimensional symmetry: a-i) Snake Valley Black-on-gray; j-l) Ivie Creek Black-on-white. M not to scale. Vessels (a), (c), (d), (g), (h) courtesy of the Fowler Museum (37.13317, 395.3444, 37.14039, 37.11791, 37.11762); vessel (b) courtesy of the Smithsonian Institute (288484); vessels (e), (k), (l) courtesy of Natural History Museum of Utah (UNMH No. 24366.883, 24575, 87689.171); vessel (i) courtesy of Anasazi State Park Museum (8251); vessel (j) courtesy of the Hutchings Museum (1956007); vessel (m) courtesy of the Museum of the San Rafael Swell.

Only four of the one-dimensional symmetry types are represented on Snake Valley Black-on-gray bowls. There were only eight Snake Valley bowls using one-dimensional symmetry and they were fairly evenly split between the four types.

Only two types of one-dimensional symmetry are represented on Ivie Creek Black-on-white bowls. Of the five Ivie Creek bowls with one-dimensional symmetry, three have P112, meaning they had no vertical or horizontal reflection lines, but could be rotated 180 degrees. The other two have P111 symmetry, meaning that the design had no horizontal or vertical reflection lines and could not be rotated 180 degrees.

Two-dimensional symmetry

Washburn describes 17 types of two dimensional symmetry; however, because it is so rare on Fremont vessels, designs were simply marked as two dimensional, and the specific type was not recorded.

Only six vessels have two dimensional symmetry, two Ivie Creek Black-on-white and four Snake Valley Black-on-gray (Figure 4.24). One of the Snake Valley and the one Ivie Creek bowls with two dimensional symmetry had non-banded layouts. The other Ivie Creek bowl has a double-banded design. Two of the Snake Valley bowls were double-banded, and the last bowl had a band of six concentric circles.

No symmetry

Only two bowls were identified with no symmetry. The first is an Ivie Creek Black-on-white bowl with a non-banded design (see Figure 4.18*e*). The bowl has a series of triangles with squared scrolls circling the interior of the vessel in a non-predictable pattern. The other is a Snake Valley Black-on-gray bowl with an undivided banded design filled with repeating concentric rectangles (see Figure 4.6*g*); however there are odd variations in portions of the design that make it non-

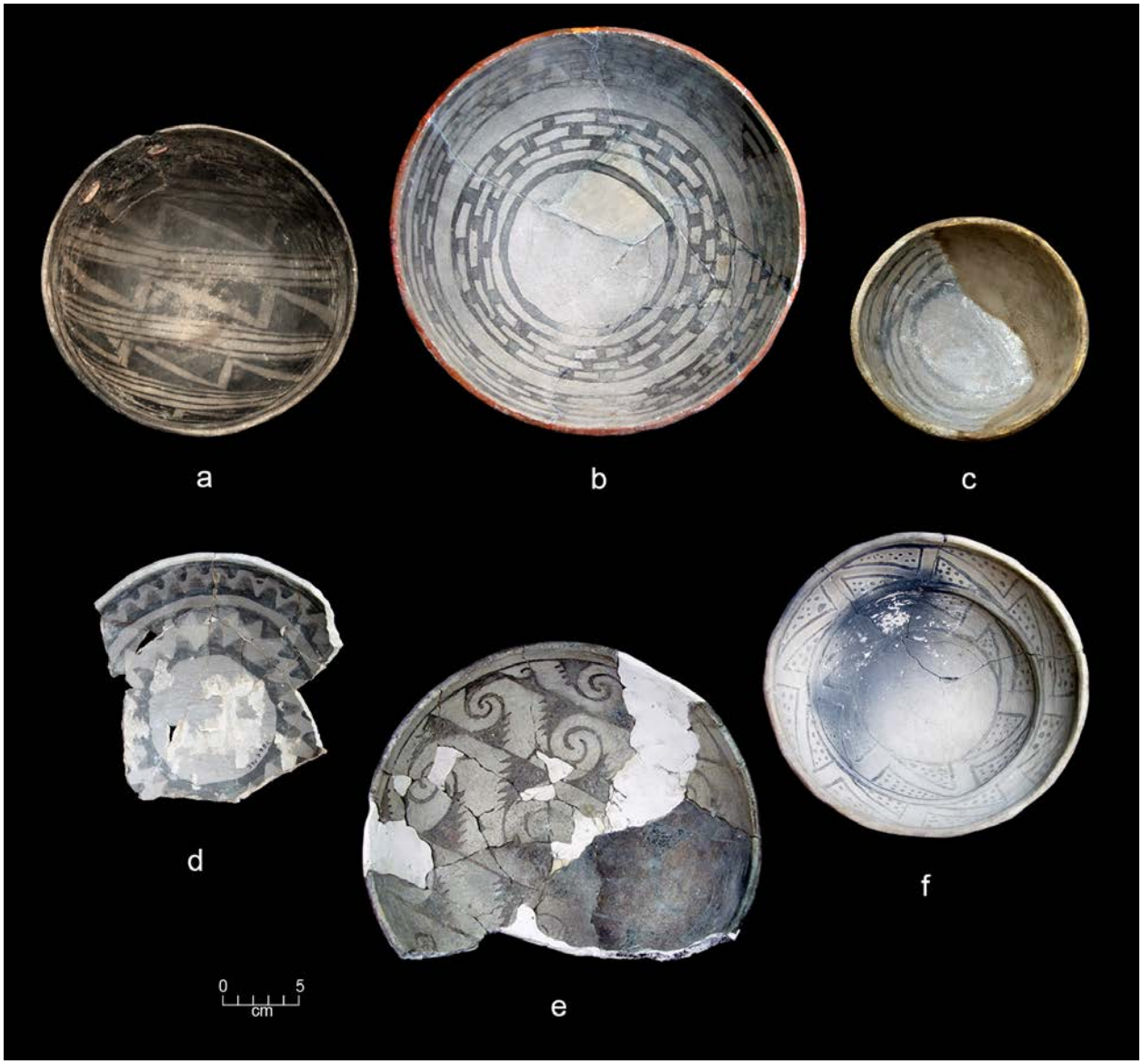


Figure 4.24. Design layouts with two-dimensional symmetry.Vessel (a) courtesy of the Peabody museum (29-5-10 A6480); vessel (b), (d) courtesy of the Fowler Museum (356.4203, 395.4982); vessel (c) courtesy of the Smithsonian Institute (A288487); vessel (e), (f) courtesy of Anasazi State Park Museum (8253, 7937).

symmetrical. The number of rectangles is not the same in each design and one appears to be a squared scroll instead of concentric rectangles. At least one of the rectangles connects to the rectangle next to it.

Design Units

Design units are defined by Allison (2010:85) as "a segment of the design containing contiguous or closely spaced elements." As discussed previously, Allison's idea of a design unit is based loosely on Jernigan's concept of a design schema, which can only be identified by looking for designs that repeat on different vessels in an assemblage. Based on that idea 11 repeating schema or design units have been identified in the collection (Figure 4.25; Table 4.10). These 11 designs are found on 80 of the 108 bowls. Determining what should be considered a design unit was a difficult and sometimes inconsistent task. Almost every design is slightly different making it easy to split the design units into so many categories that the data became difficult to interpret. Ultimately designs were lumped into categories based on the structure of the design. Smaller details of the designs were ignored.

The most common design unit on Fremont bowls in general and Snake Valley Black-on-gray bowls specifically is an interlocking scroll with a detached design (*a*). This design is present only on faux-paneled bands and is created when a design element(s) is present between two interlocking scrolls, but not attached to the scrolls.

The second most common design unit is similar to the first and is the most common on Ivie Creek Black-on-white bowls. It is an interlocking scroll with an attached design (*b*), and is also only present on faux-paneled bands with bracketed interlocking scrolls. This design has a line that runs from the top of each bracket in the design into the panel space. A design element, generally either a triangle or a stepped element is attached to the line and interacts with the line and design element attached to the next bracket interlocking scroll.

The next design is two rows of triangles offset facing each other (*c*). This design unit is most common on undivided bands and often fills the entire band. The triangles can have a variety of fills, but a solid fill is the most common. Some of the vessels have a zigzagged line drawn in the negative space created by the triangles.

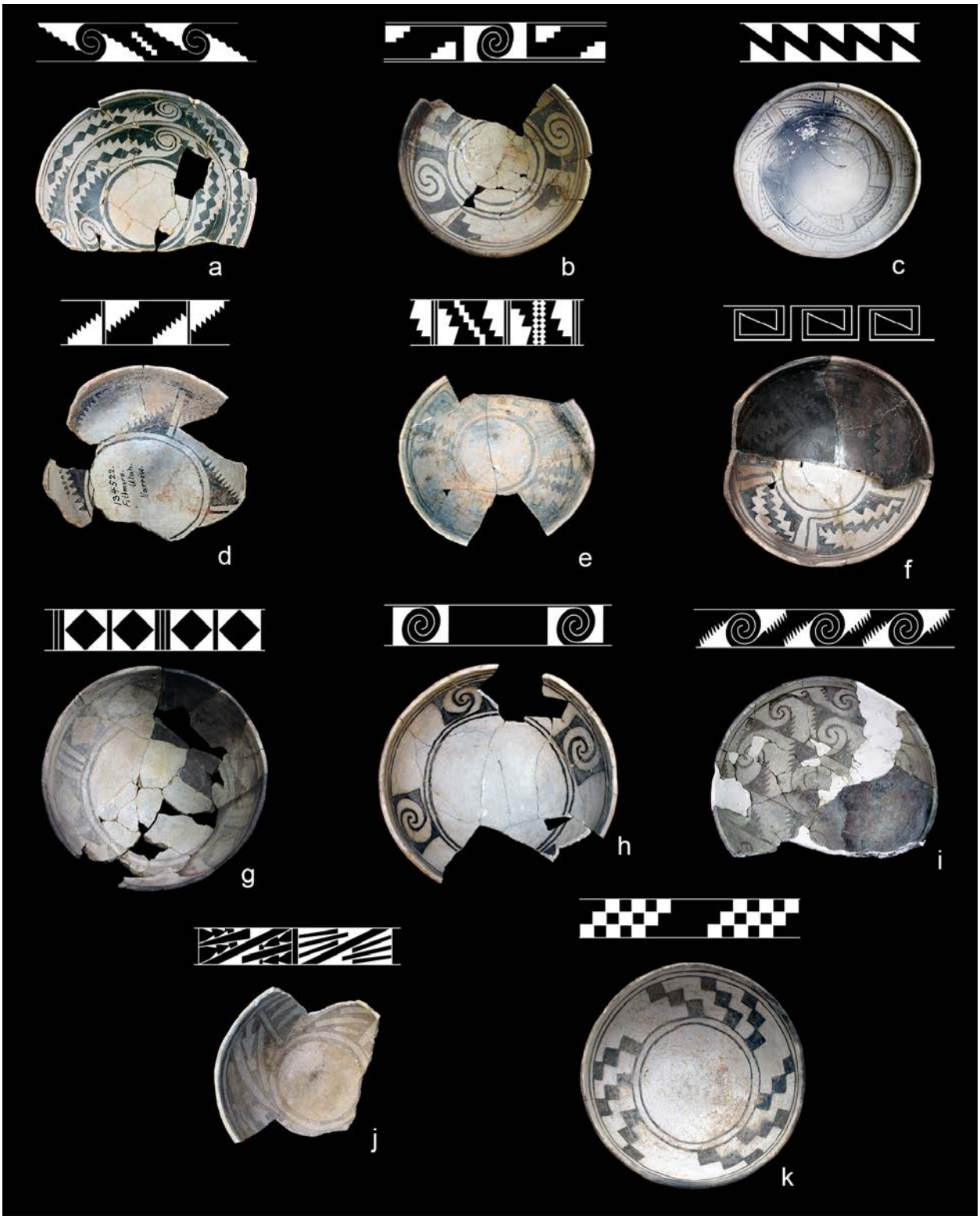


Figure 4.25. Typical Fremont design units. Vessels (a), (j) courtesy of the Fowler Museum (395.4978, 125.2971); vessel (b), (g) courtesy of the Natural History Museum of Utah (UMNH No 8769, 24135); vessels (c), (i) courtesy of Anasazi State Park Museum (7937, 8253); vessel (h) courtesy of the Prehistoric Museum of Utah (A-29), vessel (k) courtesy of the Smithsonian Institute (A292030).

Table 4.10. Fremont design units counts and percentages by type.

Design Unit	Snake Valley		Ivie Creek		Unknown		Total	
	Counts	Percentage	Counts	Percentage	Counts	Percentages	Counts	Percentages
Interlocking scrolls with an unattached design	11	15.9	5	12.2	–	–	16	13.8
Interlocking scroll with attached design	4	5.8	8	19.5	–	–	12	10.3
Row of triangles facing offset facing each other	7	10.1	4	9.8	–	–	11	9.5
Element in opposing corners of a panel with nothing in the panel	5	7.2	5	12.2	–	–	10	8.6
Element in opposing corners of a panel with additional design in panel	7	10.1	1	2.4	1	25.0	9	7.8
Interlocking scroll with no other design	2	2.9	3	7.3	1	25.0	6	5.2
Z-scroll	2	2.9	4	9.8	–	–	6	5.2
Elements in all four corners of a panel	4	5.8	1	2.4	–	–	5	4.3
Triangles in opposing corners of a panel, takes up the whole panel	3	4.3	1	2.4	–	–	4	3.4
Three diagonal lines	1	1.4	2	4.9	–	–	3	2.6
Row of interlocking scrolls	1	1.4	2	4.9	1	25.0	3	2.6
A series of diagonal lines	2	2.9	–	–	–	–	2	1.7
Triangles facing each other with tips touching	2	2.9	–	–	–	–	2	1.7
Other	19	27.5	7	17.1	1	25.0	27	23.3
Totals	70		42				116	

A design where either triangles or stepped elements are present in the opposing corners of panels with no other design filling the panel is present on 10 vessels (*d*). These designs are present on both paneled bands and the panels created on segmented designs.

The next design is similar to the previous one, but with the addition of a design in the middle of the panel (*e*). This design was much more common on Snake Valley Black-on-gray bowls than Ivie Creek Black-on-white bowls.

A z-scroll design is present on 6 bowls (*f*). This design has a continuous squared interlocking scroll that connects with the scrolls on either side of it. The scrolls often connect in the center creating the shape of a sideways "z." The diagonal line of the "z" is generally decorated with triangles, and the corners created by the design are sometimes filled with stepped solids.

The next design is only present on paneled designs and is created when either triangles or stepped elements are attached to all four corners of the panel with no additional design in the panel (*g*). No examples of this design unit have been found with an additional design in the middle of the panel.

Two more design units have been identified using interlocking scrolls, and an argument could be made that they should be counted as the same design unit. The first is a faux-paneled band with no additional designs filling the panels (*h*). They have been found with two and four repetitions of interlocking scrolls evenly spaced around the bowls. The next interlocking scroll design is a row of interlocking scrolls (*i*). This differs from the previous design in that these scrolls are closely spaced and appear to be used to fill space rather than divide it.

Another design unit is a panel filled with two triangles in opposing corners that fill the entire panel (*j*). The triangles in this design do not have a solid fill. The most common fill is additional triangles, either in the corners of the design, or creating smaller corner filled triangles inside of the larger triangles. This design is different from the other opposing element designs in that these triangles are more elaborate and they fill the majority of the panel.

Table 4.11. Primary element counts and percentages by type.

Primary element	Snake Valley		Ivie Creek		Total	
	Counts	Percentages	Counts	Percentages	Counts	Percentages
Complete elements	389	10.3	160	27.9	549	12.6
Lines	2270	60.3	368	64.1	2638	60.8
Partial element	1108	29.4	46	8.0	1154	26.6
Totals	3767		574		4341	

The last design unit is made up of three sets of design elements creating three diagonal lines from the bottom framing line to the top (*k*). This design is present on one Snake Valley Black-on-gray and two Ivie Creek Black-on-white bowls.

Elements

Design elements are the smallest portion of the design and were identified on all of the sherds in the dataset as well as the bowls. The majority of the sherds used in the analysis are small and lacked complete design elements. Most sherds only had lines and partial elements.

Primary elements

The counts of the design elements from both the sherds and bowls were added together to get the total numbers of primary elements. The number of repetitions of each design on each sherd/bowl was not counted, since it would be skewed by the size of the sherd. It would also bias the results towards high numbers of triangles, since they are often repeated more than any other design element on the same sherd/bowl (e.g. a row of running triangles).

Many of the sherds are very small and only have portions of solid design elements. Almost 27 percent of all design elements in the assemblage are partial elements; another 61 percent are a type of line. Only 13 percent are whole non-line elements (Table 4.11). Since lines are discussed elsewhere, this section only focuses on non-line, non-partial elements, and all percentages

calculated in this section refer to the percentage of that element as compared to all other non-line non-partial elements unless otherwise specified.

The most common design elements on Fremont bowls are by far triangles; right triangle and non-right triangle designs together make up 44.2 percent of all complete design elements. Right triangles are much more common than non-right triangles, especially on Snake Valley Black-on-gray bowls. They occur more evenly on Ivie Creek Black-on-gray bowls. One reason why they are so common is that they can be used in multiple ways on a single bowl or sherd (e.g. in opposing corners of a panel and as a diagonal line of triangles in the center of the panel).

Interlocking scrolls, in all of their forms, are also very common on Fremont bowls making up over 18 percent of the complete design elements. This element is common on both types of painted bowls; however, there is a difference in which type of interlocking scroll is used on which type of bowl. Interlocking scrolls appended to brackets are more common on Ivie Creek Black-on-white bowls, but occur equally on Snake Valley Black-on-gray bowls. Occasionally interlocking scrolls are appended to stepped solids, but this is uncommon and was only noted on three bowls. Interlocking scrolls not appended to another design element are also rare and only occurred on one Ivie Creek Black-on-white bowl.

Stepped solids are also common on Fremont pottery. Unlike other pottery in the Southwest, stepped solids on Fremont bowls are never double-sided. This element is used almost equally on Snake Valley Black-on-gray and Ivie Creek Black-on-white bowls.

The use of lines of dots as a design element is considerably different between Ivie Creek Black-on-white and Snake Valley Black-on-gray designs. Rows of dots are three times more common on Ivie Creek bowls than Snake Valley ones.

Boxes and diamonds are also common elements on Fremont bowls. Both elements are generally stacked in a diagonal line with the corners of the elements touching. Diamonds are much more common on Snake Valley Black-on-gray bowls. Only one was recorded on an Ivie Creek Black-

Figure 4.26. Unsual design elements on Fremont bowls. Courtesy of the Fowler Museum (125.6409, 333.8254, 356.1457).

on-white bowl. Other design elements were noted on the bowls, but make up less than 2.5 percent of the total assemblage of design elements.

Unusual Design elements

A few very unusual design elements were noted in the assemblage (Figure 4.26). One of the most interesting is an interlocking scroll appended to a triangle with a negative circle with a diamond in the middle (*b*), giving the scroll the appearance of having an eye. Another unusual design element is a circle (*c*). Small circles are almost never incorporated into Fremont designs, but have been found on a few sherds. A couple of sherds from one bowl were almost completely painted black with "z" shapes drawn using negative space (*c*). This is very odd. Fremont potters rarely depicted designs using negative space. One of the last really unusual elements is not from a sherd included in the dataset, but from a sherd from a site in the Salt Lake Valley (42SL285). The

sherd (not pictured) was identified by Lane Richens and is described here because of its unique nature. Only the base of the bowl was recovered, but the bowl had a banded design (or at least a bottom framing line) and a bold black cross drawn in the bottom of the bowl in the empty space created by the band. This is the only known banded bowl with a design drawn in the bottom of the bowl.

Anthropomorphs and zoomorphs

Anthropomorphs and zoomorphs are very unusual on Fremont bowls (Figure 4.27). One was noted by Neil Judd at his excavations at Paragonah (*b*). The Snake Valley Black-on-gray sherd that he recovered depicts two big horned sheep facing each other. This is one of only three zoomorphic depictions recorded in the literature. The other two are a sherd depicting a big horned sheep recovered from Clear Creek Canyon (*a*) (Talbot et al. 2000:260 Figure 5.17*l*), and an Ivie Creek Black-on-white sherd recovered from Snake Rock Village that depicts what appears to be a lizard (*c*).

Anthropomorphs are even rarer than zoomorphs, and were not thought to have been depicted on Fremont bowls until the recent analysis of the PVAP materials. The sherds (likely belonging to the same bowl) depict what appear to be the portions of trapezoidal figures with a leg and arms with hands and fingers (*d-f*). Unfortunately the heads of these figures have not been found.

Secondary elements

Secondary elements refer to secondary modifications of primary elements. For example in the case of a ticked line, the line would be the primary element, while the ticks would be the secondary element (Figure 4.28).

Secondary elements were only appended to certain primary elements (Table 4.12), and were most commonly recorded on sherds with partial elements. The most common complete elements

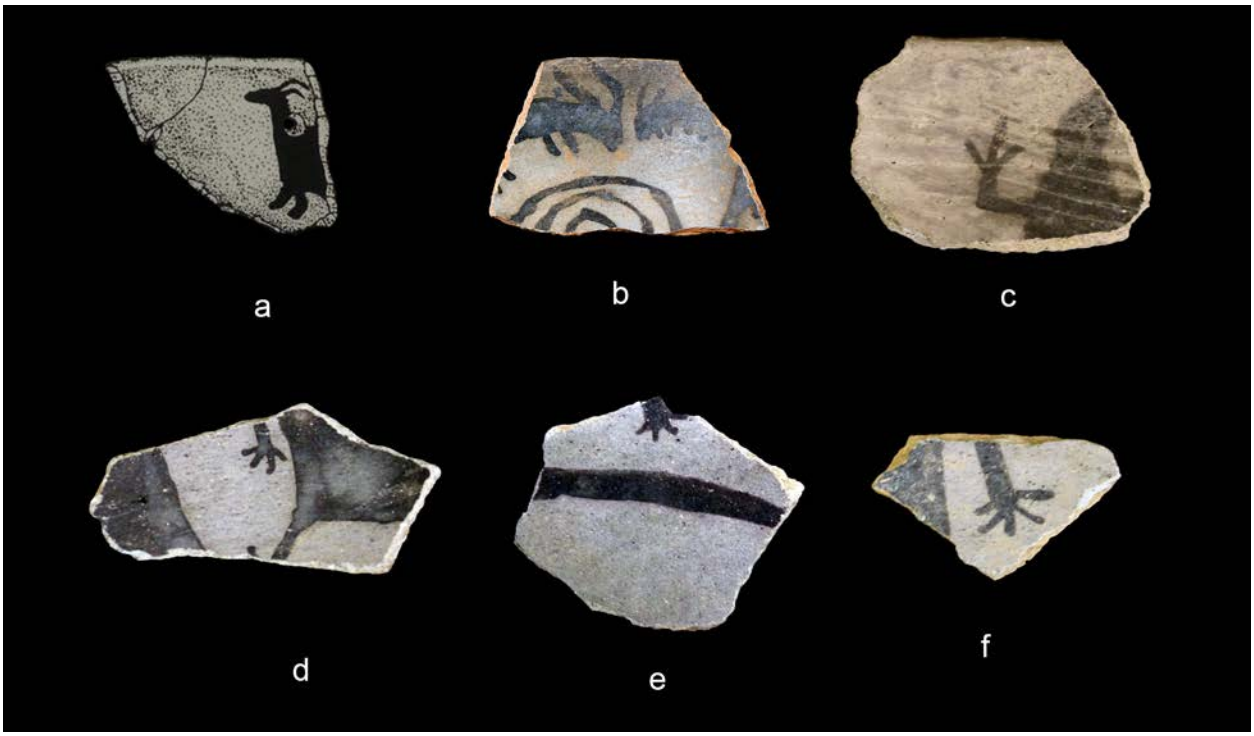


Figure 4.27. Zoomorphic and anthropomorphic.figures depicted on Fremont sherds. Sherd (a) from Talbot et al. 2000:fig. 5.17, sherd (b) courtesy of the Smithsonian Institute (A303209); sherd (c) courtesy of the Natural History Museum of Utah (42SV5.F43.23874); sherds (d-f) courtesy of the Fowler Museum (37.9686, 37.9066, 37.776).

that they are appended to are right triangles and interlocking scrolls attached to triangles. Secondary elements are also found attached to lines (single, parallel, zigzag and curved), interlocking scrolls ending in brackets, and non-right triangles. It is interesting to note that half of the interlocking scrolls ending in triangles on Ivie Creek Black-on-white bowls have secondary elements and that figure rises to 61 percent for Snake Valley Black-on-gray bowls.

The most common secondary design elements on Snake Valley Black-on-gray bowls are tick marks followed by fringing triangles and fringing dots (Table 4.13). Interestingly no fringing dots were used as secondary elements on Ivie Creek bowls. The two most common secondary elements on Ivie Creek Black-on-white are ticks and fringing triangles. Two secondary elements, a squared scroll and elongated fringe triangles, or spikes, are present on Ivie Creek Black-on-white bowls/ sherds, but not on Snake Valley Black-on-gray.

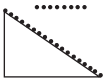
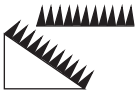
Element	Description
	Ticking
	Fringing dots, generally seen on triangles and lines
	Fringing elongated scrolls or spikes
	Squared scroll, not part of an interlocking scroll
	Fringing triangles attacked to an element, generally a triangle

Figure 4.28. Common Fremont secondary elements.

Table 4.12. Primary elements that have secondary elements.

Primary Element	Snake Valley		Ivie Creek		Totals	
	Counts	Percent	Counts	Percent	Counts	Percent
Curved lines	2	2.2	–	–	2	1.8
Interlocking scroll-bracket	2	2.2	1	5	3	2.7
Interlocking scroll- triangles	14	15.4	4	20	18	16.2
Line	3	3.3	1	5	4	3.6
Parallel curved line	1	1.1	–	–	1	.9
Partial element	43	47.3	1	5	44	39.6
Parallel line	3	3.3	2	10	5	4.5
Non-right triangle	4	4.4	–	–	4	3.6
Right triangle	18	19.8	10	50	28	25.2
Zigzag line	1	1.1	–	–	1	.9
Other	–	–	1	5	1	.9
Totals	91		20		111	

Table 4.13. Secondary element counts and percentages by type.

Secondary elements	Snake Valley		Ivie Creek	
	Counts	Percentages	Counts	Percentages
Fringing dots	15	15.5	–	–
Ticking	48	49.5	4	25
Fringing triangles	34	35.1	5	31.3
Fringing spikes	–	–	3	18.8
Squared scroll	–	–	3	18.8
Scroll	–	–	1	6.3
Totals	97		16	

Composition

The composition refers to the fill of an element. A solid fill dominated both assemblages, representing 73 percent of all Ivie Creek Black-on-white design element composition and 93 percent of all Snake Valley Black-on-gray elements (Table 4.14). Only three other composition types on Snake Valley Black-on-gray bowls constitute more than one percent of the total. The first is a corner triangle design which generally only occurs in triangles (Figure 4.29). The corners of elements with this composition are filled in solid giving the effect of additional triangles filling the corners of larger triangles. The next two are both variations of a checkerboard fill. The first is a normal checkerboard with alternating filled and blanked squares, while in the second design the checkerboard is rotated 45 degrees to create a diamond checkerboard pattern.

The most common non-solid composition type for Ivie Creek Black-on-white bowls is also corner triangles. Corner triangles appear almost as many times on Ivie Creek Black-on-white vessels as Snake Valley Black-on-gray, but make up a much larger percentage of the total. The next most common composition is freestanding dots, which almost never appear on Snake Valley Black-on-gray bowls. Half-filled elements are also uncommon on Snake Valley Black-on-gray, but present on four Ivie Creek Black-on-white bowls. Checkerboard and elements with no fill also make up more than one percent of the total.

Table 4.14 Compostion counts by type.

Composition	Snake Valley		Ivie Creek		Totals	
	Counts	Percents	Counts	Percents	Counts	Percents
Squares with dots	–	–	1	0.5	1	0.1
Checkerboard	19	1.8	4	2.1	23	1.9
Diamond checkerboard	11	1.0	1	0.5	12	1.0
Random dots	1	0.1	10	5.3	11	0.9
Hachure	5	0.5	1	0.5	6	0.5
Half filled	1	0.1	4	2.1	5	0.4
No fill	7	0.7	6	3.2	13	1.0
Solid fill	983	93.2	137	73.3	1120	90.2
Triangles in the corners	25	2.4	21	11.2	46	3.7
Other	1	0.1	1	0.5	2	0.2
Totals	1053		187		1242	

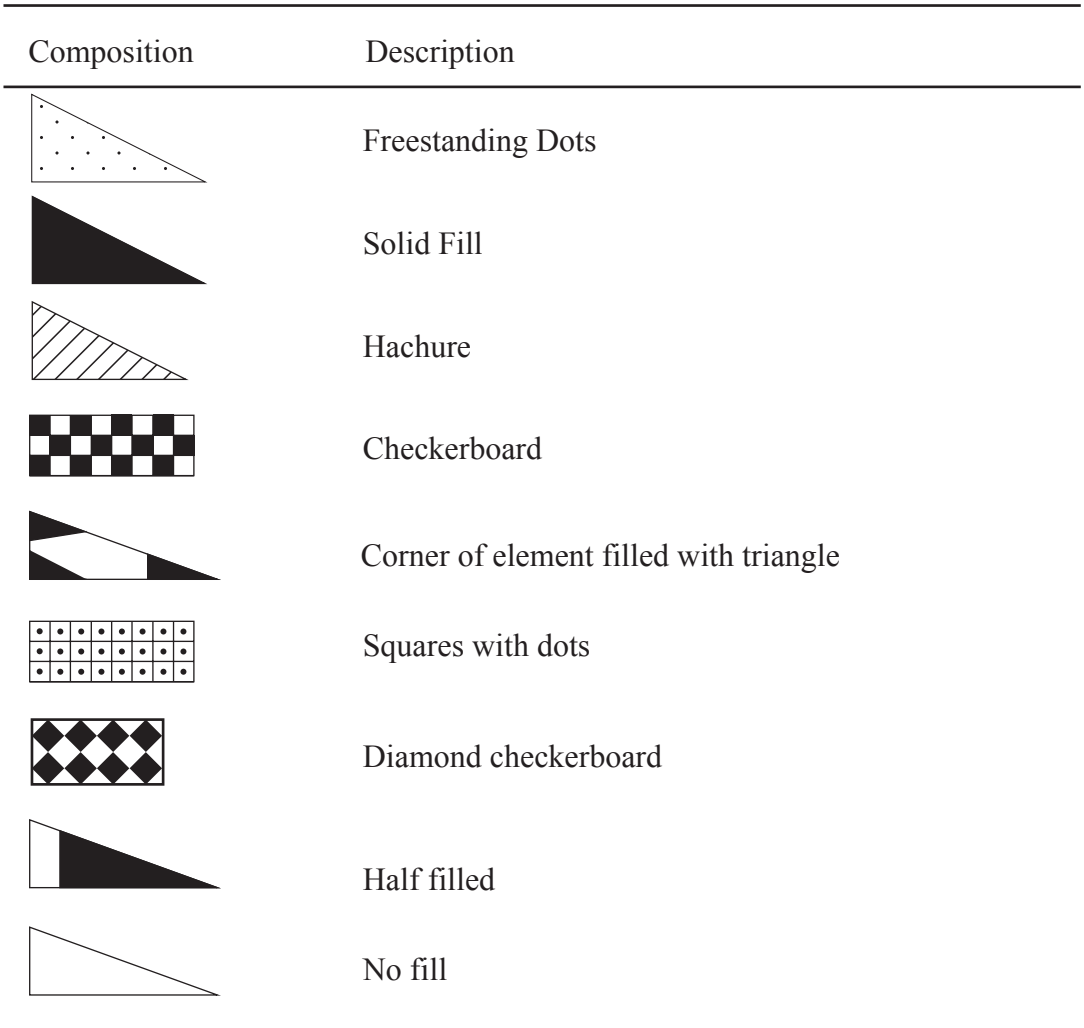


Figure 4.29. Fremont element compositions.

Lines

Framing lines

Framing lines are as the most basic structural lines that outline the design field and separate the design into either a banded or non-banded layout. At least one framing line directly below the rim is present on 95 percent of all Fremont bowls. Banded designs almost always have a top and bottom framing line, which are often doubled so two parallel lines on each side frame most bands (Table 4.15). Unfortunately the sherds in the dataset were not always large enough to determine if lines parallel to the rim line were present and were rarely large enough to determine if base lines and lines parallel to base lines of bands were present. The data for base lines and lines parallel to framing lines comes only from the whole vessels. The whole vessel dataset included 92 vessels with banded designs, 88 of which had rim lines and base lines (although one bowl had a base line but no rim line, and one bowl had a rim line but no base line). Eighty-eight of the 92 whole vessels with banded designs had a rim line, and of those 88 bowls 63 had an additional upper framing line and 62 had two bottom framing lines. The main difference between Snake Valley Black-on-gray and Ivie Creek Black-on-white framing lines is that Snake Valley Black-on-gray bowls are slightly more likely to have double framing lines.

All but two vessels with non-banded designs had a framing line directly below the rim (Table 4.16). One of these vessels had a zigzagged line below the rim of the bowl and the other had a line that was almost a rim line, but had a small gap on opposing sides dividing the bowl in half with a gap in the middle (see figure 4.17). All but one of the Snake Valley Black-on-gray bowls with a rim line had a line parallel to that line, while none of the Ivie Creek Black-on-white bowls with non-banded designs had a line parallel to the rim line.

The rim line was drawn anywhere from touching the rim to 21 mm below the rim on Snake Valley Black-on-gray bowls and 25 mm below the rim on Ivie Creek Black-on-white bowls (Figure 4.30). In general the rim lines on Snake Valley Black-on-gray bowls were drawn closer to the rim

Table 4.15. Counts of rim sherds and bowl totals and with rim lines.

	Rim sherds		Bowls	
Type	Count	Sherds with rim line	Count	Bowls with rim lines
Snake Valley	501	479	65	60
Ivie Creek	69	62	42	42
Unknown	–	–	3	3

Table 4.16. Non-banded design with rim line and line parallel to rim line counts.

Type	Rim Line	Line Parallel to rim line
Snake Valley	11	10
Ivie Creek	5	–
Unknown	1	–

than Ivie Creek Black-on-white bowls. Three width measurements were taken of each rim line, the minimum, maximum, and mode. The rim lines on Snake Valley vessels ranged from .9 to 10.4 mm wide and ranged from 1.2 to 6.6 mm wide on Ivie Creek. The average of the mode of the Ivie Creek Black-on-white line widths was about a millimeter smaller than those on Snake Valley Black-on-gray bowls.

Other lines

The widths of lines other than rim lines on both types of bowls were fairly similar; although the lines on Ivie Creek Black-on-white bowls tended to be narrower. The lines on Ivie Creek Black-on-white bowls ranged from .6 to 9.8 mm in width and Snake Valley Black-on-gray lines ranged from .2 to 11.4 mm in width. The average line width of the mode of the Ivie Creek Black-on-white lines was 3.3 mm, which is slightly narrower than Snake Valley Black-on-gray bowls at 3.7 mm (Figure 4.31).

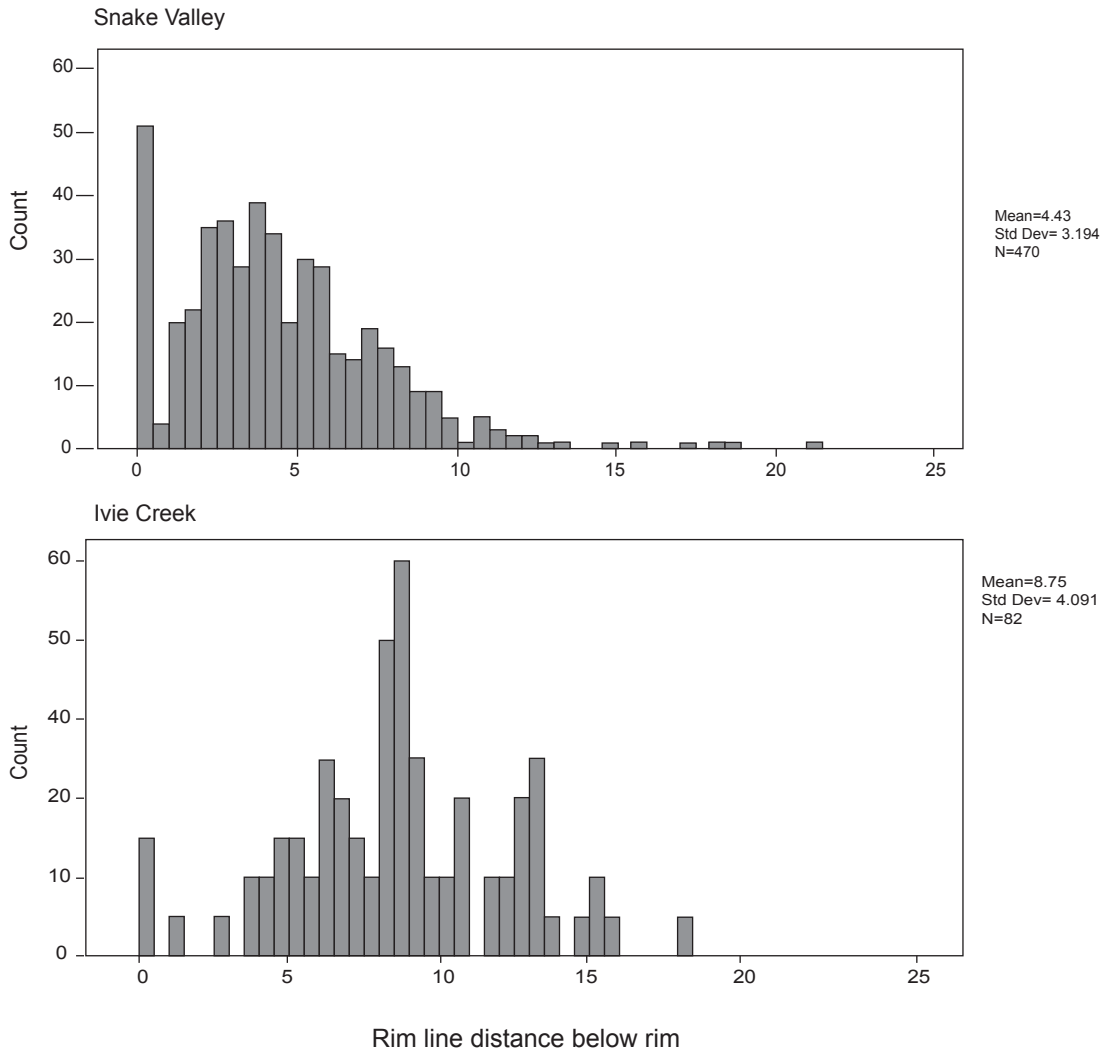


Figure 4.30. Histogram showing the distance of rim lines below the rim on both Ivie Creek and Snake Valley bowls.

Unusual painted forms and types

Jars

Very little is known about Fremont black-on-gray painted jars. Only 27 jar sherds were analyzed as part of this analysis, most of which only had lines and partial elements. Jars are most commonly painted on the exterior; however, a few sherds were found in the PVAP collection with tick marks on the interior of everted rims or with a single line painted around the interior of an everted rim.

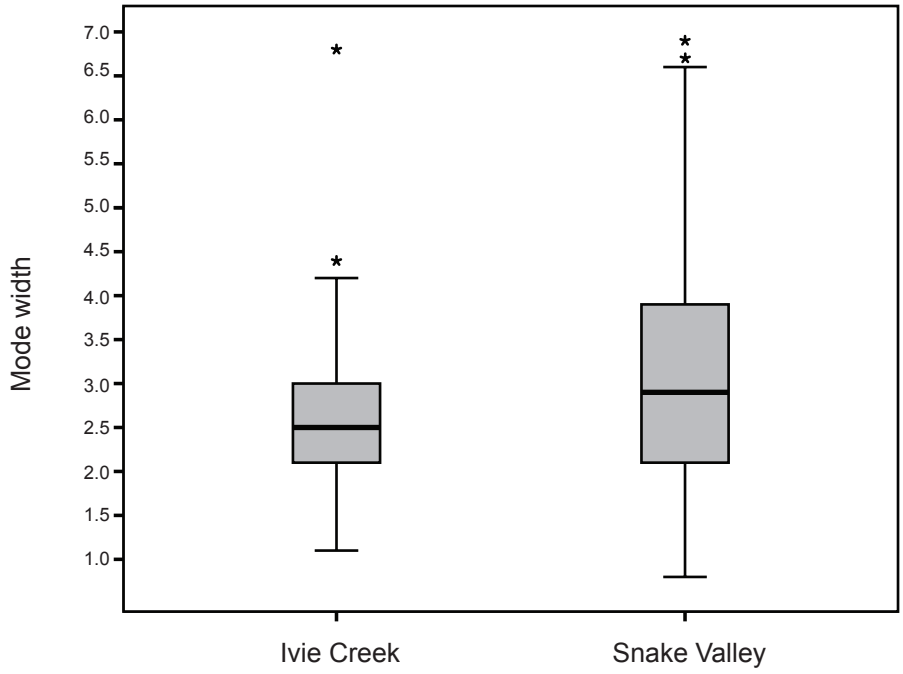


Figure 4.31. Boxplot showing the mode width of non-rim lines on Snake Valley and Ivie creek bowls.

Red-on-gray

Red-on-gray sherds have been identified at various sites throughout the northern half of the Fremont region, but seem to be most common in Utah Valley (Figure 4.32). Over 1,000 sherds have been recovered from excavations at Wolf Village (42UT273) in Goshen, Utah, and additional sherds have been identified at a site near the Salt Lake Airport (Allison 2002), in collections from the Provo Mounds (Mooney 2014), and from the South Temple site, 42SL285 (Richens 2004:Figure 6.4). At least one red-on-gray vessel has been found in the Uinta region and a red-on-gray bird effigy jar was recovered at Snake Rock Village (see below).

Only a very preliminary design analysis has been conducted for red-on-gray sherds (Freeman 2013); however observations from the analysis of sherds from Wolf Village indicate that the majority of the designs were drawn on the exterior of jars. Only sixteen of the red-on-gray sherds at the site belonged to bowls. Most of the sherds are small and complete designs are difficult to see, but lines seem to be the most common design element.

Figure 4.32. Red-on-gray sherds from Wolf Village (42UT273). Coutesy of the Museum of Peoples and Cultures.

Effigy jar

One painted bird effigy jar was recovered from Snake Rock Village (Figure 4.33). It is the only known Fremont painted effigy jar, and one of only a few Fremont effigy jars ever recovered. The vessel is not pictured or mentioned in the Snake Rock report (Aikens 1967). The jar appears to have temper consistent with the Emery series, but it was not examined microscopically. The exterior of the vessel is highly polished and painted with a reddish-brown paint. The color and way the lines are painted is consistent with the red-on-gray style found on other vessels. Five lines are painted across right side of the bird's face starting below the eye and appearing to extend across its chest; although that portion of the vessel is missing. Dots of paint have been placed in the center

Figure 4.33. Bird effigy jar from Snake Rock Village with red paint. Vessel courtesy of the Natural History Museum of Utah (42SV5.71).

of its eyes. There is also some abrasion on the eyes as if they have been ground or something was adhered to them that has since fallen off or been removed. A small slit has been made in its beak to separate the upper and lower beak, and the interior of the slit has been painted red. There are also red tick marks along the opening of the jar on the top of the bird's head. No other painting is present on the jar.

Polychromes

Neil Judd (1919) mentions finding Snake Valley Black-on-gray sherds with red paint filling in portions of the design. This technique was found on a few of sherds from the PVAP collection as well as four sherds from the Clear Creek Project. This technique was very unusual for Fremont ceramics, but is occasionally found.

VARIATION IN DESIGN

Some significant differences were observed in the designs on Snake Valley Black-on-gray and Ivie Creek Black-on-white bowls; however, the differences existed within a limited set of options that were similar for both vessel types. The following section details and, when possible, quantifies the differences and similarities in designs found on both vessel types.

Design Layouts

The most obvious difference in design layout between Ivie Creek Black-on-white and Snake Valley Black-on-gray bowls is in the three main types of bands, paneled, faux-paneled, and undivided bands (Figure 4.34). One common way to test if there is a statistically significant difference in the design layouts on the two types of vessels is using a chi-squared test. Because of the low counts of many of the layout types, categories were combined so that only the proportions of paneled bands, faux-paneled bands, undivided bands, other bands, and non-banded layouts were tested. The test shows that the observed differences in design layout between the two types of Fremont painted bowls is statistically significant (chi square = 11.685, d.f. = 4, p = .02). The biggest difference between the two is in the proportions of faux-paneled bands, which are more commonly found on Ivie Creek Black-on-white bowls, and in the "other bands" category. The higher occurrence of "other bands" on Snake Valley Black-on-gray bowls is due both to the larger

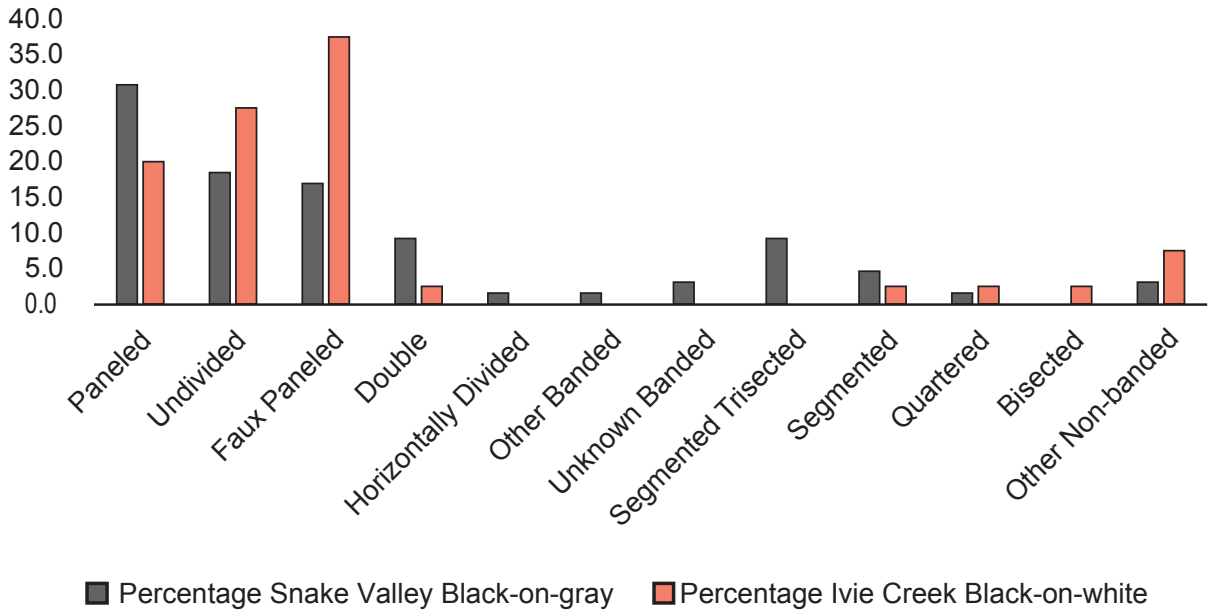


Figure 4.34. Bar chart of the ceramic type by layout.

number of recurved bowls, all of which have double-banded designs, and the presence of two additional banded types not present on Ivie Creek Black-on-white bowls.

The richness of Snake Valley Black-on-gray bowl layouts (11) is slightly higher than Ivie Creek Black-on-white (10); however, all but seven Ivie Creek Black-on-white vessels have one of the three main types of banded layouts, and each of those seven bowls has a different design layout. More than one vessel is present with six of the eleven Snake Valley Black-on-gray layouts. The remaining five layout types have only one example each. The Shannon Weaver index was used to compare the distribution of layouts on both types of vessels. The Shannon Weaver Index provides a measure for evenness (J) that can be compared between the two types. J equals zero when an anassemblage has no diversity and one when an assemblage is completely evenly distributed. The test shows that Snake Valley bowls are more evenly distributed among the possible layout options (J=.704) than Ivie Creek bowls (J=.624).

Design Symmetry

Rotational symmetry was strongly favored on both types of bowls. Not enough bowls with two-dimensional and dihedral symmetry were present to test if the differences between the two types of bowls were significant, so those symmetries were not considered in the chi-squared test. A chi-square test suggests that the differences are not statistically significant (chi-square = 4.02, d.f.= 2, p= .134).

Even though there is no statistical difference in the proportions of the design symmetries, there is a difference in the evenness of distribution. The richness of both assemblages is the same (5); however, the Snake Valley symmetries are more evenly distributed (J=.78) than the symmetries on Ivie Creek bowls (J=.53).

Design Units

A few differences are revealed by looking at the percentages of the design units on the two types of bowls; however, the low counts in each of the categories make it unclear if those differences are statistically significant or a result of the small sample size. The two most obvious differences in design unit usage appears to correspond with the most common design layout of each type of vessels. Faux-paneled bands are the most common design layout on Ivie Creek Black-on-white bowls and correspondingly the most common design unit is an interlocking scroll with an attached design, which is over three times more common on Ivie Creek bowls (19.5 percent) than Snake Valley bowls (5.8 percent). The most common design layout on Snake Valley Black-on-gray vessels is a paneled band and correspondingly the most common design unit is opposed elements in panel with a design in the panel. This design occurs on 7 Snake Valley Black-on-gray bowls, but only 1 Ivie Creek Black-on-white. Other patterns may be present in the data; however it is difficult to be confident about them due a small sample size, and a.chi -square test could not be conducted to test for statistically significant differences. Both samples were equally rich, and the Shannon

Table 4.17. The design element catagories and counts used in the chi-square test.

Type	SS-barb	Box	Diamond	IS	IS- bracket	IS-TR	Dots	TR	Other	Right TR	SS	Z-scroll	Zigzag line	Total
Ivie Creek	2	8	1	4	16	6	22	31	18	33	12	5	4	162
Snake Valley	9	21	22	31	23	23	18	73	23	106	28	3	9	389
Totals	11	29	23	35	39	29	40	104	41	139	40	8	13	551

IS= Interlocking scroll

SS= stepped solid

TR= Triangle

Weaver index showed that both types of vessels were very evenly distributed among the possible options (J=.906 for Snake Valley Black-on-gray and J=.904 for Ivie Creek Black-on-white).

Design elements

Primary design elements

The most significant differences between the two types of vessels are present in the design elements, which is also the design category with the most data. As was mentioned above over 60 percent of all design elements identified are lines and an additional 27 percent are partial elements. This section only deals with the remaining 13 percent of non-line complete elements. A chi-square test suggests that the differences in design elements present on the two types of vessels is statistically significant (chi-squared = 39.890, df = 12, $p < .000$). Some categories had to be combined in order to achieve expected values greater than five; Table 4.17 lists the categories and counts used for the chi-square test. The most obvious difference in design elements between the two ceramic types is in rows of dots, which are almost three times more common on Ivie Creek Black-on-white bowls (13.7 percent) than Snake Valley Black-on-gray (4.6 percent). Z-scrolls and interlocking scrolls attached to brackets are also more common on Ivie Creek Black-on-white than Snake Valley Black-on-gray. Diamonds, interlocking scrolls attached to triangles, and right triangles, however, are more common on Snake Valley Black-on-gray bowls. The higher number of interlocking scrolls ending in brackets is probably related the higher number of interlocking scrolls with attached designs design unit, which always have interlocking scrolls attached to brackets.

The design elements category is richer for Snake Valley Black-on-gray (19) than Ivie Creek Black-on-white (16) bowls; however, the evenness on both types bowls are fairly similar with Ivie Creek Black-on-white being slightly less even (J = .746 for Ivie Creek Black-on-white and J = .759 for Snake Valley Black-on-gray).

Secondary design elements

Very few secondary elements were identified on Ivie Creek sherds/vessels. This could be due to small sample size; however the number of whole non-line elements identified on Snake Valley Black-on-gray bowls was only around 2.4 times larger than the number identified on Ivie Creek Black-on-white bowls, but the number of secondary elements identified on Snake Valley Black-on-gray bowls is over six times the number identified on Ivie Creek Black-on-white bowls. This could be a matter of chance, but it seems likely that secondary elements are more common on Snake Valley Black-on-gray bowls than Ivie Creek Black-on-white. The other major difference is the categories present. Even though secondary elements were only identified 16 times on Ivie Creek Black-on-white bowls, the assemblage is richer (4) than Snake Valley Black-on-gray bowls where only three types of secondary elements were identified. One type of secondary element, fringing dots, was only present on Snake Valley Black-on-gray bowls, which is interesting since, as has been mentioned before, freestanding dots are common on Ivie Creek Black-on-white bowls. Fringing spikes (or elongated triangles) and squared scrolls are only found on Ivie Creek Black-on-white bowls.

Composition

The composition of 1055 elements on Snake Valley Black-on-gray vessels and 187 elements on Ivie Creek Black-on-white vessels was identified. The overwhelming majority of element compositions for both types of vessels are solid fill (90.2 percent). This may be due in part to

compositions being identified for many partial elements. Certain compositions may not have been noticeable on partial elements. For example hachuring may have looked like parallel lines, or corner triangles, and the second most common composition, may have looked like a triangle attached to a line, or simply a partial element with solid composition. This could easily have biased the count towards solid fill. Even with this skewed count a few interesting patterns are apparent. The two most common compositions are the same on both vessels, solid fill and corner triangles; however the third most common composition on Ivie Creek Black-on-white bowls is freestanding dots which is only recorded once on Snake Valley Black-on-gray bowls. Conversely, the third and fourth most common compositions on Snake Valley Black-on-gray bowls, checkerboard and diamond checkerboard, are only present on four and one Ivie Creek Black-on-white bowls respectively.

The richness of the Snake Valley Black-on-gray element compositions is 10, while the Ivie Creek Black-on-white element composition richness is 9. The Shannon Weaver Index of evenness shows that the Snake Valley composition is not very evenly distributed (J= .15), while Ivie Creek composition is more evenly distributed (J= .412). This is not surprising as 983 of 1055 elements on Snake Valley Black-on-gray sherds/bowls have a solid composition. In order to account for the biases discussed in the previous paragraph the Shannon Weaver indexed was used again using only data from elements found on whole vessels. This ensures that the actual composition was recorded, and there should be no bias towards solid compositions. Looking only at whole vessels the richness of both types was eight; however a total of 11 categories were identified. Three categories found on Snake Valley Black-on-gray bowls, hachuring, diamond checkerboard, and corner triangles, were not present on Ivie Creek Black-on-white bowls and two categories found on Ivie Creek vessels, dots and squares with dots, were not found on Snake Valley. The evenness of composition of both types increased with the changes, but the element composition on Ivie

Creek bowls is still more evenly distributed among the possible types (J= .316 for Snake Valley Black-on-gray bowls and J= .543 for Ivie Creek Black-on-white bowls).

Lines

As was mentioned above line widths are slightly narrower on Ivie Creek Black-on-white bowls than Snake Valley Black-on-gray bowls (see Figure 4.31). The biggest difference is that Snake Valley bowls more often have a line parallel to the rim line than Ivie Creek bowls. A chi-square test indicates that this difference is significant (chi-square=6.270; df=1, p=.012).

DISCUSSION

The data presented above show significant differences in many of the categories of design attributes; however, I believe that many of these differences are best seen as variations of the same distinctly Fremont design style. Both Snake Valley Black-on-gray and Ivie Creek Black-on-white designs follow the same basic rules, but in slightly different proportions. For example even though statistically significant differences were found in the the design layouts represented on Snake Valley Black-on-gray and Ivie Creek Black-on-white bowls the majority of the designs on both types are limited to the same three banded layouts. Similar patterns can also be seen in other categories of design attributes. When like elements such as all triangles and interlocking scrolls regardless of attached element are combined they are by far the two most common non-line design elements found on Fremont bowls and account for 66.6 percent of design elements found on Snake Valley Black-on-gray bowls and 57.2 percent of design elements on Ivie Creek Black-on-white bowls. More variation exists in the remaining design elements; however, very few elements are only present on one type of bowl and none in any significant quantity. Greater variation seems to exist in the more detailed aspects of the designs. Snake Valley Black-on-gray design elements are more likely to have secondary elements, but are limited to ticking, fringing triangles, or fringing

dots. Secondary elements are less common but more varied on Ivie Creek Black-on-white designs. The element compositions on both ceramic types are similar with solid and corner triangles being the two most common on both; however, the third most common composition for each ceramic type (dots for Ivie Creek Black-on-white and checkerboard for Snake Valley Black-on-gray) is rare on the other.

Interestingly the only design attribute with sufficient data to test without statistically significant results is design symmetry. Washburn has suggested that design symmetry reflects the structure of a society. She has argued that "decorative traditions that display consistency in structure over time and space can be assumed to have been generated by members of a cohesive cultural group who shared the same principles and practices for living" (2011:277). Although we are still trying to gain a basic understanding of the structure of Fremont culture, the similarities in design symmetry could suggest that the Fremont producing and using these bowls had a shared cultural identity, and should be studied, at least at some level, as a cohesive group.

The main differences between the design styles of the two vessel types mostly exist in the proportions of certain design traits. Interpreting what these similarities and differences mean in terms of Fremont culture is a difficult task, but the results seem to support Janetski et al.'s argument that the Fremont are best seen as a "tribal" society with some level of "socioeconomic cohesion" and shared identity expressed through stylistic similarities, but with internal regional variation (2011).

5 Conclusions

Fremont painted ceramics are mostly produced in two ceramic production zones, Snake Valley and Emery, and designs on each type appear to be variations of a distinct Fremont design style. Below I define the Fremont design style while discussing the major differences between the two types, and then discuss how the data fit into recent arguments about conceptualizing the Fremont.

Layout

Fremont designs are generally banded, primarily with the same three banded layouts (paneled, faux paneled, and undivided) with Snake Valley Black-on-gray favoring paneled bands and Ivie Creek Black-on-white tending towards faux paneled bands. Other banded layouts such as horizontally divided and double bands are present, albeit rarer, especially on Ivie Creek bowls. Non-banded layouts are much less common than banded ones and are more varied. The segmented trisected layout, which is the most common non-banded layout on Snake Valley Black-on-gray vessels, is not present on Ivie Creek Black-on-white bowls.

Design Symmetry

Fremont design symmetry heavily favors rotational symmetry; however, each of the other symmetry types are represented in small quantities. Rotational; designs can most often be rotated either two or four times around the vessel.

Design Units

Interlocking scroll design units are the most prevalent type on Fremont bowls. Snake Valley Black-on-gray bowls most commonly have an unattached interlocking scroll design, and attached interlocking scroll designs occur more frequently on Ivie Creek Black-on-white bowls. Other common design elements include triangles or stepped elements in the opposing corners of a panel with or without an additional design filling the panel, two rows of offset triangles facing each other, and z-scroll designs.

Elements

The most common non-line design elements on both types of bowls are triangle and interlocking scrolls; however, interlocking scrolls attached to brackets are much more common on Ivie Creek bowls than interlocking scrolls attached to triangles. The two types of scrolls are equally as common on Snake Valley bowls. Another significant difference in design elements on Fremont painted bowls is in the proportions of rows of dots in the designs. Rows of dots are the third most common design element on Ivie Creek bowls, but are comparatively rare on Snake Valley bowls. Stepped elements are also a frequent design element on Fremont painted bowls occur in about the same frequency on both types of bowls.

Secondary elements are most commonly found appended to right triangles, triangles attached to interlocking scrolls, and lines. They occur on a larger percentage of Snake Valley Black-on-gray designs where they exclusively include tick marks, fringe dots, and fringe triangles. Secondary elements are rarer, but more varied on Ivie Creek designs and include fringing triangles, ticking, fringing elongated triangles, and squared scrolls.

Over 90 percent of all design elements have a solid composition followed by triangles filling the corners of elements. After these composition frequencies vary by type. Checkerboard and diamond checkerboard compositions are common on Snake Valley Black-on-gray design elements

but rare on Ivie Creek Black-on-white. Conversely freestanding dots are common on Ivie Creek Black-on-white but are rare on Snake Valley Black-on-gray.

Lines

Framing lines are common on both types of bowls. Upper and lower framing lines are present on almost 96 percent of all banded designs. A second line running parallel to the framing lines is common on banded designs. A line parallel to the rim line is present on most Snake Valley Black-on-gray non-banded bowls, but is not exhibited on any Ivie Creek Black-on-white bowls.

Line widths are similar on both Snake Valley and Ivie Creek designs; however, Ivie Creek line widths are slightly narrower on average.

SNAKE VALLEY BLACK-ON-GRAY AND IVIE CREEK BLACK-ON-WHITE IN THE FREMONT REGION

Many notable similarities between Snake Valley Black-on-gray and Ivie Creek Black-on-white bowls coexist with very important differences, but why these similarities and differences exist as well as what role they played in Fremont social life in or between the two production zones is more difficult to determine. The presence of Ivie Creek sherds at the Parowan Valley sites and Snake Valley sherds at Snake Rock— albeit in small amounts— firmly indicates exchange of material goods between the two regions. The similarities in design style between the two major types of painted bowls strongly indicate that there was also an exchange of ideas. The most significant similarity between painted bowls from the two regions is in the designs symmetries. Analysis shows that the differences in design symmetries are not statistically significant. Design layouts used on painted bowls in the two regions also have important parallels. Although the most common design layout is different in each region (paneled bands on Snake Valley ceramics and faux paneled bands on Ivie Creek ceramics), banded layouts dominate both assemblages.

Three particular banded layouts— undivided, paneled, and faux paneled— are present on over 60 percent of the bowls in each assemblage. Similarities are also present in the most common design units (interlocking scroll designs) and design elements (triangles and interlocking scrolls). These stylistic similarities confirm that not only ceramic vessels were exchanged between the two regions, but the designs painted on them were exchanged as well.

Despite these similarities, however, sufficient differences are present in the two assemblages to suggest that even though Fremont potters in the two regions shared ideas they still maintained distinct regional traits. One of the most obvious differences is in the ceramic temper. Additionally, Ivie Creek generally has a distinctive white slip giving it a white interior surface in contrast to Snake Valley's gray color. Even though the same three banded layouts are present on the majority of Fremont bowls, the most common of the three on Snake Valley bowls (paneled bands) is the least common on Ivie Creek, and faux paneled bands, the most common layout on Ivie Creek bowls, is the least common on Snake Valley vessels. In addition, a wider variety of design layouts are present on Snake Valley bowls, which includes four layouts that are not present at all on Ivie Creek vessels. There are also significant differences in the design units used on the bowls. Even though interlocking scroll designs are the most common design unit in general, different types of scroll designs occur frequently on the two bowl types. The most common design unit on Snake Valley bowls is interlocking scrolls with unattached designs, whereas Ivie Creek more commonly has interlocking scrolls with attached designs. Even though the two most common design elements on both bowl types are the same, the third most common design unit on each type was rare on the other (stepped elements for Snake Valley and a line of dots for Ivie Creek). Snake Valley designs more commonly included secondary design elements than Ivie Creek, but a wider variety of secondary elements are found on Ivie Creek bowls.

Many aspects of the design style are shared between Snake Valley Black-on-gray and Ivie Creek Black-on-white bowls indicating interaction and exchange between the two regions. Shared

design styles may indicate that the messages embedded in the designs were also shared between the two regions, but this is difficult to determine.

The data in this project support Janetski et al.'s (2011) argument that a Fremont regional complex or interaction sphere exists. The authors identify stylistic similarities in artifacts such as ceramics, rock art, ornaments, and figurines. Even though the majority of Fremont painted ceramics was produced in two particular areas, these ceramics were distributed throughout the region and are present at almost every late Fremont site (the primary exception being sites in the Uinta Basin). It again is difficult to say what meaning the designs carried throughout the Fremont region and if that meaning was the same across the region or changed from area to area, but it does at the very least indicate interaction and exchange of material goods across the region.

Even though Snake Valley painted ceramics (and Ivie Creek to some extent) are found in northern Utah, particularly around Utah Lake, the groups there maintained regional distinctiveness through also producing their own type of painted ceramic, Great Salt Lake Red-on-gray. Great Salt Lake Red-on-gray is in many ways the opposite of black-on-gray/white types. It is painted with red paint on the exterior of jars opposed to black paint on the interior of bowls. It is an unusual type very distinct from the more prominent types of Fremont painted bowls.

Fremont designs are also distinctive in the larger context of the greater Southwest. As mentioned above, Fremont designs have long been cited as being similar to Black Mesa, Sosi, and Dogoszhi styles, among others. All three of these styles are found in the northern Southwest on Virgin and Kayenta vessels. Although little work has been done on the topic, both Thompson and Allison (1986) and Richards (2014) have suggested that the supposed connection between Fremont and Virgin design styles is in fact rather weak, despite the close proximity of the two production zones. Designs created by the Fremont are actually very distinct from those produced by their southern neighbors. One-dimensional designs are much more common on Virgin Anasazi bowls than Fremont as are non-banded layouts. Paneled bands are also uncommon and faux paneled

bands, while quite common on Fremont bowls, are non-existent. Interlocking scrolls are rare on Virgin bowls which, on Fremont pottery, are important design elements and elements of design units (Richards 2014; Thompson and Allison 1988). There is also little evidence of significant ceramic trade across the Fremont-Anasazi border. Only a handful of Fremont ceramics have been identified at Anasazi sites (with the exception of Coombs Village), and proportionally few Anasazi ceramics have been found at Fremont sites. In this context Fremont painted ceramics, especially those produced in the Snake Valley region, seem to have acted to create and maintain a social boundary between the groups living in the Parowan Valley and their Virgin Anasazi neighbors near St. George.

Temporal Variation

Fremont painted ceramics were produced for around 300 years, and it would be unrealistic to assume that designs did not increase and decrease in popularity during that time. Unfortunately most Fremont sites are poorly dated making it difficult to determine what variation is due to real differences between the Snake Valley Black-on-gray and Ivie Creek Black-on-white designs and what may just be due to temporal change. Although this issue was outside the scope of the current project, I hope to explore this issue more at a later time.

CONCLUSION

Snake Valley Black-on-gray and Ivie Creek Black-on-white ceramics have many similarities in design styles and follow many of the same basic rules for structuring and filling design layouts on painted bowls. Interaction and exchange of material goods occurred between regions as evidenced by the presence of Snake Valley pottery in the Ivie Creek production zone and vice versa, but similarities in design styles indicate that ideas were being traded between the two regions as well. These styles found throughout the Fremont region are not only distinctly Fremont but also very

distinct from painted bowls produced just south of the Fremont region by the Virgin Anasazi. This coincides with Janetski et al.'s argument that a Fremont style existed and was expressed through different artifact types across the Fremont regional system. Despite these significant similarities, the Snake Valley and Ivie Creek production areas also maintained regional distinctiveness through just as significant differences in design style.

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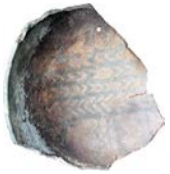
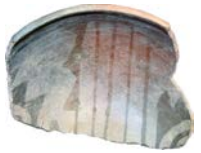
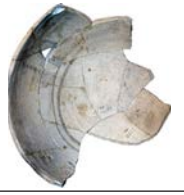
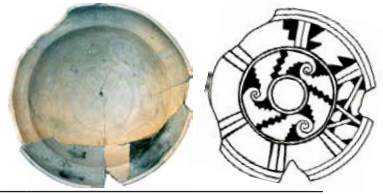
Appendix A: Whole Vessel Location and Selected Analysis

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
1	MPC/ Fowler Museum	31/37			42IN40	Ivie Creek	329.3	8.7	18	Offset Quartered 
2	MPC/ Fowler Museum	37	11762		42IN40	Snake Valley	79.4	6.3	16	Undivided Band 
3	MPC/ Fowler Museum	37	13317		42IN40	Snake Valley	322.5	9	20	Paneled Band 
4	MPC/ Fowler Museum	37	1195		42IN40	Snake Valley	161.1		18	Paneled Band 
5	MPC/ Fowler Museum	333	7139	5706	42IN40	Snake Valley	185.5	8.2	22	Indeterminate band 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
6	MPC/ Fowler Museum	37	11980		42IN40	Snake Valley	52			Indeterminate band 
7	MPC/ Fowler Museum	333	8667	1054	42IN40	Snake Valley	314.2		22	Faux-paneled band 
8	MPC/ Fowler Museum	433	9685	3146	42IN100	Snake Valley	132.3		24	Undivided Band 
9	MPC/ Fowler Museum	125	11172	3105	42IN43	Snake Valley	292.9	5.8	18	Paneled Band 
10	MPC/ Fowler Museum	125	9463		42IN43	Snake Valley	221.4		18	Undivided Band 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
11	MPC/ Fowler Museum	125	11768	3505	42IN43	Snake Valley	187.1	7.7	20	Segmented trisected 
12	MPC/ Fowler Museum	125	2063	411	42IN43	Snake Valley	172.4	8.1	18	Segmented trisected 
13	MPC/ Fowler Museum	125	9217	9035	42IN43	Snake Valley	223.2		28	Indeterminate band 
14	MPC/ Fowler Museum	125	2971		42IN43	Snake Valley	218	8.8	16	Paneled Band 
15	MPC/ Fowler Museum	125	11874	3226	42IN43	Snake Valley	223.2	6.7	18	Segmented trisected 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
16	MPC/ Fowler Museum	125	7811	2205	42IN43	Snake Valley	258.6	5.8	15	Undivided Band 
17	MPC/ Fowler Museum	125	1928		42IN43	Snake Valley	243.4	8.4	16	Paneled Band 
18	MPC/ Fowler Museum	125	3116	5393	42IN43	Snake Valley	584.7	10.3	20	Double Band 
19	MPC/ Fowler Museum	125	6410	1263	42IN43	Snake Valley	200.7	8.5	18	Faux-paneled band 
20	MPC/ Fowler Museum	37	14039		42IN40	Snake Valley	310.1	6.4	20	Horizontally-Divided 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
21	MPC/ Fowler Museum	31	1311		42IN40	Snake Valley	210.4	8.8	20	Paneled Band 
22	MPC/ Fowler Museum	31	820		42IN40	Snake Valley	315.7	6.8	17	Paneled Band 
23	MPC/ Fowler Museum	37	11791		42IN40	Snake Valley	102.4		24	Undivided Band 
24	MPC/ Fowler Museum	125	7814	2205	42IN43	Snake Valley	91	3.7	12	Faux-paneled band 
25	MPC/ Fowler Museum	395	3401	1213	42IN40	Snake Valley	442.5	8.3	22	Undivided Band 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
26	MPC/ Fowler Museum	395	3444	5087	42IN40	Snake Valley	229		18	Double Band 
27	MPC/ Fowler Museum	395	4982		42IN40	Snake Valley	164.6	5.9	18	Double Band 
28	MPC/ Fowler Museum	395	4978	5024	42IN40	Snake Valley	394.8	8.2	20	Double Band 
29	MPC/ Fowler Museum	37	10784		42IN40	Snake Valley	210.7		24	Faux-paneled band 
30	Museum of Peoples and Cultures	67.43.49			UNK	Snake Valley	1275.73	8.8	33	Faux-paneled band 

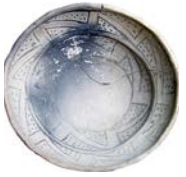
Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
31	Museum of Peoples and Cultures	98.237.2574.42			South Temple	Snake Valley	365.5		20	Undivided Band 
32	MPC/ Fowler Museum	125	1444		42IN43	Snake Valley	101.6	4.3	11	Paneled Band 
33	MPC/ Fowler Museum	125	1891		42IN43	Snake Valley	439.2	8.8	20	Faux-paneled band 
34	Natural History Museum of Utah	24300		188	42MD180	Snake Valley	405.1		24	Faux-paneled band 
35	Natural History Museum of Utah	24315		302	42IN124	Snake Valley	365.4	10	24	Other 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
36	Natural History Museum of Utah	24135		190	42IN124	Snake Valley	650.1	9.5	22	Paneled Band 
37	Natural History Museum of Utah	87692		293	42SV662	Ivie Creek	356.1	7.2	18	Faux-paneled band 
38	Natural History Museum of Utah	2276		70	42SV5	Ivie Creek	141.4	7.7	18	Undivided Band 
39	Natural History Museum of Utah	4543		953	42IN40	Snake Valley	253.8	6.8	18	Paneled Band 
40	Natural History Museum of Utah	24366		883	42IN40	Snake Valley		7.4	16	Undivided Band 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
41	Natural History Museum of Utah	4646		1193	42IN40	Snake Valley	283.8	6.5	15	Paneled Band 
42	Natural History Museum of Utah	24241		2	42SV5	Ivie Creek	456	7	20	Faux-paneled band 
43	Natural History Museum of Utah	87689		171	42SV662	Ivie Creek	169.9	6.8	19	Undivided Band 
44	Natural History Museum of Utah	87691		165	42SV662	Ivie Creek	369.8	7.6	20	Faux-paneled band 
45	Natural History Museum of Utah	UNK			42SV662	Ivie Creek		7.8	18	Paneled Band 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
46	Natural History Museum of Utah	UNK			42SV662	Ivie Creek		10.4	22	Faux-paneled band 
48	Smithsonian Institute	A132976			Deep Creek Valley	Snake Valley		8	22	Faux-paneled band 
49	Smithsonian Institute	A292030			Meadow	Ivie Creek		9	24	Undivided Band 
50	Smithsonian Institute	A288487			Beaver	Snake Valley	249.8	6.5	12	Undivided Band 
51	Smithsonian Institute	288484			Beaver	Snake Valley		8.25	18	Double Band 

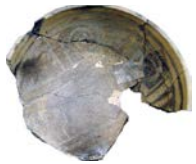
Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
52	Smithsonian Institute	A288609			UNK	Snake Valley	130.6		22	Faux-paneled band 
53	Smithsonian Institute	A303204			42IN43	Snake Valley	148.3	5.7	16	Paneled Band 
54	Smithsonian Institute	A303210			42IN43	Snake Valley	113.1		22	Paneled Band 
55	Smithsonian Institute	134522			Fillmore	Snake Valley	512.6	9.4	24	Paneled Band 
56	Smithsonian Institute	A288608			Beaver	Snake Valley	252.6		22	Paneled Band 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
57	Peabody Museum at Harvard	29-5-10	A6480		Sanpete County	Snake Valley		7.2	19	Segmented 
58	Peabody Museum at Harvard	37-130-10	19081		Marysville	Snake Valley	240.7		28	Faux-paneled band 
61	Peabody Museum at Harvard	39-130-10	18973		UNK	Snake Valley		7.4	20	Quartered 
62	Anasazi State Park Museum	7937			42GA34	Ivie Creek		7.8	15	Double Band 
63	Anasazi State Park Museum	7963			42GA34	Ivie Creek		11.8	22	Undivided Band 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
64	Anasazi State Park Museum	8240			42GA34	Ivie Creek		10.2	23	Faux-paneled band 
65	Anasazi State Park Museum	8247			42GA34	Ivie Creek		6.6	13	Undivided Band 
66	Anasazi State Park Museum	8251			42GA34	Ivie Creek		6.6	17	Undivided Band 
67	Anasazi State Park Museum	8253			42GA34	Ivie Creek		7.4	22	Segmented 
68	Anasazi State Park Museum	8255			42GA34	Ivie Creek		6.1	17	Undivided Band 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
69	Anasazi State Park Museum	8291			42GA34	Ivie Creek		9.25	19	Paneled Band 
70	Anasazi State Park Museum	8292			42GA34	Ivie Creek		9.5	19	Paneled Band 
71	Fremont Indian State Park Museum	2530.23			42SV1686	Ivie Creek		9.6	16	Paneled Band 
72	Fremont Indian State Park Museum	5763.11			42SV1686	Snake Valley		6.6	16	Paneled Band 
73	Fremont Indian State Park Museum	7054.1			42SV1686	Snake Valley		8.5	16	Paneled Band 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
74	Fremont Indian State Park Museum	7048.1			42SV1686	IC		9.4	19	Paneled Band 
75	Fremont Indian State Park Museum	6082.1			42SV1686	Snake Valley		8.8	20	Faux-paneled band 
76	Fremont Indian State Park Museum	1706.1			42SV1686	Ivie Creek		8	17	Faux-paneled band 
77	Fremont Indian State Park Museum	4810.6			42SV1686	Other*		6	14	Segmented trisected 
78	Fremont Indian State Park Museum	9371.1			42SV1686	Other*		8.2	20	Paneled Band 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
79	Fremont Indian State Park Museum	9396.1			42SV1686	Ivie Creek		7.5	17	Faux-paneled band 
80	Fremont Indian State Park Museum	9408.1			42SV1686	Other*		6.5	10	Undivided Band 
81	Natural History Museum of Utah	11281			Grantsville	Ivie Creek	684.5	9	20	Paneled Band 
82	Natural History Museum of Utah	24315		341	42IN124	Snake Valley	243.8		22	Undivided Band 
83	Natural History Museum of Utah	24300		183	42MD180	Snake Valley	251.3	6.3	14	Segmented trisected  

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
84	Natural History Museum of Utah	24300		211	42MD180	Ivie Creek	129.9	6	18	Faux-paneled band 
85	Natural History Museum of Utah	24354		656	42IN40	Snake Valley	308.8		24	Segmented 
86	Natural History Museum of Utah	24300		349	42MD180	Snake Valley	326.7	7.8	20	Paneled Band 
87	Natural History Museum of Utah	24300		206	42MD180	Ivie Creek	294.5	7.8	18	Faux-paneled band 
88	Natural History Museum of Utah	24521		85	42MD180	Ivie Creek	220.6	4.8	13	Bisected 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
89	Natural History Museum of Utah	24575		188	42MD180	Ivie Creek	397.8	7.3	20	Undivided Band 
90	Museum of Peoples and Cultures	356	4203		42IN43	Snake Valley	584	9.4	22	Double Band 
91	Hutchings Museum	1956007			UNK	Ivie Creek	912.6	10.3	22	Other 
92	Hutchings Museum	546.7			UNK	Ivie Creek	546.7	8.8	22	Other 
93	Hutchings Museum	1956007			UNK	Ivie Creek	531.5	8.8	19	Undivided Band 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
94	Church History Museum	20-315			UNK	Snake Valley	488.3	8.2	17	Paneled Band 
95	Natural History Museum of Utah				Grantsville	Snake Valley	489.9	8.1	18	Paneled Band 
96	Natural History Museum of Utah	24390		1209	42IN40	Snake Valley	428.8	7.8	19	Segmented trisected 
97	Natural History Museum of Utah	1976		374	42SV662	Ivie Creek	262.5	8.7	18	Faux-paneled band 
98	Natural History Museum of Utah	4673		1247	42IN40	Snake Valley	331.9	7.1	18	Segmented 

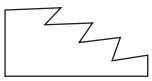
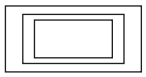
Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
99	Natural History Museum of Utah	1973		154	42IN40	Snake Valley	258.1		21	Segmented trisected 
100	Natural History Museum of Utah	4488		827	42IN40	Snake Valley	388	8.5	22	Other 
101	Natural History Museum of Utah				Grantsville	Ivie Creek				Faux-paneled band 
102	Natural History Museum of Utah				Grantsville	Ivie Creek				Undivided Band 
103	Natural History Museum of Utah				Grantsville	Ivie Creek				Faux-paneled band 

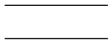
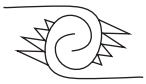
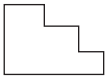
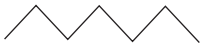
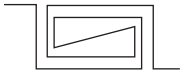
Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
104	Natural History Museum of Utah	2274		77	42SV5	Ivie Creek	167.4	6.5	18	Other 
105	Prehistoric Museum of Utah	A-294			UNK	Ivie Creek	315.1	7.6	14	Paneled Band 
106	Prehistoric Museum of Utah	A-29			UNK	Ivie Creek	457.4	9.4	20	Faux-paneled band 
107	Museum of the San Rafael Swell				UNK	Ivie Creek				Undivided Band 
108	Museum of the San Rafael Swell	53			UNK	Snake Valley				Paneled Band 

Vessel No	Location	Acc #	Cat #	FS #	Site	Ware	Weight (g)	Height (cm)	Rim Dia. (cm)	Layout
109	MPC/ Fowler Museum	509	1065	2313	42IN40	Snake Valley	209.6		20	Undivided Band 
110	MPC/ Fowler Museum	333	8667	1055	42IN40	Snake Valley	435		22	Undivided Band 
111	Museum of Peoples and Cultures	2008.27.001.001			West Canyon	Ivie Creek			19	Faux-paneled band 

* Indcates an unamed Fremont ceramic ware that is thought to have been locally produced near Five Finger Ridge 42SV1686 (see Richens 2000).
Vessel drawings 75–77 and 79 from Richens 2000:table5.2
Vessel drawings 100–103 from R. Madsen 1977:fig. 31
Vessel images 45 and 46 from D. Madsen 1977:fig. 33*b, c*
All other vessel drawings by Jessica Corbett Kramer

Appendix B: Primary Design Elements on Fremont Bowls

Primary Element	
Element	Description
	Rectangle
	Bottom framing line (framing line at the bottom of a band)
	Barbed Terrace (looks like a terrace, but the steps have a steeper angle) (can sometimes look enlongated)
	Box/square
	Concentric Boxes
	Circle
	Curved line
	Running Chevrons
	Diamond
	Dots (not used as a fill)
	Horitzontal dividing line
	Interlocking scroll ending in a bracket
	Interlocking scroll
	Interlocking scroll ending in a triangle
	Lines meeting at a corner (could be part of a chevron)
	Ladder
	Line parallel to the rim, but not the rim line
	Single line (not a framing line near the rim
	No rim line

Primary Element	
Element	Description
	Line parallel to the bottom framing line
	Parallel curved lines
	Partial Element
	Parallel lines
	Rim line (first line directly below the rim)
	Interlocking scroll with spikes
	Terrace or steps
	Triangle, not at a right angle.
	Right triangle
	Zig zag line
	Z-scroll