RETRACING THE PENUTIAN EXPANSION:

USING VISUAL ANALYSIS AND STATISTICAL RESEARCH TO MAP CHANGES IN CALIFORNIA NATIVE AMERICAN BASKETRY

A Thesis

Presented to the faculty of the Department of Anthropology

California State University, Sacramento

Submitted in partial satisfaction of
the requirements for the degree of

MASTER OF ARTS

in

Anthropology

by

Rosemary Ellen Brother

FALL
2019

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Abstract

of

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For this research I examine 123 Native American baskets from northern and central California to identify their origin by using microscopy to identify taxonomic types of certain weaving attributes. The results were categorized in tables and then displayed geographically on maps. The purpose was to see whether the visual assessment of the data agreed with past statistical studies that had concluded that cultural transmission of craft traditions were most alike between neighboring groups regardless of ethnic affilliation, and whether the data mapped geographically could add to the discussion regarding the expansion of Penutian Wintun tribes from southern Oregon into northern California. The findings agreed with the two previous statistical studies but showed that there are other factors that influence the cultural transmission of basketry traditions. The mapping of basketry attributes did not result in conclusive results, however was consistent with one generally accepted theory of the Penutian expansion.

_____, Committee Chair
David Zeanah PhD

_____
Date

ACKNOWLEDGEMENTS

First and foremost, I want to acknowledge the members of my committee, Drs. David Zeanah and Michael Delacorte for their munificence in allowing me the opportunity to choose this topic and allowing me to learn as I worked my way through the analysis of all the baskets. In addition, I very much appreciated their patience as I struggled to stay on track with a topic that leads one in many different directions.

Secondly, I would like to acknowledge the curators and Universities who granted me access to their collections for this research. They provided access to the material for this study and the generous donation of their valuable time and expertise. Thanks to Elizabeth Guerra and Greg Wada from the University of California Davis; Karen Dively from California State University Sacramento; Dr. Carolyn White and Marielle Black at the University of Nevada Reno, and Ellen Bowden for making the necessary arrangements to access the collection at American River College.

Last, but certainly not least, I want to thank the Native American weavers who, through stubborn determination against such high odds, were able to keep this unequaled art form alive and continuing to grow. By refusing to surrender the old knowledge that had been passed from family to family for thousands of years, they have enabled new generations of Native Americans to connect to their heritage.

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INTRODUCTION

There are a few recognized experts on California basketry, and it is primarily their informed opinions that establishes the current state of knowledge. It takes years of experience under the guidance of a knowledgeable mentor and examination of hundreds of baskets to develop such expertise. In most cases, prehistoric and ethnographic basketry materials are identified by microscopic identification and comparison with plant specimens in botanical collections. Despite advancements in technology, including infrared and Raman microspectroscopy, microscopy is considered the best method of fiber identification (Adovasio 2010; Houck 2009). Material identification is one of several attributes analyzed to infer a basket's cultural affiliation. In fact, many experts such as Justin Farmer, a respected Chumash collector, author, lecturer and recognized authority on basketry plant materials, believe that identification of plant materials is the best way to identify a baskets' ethnic affiliation (Farmer 2010). Specific attributes and design elements have been identified by ethnologists and basketry experts and documented in many publications (Adovasio 2010; Anderson 2013; Bibby 2012; Farmer 2010; Moser 1989; Shanks and Shanks 2006, 2010, 2015; Sturtevant and Heizer 1978). Ultimately, most basketry identification comes down to the skill, experience and opinion of the analyst.

While scholarly research may be quantitative, scientific and exacting, in most cases, identification of a basket's ethnic affiliation continues to be subjective. Statistical models that analyze basketry attributes have been used to determine relatedness between neighboring groups (Jennings et al. 1986; Jordan and Shennan 2003; Washburn 1987), but visual identification of combinations of these related attributes may add more to the discussion of migration, displacement and combining of cultural ideas. By categorizing baskets into geographic areas

controlled by specific socio-political units, or tribelets, on the basis of trading partners, neighbors and distant kin groups weaving technologies, a pattern of geographical cultural transmission of ideas between tribes, could emerge.

California Indian basketry is regarded as some of the most beautiful in the world. It also is among the most sought after by collectors. The phenomenon of collecting Native American basketry began at the end of the nineteenth century and continued through the first three decades of the twentieth century. It was linked to the Arts and Crafts movement and a desire by collectors to possess the exquisite baskets that were commonly advertised in books and magazines as being made by a tribe's last weaver (Griset 1993; Jackins and Schevill 1993; Usner 2012). Ironically, it was probably the high demand for California baskets, combined with the skill and adaptability of the weavers who refused to let the art form die, that saved it from extinction and preserved at least part of the traditions that had been passed down from generation to generation for thousands of years.

Because weaving knowledge is passed from teacher to student, often a family member, and at a young age, it is reasonable to assume that weaving traditions remained consistent throughout most of the prehistoric period across the Great Basin and in California. When populations were small, most interaction was with other bands often related by blood and language. Weavers shared basketry designs and standardized similarities within related groups developed. But as populations grew and established fixed territories, interactions of trade, arrogation and intermarriage resulted in diffusion of weaving traditions that show in the archaeological record and are important clues to understanding the evolution of California basketry (Delacorte and Basgall 2012). This research examines how one wave of the Penutian expansion, the migration of the Wintun subfamily into California, have changed northern California weaving traditions.

Ancient Populations of Western North America, Moratto's Hypothesis

Since the beginning of archaeology in the United States, numerous theories about the possible migrations of people into North America have been proposed by researchers. Moratto and Fredrickson (1984) proposed a timeline for the populating of California by examining and synchronizing theories from archaeologists, linguists, geneticists and personal research. The fact that the archaeology seems to fit with proposed linguistic theory may or may not be a coincidence, but many accept his publication as a robust hypothesis for the peopling of California, Oregon and Nevada (Hughes 1992).

Moratto and Fredrickson propose that Hokan speaking people appear in the California archaeological record as the Western Pluvial Lakes tradition between 12,000 and 10,000 BP having migrated to North America through the mid-continental ice-free corridor. By 8000 to 6000 BP, they were well established in all cismontane California, and many archaeologists associate their cultural remains with the Early Millingstone Horizon because their appearance in the archaeological record coincides with linguistic theory (Moratto and Fredrickson 1984). Whistler (1977) has suggested that small groups had spread all over California and diverged into several different language dialects by 6000 BP, but probably had little structure or political organization.

The Ancestral Yukian people are believed to have entered California from a Pacific coastal migration and may have been the first Native Americans to occupy territory along the northwest coast of California. According to Moratto and Fredrickson, it is not clear if they are connected linguistically to any other group, as they show similarities with Penutian, Athapascan, Siouan, and Hokan languages, but it is also possible that they may not be related to any other known language group (Moratto and Fredrickson 1984; Shanks and Shanks 2015; Whistler 1977).

Ancestral Penutian groups may have followed the Pacific coast down to the Columbia River and Oregon coast. Cressman of the University of Oregon first documented evidence of human

habitation of the Oregon Lakes region to the south of the Columbia Plateau. In 1938, Cressman and his students excavated what would come to be known as Fort Rock Cave. Over the next eighty years other excavations in the Oregon lakes basin would yield proof of human occupation as far back as 14,300 years ago (Fowler and Fowler 2008). Evidence indicates that populations inhabited, abandoned and reinhabited the caves coinciding with temperature fluctuation effects of the Anathermal and Altithermal periods (Bedwell 1973). As these populations moved into different areas of Oregon and the Great Basin, their root language diverged into several subfamilies.

The Penutian Expansion

Dixon and Kroeber (1913) proposed theoretical language families for California Native American groups by comparing more than 200 stem words and discovering the strong "lexical and structural similarities" between certain groups speaking different languages. They named the language stock for the largest number of related tribes that occupied the entire central valley of California, Penutian. One other group, the Hokan, inhabited more rugged terrain in the foothills on both sides of the central Sacramento Valley. The linguistic evidence, they believed, indicated that the Hokan groups had originally occupied most of the central Sacramento Valley, but they had been pushed out to the peripheral areas by more aggressive Penutian groups (Dixon and Kroeber 1913).

Hundreds of articles have since been written about the linguistic families, genetic relationships, and possible migration routes that the ancestral Penutian speakers may have taken. DeLancey and Golla's (1997) inventory of relevant publications and their contributions to knowledge on the subject, will not be duplicated here. It should be pointed out however, that most of the articles support Dixon and Kroeber's originally proposed linguistic groups, but not all. Much of the dissention centers around where the various sub-groups of the Penutian language family may have originated, when and which way they traveled to get to the central Sacramento Valley and which groups came in what sequence.

It is not known exactly why ancestral Penutians began to explore new territory, but it may have been in response to climate change, population growth, the promise of better resources, or a combination of factors. Recent studies of Great Basin archaeological sites with basketry, support the idea that from the terminal Pleistocene until the Numic expansion around 1000 BP, Penutian speakers occupied much of the northern Great Basin and parts of the Columbia Plateau, including Honey Lake, Lovelock Cave and Stillwater Marsh in northern Nevada (Camp 2017). Extensive evidence of their basketry has been recorded in cave excavations across the Great Basin.

It is theorized that Penutian speakers moved into California in several migrations (Camp 2017; Whistler 1977). But climatic conditions in California have destroyed any basketry evidence that can provide definitive dates using basketry for northern California sites. There are similarities between artifact types from Lovelock Cave, Nevada, including basketry traditions that are linked to California ethnographic cultures (Hattori 1982).

Non-basketry evidence indicates that around 5000 to 4500 BP, Utians (Proto Miwok and Costanoan) entered the lower Sacramento Valley from Nevada (Moratto and Fredrickson 1984). Linguists believe that the ancestral Miwok and Costanoan languages indicate a time depth in California of at least forty to forty-five centuries. These dates correspond with the Windmiller Pattern and archaeological changes in everything from burial practices to food processing. The similarities between cultures in the western Great Basin and groups in California including extended burials, red ochre, quartz crystals, charm stones and projectile point types, suggest that they came from the Lovelock or similar Nevada location (Delacorte and Basgall 2012; Hattori 1982). Another Yok-Utian group closely related to the Utians, were the Yokustan or ancestral Yokuts. They could have been a part of the Utian migration or may have arrived separately around the same time or slightly later. Evidence from excavations in Central California indicate that these people had more complex social organization, as indicated by abundant grave goods in certain

burials, and also that they exploited a greater variety of resources (Heizer 1949). It is reasonable to conclude that this may have contributed to their successful adaptation, allowing them to expand into new areas previously occupied by earlier hunter-gatherer groups. Long-established Hokan-speaking groups were pushed out of the Delta and southern Sacramento Valley by Utians as they expanded toward the Pacific coast and established new territories that eventually came to be held by Costanoan and Miwok groups. Ancestral Esselen, one established Hokan group, were absorbed as the Proto Costanoan expanded south to San Francisco Bay and surrounding areas by 4000 BP. The Berkeley Pattern suggests changes in the archaeological record indicating an admixture of the two cultures through trade, intermarriage and sharing of ideas. Between 3500 and 3000 BP the Proto Miwok also take over new territories in the north San Francisco Bay and Napa Valley and as far north as Clear Lake by 2500 BP, pushing back both Hokan and Yukian groups.

According to Moratto and Fredrickson (1984), Yokustan groups likely arrived after Utians, as they demonstrate less linguistic diversity than Utian groups. Basketry comparisons with specimens from Roaring Springs Cave, Oregon, show nearly identical construction of both string and plain twined basketry, so it is believed they descended from the Proto-Penutian linguistic family who inhabited the northern Great Basin and Columbia Plateau (Dawson 1978). After settling in central California between 3500 and 3000 BP, they spread southward along the Sierra Nevada foothills and San Joaquin Valley circa 3000 to 2500 BP (Moratto and Fredrickson 1984).

During the period between 1950 to 1750 BP, ancestral Maidu, also a member of the sub-family of Penutian speakers, may have migrated from the Great Basin into eastern central California reaching the eastern Sacramento Valley and foothills by 1300 BP. Moratto and Fredrickson (1984) indicate the likelihood that they displaced existing Washoe and Yana because of borrowing and anomalies of plant names and differences in archaeological traits between occupations.

Another Penutian sub-family, the ancestral Wintun had roots in the upper Rogue River region of southern Oregon where their ancestors had settled after migrating from the Columbia Plateau (Moratto and Fredrickson 1984). But linguists and other scholars do not agree on whether the Wintun came to California in one large group, or multiple groups traveling separate routes at different times. Whistler (1977) proposed that it was the Patwin who first left southern Oregon, traveling down the Sacramento River moving into territories occupied by Hokan and Yukian groups and continuing to expand as far south as the northeastern shore of San Francisco Bay. They were followed by a separate Wintun migration who may have also traveled through Shasta territory, settling in the northern Sacramento Valley (Whistler 1977). As they adapted to their environment, they split into separate but related groups occupying different territories and eventually speaking different but related dialects. The northern people are later called Wintu by Europeans, and the people to the south of Cottonwood Creek were called the Nomlaki (Golla 2011; Moratto and Fredrickson 1984).

This hypothesis is reinforced by another study demonstrating linguistic ties between the ancestral Wintun of southwestern Oregon and Oregon Coastal Penutian tribes, specifically the Alcea (Golla 1997). The Alcea are from the Oregon Peripheral division of the root language. Golla (1997) proposed that the Wintu and Nomlaki show linguistic connection to the Alcea, but that the Patwin do not. It fits that if the Patwin migrated first, before the connection was made between the Alcea and the Wintun, they would lack the loan words that were borrowed from the Alcea. This hypothesis is far from conclusive, but worth considering in light of how it fits with other migration theories.

If the currently accepted outline for the Penutian expansion (Moratto and Fredrickson 1984) is relatively accurate, the Pomo and Esselen probably represent the prehistoric Hokan people in twining technique. Shanks and Shanks (2006) discuss the strong possibility the Esselen held a

vast territory stretching from San Francisco Bay to Monterey County and possibly inland as far as the San Joaquin Valley. No living relatives of the Esselen are alive today. Costanoan Utians took over Esselen territory and gradually absorbed the people and much of their culture. Descendants of Costanoan, Coast Miwok and Pomo live in an area of central California where coiling is the predominant weaving method, yet for these three tribes twining is either the predominant weaving choice or done equally with coiling.

Another difference between the ancestral Esselen and the Pomo was the way they decorated their twined baskets. Rather than adding a second weft material of a different color to make designs, as done by all other California tribes, Esselen and Pomo weavers sometimes used different types of twining methods to create patterns on baskets. These included twining in up-right and down-right directions, and use of both plain, diagonal and three strand twining to create patterns, suggesting that the first Hokan people who populated California twined in both directions.

Other northern California Hokan groups, the Achumawi, Atsugewi, Yana, Karuk, Shasta and Washoe twine primarily in an up-right direction, but not all. Exceptions include the eastern Achumawi, eastern Atsugewi and Shasta who do some down-right twining on cordage warps. Also, these more northern tribes use different technique to decorate baskets, including overlay and color substitution. Since, in theory, Hokan groups once occupied most of California in ancient times, it is difficult to know why or when their languages, people and basketry methods diverged. But it is very likely that for the Esselen and Pomo, stitch slant in both directions developed very early.

The migration of the Penutian language family is also complicated. Whistler (1977) proposed that Penutians migrated from the Columbia River area of the Columbia Plateau and spread across the Northern Great Basin in northern Nevada and Southern Oregon, into southwestern Oregon and finally into California. Current Penutian weavers from these different areas do not twine in the same direction. Figure 1 illustrates ways the root language could have diverged into

sub-families as different groups split and migrated to different areas. It is reasonable to assume that other aspects of their cultures, including basketry, could also have changed.

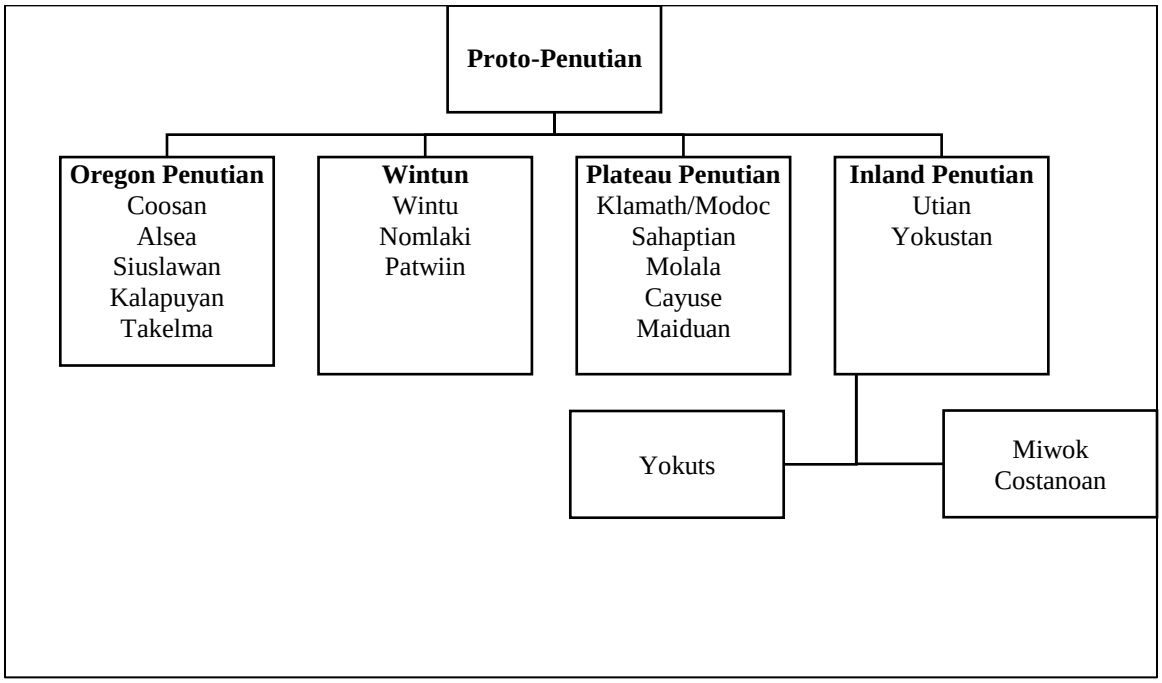

Figure 1: Example of a Penutian Family Language Tree; Constructed from Delancey (2018)

According to Camp (2017) Catlow twiners from the northern Great Basin around Klamath Lake twined down-right. Early migrations of Penutian speakers, ancestral Miwok, Costanoan, Yokuts and Maidu, came from the Great Basin where prehistoric twining was done down-right, so it is logical that they brought that tradition with them. The ancestral Wintun may have twined in both directions, having been influenced by the northwest style of weaving after migrating to the upper Rogue River territory next to Shastan and western Oregon tribes that twine up right.

Evidence of prehistoric basketry is rare in California, but ethnographic Wintu and Patwin baskets are very different, suggesting their basketry traditions may have diverged long ago, consistent with the Whistler (1977) hypothesis. Wintu predominately twine up right and coiling is

rare. Most Patwin basket types are coiled and the few that are twined, usually have a down-right stitch slant. Shanks and Shanks (2006) point out however, that they do twine up right on certain types of open-twined burden baskets.

Nomlaki baskets are rare and information about them is sometimes contradictory depending on the source. Elsasser (1978) suggested that their weaving was like the Wintu, but Shanks and Shanks (2006) show how it is more closely related to their kin and southern neighbors, the Patwin. It seems plausible that Patwin influence was greater, because they adopted coiling for most basket types like the Patwin. Perhaps the Patwin retained the down-right stitch slant from their early origins and the Proto Wintu and Nomlaki adopted the up-right stitch slant when they were influenced by coastal Oregon tribes after the Patwin had already gone.

Shanks and Shanks (2006) believe that the Maidu had the greatest influence on Patwin and all central California coiled basketry. The Maidu migrated from the western Great Basin where coiling was practiced as early as 4200 years ago (Elsasser 1978). Utian-Yokustan speakers could have brought coiling to California from Nevada, but Elsasser (1978) suggests that coiled basketry was first introduced to northern California around 3000 BP, because there is little evidence of bone awls in archaeological sites in California prior to that time. Since the first Utians are believed to have arrived in California as early as 4500 BP, they are unlikely to have introduced coiling into California. This could indicate that there were any number of entries of Penutian groups from Nevada. Shanks and Shanks (2006) point out that the coiled basketry of the Lovelock culture in western Nevada shares similar uncommon attributes consistent with coiling of the Sierra Miwok, Maidu and Washoe, including split stitches, leftward work direction and the use of duck feathers, among others. Ancestral Maidu twined down right, but they also are primarily coiling people. Their coiled baskets have distinctive large bold designs that have been adapted from their ancestral twining designs and are different from other tribes who developed coiling designs that differed

from their twining designs. Maidu coiled designs are almost identical to twining designs of the Klickitat from the Columbia Plateau. The likelihood of an ancient connection with this area seems robust and shows that distant kin can also affect basketry designs, not just neighbors in proximate areas.

This proposed timeline for the early populating of California by Penutian speakers is just one of many proposed theories. It has the support of many scholars because it correlates with the linguistic, archaeological and genetic records in many ways. Now basketry studies may be able to contribute even more to the discussion. Although, it is not possible to know definitively which direction prehistoric Californians twined, it seems clear that their traditions were affected by interaction with different groups as they populated the state. Perhaps as they became more sedentary and established tribal identities, the techniques they used for weaving became more ethnically specialized. Some researchers have already begun using basketry data to understand the migrations and interactions of California's first people.

Previous Research

As the nineteenth century ended, scholars realized that the cultures of Native California had undergone irrevocable changes since European contact. It was unclear at the time how great the cultural upheaval had been, but it was a concern to some anthropologists and museum curators like Franz Boas and his student Alfred Kroeber. To address this issue, university-based ethnographers, linguists and naturalists, and amateur collectors and dealers began to study and record the knowledge and memories of pre-contact cultures before the elders took it with them to their graves. Curators realized that important artifacts were disappearing into private collections, so obtaining collections for museums and the data related to them was a driving force of anthropology in the early twentieth century.

This information was particularly significant in regard to basketry, because unlike the Great Basin where the dry climate preserved prehistoric basketry for study, California's wetter climate along with the burning the personal baskets of deceased individuals practiced by some groups, were two reasons that almost no prehistoric basketry was available for examination. These early university-based ethnographies and a small number of baskets that were collected by the first trappers and explorers in California are the only information available about the pre-contact basketry of many California tribes. It is from these scant data that researchers tried to answer a plethora of questions regarding population movement and cultural interaction. It has not been an easy task, and researchers do not agree on any one hypothesis regarding the populating of California. This is further complicated by the number of languages and dialects spoken by as many as 500 tribelets from region to region, and any number of migrations, disruptions and genocides that have taken place. In some cases, entire tribes perished from introduced diseases, leaving no information at all.

California researchers have had to use creative methods to study California basketry. Studies and publications about ethnographic California basketry were written by collectors, anthropologists, museum personnel and dealers. Researchers and collectors experienced Native Americans in different ways, some as scientists-observers, and others as insiders who had gained the trust and friendship of the people with whom they worked. Grace Nicholson was a collector and dealer who wrote about northern California weavers and their baskets (Usner 2012). Although not an expert, she learned from basket weavers with whom she frequently interacted, that there were certain protocols for correct weaving of each basket type, but also freedom to be creative within certain parameters.

Kroeber dispatched numerous graduate students like Lila M. O'Neale, Cora DuBois and Edward Gifford to the field to conduct "salvage" ethnography across the state, and each made

observations about basketry. O'Neale's notes and publications contain a wealth of material about Native American basket weaving. Her interviews with Karuk weavers, as she camped with them on the lower Klamath River over a six-week period, are extremely informative. She was able to get the women to critique some familiar baskets made by other women they knew. She learned that each basket type had its own specifications that were supposed to be followed exactly, or the basket would be considered wrong by the other weavers (O'Neale 1932). Women told her about the "memories" of basket patterns that some weavers were able to pass forward, but that most women could only copy their designs. It was not uncommon for a woman to ask to borrow a basket with a design she admired, to copy the pattern layout. This explains how designs could have been repeated and then adapted to a neighboring groups' repertoire.

The study of Native American culture was in its heyday at the beginning of the twentieth century. But while early ethnographic basket data was thought to be important at this time, it was of little interest to archaeologists. California archaeologists did not seriously analyze perishable artifacts for information about ethnicity, cultural transmission, or the importance of baskets in the lives of Native Americans because California sites yielded few perishables (cordage, sandals, garments, basketry).

Cressman (1943) was one of a handful of archaeologists who seriously discussed basketry and how it could be used to indicate migrations across the Great Basin. He was also one of the earliest researchers to describe basketry attributes and their possible use as taxonomic types, by comparing the traits found in Catlow twined basketry to similar basketry of the Anasazi, Columbia Plateau, Lovelock cave and Klamath Lake and west coast Tlinglet ethnographic basketry (Cressman 1943).

It was not until the late 1960's that archaeologists began to recognize the data potential of basketry. Baskets were used by all Native American tribes for many millennia and were essential

for survival, such that their study can provide important information about past cultures and their day to day lives from birth to burial. This realization was the beginning of a new era of study for California archaeology. Since then, an increasing number of researchers have explored questions about group migrations, interactions and language, and the possibility of their connection with Native American basketry. For example, Jordan and Shennan (2003) investigated language transmission and craft traditions to determine whether weaving traditions were transmitted like languages, through branching; or by phylogenetic processes, like biological traits such as eye color being passed between generations. They used data from previously analyzed baskets in existing collections, including the basketry chapter in the Smithsonian publication *Indians of North America, Volume 8* (Elsasser 1978). They tested the hypothesis that similarities in basketry traditions either between linguistic groups or between neighboring groups with no linguistic ties, would reflect how craft traditions were transmitted. They found that "geographic distance and adjacency" exert the greatest influence on the types of baskets made in proximate areas and that similar cultural processes of language and craft transmission are the reason. However, there were also some areas in the results of their analyses that remain unexplained. This includes the now widely acknowledged fact that subtle distinctions between local groups' baskets can be identified by weavers and careful observation of experts (Adovasio 2010; Bibby 2012; Camp 2017; Elsasser 1978; Farmer 2010; Shanks and Shanks 2006, 2010, 2015). Jordan and Shennan (2003) concluded that these distinctions cannot be explained by the results of their research and that further study is necessary at a more localized level.

Dorothy Washburn (1987) reached a similar conclusion in her research on basketry designs of 858 baskets from the University of California Berkeley and University of California Davis. She focused on two research issues: (1) how design elements (specifically the arrangement of geometric

motifs) contrast with linguistic evidence for group interactions; and (2) how types of interaction foster similarities and differences in basket design.

Using symmetry analysis (in this instance, studying the similarity between geometric elements of repeated patterns, bands or floating elements on a two dimensional plane) she was able to show that proximity between weavers has greater influence on basketry design than linguistic affiliation (Washburn 1987). Washburn concluded that environment, proximity, trade and marriage were important factors in determining differences in design structures. This is important because it might explain the differences between the basketry of the Wintu, Nomlaki and Patwin, Penutian-speaking people who entered the upper Sacramento Valley displacing established Hokan groups. Whether each of these Penutian groups moved into California with the same or slightly different weaving traditions is the subject of ongoing debate, but today there are few similarities between their baskets.

Camp (2017) researched Great Basin prehistoric and ethnographic basketry and was able to make several important conclusions in regard to both. Using radiocarbon dated specimens from throughout the Great Basin, she concluded that Catlow twined basketry has not changed technologically since the end of the Pleistocene. She was also able to demonstrate that Klamath/Modoc twining from southern Oregon and northern California was most likely related to Catlow twining, but that some examples had undergone technical and decorative changes after European contact (Camp 2017). In general, Catlow-type twining done with a down-right stitch slant is mostly unchanged.

These research examples answered some questions regarding cultural transmission of basketry technology, but also point to many more questions that need to be answered. The questions that will be addressed in this research paper are:

1. Do the present data, used to designate tribal affiliation, agree with the studies by Jordan and Shennan (2003) and Washburn (1987) that geographic distance and adjacency have a greater influence on basketry designs than linguistic affiliation?
2. Does the data, when displayed geographically, contribute to discussions regarding the possible migration routes of the Wintun into California?

Chapter 2

THE ANALYSIS

This research focuses on basketry of the Wintu, Nomlaki, and Patwin tribes, Penutian speakers who are believed to have migrated to the Sacramento Valley from southern Oregon around 1450 to 1250 BP. Logically, all three groups started with the same basketry traditions, yet many changes occurred as this ancestral population split and settled in different areas and their basketry evolved in response to influences from new neighbors and groups encountered during their respective migrations. Basketry evidence indicates this to be the case (Shanks and Shanks 2015). Also included are baskets of nearby tribes, Mountain Maidu, Klamath/Modoc, Shasta, Karuk, Hupa, Yurok, Atsugewi, Achumawi, Yana, Pomo, Paiute and Washoe, who may have interacted with Wintu, Nomlaki and Patwin groups through trade, displacement and intermarriage. Available samples of these tribes' basketry were visually compared for similarities that might indicate cultural transmission between unrelated language groups. In the case of the Nomlaki, whose twined baskets are rare, information collected from previous research was considered. The first section of this chapter, Collecting the Plants, discusses the process by which the plant materials used for the analysis were identified. Next, Data Collection deals with the physical analysis of the baskets. Following this, Data Analysis explains the process that resulted in tables that display the information for easier interpretation.

Definitions of Terms (Appendix A) provides an explanation of technical terminology specific to weaving that may be unfamiliar to the reader. Appendix B lists the names and descriptions of commonly used basketry plants that were included in the comparative botanical collection used for analysis. An analysis form was completed for each basket chosen for analysis. All analytical data were transferred to a corresponding Excel spreadsheet. A sample analysis form

and data from the spreadsheet are included in Appendix C. The analysis forms were bound and labeled for future reference.

Collecting the Plants

Before data collection could begin, it was necessary to assemble a comparative botanical collection of basketry plants for identification of the plant materials used by Native American weavers. The collection was created from species identified in the arboretums at the University of California Davis and California State University Sacramento, and from nursery stock. Each specimen was placed in a labeled bag that included only those parts of each species used by California tribes for weaving or related purposes such as dying. For example, there might be more than one usable plant structure as in the case of willow (*Salix* spp.) where both the shoot and the roots were harvested and used for warp and weft elements.

The plant specimens were processed as closely as possible to the way Native weavers processed them (Navajo School of Indian Basketry 1971; Newman 1992). Shoots were prepared for use as both warps and wefts; examples of warps both with and without cortex and examples of whole and split wefts were fabricated. Split wefts were prepared by removing the inner plant layers and thinned and sized so that they would be comparable to wefts in baskets. Information on the collected plants is contained in Appendix B.

Data Collection

Photos were taken of the comparative botanical samples using an AmScope SM-6TZ-54S-10M Digital Professional Trinocular Stereo Zoom Microscope, with 10x Eyepieces, 3.5X-90X magnification, 0.7X-4.5X zoom objective, clamping articulating arm stand, and 10MP Camera with reduction lens. Plant materials were photographed at one hundred times magnification. The images were used to create a dichotomous key that served as a reference during the analysis along with the

stored digital images. Figures 2-4 are examples of photographs that were chosen for the dichotomous key.

Figure 2: Image of Conifer Root under Magnification. Photo Shows Stringy rough surface.

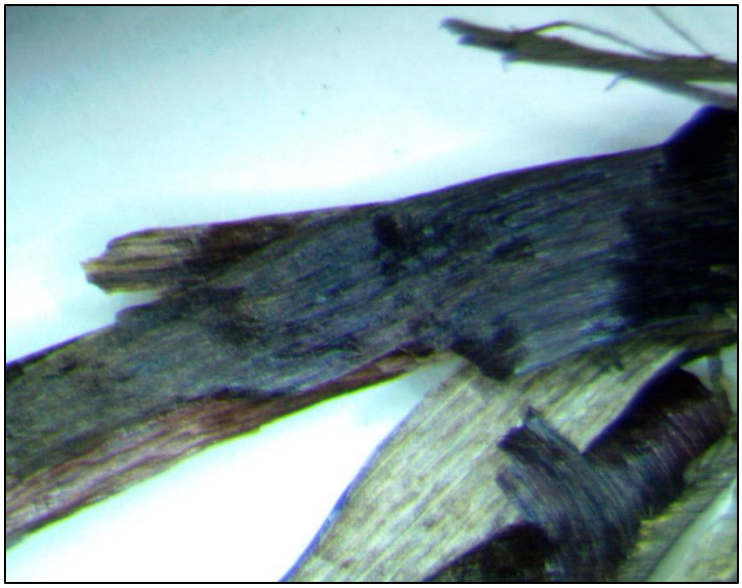

Figure 3: Image of Bulrush Root under Magnification. Photo Shows Smooth Shiny Surface.

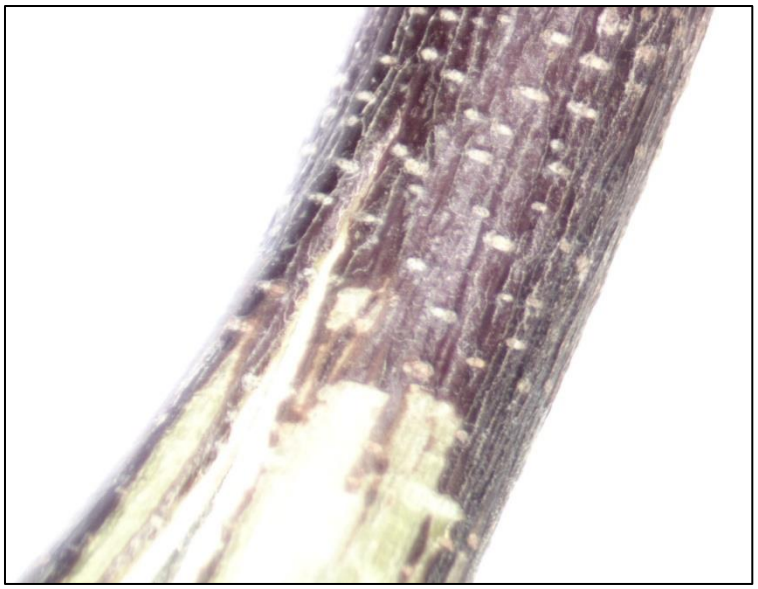

Figure 4: Image of Redbud under Magnification. Photo Shows Lenticels and Rough Surface Texture.

The collection of basket data followed the protocols in *Fiber Identification in Ethnological Textile Artifacts* (Schaffer 1981). A form was created to record the material and other significant basket attributes using the sample analysis templates included in *Basketry Technology* (Adovasio 2010) as a reference. This template includes a comprehensive list of potential basket attributes that might be encountered during analysis. Although not all attributes would prove to be informative regarding the current research questions, it was decided to record as many attributes as feasible during analyses because it would be difficult to return to the museum facilities.

The process of recording data was kept as uniform as possible given that each University had its own rules for handling collections. The process consisted of a set of steps that were completed in the same order and the same way for each specimen analyzed. Each collection was first evaluated for potential specimens and a sample was chosen that most closely fit the established criteria: (1) specimen is either a burden basket or vessel, (2) specimen is of twined construction, (3) materials or provenance indicate that the item is likely from the chosen area, (4) specimen is of traditional form and design.

The reasoning behind the choice of basket forms selected for analysis (Criterion 1) was two-fold. First, I thought that there would be more examples of these two basket types available to analyze. Secondly, I was interested in whether burden basket shape could be used to distinguish tribe or language family. Twined construction was the method used by most northern California Native American weavers and was probably the only type of weaving done by Wintun people when they arrived from southern Oregon. Because the research examines changes in Wintun weaving that may have resulted from migration, only twined baskets were analyzed (Criterion 2). This increased the likelihood that analyzed specimens would be from the target area (Criterion 3), because the Wintu and their surrounding neighbors did little or no coiling.

As employed here, the term traditional (Criterion 4), refers to basketry forms and designs that are common on pre-1850 California Indian baskets. This excludes designs containing non-abstract animals or plants and shapes like cups with handles, footed containers, or unusually decorated and covered containers made for sale.

In total, 123 baskets matching the four criteria were identified from four local museum or curation facilities and two private collections, Brother and Caramagno (Table 1). On the first visit to each facility a work area was established, and twined baskets were selected for analysis. Baskets containing either double-sided or single-sided overlay and baskets with cordage warps were selected because they were presumably from the target area and were rarely made south of the boundary between the Wintu and Nomlaki.

Table 1: Basket Specimens Included in the Present Research.

Facility Name	Study ID#	Site ID#	Site Tribe
American River College	1A	708	None
	2A	2658	Wintu
	3A	12661	Klamath
	4A	2725	None
	5A	--	Achumawi
	6A	--	Pomo
	7A	L836	Northwest
	8A	2657	Klamath/Modoc
	9A	122305	None

Facility Name	Study ID#	Site ID#	Site Tribe
University of California, Davis	1D	237	Achumawi
	2D	24	Achumawi
	3D	25	Achumawi
	4D	27	Pit River
	5D	415	Klamath Canyon
	6D	418	Shasta
	7D	421	Achumawi
	8D	422	Shasta
	9D	786	Wintu
	10D	787	Wintu
	11D	788	Wintu
	12D	789	Wintu
	13D	790	Wintu
	14D	791	Wintu
	15D	794	Wintu
	16D	795	Wintu
	18D	796	Wintu
	19D	797	Wintu
	20D	798	Wintu
	21D	799	Wintu
	22D	800	Wintu
	23D	801	Wintu
	24D	803	Wintu
	25D	804	Wintu
	26D	806	Wintu
	27D	810	Wintu
	28D	815	Yana
	29D	816	Yana
	30D	817	Yana
	31D	818	Yana
	32D	792	Wintu
	33D	777	Patwin
University of Nevada, Reno	1N	G77-109	None
	2N	G77-119	Paiute
	3N	82-107-0020	None
	4N	75-2-123	Great Basin
	5N	82-107-0020	None
	6N	G77-102	None
	7N	G77-103	N California
	8N	G77-101	None
	9N	82-107-297	Wintu
	10N	82-107-534	Pomo
	11N	82-107-267	Yurok
	12N	82-107-264	Klamath Modoc
	13N	82-107-431	Klamath River
	14N	82-107-10	Paiute
	15N	G77-110	Paiute
	16N	82-107-296	Klamath/Modoc
	17N	82-107-278	Klamath/Modoc
	18N	82-107-295	Atsugewi
	19N	82-107-254	None
	20N	82-107-219	Karuk

Facility Name	Study ID#	Site ID#	Site Tribe
	21N	82-107-303	Klamath
	22N	82-107-318	Modoc
	23N	82-107-339	None
	24N	82-107-287	Klamath/Modoc
	1S	80-6-13, 132	Great Basin
	3S	75-2-100	Klamath
	4S	75-2-123	Great Basin
	5S	74-37-3	Pit River
	6S	74-32-2-33	McCloud River
	7S	74-37-1, 60	Klamath/Modoc
	8S	FIC 276, 268	Plateau
	9S	FIC 240, 103	Miwok
	10S	74-32-2-37	Pomo
	11S	80-6-8, 133	Great Basin
	12S	75-2-21, 72	Klamath Lake
	13S	74-37-17, 57	Klamath/Modoc
	14S	74-37-20, 47	Klamath/Modoc
	15S	12-24, 142	Klamath/Modoc
	16S	75-2-23, 73	Klamath Lake
	17S	74-37-32	Pit River
	18S	75-2-35, 104	Modoc
	19S	83-3-16, 106	Klamath Lake
	20S	80-6-7, 130	Great Basin
	25S	75-2-119, 71	Klamath Lake
	26S	74-37-5, 63	Klamath/Modoc
	28S	74-37-14, 56	Klamath/Modoc
California	29S	74-37-13, 48	Klamath/Modoc
State	30S	74-37-15, 44	Klamath/Modoc
University,	31S	74-37-16, 49	Klamath/Modoc
Sacramento	32S	74-37-18, 30	Hupa
	33S	74-37-19, 33	Hupa
	34S	74-37-29, 62	Klamath/Modoc
	36S	74-37-22	Klamath/Modoc
	37S	74-37-2, 144	Pit River
	38S	74-37-23, 69	Klamath/Modoc
	39S	74-37-25, 54	Klamath/Modoc
	40S	74-37-33, 67	Klamath/Modoc
	41S	74-37-31, 46	Klamath/Modoc
	42S	74-37-28, 53	Klamath/Modoc
	43S	74-37-30, 51	Klamath/Modoc
	44S	74-37-11, 66	Klamath/Modoc
	45S	74-37-26, 50	Klamath/Modoc
	46S	74-37-27, 45	Klamath/Modoc
	47S	74-37-9, 61	Klamath/Modoc
	48S	74-37-10, 55	Klamath/Modoc
	49S	74-37-7, 59	Klamath/Modoc
	50S	74-37-8, 58	Klamath/Modoc
	51S	74-32-2-16	Eel River
	52S	74-32-2-13	Yurok
	53S	74-32-2-30	Klamath River
	54S	75-2-37, 77	Klamath Lake
	55S	83-3-14, 31	Hupa

Facility Name	Study ID#	Site ID#	Site Tribe
	56S	83-3-13, 84	Klamath River
	57S	74-41-7	NW Coast
	58S	74-41-14	Klamath Lake
	59S	74-41-21	Klamath Lake
Brother	1B	--	Washoe
	2B	--	Klamath/Modoc
	3B	--	Klamath/Modoc
	4B	--	W Atsugewi
	5B	--	Plateau
Caramagno	1C	--	E Achumawi
	2C	--	W Achumawi
	3C	--	E Atsugewi

Selected baskets were brought to the analysis area and positioned so that the articulating arm of the microscope could be manipulated to photograph almost anywhere on each basket. An analysis sheet containing the research identification and number and facility catalog number, and date was then completed. The basket was then photographed from the side, top and bottom with a Samsung Galaxy S6 with a 10 MP camera. Photos were labeled with the research identification number and added to Dropbox, an application designed to transfer data between devices. Photos were identified by place, time and date information so they could be matched with the corresponding analysis form if necessary. Each photograph was added to the original Excel spreadsheet.

Next the software program designed for the AmScope SM-6TZ-54S microscope was started and photography of the attributes began. This part of the analysis took between one and two hours, depending on the materials and presence of a defining trait. For example, western redbud (*Cercis occidentalis*) is easily identified by the deep blood-red color and spots called lenticels on the epidermal surface. But when redbud is peeled, it looks like many other materials such as peeled red willow or maple. Thus, it was often necessary to move the microscope around the basket searching for something that could identify the material. If the material is redbud it is possible to find small remnants of remaining cortex with a few lenticels because of the high magnification.

The texture and color of the material were also observed to confirm the material designation. The length of time required to verify material identification was highly variable. Photos were taken of all identifiable attributes on both warps and wefts.

Subsequent examination followed the analysis form (Appendix C, C-1) beginning with measurements and ending with how the basket was finished. For a few baskets, condition issues or the museum support structure precluded getting some measurements or ability to record certain attributes. In those cases, nothing was recorded and "unknown" was entered in the spreadsheet.

Basket 4B provides an example of the analytical process. Figures 5 through 12 were taken as the first step in the documentation process. Figure 5 shows the overall shape and design of the basket, with the design consisting of a zig-zag pattern of split parallelograms encircling the basket. There is a small design just below the rim and the rim is finished without overlay, with the warps cut slightly above the last row of weaving. Figure 6, showing the interior, indicates that the basket has double-sided overlay, because the same pattern appears on both the interior and exterior walls.

Figure 5: Exterior View of Basket 4B. Photo Shows Exterior Design of Split Parallelograms.

Figure 6: Interior View of Basket 4B. Photo Shows Design on the Interior Matching the Design on the Exterior Resulting from Double-sided Overlay Technique.

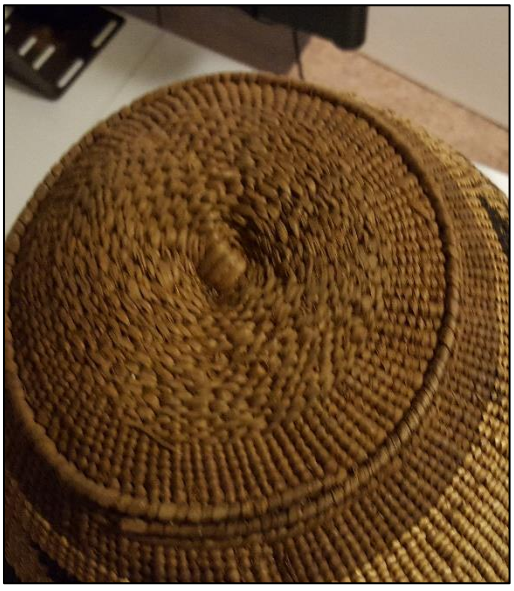

Figure 7: Exterior View of Bottom of Basket 4B. Note Lattice Twinning, Inverted Cone and Three-strand Twining Where Wefts Cross 2 Warps.

Figure 8: Interior View of Bottom of Basket 4B. Note Three-Strand Twining. Interior Looks Like Plain Twining with the Rows Lining Up.

The photograph of the basket's underside (Figure 7) shows that the bottom does not have overlay and the starting knot is an inverted cone. Three strand twining is present from the starting knot for approximately 45mm and then it is replaced with plain twining for approximately 15mm of the remaining base. Three strand twining looks like plain twining, lining up in straight rows, on one side (Figure 8), but the stitches are offset on the reverse side, like diagonal twining (Figure 7). This is the result of the third weft element that is introduced to make the area more durable. Also noted in (Figure 7) is the lattice twining around the base where the sides join the base. Lattice twining is a technique that is often used for reinforcement by adding a supporting rod within the weaving. The rod protrudes slightly around the basket making it easily identifiable.

Representative photos were also taken of the different materials used for background and foreground wefts and compared to the botanical collection photos to identify material type. Basket 4B was made using stick warps most likely of peeled redbud. Little of the warp material was exposed, making it difficult to identify the material with certainty. However, there were areas where

a reddish cortex could be seen and one or two tiny areas that looked like lenticels (Figure 9), and the surface course texture was consistent with peeled redbud. No bud scars were identified.

Figure 9: Basket 4B Warp Showing Possible Redbud (left) and Botanical Sample of Peeled Redbud (*Cercis occidentalis*) (right). Small Amounts of the Cortex are Exposed in Both Photographs.

Figure 10 is of the starting knot area on the basket bottom. The entire bottom is woven from this material, which is identified as conifer root, *Pinophyta or Coniferophyta.* Many species of conifer root were used by weavers and most look very much alike. Figure 11 was taken to illustrate both the use of the material bear grass, *Xerophyllum tenax* and the material overlaid over the conifer root base weft. Arrows point to areas where the overlay has been damaged exposing the material underneath. Figure 12 is the material redbud, *Cercis occidentalis*, being used as the color element in the design. This material, which naturally appears reddish in color, has been dyed black for the design on this basket.

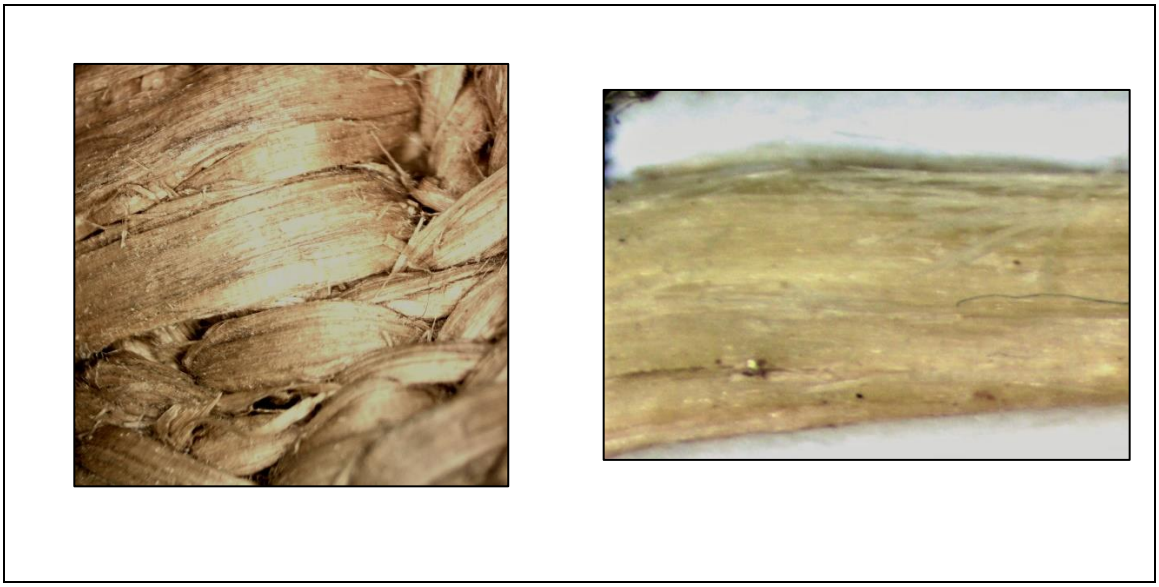

Figure 10: Basket 4B Showing Conifer Root Start (left) and Botanical Sample of Conifer Root (*Coniferophyta*) (right). Similar Texture is Apparent.

Figure 11: Basket 4B Showing Bear Grass Overlay (left) and Botanical Sample of Bear Grass (*Xerophyllum tenax*) (right). Bear Grass is Partly Missing over Exposed Conifer Root Underlay.

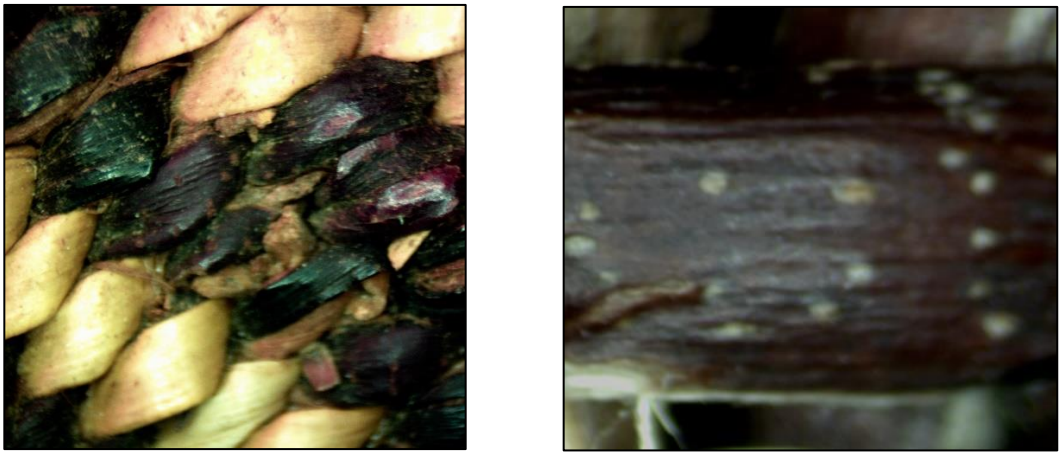

Figure 12: Basket 4B Showing Dyed Redbud (left) and Botanical Sample of Redbud (*Cercis occidentalis*) (right). Both photos Show Lenticels on the Cortex Surface and Similarity in Surface Texture.

Once the analysis form was completed, the attributes were matched against the lists of attributes most commonly used by the tribes (Appendix D). A basket could be attributed to more than one group, so it was important to identify as many group indicators as possible to choose the most likely tribal affiliation. Tribal affiliation for baskets whose tribal designation was missing or the designation changed by the present study relied on the information compiled in Appendix D from multiple sources (D'Azevedo and Sturtevant 1986; Elsasser 1978; Farmer 2010; Moser 1989; Shanks and Shanks 2015).

In the case of basket 4B, there were several potential tribal affiliations. Many groups used double-sided overlay, including the Wintu, Achumawi, Atsugewi, Yana, Shasta, and Klamath/Modoc. But among this group, commonly only Achumawi and Atsugewi baskets have a bottom inverted cone like basket 4B. Of these two groups, only the western Atsugewi use lattice twining on the bottom rim; the Achumawi do not. The stitch direction, weave quality, number of colors used, materials, design pattern and three-strand twining on the base of the basket are also

consistent with western Atsugewi weaving. Since the western Achumawi employed many of the same attributes, it is the inverted cone base combined with the lattice twining that determine the most likely origin of basket 4B as western Atsugewi.

Many specimens had the tribal designation already listed in the museum records which were later checked for accuracy against the tribal attributes in Appendix D. Seventeen baskets that did not appear to conform to accepted criteria for their group were reevaluated and recategorized.

Part of this group of seventeen baskets were some not identified by tribe, but by the geographic area the basket was believed to have come from. For example, baskets 4D and 5S were labeled only “Pit River”. The Pit River runs through Achumawi territory, and that group is often referred to as simply the Pit Rivers. Baskets 4D and 5S were determined likely to be Mountain Maidu rather than Achumawi, because of the single sided overlay and down-right stitch slant. The Achumawi make baskets with double-sided overlay and their stick warp baskets are twined up right. Mountain Maidu do both single-sided and double-sided overlay and commonly twine down right. Similarly, baskets 17S and 37S were also attributed to Pit River but were recategorized more specifically here as eastern Achumawi because they were of cordage warp construction and also had double-sided overlay and down-right slant of weft twist, a combination of traits used by the eastern Achumawi living along the upper Pit River. Basket 7N was changed from northern California to western Atsugewi because of the double-sided overlay, and lattice twining on the base.

Basket 56S was labeled as Klamath River which flows through Klamath/Modoc, Shasta and Northwest tribal areas, but the specimen is either Shasta or one of the Northwest tribes given it is twined up right around stick warps, and lattice twining design bands, often found on Northwest and Shasta baskets. Basket 56S appears to be an old basket, which would have been twined down right using tule cordage warps if it were a traditional Klamath/Modoc basket.

Many baskets were simply labeled Wintun or Wintoon. This refers to a sub-family of Penutian speakers who theoretically migrated to California from Oregon, not a specific tribe. Once they moved into different areas of California, there were identifiable changes to their basketry, including stitch slant, number of design colors used, overlay and type of construction, which can be used to distinguish between tribes. By considering their attributes more closely it was possible to assign these baskets to one of the three Wintun tribes, the Wintu, Nomlaki or Patwin.

Several baskets from the collection at California State University Sacramento were reassigned to different tribes. Baskets 32S and 33S were both designated in the catalog as Hupa, but 32S was changed to western Achumawi/Atsugewi because it has double-sided overlay, truncated flush warps and a very globular shape. It is also possibly Wintu, but Wintu baskets usually have straighter sides and the warps very often are truncated slightly sticking up. Basket 33S was reassigned as Klamath/Modoc because it has cordage warps and a down-right slant of twist. It could also be eastern Achumawi or eastern Atsugewi who also make tule cordage baskets, but the design is inconsistent with usual Achumawi or Atsugewi basketry. Basket 7D was also changed from Achumawi to Klamath/Modoc for the same reason.

The affiliation of basket 36S was changed from Klamath/Modoc to Northwest because it has lattice twining double bands as a design element, stick warps, up-right stitch slant and single-sided overlay over conifer root, consistent with Northwest weaving and not with Klamath/Modoc weaving.

Basket 11S was unlike Great Basin burden baskets as it was designated. First it lacked the regular cone-shape of Paiute baskets and has double-sided overlay not found on Paiute baskets. It is up-right slant, well-executed one-color design, lattice twining on base rim and double-sided overlay indicate this is a western Atsugewi basket. Similarly, basket 20S was changed from Great

Basin to Western Achumawi because of the double-sided overlay, inverted cone start and one color design.

Although the Patwin are known mostly for twining with a down-right stitch slant, this is not always the case. There are two baskets in the study that are designated as Patwin. One, 33D, is an openwork whole-stick burden basket that is roughly twined in an up-right stitch slant. Shanks and Shanks (2006) document that this type of Patwin burden basket was twined up-right. The other Patwin basket, which is also twined up right, is more questionable. Basket 9S, originally designated Miwok, was determined to be a Patwin basket because of the reinforced bulbous shape at the point of the cone-shaped burden basket. Other tribal weavers reinforced the end of diagonally twined burden baskets, but not to the extent that it formed a ball on the tip like Patwin burden baskets. However, in the case of this basket, the tribal designation remains ambiguous. Although the Patwin sometimes use willow for weft material as in basket 9S, they usually used sedge for diagonally twined burden baskets. Other attributes of the basket are also shared with the neighboring Miwok and Valley Maidu. The Miwok and Valley Maidu twine both up right and down right and Maidu burden baskets commonly use horizontal band designs, although the Patwin and Miwok employ them as well (Shanks and Shanks 2006). As in this basket, Patwin, Pomo and Valley Maidu baskets commonly have a top band comprising several rows of plain twining over two or more warps just below the rim.

Baskets 5D and 6D were originally classified as Shasta baskets, but Shasta weavers twined up right like the Northwest group. Basket 5D is twined with a down-right stitch slant, tule cordage warps and porcupine quill in the design, more like a Klamath/Modoc basket. Basket 6D has an up-right stitch slant like Shasta baskets but lacks horizontal bands in the design often found in Shasta designs. This basket has the classic Wintu globular shape with straighter sides, and classic Wintu diagonal stacked triangle design.

Basket 3S was catalogued as Klamath, but the diagonal twining with willow and bracken fern over stick warps and narrow cone shape is more indicative of the Washoe. Table 2 tabulates the sample by tribal affiliation and language group as determined by procedures outlined above.

Table 2: Baskets by Language Family and Most Likely Tribal Affiliation.

Group	Tribe	Athabascan, Hokan, Coosian, Algonquin	Hokan	Penutian	Uto-Aztecan	Total
Group 1	Klamath/Modoc			43		43
	Plateau			3		3
Group 2	Northwest	13	1			14
	Coos			1		1
	Shasta	3				3
Group 3	Achumawi E		5			5
	Achumawi W		3			6
	Atsugewi E		1			1
	Atsugewi W		5			5
	Paiute				6	6
	Pomo		3			3
	Washoe		2			2
	Yana		4			3
Group 4	Mountain Maidu			2		2
	Patwin			2		2
	Wintu			24		24
Grand Total		16	26	75	6	123

Data Analysis

This section begins with a few disclaimers. First is that the analyzed sample is small and not randomly selected. It is composed of specimens from six collections that were available for study within a one to two-hour radius of California State University Sacramento. Despite these factors, most basket experts believe that attributes can be used to determine the most likely tribal area a basket derives from (Adovasio 2010; Farmer 2010; Sturtevant and Heizer 1978). These sources list specific basket attributes for groups of tribelets with related language dialects. These data included in Appendix D, were originally gathered from papers, diaries, interviews and early collections by settlers, trappers, traders, and explorers and researchers who were the first to

encounter or study California tribes. Elsasser (1978) discusses regional as well as ethnic differences that define the weaving of different groups. He specifically points to differences between geographical regions; northern California being a region where only twining is done, and central and southern California having groups who employed both twining and coiling, or mostly coiling. Elsasser (1978) continues to be one of the most important sources of information for researchers undertaking basket analysis. It is the source used by Jordan and Shennan (2003) and was also one of several sources consulted for this research to assign tribal affiliation where none was available or its veracity uncertain.

For example, Shanks and Shanks (2015) indicate that double-sided overlay is limited to five northern California tribes who are all neighbors but not of the same language family. Some tribes only twine up right or down right. Some use only one color. Other groups of attributes are likewise unique to the Wintu. Only the Wintu employed double-sided overlay using three colors, including alder-dyed woodwardia fern. Their kin, the Nomlaki and Patwin, do not weave using these attributes nor are they used in this combination by other tribes (Shanks and Shanks 2015). By looking for combinations of attributes or taxonomic types, most baskets can be assigned to specific tribes with considerable certainty.

Having established the most likely tribal affiliation for the baskets, individual tribes were grouped into categories based on shared basket attributes, language family or number of examples. The four groups were used to compute Chi Square tests except when a group had a zero value in a category. For those instances the group was removed or combined so Chi Square tests could be performed.

Klamath/Modoc and Plateau baskets (Group 1) were grouped together based on common ancestry and similarity. Although Klamath/Modoc, Plateau and Wintun groups speak forms of the Penutian language stock, their language differences suggest a divergence sometime in the past. The

Wintun have very different weaving styles and use different materials than the Klamath/Modoc or Plateau tribes, who retained the use of cordage warps for most basket types.

The Northwest style of weaving (Group 2) is used by coastal tribes from northern California to southern Oregon. Although baskets in the Northwest style vary by individual tribe, it is well-documented that they share many commonalities (Shanks and Shanks 2015). These include an up-right slant of stitch, single-sided overlay of either bear grass (*Xerophyllum tenax*), red dyed Woodwardia fern (*Woodwardia),* or maidenhair fern *(Adiantum),* and plain twining over stick warps. The baskets included in this category are most likely Karuk, Yurok, Hupa and Shasta. Coos was also included because their baskets share many attributes of the Northwest style that were carried south as groups migrated down the Pacific coast from Washington State (Shanks and Shanks 2015). The Coos language is a peripheral sub-family of Penutian, and their basketry is a mixture of Northwest and Oregon Penutian attributes.

The Achumawi, Atsugewi, Yana, Washoe, Paiute, and Pomo are members of Group 3, Hokan and Other. Members were grouped together because of their differences in relation to other groups and the small number of examples analyzed. It should be noted that within this group a variety of weaving processes and materials were used, and that both Hokan and Uto-Aztecan languages are represented.

Group 4, Wintun and Mountain Maidu includes the Wintu and Patwin, who probably shared the same weaving traditions before migrating to northern California from the Upper Rogue River area of southern Oregon (Golla 1997). Although the Mountain Maidu did not originate in this region, both Wintun and Mountain Maidu languages are believed to be closely related (Figure 1), and the Mountain Maidu sometimes twine with double-sided overlay on stick warps like the Wintu. Logic dictated that they be included in one group.

Chapter 3

DISCUSSION

At the onset of this research there were a number of expectations that certain attributes would distinguish how basketry changes have occurred. Stitch slant, overlay type, materials, designs and number of colors used for designs were the top choices.

Stitch Slant

Table 3 lists the number of baskets for each group that twine up right and down right. This refers to the direction that the weaver moves the weft strands as he/she crosses the warp. Because different researchers describe this process in several ways (i.e., Z slant, S slant, up or down to the left or right), for the sake of clarity, the weave direction will be referred to as up right or down right. For Table 3 the Chi Square statistic is (x^2 =77.7063), p < 0.00001; and highly significant.

Table 3: Stitch Slant by Group.

Group	Down-Right	Up-Right	Total
Klamath/Modoc & Plateau	45	1	46
Northwest & Coos	1	17	18
Hokan and Other	8	23	31
Wintun & Mountain Maidu	4	24	28
Total	58	65	123

Table 3 shows that Northwest weavers consistently weave up-right. The Coos, as previously stated, do not share all the Northwest category traits. One difference is stitch slant. South of the Coos the stitch slant is invariably up-right, but the weave direction changes to down-right at the Coos and north of their location. Shanks and Shanks (2015) and O'Neale (1932) document that the Karuk, Hupa and Yurok, who inhabit the lower Klamath river in northwestern California, make almost identical baskets. As Moratto and Fredrickson (1984) discuss, each of these tribes derives

from a different language family and arrived from different areas at different times. This makes a strong case for cultural transmission between adjacent groups regardless of language family.

Data from Table 3 show that 45 of 46 Klamath/Modoc and Plateau baskets were woven with a down-right stitch slant, including all 43 Klamath/Modoc baskets and two Plateau baskets. Camp (2017) demonstrated that this tradition was well established as far back as the early Holocene across the Columbia Plateau and large areas of the Great Basin, where it continued into the historic period. It appears that Klamath/Modoc stitch slant was not influenced by their neighbors to the west or south, although trade networks with these areas were well established.

Wintu baskets, as shown in Table 4, are twined up right. Neighboring tribes to the west, north and east of the Wintu also twine up right, except for tule cordage baskets of the eastern Achumawi and Atsugewi that are twined down right. It seems likely that if the Proto Wintun had originally twined down right like the Klamath/Modoc, they were influenced by the Northwest tradition of up-right weaving while they still lived in Oregon. The two Patwin baskets in Table 4 have an up-right stitch slant, unlike the down-right twining typical of most Patwin baskets. Golla (1997) suggests the Patwin left Oregon earlier than the rest of the Wintun people. An independent adoption the slant of neighboring groups after they left Oregon might explain the difference between Wintu and Patwin stitch slant.

Figure 13 shows the tribal and linguistic areas of northern California. From Table 4, arrow colors indicate the direction of stitch slant by tribe, and the background colors indicate language family. The overall picture of stitch slant shows that for the present sample, tribes are grouped by geographic area, not by language family. North coastal tribes twine up right as do the Wintu. Most central and eastern groups twine some baskets up right and some down right, except the Pomo and two of their central California neighbors, the Costanoan and Coast Miwok, who often twine in both directions on the same basket to create a design. The Klamath/Modoc and Plateau tribes twine

down-right. Prehistoric Great Basin weavers also twined in this direction, although later Paiute people who moved into the northern Great Basin and occupy the area today, twine up right.

Table 4: Stitch Slant by Tribe.

Tribe	Group	Down-right	Up-right	Total
Klamath/Modoc	Group 1	43		43
Plateau		2	1	3
Northwest	Group 2		14	14
Coos		1		1
Shasta			3	3
Achumawi E	Group 3	5		5
Achumawi W			5	6
Atsugewi E			1	1
Atsugewi W			5	5
Paiute			5	5
Pomo		*3*		3
Washoe			3	3
Yana			4	3
Mountain Maidu	Group 4	4		4
Patwin			2	2
Wintu			22	22
Grand Total		58	65	123

Further examination of Table 4 shows that some tribelets within groups were influenced by different neighbors, because from east to west, they twine in different directions. For example, western Achumawi twine up right like their Wintu neighbors to the west, but Eastern Achumawi also make cordage warp baskets twined down right like the Klamath/Modoc and early Great Basin weavers. The Atsugewi, whose baskets are very similar to the Achumawi also twine in both directions, although there are no examples of Atsugewi down-right cordage warp twined basket in the baskets analyzed sample.

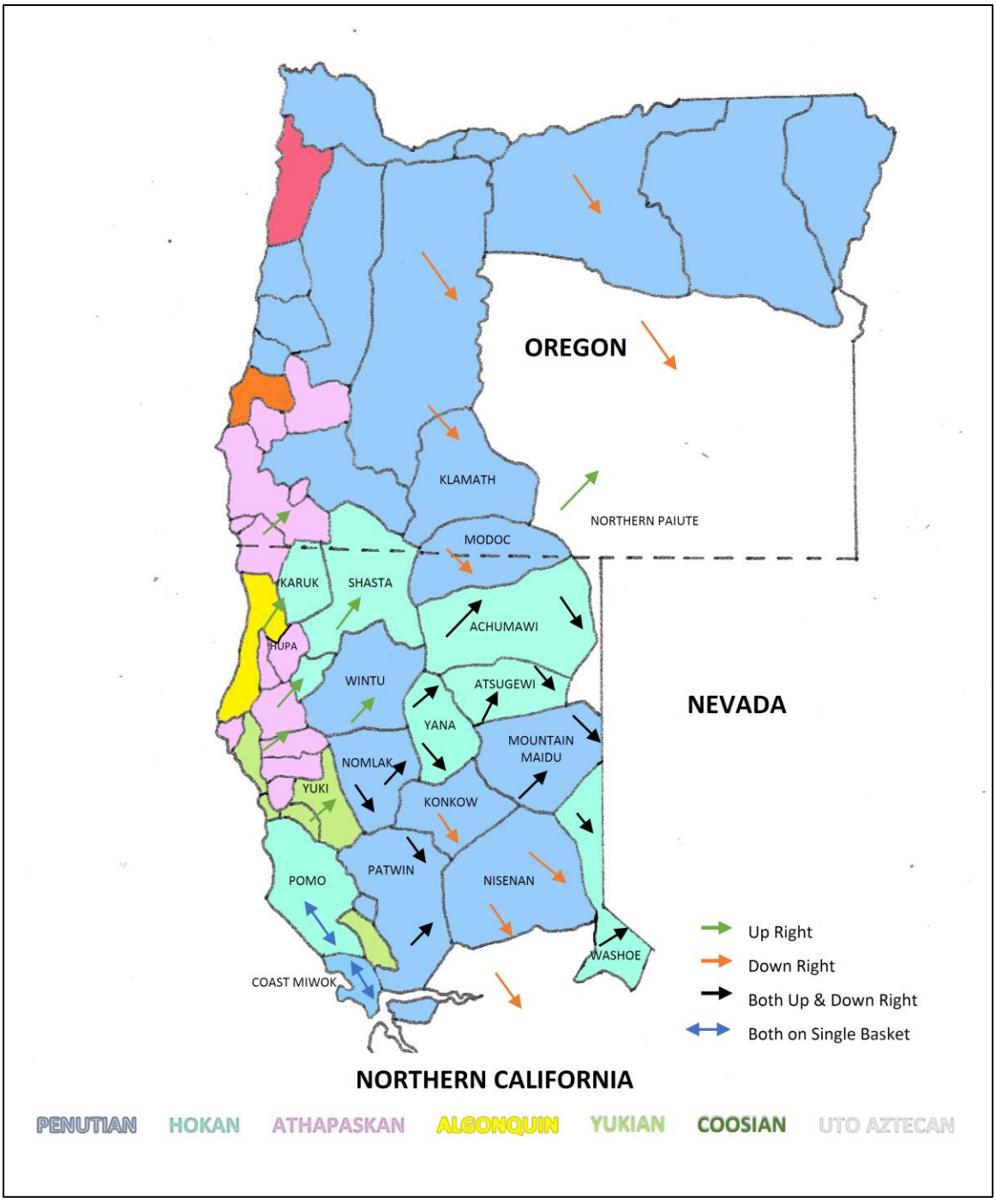

Figure 13: Map of Stitch Slant. Colored Arrows Show the Direction of Areas Twining Up right, Down right and in Both Directions. Map Indicates that Northwest Areas Twine Up right and Areas Further South and East Twine Either Down Right or in Both Directions.

The existence of Catlow-type twining suggests that the eastern California plateau tribes had contact with the Klamath/Modoc or other Great Basin Penutians. Shanks and Shanks (2006) note that cordage warp basketry is not restricted to tribes neighboring the Klamath/Modoc or Great Basin groups. All central California Penutian-speaking tribes occasionally make cordage warp baskets. This makes it difficult to know if Catlow-type twining was learned from interactions with tribes who made it, or if it was an ancient technique retained for certain baskets.

The fact that the Northwest tribes are not known for making down-right tule cordage basketry raises the question why they were the only group of tribes that did not adopt it. If the northwest weaving style tribes were primarily coastal in the early Holocene, and the Klamath/Modoc were an inland group, this early separation and difference in language, subsistence and habitat may have been great enough for them to established strong traditions in the early Holocene that continue to this day. Perhaps the Northwest groups did not make cordage warp baskets because they rarely traveled far from home for subsistence. Fish and shellfish were plentiful resources for Klamath River and coastal populations, but not for Plateau and Great Basin people who had a different situation after temperatures increased and pluvial lakes began to disappear. They had to move extensively in search of seasonal resources, favoring flexible tule baskets that were light and easily carried when traveling.

Overlay

Tables 5 and 6 display data on the use of overlay by group and tribe, with No Overlay and Single-sided Overlay values combined in Table 5 for computation of a Chi Square test. The resulting chi-square statistic (x^2 = 18.5201, p < 0.001) is highly significant. Adjusted residuals show that the Wintu and Mountain Maidu group is significantly associated with double-sided baskets, whereas the Northwest and Coos group is primarily comprised of baskets with single-sided overlay when overlay is present.

Table 5: Overlay by Group.

Group	Single Overlay & None	Double-sided Overlay	Total
Klamath/Modoc & Plateau	25	21	46
Northwest & Coos	16	2	18
Hokan & Other	14	17	31
Wintun & Mt. Maidu	7	21	28
Total	62	61	123

Table 6: Overlay by Tribe.

Tribe	Group	Double-sided	Single-sided	None	Total
Klamath/Modoc	Group 1	21	1	21	43
Plateau				3	3
Northwest	Group 2		13	1	14
Coos			1		1
Shasta		2	1		3
Achumawi E	Group 3	4		1	5
Achumawi W		4		1	6
Atsugewi E				1	1
Atsugewi W		5			5
Paiute				5	5
Pomo				3	3
Washoe				3	3
Yana		4			3
Mountain Maidu	Group 4	1	3		4
Patwin				2	2
Wintu		20	1	1	22
Grand Total		61	20	42	123

Figure 14 locates the tribes that employed single-sided, double-sided and double-layer overlay. As previously shown, regional preferences for overlay type are apparent. Table 5 shows four tribes that employed both single and double overlay. Klamath/Modoc have a long history of Great Basin-type twining, which is known to contain single overlay. Surrounded by Plateau, Northwest and Hokan groups, Klamath/Modoc people were in a position to influence and be influenced by a variety of basketry traditions. They may have learned double-sided overlay from contact with the Achumawi.

The double-sided overlay technique of the Achumawi, Atsugewi and Yana may be the only attribute that can be clearly linked to diffusion between different languages across shared borders.

Wintu double-sided overlay is identical in many ways to that of the Achumawi, Atsugewi and Yana. The Mountain Maidu were the other group who made double sided overlay baskets. They probably learned the technique from neighboring Yana through trade or intermarriage. In as much as no other tribes are known to have used this type of overlay, and it was adopted by the Wintu and Mountain Maidu and no other groups, it is difficult to believe that it was not diffused.

According to Shanks and Shanks (2015), the Shasta, traditionally Northwest style weavers, stopped making baskets early in the historic period. By the time ethnographers started to interview Shasta elders, no Shasta baskets were being made, so little is known about them. Historically, the Shasta traded extensively with their neighbors, so it is difficult to know if baskets collected from Shasta territory were made by Shasta weavers or were trade items. If the Shasta did use both types of overlay, they may have learned it from either the Achumawi or the Klamath/Modoc. However, Shasta and Klamath/Modoc double-sided overlay is very different from that of the Achumawi, Atsugewi or Yana.

Number of Design Colors

Table 7 tallies the number of design colors in the current sample by tribe. The presence or absence of more than two colors in designs can point to tribal affiliation. The Wintu, with 19% of the 123 baskets in the study, represent 39% of the baskets with three or more colors. The Klamath/Modoc have the largest number of baskets in the study, but only 35% of the ones with three or more colors. The Northwest group are 15% of the total baskets in the study but 22% of the baskets with three or more colors. These data show that, for the present group of baskets, the Wintu made the greatest use of three or more colors for designs, followed by the Klamath/Modoc and the Northwest. Other groups rarely use more than one or two colors. This leads to some questions regarding the origin(s) of the technique, and how and why it was adopted by other groups.

Table 7: Number of Design Colors by Tribe.

Tribe	Group	0-2 Colors	3 or More Colors	Total
Klamath/Modoc	Group 1	35	8	43
Plateau		3		3
Northwest	Group 2	11	3	14
Coos		1		1
Shasta		1	2	3
Achumawi E	Group 3	5		5
Achumawi W		5		6
Atsugewi E		1		1
Atsugewi W		5		5
Paiute		5		5
Pomo		3		3
Washoe		3		3
Yana		4		3
Mountain Maidu	Group 4	3	1	4
Patwin		2		2
Wintu		13	9	23
Grand Total		100	23	123

The Klamath/Modoc and the Wintu are both from Penutian language stock, but do not share a common border. Wintu do neighbor several Northwest tribes who are from different language families. The fact that these tribes employ three color designs does not necessarily suggest that they use the same materials or techniques. Of the three, the Northwest and Wintu are most similar. Klamath/Modoc cordage warp baskets are often made from different shades of tule with the addition of bear grass overlay and sometimes porcupine quills. Wintu and Northwest use different techniques and materials. Their baskets are most commonly plain twined over stick warps. Designs are added by incorporating overlay of bear grass and other materials like alder-dyed woodwardia, maidenhair fern, redbud and sometimes porcupine quills.

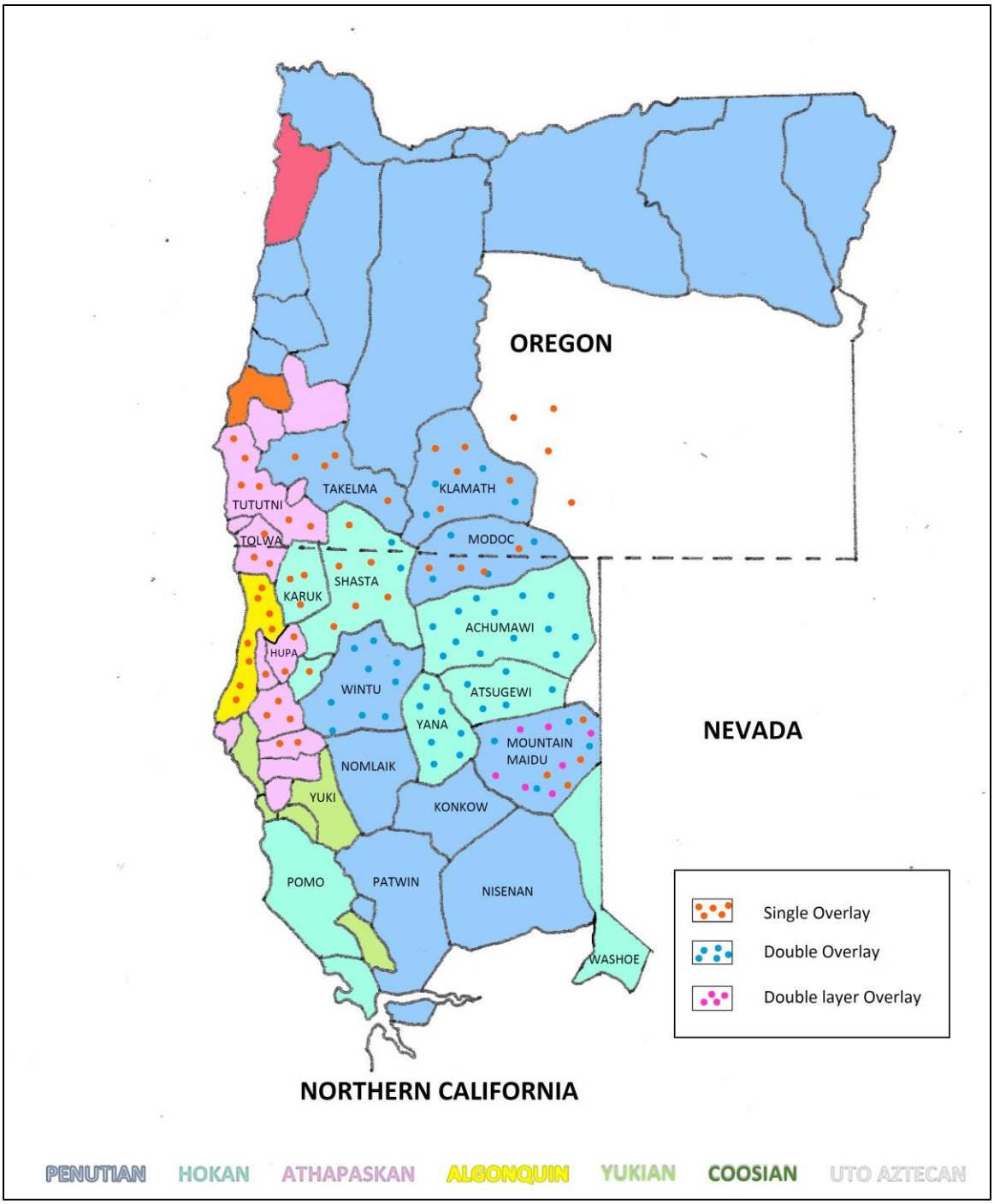

Figure 14: Map of Overlay. Map indicates that Northwest weavers use only single-sided overlay and that more central and eastern areas use double-sided overlay technique or both types. Southern areas of northern California do not do overlay. Only the Mountain Maidu do double-layer overlay.

Northwest and Wintu baskets mainly differ in the type of overlay used. Use of three-color designs is an esthetic choice, not a prescribed requirement. Table 7 indicates that weavers may choose to use just one or two design colors. Materials and method may indicate diffusion of ideas between neighbors of different language families, but it is also possible that the use of three colors derives from Penutians of the Columbia Plateau. Preference for this esthetic may have developed on the Plateau and the Wintu later incorporated new materials into the designs. However, baskets of other California Penutian speaking tribes south of the Wintu, including the Patwin, Nomlaki, Maidu, Miwok and Costanoan, rarely use three color designs, except on feather-decorated baskets, suggesting this esthetic probably post-dates Penutian migrations to Nevada and California. It seems more likely that the Wintu adopted the use of three-color designs from neighboring Northwest tribes, either in southwest Oregon or after settling in the northern Sacramento Valley. The Patwin, Nomlaki, Maidu, Miwok and Costanoan, are uniformly located south of the Wintu, and all make mostly coiled baskets. Their twined baskets and utilitarian coiled baskets are predominantly of one-color designs, but fancy decorated feather baskets are multi-colored. Might the use of feather decoration and adoption of coiling be related to location? Perhaps feather decoration replaced overlay in areas that adopted coiling as the preferred weaving technique because they had more access to wetland bird populations.

Chi Square analysis of Table 8 data furnished a value of x^2 = 14.049 (p = .003). Adjusted residuals show that the most significant occurrence of one-color designs is among Hokan & Other baskets, accounting for only 25% of the total sample but 43% of the one-color designs. This includes the Achumawi, Atsugewi and Yana, who are among the few tribes that cover their baskets with double-sided overlay. But one big difference between the Achumawi and Atsugewi, and the Yana who live further south, is that the Yana also weave coiled baskets, while the Achumawi and Atsugewi do not. This suggests that there may be a geographic relationship between the use of

coiling and one-color designs. Evidently, groups living south of the Wintu with contiguous borders, whether Penutian or Hokan, seem to prefer one color designs and coiling, except the Pomo who show no preference between coiling and twining.

Table 8: One-Color Designs by Group.

Group	1 Color	More than 1 Color	Total
Klamath/Modoc & Plateau	16	29	45
Northwest & Coos	6	11	17
Hokan & Other	23	8	31
Wintun & Mt. Maidu	9	17	26
Total	54	65	119

Arrows on Figure 15 point to the likely groups whose baskets show influence of another groups' weaving. Red arrows point to the areas possibly influenced by ancestral Penutian cordage warp weaving. Both the Achumawi and Atsugewi are Hokan speakers, and it seems likely that they adopted the cordage warp method from one or more of their Penutian neighbors to the north and east. It is also possible that Hokan people made cordage warp baskets when they first settled the Sacramento Valley and that a few sub-groups retained the process. However, Figure 15 reveals a geographic element to the distribution of cordage warp baskets, suggesting that northeastern California tribes may have adopted it from Great Basin people and east. It is also possible that Hokan people made cordage warp baskets when they first settled the Sacramento Valley and that a few sub-groups retained the process. However, Figure 15 reveals a geographic element to the distribution of cordage warp baskets, suggesting that northeastern California tribes may have adopted it from Great Basin people.

Figure 15 also illustrates the geographic distribution of the number of design colors from Tables 7 and 8. It shows a diagonal division northwest to southeast northern California, from the Pomo to the southern border of the Modoc. This division does not follow language divisions and habitat is similar across the area so some other factor or factors must be the cause of this division.

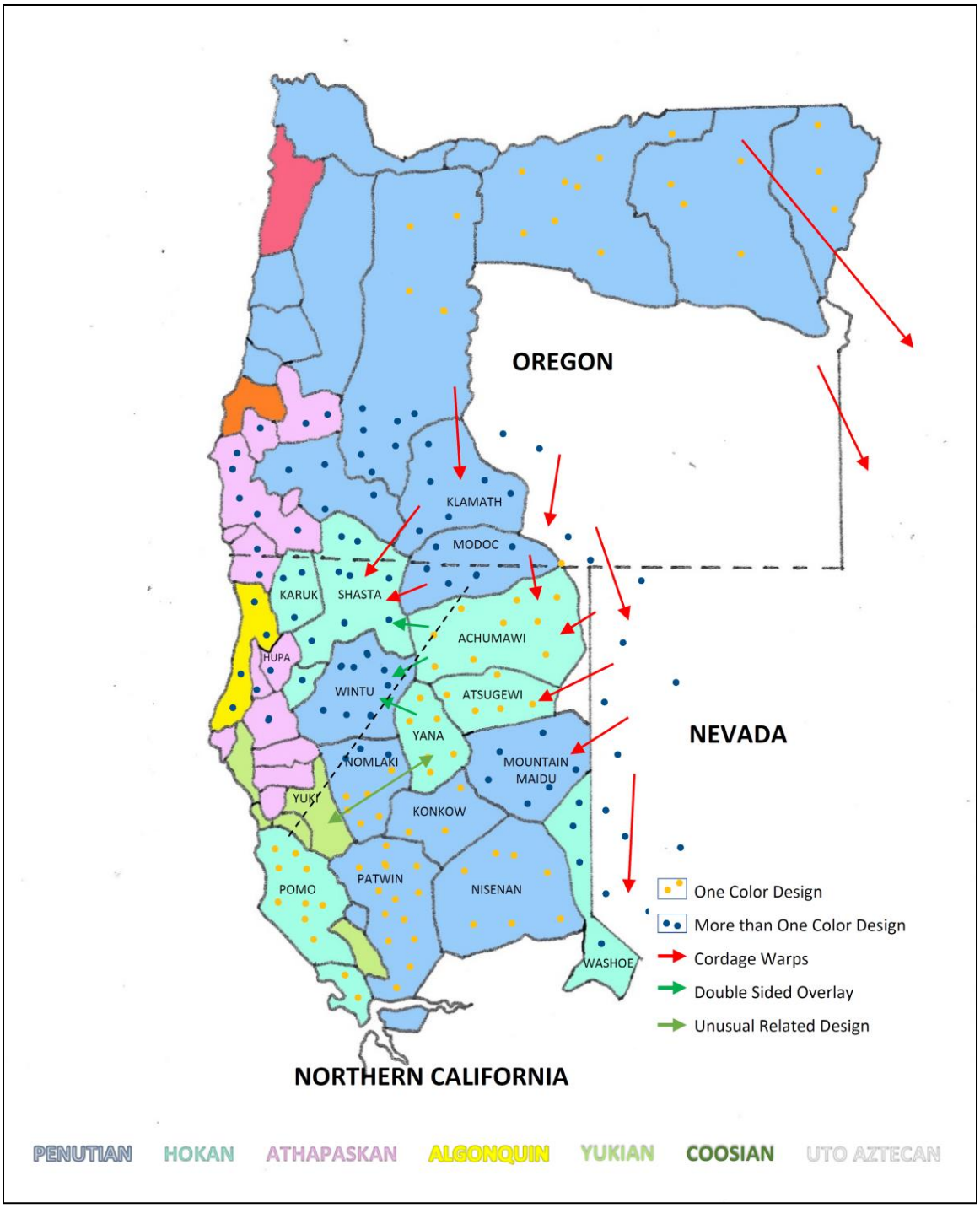

Figure 15: Map of Attribute Influence. Map shows the possibility of multiple influences. A Clear Division Shows between Northwest and Southeast in Number of Design Colors used.

Alder-dyed Woodwardia Fern

Table 9 indicates that only two groups in the sample use alder-dyed woodwardia fern in their weaving. Of the Northwest baskets, which includes the Shasta, 33% had alder-dyed Woodwardia fern, as did 50% of the 28 Wintu baskets. Given that this material is available to almost all northern California tribes, its use must be an esthetic choice within groups. It is commonly found in Northwest and Wintu baskets throughout northern California and southwestern Oregon representing four language families. Without definitive dates on prehistoric baskets, it is impossible to know which language group should be credited with discovering how to dye the material red-orange and first using dyed Woodwardia in basketry. But whatever the case, the data suggest its use spread across ethnic borders and is not tied to a specific language family.

Table 9: Alder-dyed Woodwardia by Tribe

Tribe	Group	Absent	Present	Total
Klamath/Modoc	Group 1	43		43
Plateau		3		3
Northwest	Group 2	10	4	14
Coos		1		1
Shasta		1	2	3
Achumawi E	Group 3	5		5
Achumawi W		5		5
Atsugewi E		1		1
Atsugewi W		5		5
Paiute		5		5
Pomo		3		3
Washoe		3		3
Yana		4		4
Mountain Maidu	Group 4	4		4
Patwin		2		2
Wintu		8	14	22
Grand Total		103	20	123

Burden Basket Shape

The sample of 23 burden baskets is shown in Table 10. Looking at groups, the Northwest twining tradition appears most consistent in burden basket shape with all three of the baskets having wide flat or round bottoms, a commonly recognized trait of Northwest style burden baskets (Shanks and Shanks 2015). The only other basket with a wide flat or round bottom is a cordage warp Columbia Plateau specimen. Although Plateau weavers speak a dialect of Penutian, their weaving is nothing like Northwest tradition basketry, except for similarity in burden basket shape.

Table 10: Burden Basket Shape by Tribe.

Tribe	Group	Bell	Cone	Flared Cone	Wide Cone	Narrow Cone	Wide Flat or Round Bottom	Total
Klamath/Modoc	Group 1						1	1
Plateau								
Northwest	Group 2						2	2
Coos								
Shasta							1	1
Achumawi E	Group 3							
Achumawi W			1	1	1			4
Atsugewi E								
Atsugewi W								
Paiute			2		1	2		
Pomo		1						
Washoe			2			1		
Yana				1				
Mountain Maidu	Group 4		1	1	1			
Patwin		1				1		
Wintu		1						
Total		3	6	3	3	4	4	23

Two neighboring northwestern tribes, Patwin and Pomo, had bell-shaped burden baskets. While the Pomo are known for making fine bell-shaped burden baskets, Patwin close twined burden baskets are usually cone shaped like basket 9S previously discussed in Chapter 2. The Patwin basket in Table 10 (basket 33D) is an open twined basket. Shanks and Shanks (2015) discuss how

Patwin open twined burden baskets can be different from their close twined conical baskets, like 9S, suggesting they learned to make this shape basket from their Pomo neighbors.

When burden basket shape is assessed by individual tribe, a different picture emerges. Of eleven burden baskets in this study, six had variations of cone shapes. Of these, Mountain Maidu, Paiute and Washoe, are northeastern California/Great Basin neighbors and the other two, western Achumawi and Yana are also from northeastern California. Although it is difficult to generalize from such a small sample, further research on burden baskets might identify a geographic pattern of burden basket shapes from east to west in northern California.

Figure 16 illustrates common differences in burden basket shapes by tribe. Burden basket shapes can be unique to the weavers' tribe but as we see in Table 10, a common form can also show variations. This may reflect artistic license, a weavers' skill or the intended use of the basket. This is surprising, as one would expect greater uniformity by tribe. Indeed, the diversity in burden basket shape for such a limited sample, suggests that the range of variations within tribes is even greater than documented here.

Design Type

Table 11 tallies the number of designs by tribe for each design category analyzed. Design similarities were the focus of previous research by Jordan and Shennan (2003) and Washburn (1987). Table 12 condenses these data into groups. Since the values for Floating Designs and Vertical and Stacked Triangles are small, these categories were combined with the Other category to allow a valid Chi Square test. The expected value for the Group 2 category, Diagonal Triangles and Split Parallelograms was slightly less than the required value of 5 or greater, but because it was very close, the Chi Square test was still performed. The resulting Chi square statistic x^2= 12.2989 (p = .06) is not significant at the .05 level. This is consistent with previous research, which showed similarities between adjacent tribes, not tribal specific patterns.

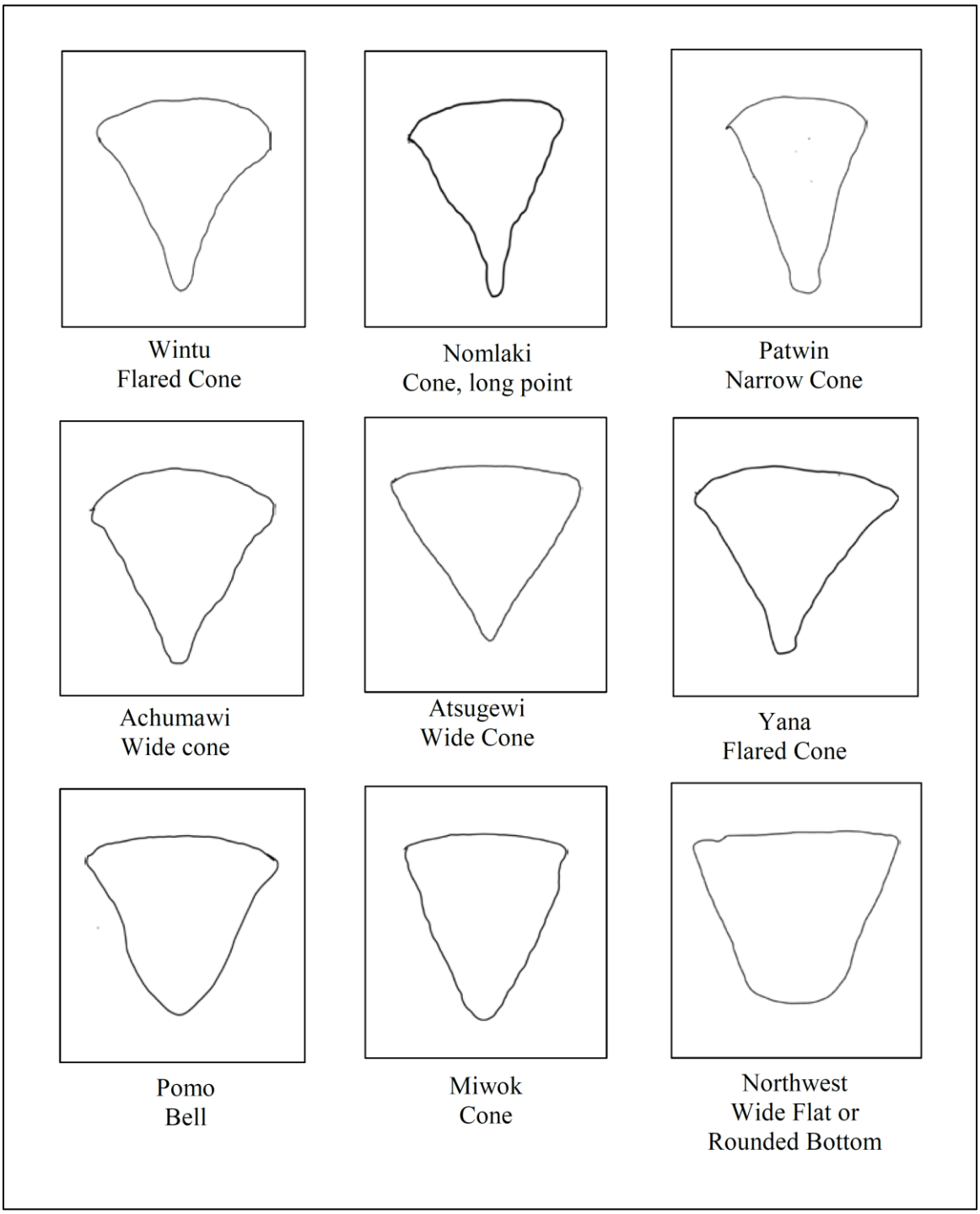

Figure 16: Common Burden Basket Shapes. Figure Illustrates Common Burden Basket Shapes for Northwest California Tribes.

Figure 17: Common Burden Basket Shapes.

Table 11: Basket Designs by Tribe.

Tribe	Group	Diagonal Triangles &Split Parallelograms	Floating	Vertical & Stacked Triangles	Horizontal Bands and Zig-zag	Other	Total
Klamath/Modoc	Group 1	5	4	2	27	5	43
Plateau			2			1	3
Northwest	Group 2	6	1	1	5	1	14
Coos					1		1
Shasta					2	1	3
Achumawi E	Group 3	3			2		5
Achumawi W		4				1	5
Atsugewi E		1					1
Atsugewi W		3		2			5
Paiute					4	1	5
Pomo		1			1	1	3
Washoe					3		3
Yana			1	2		1	4
Mountain Maidu	Group 4	3			1		4
Patwin					1	1	2
Wintu		8	3	2	7	2	22
Total		34	11	9	54	15	123

Table 12: Basket Designs by Group.

Group	Diagonal Triangles & Split Parallelograms	Floating	Vertical & Stacked Triangles	Horizontal Bands and Zig-zag	Other	Total
Klamath/Modoc & Plateau	5	6	2	27	6	46
Northwest & Coos	6	1	1	8	2	18
Hokan & Other	12	1	4	10	5	32
Wintun & Mt. Maidu	11	3	2	9	2	27
Total	34	11	9	54	15	123

However, adjusted residuals show that Klamath/Modoc & Plateau baskets are more likely to have Horizontal Bands and Zig-zag designs. This is also not surprising because the Klamath/Modoc came from the Columbia Plateau and both weave using cordage warps. We know

from Camp (2017) that the Klamath/Modoc retained traditional weaving techniques, so their preference for horizontal designs may be another expression of their preference for the traditional.

In reference to the Jordan and Shennan (2003) conclusion that weavers and experts can discern subtle differences between the baskets of neighboring tribes, a more detailed study of designs might produce different results. In this research 123 baskets were sorted into five general categories. Some baskets with similar design types looked very different from others in the same category. Thus, better methods are needed to define categories on the basis of more detailed criteria in order to distinguish group-specific designs.

Chapter 4

CONCLUSION

Chapter 1 of this thesis introduced theories from previous linguistic research regarding the Wintun migration into California. Ethnographic evidence and recent research on basketry were also discussed and two research questions were proposed. Data from 123 baskets were used to address these research questions and draw conclusions on the basis of the results.

Question 1

Do data from this research support the hypothesis that groups are more heavily influenced by their neighbors than linguistic ties, however distant? The present results support this hypothesis. Analyses of Tables 3 through 12 identified some potentially group-specific traits, but by themselves they cannot be used to assign an ethnic identity to a basket. Even groups of attributes were insufficient to determine from whom tribes adopted new weaving techniques. More to the point, the disruption of the historic period, along with earlier migrations and diffusion, have resulted in excessive variation in weaving designs and techniques within and between tribes.

Figures 13-15 revealed many similarities between neighboring groups regardless of language affiliation. From overlay type to the number of design colors and stitch slant, attributes are grouped by region. It seems likely, for example, that Penutian trade and migration from the Great Basin influenced the Hokan speaking eastern Achumawi, eastern Atsugewi and Shasta as well as the Mountain Maidu, who all make some cordage warp baskets as well as stick warp baskets.

Although this research shows that several tribes used double-sided overlay to decorate small areas on some baskets, Wintu and Mountain Maidu baskets were made using the same technique of covering entire baskets used by the Achumawi, Atsugewi and Yana. It seems likely

the two Penutian-speaking groups learned to make baskets with double-sided overlay from their Hokan-speaking neighbors. If diffusion of double-sided overlay was not significant, the Wintu and Mountain Maidu would make baskets like the ancestral Wintun from Oregon or like their distant ancestors the Klamath/Modoc.

Diffusion is also the likely mechanism that created the Northwest style of weaving. Northwest baskets demonstrate that tribes from coastal areas of northern California and southern Oregon share a number of traditions such as the use of up-right stitch slant, single-sided overlay and alder-dyed woodwardia fern, though they represent Athabaskan, Algonquin, Hokan and Penutian languages. The similarities shared between these groups are too significant to have developed independently.

Another important factor supporting the hypothesis that neighbors have a pervasive influence on basketry is the sharp geographical division between twining and coiling. A line drawn from east to west across California at the latitude of the Wintu southern border is relatively accurate in dividing groups who rely on twining from those who depend on coiling for most basket types. Though their ancestors probably had strong twining traditions, the Patwin, Nomlaki, Maidu and Miwok groups, all located south of the Wintu, adopted coiling as their primary weaving method, fundamentally altering their weaving traditions.

If one accepts that the Wintu, Nomlaki and Patwin originated in southwestern Oregon, can diffusion alone explain how Nomlaki and Patwin came to weave baskets so differently from their Wintu relatives? Shanks and Shanks (2006) suggest the Valley Maidu most likely influenced Patwin and Nomlaki coiling, but do not explain why weaving traditions changed. Future research could be focused on this issue, which may be connected with religious or other ceremonial practices like the Kuksu Cult, adopted by the Nomlaki and Patwin, that requires specific basketry.

The Wintu are interesting because they seem to have exchanged ideas with many surrounding groups. As previously stated, Wintu use double-sided overlay with three color designs incorporating alder-dyed Woodwardia fern in the color scheme, a combination unlike any of their southern or eastern neighbors, including their Patwin and the Nomlaki kin. This may have resulted from intermarriage and interaction with surrounding people who had different weaving traditions. From this, Wintu weavers chose what they liked esthetically and functionally, and over time developed new traditions for their group.

The Yana, Atsugewi and Achumawi, who are all Hokan speakers and neighbors, make very similar burden baskets in both shape and pattern. The Yana were pushed into some of the most unproductive and rugged territory in the Sierra Nevada, which may account for the rough weave of their baskets that distinguishes them from more finely woven Achumawi and Atsugewi baskets. It is interesting to note that a particular design used by Yana weavers was used by only one other tribe, the Yuki. Yukian speakers believed to have migrated down the Pacific coast and at one time may have occupied a large area from the coast to the Sacramento Valley (Moratto and Fredrickson 1984; Shanks and Shanks 2006). It makes sense that both groups might share this unique design pattern if they were neighbors before the Nomlaki separated them as they moved to the area south of Cottonwood Creek in the Sacramento Valley. This supports the notion that ideas diffuse across linguistic boundaries and that the Wintun displaced the original settlers of the Sacramento Valley.

These examples support results of previous studies by Jordan and Shennan (2003) and Washburn (1987). Once emplaced, changes in baskets would have become normalized because of the way designs and techniques were taught and exchanged. Over time, differences in combinations of materials and techniques developed within tribes and created the sometimes subtle variations in the basketry between neighboring groups.

By comparing the burden basket silhouettes from traced photos (Figure 16), one can see that burden basket shapes differed between groups, unlike the design motifs that are often very similar between adjoining tribes. Thus, it appears that each group had a distinct burden baskets shape. However, Table 10 also shows that there is variation in shape within groups, suggesting that personal preference, materials and function were more important to burden basket shape than sharing between neighbors.

This conclusion supports previous statistical analyses by Jordan and Shennan (2003) and Washburn (1987), although the present study was insufficiently detailed in design categorization to reveal differences between neighboring tribes. As Jordan and Shennan (2003) proposed, subtle differences in basketry may be discernable between different tribes if an appropriately detailed approach is taken.

So, while it is clear that neighbors had a strong influence on each other's weaving patterns, proximity is only one of the factors that determined how each type of basket takes shape. Subtle differences in construction, choice of materials and differences in design and form are distinctions that allow tribes to recognize their own baskets and experts to assign tribal affiliation.

Question 2

Do the textile data contribute to discussions regarding possible migration routes into California taken by the Wintun? Figure 18 shows proposed Wintun migration routes into California from Whistler (1977). His theory is based on evidence from numerous linguistic studies that support his hypothesis. Although not conclusive, his theory is well regarded (DeLancey and Golla 1997; Moratto and Fredrickson 1984) and was chosen for this research to determine if the basketry evidence would support his hypothesis.

Discussion of Figure 13 indicated that weaving direction shows no consistent pattern by language group or even by tribe. Thus, while Whistlers' (1977) migration route happens to be

located between groups twining up right and down right, there is nothing to suggest that this is significant.

Discussion of overlay from Tables 5 and 6 indicated that the Wintu likely learned double-sided overlay from their neighbors (Figure 14). This may help to explain the dynamics of how the Wintuns pushed into already inhabited areas of northern California, moving through Northwest tribal areas until they reached the northern Sacramento Valley. From there they pushed further south, southeast and southwest, expanding their territory at the expense of surrounding established groups. As the Achumawi, Atsugewi and Yana were pushed further and further east, we can speculate that there was some intermarriage and interaction between groups with overlapping territories. Achumawi and Atsugewi women who married Wintu men would have taken their weaving technique with them and shared it with other weavers. The process of double-sided overlay is difficult to master, implying that the Nomlaki and Patwin moved further south before developing the skill and borrowed instead from other neighbors, supporting the proposed migration route. By contrast, the adoption of multiple color designs and use of new materials required much less time and interaction between groups. As discussed, the Wintu may have twined in the Northwest style, either before or after arriving in California. One possibility is that the Wintu learned to use alder-dyed Woodwardia and multi-color designs before leaving southern Oregon. Alternatively, they may have traded for baskets with the Shasta while in route. This would have permitted them to acquire the technique of three-color designs using alder-dyed Woodwardia and also supports Whistlers' (1977) proposed migration route.

Of course, the Wintu may have taken more than one route when coming from the upper Rogue River area at different times. Although the present research does not confirm Whistler's (1977) model, neither does it contradict his theory. While the evidence for where the Wintu

originated and eventually settled seems beyond doubt, exactly how and when they arrived is unknown.

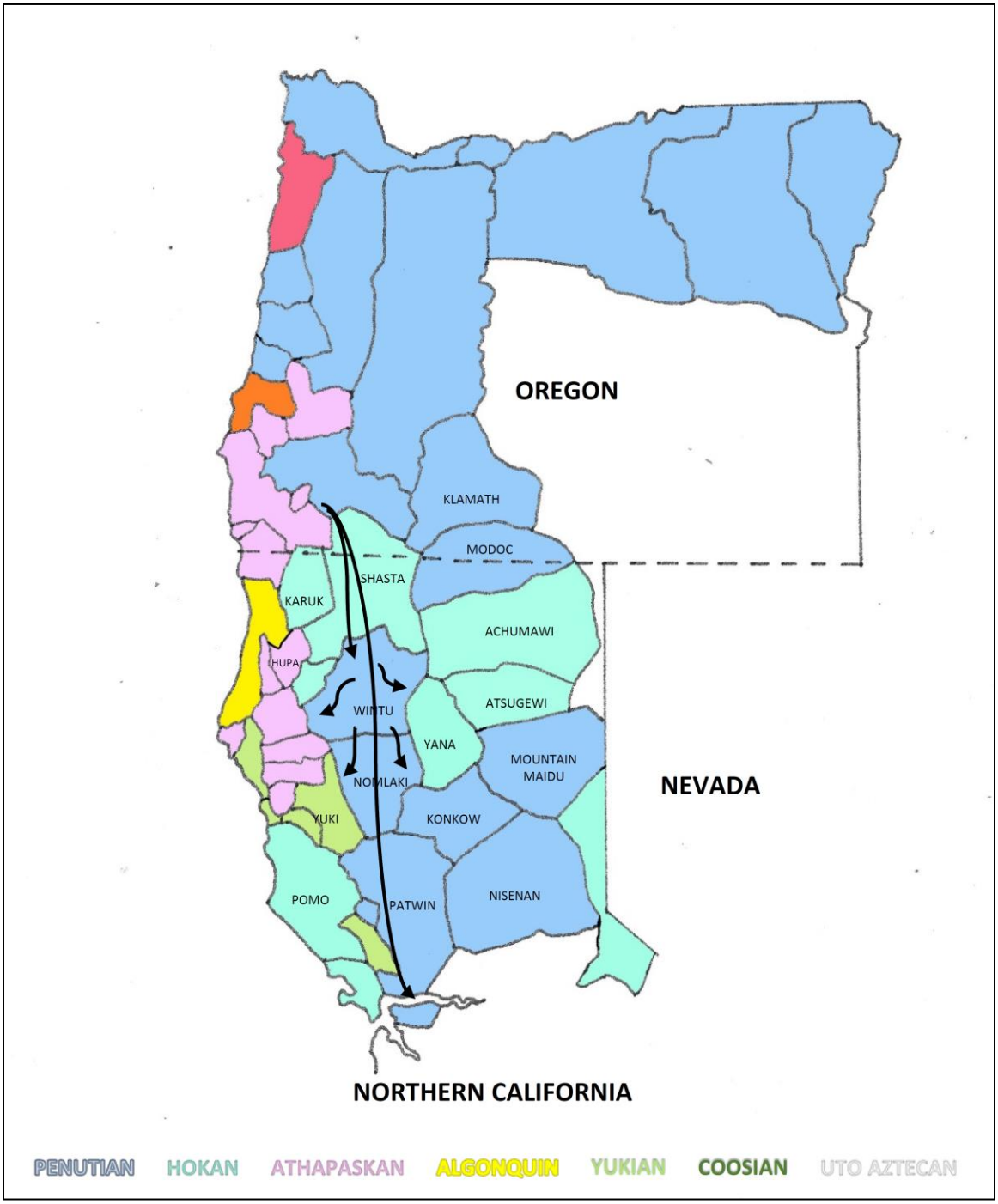

Figure 17: Map of Wintun Expansion Hypothesis. Map shows Possible Migration Route for Wintun into Northern California.

Concluding Thoughts

Results of the present research support the findings of Jordan and Shennan (2003) and Washburn (1987) that basketry designs were commonly shared within and between groups, regardless of tribal affilliation or language. But within groups, some weaving elements such as basket shape were apparently standardized and commonly selected. The choices each weaver made were certainly influenced by location, but other factors like religion, etiquette and tradition played larger rolls. The Patwin, Nomlaki and Wintu who shared the same linguistic background, diverged into separate tribes with distinctive basketry influenced by their neighbors, while retaining unique features that distinguish their basketry. Thus, while weaving in many of its aspects is a craft that was culturally transmitted between both related and non-related people who came in contact, it is also an art that was individualized and evolved according to each groups esthetic vision.

There are endless possibilities for future research. Detailed studies of specific attributes between neighbors might suggest reasons why new methods were adopted. More focused research on the abrupt line between twining and coiling techniques might provide a better understanding of the importance of specific basket types for cerimonial and other purposes. It would also be interesting to understand why materials, like alder-dyed Woodwardia fern, were favored by some groups but not others with the same access to them.

If nothing else, this research is a testament to California Native Americans, who have survived and prospered, in spite of all the obstacles they had to face. The fact that they were not afraid to adapt and make the best of any circumstances is a tribute to their tenacity and perseverance. Today, California Native American Basketry is alive and well and continues to evolve in ways the ancestors never could have imagined.

Appendix A

DEFINITIONS OF TERMS

Basket Record – A set of all the attributes that define an individual basket including but not limited to: form; measurement; twining type(s); stitch slant; warp number as a functioning unit; warp texture; width of warp elements; width of warp unit; open or close twined; width of individual weft; width of weft unit; number of weft rows per cm; weft texture; weft preparation; spin and twist; warp splices; weft splices; composition (genus, species); start type; rim finish type; end finish; background materials, design elements; design materials, dyed or natural; number of design colors; decoration techniques; etc.

Catlow Twining – A method of twining in which the warp element is made from flexible cordage resulting in bags or baskets that are semi flexible to flexible. Catlow twining has been radiocarbon dated to 8000 BP.

Coiling – A method of basketmaking in which coils of plant materials are sewn together by looping thin strips of usually a different material around each row of stacked coils, holding them together.

Cortex – Cortex is the outside layer of a plant called the epidermis. It is either left on or peeled off the warps or wefts in weaving.

Lattice twining – The addition of an extra support element (warp rod) in the weaving to add strength to an area or for decoration. The rod can be parallel, perpendicular or diagonal to the main warps.

Open or close twining - Terms that refer to the distance between rows of weaving. Close twined baskets do not have space between rows of weaving. Open twined baskets have obvious open areas between weaving rows.

Quantitative attributes – Measurements of basket dimensions such as height and diameter. Measurements are in millimeters.

Rigid, Semi Flexible or Flexible – A rigid basket is stiff and unbendable. A semi flexible basket holds it shape but can be flexed or bent returning afterward to its original shape. A flexible basket can be bent and folded and will not return to its original shape unless it is returned to it manually.

Sample – A group of baskets selected from a larger population. For this research the sample consists of groups of twined burden baskets and bowl-shaped baskets designated vessels (to cover a range of shapes and uses for this form). The population was chosen from the Wintu and their immediate neighbors, including the Shasta, Klamath, Modoc, Achumawi, Atsugewi, Yana, Nomlaki and Patwin, Paiute, Pomo, Washoe and Northwestern groups. The sample is limited by availability and accessibility, resulting in the fact that the tribes are unevenly represented in the sample.

Simple or diagonal twining – In simple twining two weft strands are woven around one or more warp elements at a time, creating a vertical line of weaving on a basket. For diagonal twining, in the first row, two weft strands are woven around two warp strands but in subsequent rows the weaving is off set so that each twist of the weave begins between the two rows above it. This creates a diagonal line of weaving elements.

Stitch slant – The direction that the weft elements are directed as the weaver holds the basket. The direction can either be down to the right (Z twist) or up to the right (S twist).

Three strand twining – This twining is accomplished by adding a third weft element. The weaver weaves over two warps and under one warp picking up each weft element sequentially. This creates a thicker weave that shows on the work side of the basket but not on the inside. Three strand twining can be used for strengthening an area (usually the bottom or rim of a basket) or for decorative purposes.

Appendix B

THE PLANTS

California has 6300 native plant species according to the California Native Plant Society. Of these, many could be used to make baskets. This is not meant to be a complete list of basketry or basketry related plants. The list only includes the species that were identified during analysis and are relevant to the present research.

Alder, *Alnus rhombifolia*

White alder grows throughout northwestern California from the San Francisco Bay to the Oregon border and beyond. One of the most wide-spread uses for this plant was making red-orange dye from the bark. Groups from the northwest to the northeast California used it to dye the filaments of Woodwardia fern, *Woodwardia spp.,* a brick orange color.

Bear Grass, *Xerophyllum tenax*

Bear Grass has very long and strong white grass shoots that are used as overlay material in northern California. It can be recognized in a basket because it ages to a warm tan that is smooth and shiny. It can be confused with another overlay material, common reed, *Phragmites australis*, but with enough magnification, the difference is easily recognized. Bear Grass is flat and has no pith where Phragmites is thicker and more easily cracked, revealing its pith inside.

Bracken fern root, *Pteridium aquilinum*

Bracken fern grows from the Mexican border to Canada and beyond anywhere it has ample moisture. The plant part used in basketry is the rhizome which has a horizontal growth habit and can get very long under the right soil conditions. Two thin filaments can be extracted from the rhizome after the gooey outer layers are removed and the remaining part is split lengthwise.

Naturally these filaments are brown, but they are almost always dyed a deep black. Magnified, the surface of bracken fern root is rough with shaggy striations lengthwise on the surface.

Bulrush (Black root), *Schoenoplectus fluviatilis, S. maritimus, S. robustus*; formerly *Scirpus*

Bulrush is a wetland rush found in many areas of northern California. The above-ground portion of the plant is called tule and the root portion is called bulrush. Both parts are used in weaving. Tule stalk is used to make cordage warps, whereas both Tule and Bulrush are used as wefts.

Cattail, *Typha latifolia*

Cattail is a versatile plant that was used for everything from baskets and houses to food and clothing. Cattail was not often used in basketry, except in northeastern California and southern Oregon. This area is known for a type of weaving called Catlow twining in which cordage made from marsh reeds (*Scirpus or Typha*) is used for the warps in baskets. This type of basketry is very flexible to semi flexible depending on how tight the article is woven.

Conifer Root, *Pinophyta or Coniferophyta,* various species

Any evergreen tree that bears a cone is classified as a conifer. The roots of pine, fir, redwood, yew, juniper, hemlock, spruce, etc. were used for both warps and wefts in California, Oregon and Washington. Conifer root is very strong, but also very rough, so in basketry it was primarily used in the parts of a basket that need strength such as the bottom or rim, or it was used as underlayment by northeastern California weavers. The preparation of conifer root involves roasting or boiling approximately three feet long root sections around one inch in diameter to soften the fibers. This makes it possible to split the roots into warps or wefts of smaller and smaller thickness. The very thin material can result in baskets with very fine weaving.

Grape*, Vitis californicus*

Wild grape was exploited by many California tribes for several uses. People enjoyed the fruit, the leaves were collected for use in food preparation and the long, strong, flexible vines are found in basketry. The flexible vines were attached to the rims of burden baskets for strength and Northwestern groups like the Hupa, Yurok and Karuk made warps and wefts from the hair roots growing from the parent root.

Hazel, *Corylus rostrata*

Hazel grows in mountains and valley woodlands of northern California and is highly valued for use in weaving. Hazel shoots are ridged, flexible and strong. They are preferred for warps in close weave baskets and for both warps and wefts in the construction of open weave burden baskets, cradles and winnowers. Hazel can be identified by its easily recognizable leaf scar that looks like a face or by the crook in the shoots that results from having offset leaves.

Maidenhair Fern (Five finger fern) *Adiantum aleuticum*

Of the many varieties of maidenhair fern, this species is used in basketry. In northern California its stems are commonly twenty inches long. The species has one side that is lighter in color than the other. The darkest side appears black unless viewed under magnification, which shows the color to be a dark reddish maroon. The lighter side is more of a light reddish-brown. It is the black shinny side that is mostly used by weavers. Maidenhair fern has rounded undulating ridges running lengthwise that make it easy to recognize. Other black fibers do not have the smooth rounded ridges.

Bigleaf Maple, *Acer macrophyllum*

Given fertile soil, bigleaf maple grows anywhere in California from the southern San Juaquin Valley to the Oregon border. Many groups probably used it the same way as willow, redbud or hazel, but it is often misidentified in baskets because of its similarity to peeled redbud or sumac.

Bright Yellow-Green Moss, *Letharia vulpina*

Wolf lichen, commonly called wolf moss or bright yellow-green moss was used to make yellow dye. The Hupa boiled the moss with bear grass leaves, turning them bright yellow, and used them to decorate fancy hats. Porcupine quill was also dyed in this manner.

Nettle, *Urtica dioica, subsp. Gracilis*

Nettle fibers are removed from dried stems by pounding the stalk to break up the pithy outer part and then separating the strong inner fibers from the chunks of pith. The cleaned fibers are twisted into cordage. The Modoc are the only documented tribe to use nettle fiber cordage in their basket starts, although its use was not common.

Porcupine Quill, *Erethizon dorsatum*

Although not a plant, porcupine quills were used in northern California basketry as false embroidery or overlay material in the same way plant materials were. Most commonly the split quills were dyed with bright yellow-green moss, turning them a bright waxy-looking yellow.

Redbud, *Cercis occidentalis*

Wherever it grows, redbud is a popular material for basketry. It is commonly found in the foothills above the severe valley heat and is harvested in the late fall when it has turned a deep red after a frost. Redbud is used for both warps and wefts, peeled as warps and wefts and unpeeled in designs. Redbud has two attributes that make it easy to identify, its dark blood- red color and the tiny spots on the surface called lenticels.

Reed, *Phragmites australis*

Phragmites, or common reed, is a perennial grass found in wetlands. It is sometimes used in place of bear grass in making Indian baskets. The Klamath and Northern Modoc had difficulty obtaining bear grass as it was not native to their area, and trading for it and maidenhair fern was costly. Instead they often substituted Phragmites for overlay material. To tell the difference between

common reed and bear grass, look for breaks in the reed epidermis exposing the pith. Bear grass does not have pith.

Sedge (White Root*), Carex barbarae*

This species of sedge is coveted for its extremely long rhizomes that can be split into fine thread for basketry. When viewed in a basket sedge looks a lot like redbud and sumac. However, sedge has a chalky appearance to the surface, not a smooth surface like sumac and redbud.

Tule*, Schoenoplectus fluviatilis, S. maritimus, S. robustus*; formerly *Scirpus*

Tule was a valuable plant for many California Native Americans. It grows in freshwater wetlands and along streams and also tolerates saltwater. Prior to the building of dams and irrigation canals in California, much of the area from the central Sacramento Valley to the southern San Joaquin Valley turned into freshwater lakes during the rainy season and around snowmelt. Tulare Lake was a 13,670 square mile lake named for the tule rush that lined its shores. Tule Lake is a 13,000-acre wetland-lake that is in northeastern Siskiyou and northwestern Modoc counties in northern California. As with its southern counterpart, it was named for the tule rush. The Shasta and Modoc used the flower stalk for weaving basketry. The tule stalk is round so it can be compared to cattail when made into cordage for Catlow twined baskets. Cattail leaves are used to make cordage and they are flat and thin. Tule flower stalk is rounded and two twisted rounded strips in tule cordage are easily contrasted with the twisted bundles of leaves in cattail cordage.

Willow, *Salix,* various species

The popularity of willow as a basket material is unsurpassed. Willow grows everywhere in California except the highest elevations and arid deserts. It was used by California Native American groups from Mexico to Oregon. Willow looks much like other weaving materials but has one distinctive attribute that makes it easy to identify. The leaf scars left on willow look like tiny

exclamation points. No other material has these unique marks, so willow is usually correctly identified.

Woodwardia Fern, *Woodwardia fimbiata*

Woodwardia is a large fern that grows in the damp forests of northern California. Here the fronds can grow to over four feet in length. The part of the frond that is used in basketry is two thin filaments that run the length of each frond. The filaments are removed by pounding the stem and separating them from the pulp. Most of the northern tribes that use Woodwardia, stain the material a brick red orange with a dye made from white alder bark. Woodwardia is rather distinctive with a stripe down the middle and orange color, but when a basket is in well-used condition the material can get shredded, the color faded and the stripe much more difficult to see.

Appendix C

ANALYSIS FORM AND BASKET DATA

C-1 Analysis Form

Function	Burden	Vessel				
Measurement	Height	Width	Diameter	Diameter	Other	
Twining Type	Open	Close	Simple	Diagonal	3 Strand	Lattice
Stitch Slant	Down right	Up right				
Warp Elements	# Per Unit	Warp Width	Mean Warp Width	Width Unit	Width Unit	Mean width unit
	Warp Width	Warp Width		Width Unit		
Warp Texture	Rigid	Semi Flexible	Flexible	Whole	Halved Quartered	Split
Warp Preparation	Cortex	Decorticated	Cordage			
Materials	Conifer Root	Willow	Hazel	Maple	Tule	Redbud
Porcupine Quill	Bracken Fern Root	Woodwardia	Maidenhair Fern	Bulrush root	Bear grass	Other Unknown
Weft Spacing	Row Gap	Close	Open	Weft width	Rows/CM	
Weft Treatment	Peeled	Unpeeled	Whole	Cordage	Split	
Design Pattern	Horizontal bands	Diagonal	Floating elements	Zig-Zag	Parallel	Anthro-apomorphic
Design Colors	One color	Two Colors	Three or more colors			
Design weaving	1 Side Overlay	2 side Overlay	False embroidery	dyed elements		
Start Type	Square 2 sets of 4	Cross warp	Radiating	Other		
Warp splices	Inserted	U-shaped	Cloning	Other		
Weft splices	Laid-in underneath	Looped warp	Knotted			
Fag ends	Bound Under	Snapped off	Hidden			
Selvage Warps	Truncated	Knotted	Twisted/Braided	Folded/Angle	Horizontal Band	Turned Down
Finish Additions	Reinforcing rod	Rim Tics	Wrapped	Other		

Research ID#_____ Date _____
Location ID#_____ Ethnic Designation_____

C 2 - Analysis Data

ID number	1A	2A	3A	4A	5A	6A	7A	8A	9A	1B	2B	3B	4B	5B
Date	1/3/2018	1/3/2018	1/3/2018	1/4/2018	1/4/2018	1/4/2018	1/4/2018	1/4/2018	1/4/2018	6/13/2017	7/4/2017	6/14/2017	10/6/2017	10/6/2017
Location ID	708	2658	12661	2725	None	None	L836	2657	22305	Private collection	Private collection	Private collection	Private collection	Private collection
Tribe	Northwest	Wintu	Klamath / Modoc	Northwest	Achumawi W	Pomo	Northwest	Klamath / Modoc	Northwest	Washoe	Klamath/Modoc	Klamath/Modoc	Atsugewi W	Plateau
Language Family	Multi	Penutian	Penutian	Multi	Hokan	Hokan	Multi	Penutian	Multi	Hokan	Penutian	Penutian	Hokan	Penutian
Group	Northwest	Wintun	Klamath / Modoc	Northwest	Hokan & other	Hokan & other	Northwest	Klamath / Modoc	Northwest	Hokan & other	Klamath/Modoc	Klamath/Modoc	Hokan & other	Hokan & other
Type	Burden basket-wide flat or round bottom	Vessel-shallow	Vessel / Cylinder	Vessel-globular	Burden basket-flared cone	Vessel-globular	Vessel-Globular	Vessel-oval	Vessel-Flower pot	Burden basket-cone	Vessel-globular	Vessel-cylinder	Vessel-globular	Vessel-cylinder
Height (mm)	217.7	69	82	96.3	472	266.3	159	94	131	340	78	175	334	117
Max width (mm)	380	219	138	162	520	418	271	199	220	306	110	237	327	86
Mean diameter(mm)	339.3	215.7	106.3	149.67	490.3	322.7	241	185	216.3	300.6	103.3	214	156.3	86.3
Twining type	Simple	Simple	Simple	Simple	Simple	Diagonal	Simple	Simple	Simple	Diagonal	Simple	Simple	Simple	Simple
3 strand twining	Absent	Design	Design	Design	Design	Design	Design	Absent	Design	Absent	Bottom or rim	Bottom or rim	Bottom or rim	Bottom or rim
Lattice twining	Absent	On base rim	Absent	Absent	Absent	Absent	\Design	Absent	Absent	Absent	Absent	Absent	Base	Absent
Foundation	Sticks	Sticks	Cordage	Sticks	Sticks	Sticks	Sticks	Cordage	Cordage	Sticks	Cordage	Cordage	Sticks	Cordage
Overlay	None	Full Twist	Full twist	Single sided	Double sided	None	Single sided	None	Single sided	None	None	None	Double sided	None
Number of colors	0	3	1	3	1	1	1	2	2	2	1	1	1	0
Design	None	Diagonal	Floating	Diagonal	Zig zag	Other	Zig zag	Horizontal bands	Floating	Horizontal bands	Horizontal bands	Floating	Zig zag	None
Top rim horizontal band	Absent	Present	Present	Present	Present	Present	Absent	Absent	Present	Absent	Absent	Present	Present	Absent
Stitch slant	Up right	Up right	Down right	Up right	Up right	Down right	Up right	Down right	Up right	Up right	Down right	Down right	Up right	Up right
Weave quality	Average	Average	Fine	Fine	Fine	Fine	Fine	Fine	Average	Fine	Fine	Fine	Fine	Fine
Alder-dyed Woodwardia	Absent	Present	Absent	Present	Absent	Absent	Absent	Absent	Present	Absent	Absent	Absent	Absent	Absent
Double layer overlay	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Black Designs	None	Maidenhair fern	Maidenhair fern	Maidenhair fern	Dyed redbud	None	None	Dyed tule	None	Bracken fern	Maidenhair fern	Dyed tule	Bulrush	None
Warps	Redbud	Unknown	Tule	Unknown	Unknown	Redbud	Unknown	Tule cordage	Juncus	Willow	Tule	Tule	Redbud	Dogbane
Wefts	Redbud	Maidenhair fern, bear grass, conifer / Woodwardia,	Tule, maidenhair fern, phragmites	Maidenhair fern bear grass, conife Woodwardia, roo	Redbud, bear grass, conifer root	Redbud	Conifer root, bear grass	Tule	Juncus, bear grass, woodwardia	Willow, bracken fern redbud	Tule, maidenhair fern	Tule	Redbud, bear grass	Dogbane
Fag Ends													Hidden	Knotted
Start type	Cross warp	Cross warp	Cross warp	Cross warps	Cross warps	Cross warps	Cross warps	Non intersecting arcs	Square 2/4	Cross warps	Cross warps	Cross warps	Hidden	Knotted

ID number	1C	2C	3C	1D	2D	3D	4D	5D	6D	7D	8D	9D	10D	11D
Date	12/24/2017	12/24/2017	12/24/2017	6/14/2017	6/21/2017	6/21/2017	6/22/2017	6/28/2017	6/28/2017	6/29/2017	6/29/2017	7/12/2017	7/12/2017	7/12/2017
Location ID	Private collection	Private collection	Private collection	237	24	25	27	415	418	421	422	786	787	788
Tribe	Achumawi E	Atsugewi W	Atsugewi E	Achumawi E	Achumawi W	Achumawi W	Mountain Maidu	Klamath / Modoc	Wintu or Shasta	Klamath / Modoc	Shasta	Wintu	Wintu	Wintu N
Language Family	Hokan	Hokan	Hokan	Hokan	Hokan	Hokan	Penutian	Penutian	Penutian	Penutian	Hokan	Penutian	Penutian	Penutian
Group	Hokan & other	Hokan & other	Hokan & other	Hokan & other	Hokan & other	Hokan & other	Hokan & other	Klamath / Modoc	Wintun	Klamath / Modoc	Northwest	Wintun	Wintun	Wintun
Type	Vessel-bowl/hat	Vessel globular	Vessel globular	Vessel globular	Burden basket-cone	Burden basket-cone	Burden basket modified bell	Vessel bowl/hat	Vessel globular	Vessel-globular	Burden basket modified bell	Vessel-globular	Vessel-globular	Vessel-globular
Height (mm)	110	187	81	84	375	337	358	110.7	143	143	510	215	280	283
Max width (mm)	188	338	160	144	380	457	399	210	245	185	570	318	385	375
Mean diameter(mm)	183.3	298	143.6	126.9	380	447.3	389.5	229.5	178	164.5	569	250.7	272.3	262
Twining type	Simple	Simple	Simple	Simple	Simple	Diagonal	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple
3 strand twining	Bottom or rim	Bottom or rim	Bottom or rim	Absent	Bottom or rim	Absent	Absent	Bottom or rim	Bottom or rim	Absent	Absent	Bottom or rim	Absent	Absent
Lattice twining	Absent	Base	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Foundation	Cordage	Sticks	Cordage	Cordage	Sticks	Sticks	Sticks	Cordage	Sticks	Cordage	Sticks	Sticks	Sticks	Sticks
Overlay	None	Double sided	None	Double sided	Double sided	None	Single sided	None	Double sided	Double sided	Single sided	Double sided	Double sided	Single sided
Number of colors	1	1	2	1	1	1	1	2	1	1	3	1	3	2
Design	Diagonal	Diagonal	Diagonal	Horizontal bands	Diagonal	Unknown	Elbow	Parallel	Parallel	Diagonal	Zig zag	Diagonal	Diagonal	Diagonal
Top rim horizontal band	Present	Present	Present	Present	Present	Absent	Present	Present	Present	Present	Present	Present	Present	Present
Stitch slant	Down right	Up right	Up right	Down right	Up right	Up right	Down right	Down right	Up right	Down right	Up right	Up right	Up right	Up right
Weave quality	Fine	sent	Fine	Coarse	Average	Coarse	Coarse	Average	Average	Average	Average	Fine	Fine	Average
Alder-dyed Woodwardia	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Present	Present	Present	Absent
Double layer overlay	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Black Designs	Maidenhair fern	Dyed redbud	Maidenhair fern	None	None	None	Dyed redbud	Dyed tule	Maidenhair fern	None	Dyed redbud	None	Maidenhair fern	Maidenhair fern
Warps	Tule	Willow	Tule	Tule	Hazel	Willow	Redbud	Tule	Unknown	Tule	Hazel	Hazel	Hazel	Willow
Wefts	Maidenhair fern, bear grass, dogbane	Conifer root, redbud, bear grass	Tule, maidenhair fern	Tule. Bear grass	Redbud. Bear grass, conifer root	Redbud	Redbud. Bear grass willow root	Cattail, tule, porcupine quill	Conifer root, bear grass, maidenhair fern	Tule, bear grass	Hazel, bear grass, woodwardia	Bear grass, conifer root, woodwardia	Conifer root, woodwardia, maidenhair fern	Bear grass, conifer root, maidenhair fern
Fag ends	Bound under	Hidden	Bound under	Bound under	Bound under	Bound under	Snapped	Bound under	Snapped	Bound under	Knotted	Snapped	Snapped	Bound under
Start type	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Radiating	Cross warps	Cross warps	Unknown	Cross warps	Cross warps	Nonintersecting arcs

ID number	12D	13D	14D	15D	16D	18D	19D	20D	21D	22D	23D	24D	25D	26D
Date	7/13/2017	7/13/2017	7/13/2017	7/19/2017	7/19/2017	7/20/2017	7/20/2017	7/20/2017	7/20/2017	8/9/2017	8/9/2017	8/9/2017	8/10/2017	8/10/2017
Location ID	789	790	791	794	795	796	797	798	799	800	801	803	804	806
Tribe	Shasta	Wintu	Wintu	Wintu	Wintu	Wintu	Wintu	Wintu	Wintu	Wintu	Wintu	Wintu	Wintu	Wintu
Language Family	Hokan	Penutian	Penutian	Penutian	Penutian	Penutian	Penutian	Penutian	Penutian	Penutian	Penutian	Penutian	Penutian	Penutian
Group	Northwest	Wintun	Wintun	Wintun	Wintun	Wintun	Wintun	Wintun	Wintun	Wintun	Wintun	Wintun	Wintun	Wintun
Type	Vessel-globular	Vessel-bowl/hat	Vessel-shallow	Vessel-globular	Vessel-globular	Vessel-globular	Vessel-globular	Vessel-globular	Vessel-cylinder	Vessel-globular	Vessel-globular	Vessel-globular	Vessel-globular	Vessel-globular
Height (mm)	175	189.7	130	232	153	127.5	190	119	138	165	170	132	115	79.5
Max width (mm)	242	328	370	265	233	250	315	190	170	190	217	202	123	155
Mean diameter(mm)	234	322	360	235	194.5	176	286.7	126.3	131.3	176	165	200	154.3	115
Twining type	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple
3 strand twining	Design	Absent	Absent	Bottom or rim	Bottom or rim	Bottom or rim	Bottom or rim	Bottom or rim	Bottom or rim	Bottom or rim	Bottom or rim	Absent	Bottom or rim	Bottom or rim
Lattice twining	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Foundation	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks
Overlay	Double sided	Double sided	Double sided	Double sided	Double sided	Double sided	Double sided	Double sided	Double sided	Double sided	Double sided	Double sided	Double sided	Double sided
Number of colors	1	1	1	2	1	3	2	3	2	3	2	3	2	3
Design	Horizontal bands	Zig zag	Diagonal	Floating	Zig zag	Horizontal bands	Vertical	Parallel	Floating	Diagonal	Diagonal	Horizontal bands	Vertical	Diagonal
Top rim horizontal band	Absent	Present	Present	Present	Present	Present	Present	Present	Present	Present	Present	Present	Present	Present
Stitch slant	Up right	Up right	Up right	Up right	Up right	Up right	Up right	Up right	Up right	Up right	Up right	Up right	Up right	Up right
Weave quality	Average	Average	Average	Average	Average	Average	Average	Average	Average	Coarse	Coarse	Average	Fine	Fine
Alder-dyed Woodwardia	Absent	Absent	Absent	Absent	Present	Present	Present	Present	Present	Present	Absent	Present	Present	Present
Double layer overlay	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Black Designs	None	None	None	Bulrush	None	Maidenhair fern	none	Maidenhair fern	Maidenhair fern	Maidenhair fern	Dyed redbud	Dyed redbud	Maidenhair fern	Maidenhair fern
Warps	Hazel	Willow	Hazel	Unknown	Willow	Willow	Willow	Willow	Unknown	Unknown	Willow	Hazel	Unknown	Unknown
Wefts	Conifer root, bear grass	Conifer root, bear grass,	Conifer root, bear grass	Bear grass, bulrush, conifer root	Conifer root, bear grass, woodwardia	Conifer root, Bear grass, woodwardia	Conifer root, Bear grass, woodwardia	Conifer root, Bear grass, woodwardia, Maidenhair fern	Conifer root, bear grass, woodwardia, maidenhair fern	Conifer root, phragmites, woodwardia, maidenhair fern	Conifer root, redbud, phragmites	Conifer root, redbud, woodwardia	Conifer root, bear grass, woodwardia	Maidenhair fern, bear grass, woodwardia, conifer root
Fag ends	Bound under	Snapped	Bound under	Bound under	Bound under	Snapped	Snapped	Snapped	Snapped	Bound under	Bound under	Bound under	Bound under	Bound under
Start type	Cross warps	Cross warps	Cross warps	Radiating	Cross warps	Cross warps	Nonintersecting arcs	Cross warps	Cross warps	Unknown	Cross warps	Cross warps	Cross warps	Spiral

ID number	**27D**	**28D**	**29D**	**30D**	**31D**	**32D**	**33D**	**1N**	**2N**	**4N**	**5N**	**6N**	**7N**	**8N**
Date	8/16/2017	8/16/2017	8/17/2017	8/17/2017	8/17/2017	8/24/2017	8/24/2017	9/26/2017	9/26/2017	10/3/2017	10/3/2017	10/3/2017	10/6/2017	10/6/2017
Location ID	810	815	816	817	818	792	777	G77-0109	G77-119	75-2-123	82-107-017	G77-102	G77-103	G77-101
Tribe	Achumawi W	Yana	Yana	Wintu	Yana	Wintu	Patwin	Paiute	Paiute	Paiute	Mountain Maidu	Wintu	Atsugewi W	Northwest
Language Family	Hokan	Hokan	Hokan	Penutian	Hokan	Penutian	Penutian	Uto Aztecan	Uto Aztecan	Uto Aztecan	Penutian	Penutian	Hokan	Multi
Group	Hokan & other	Hokan & other	Hokan & other	Wintun	Hokan & other	Wintun	Wintun	Hokan & other	Hokan & other	Hokan & other	Hokan & other	Wintun	Hokan & other	Northwest
Type	Burden basket modified bell	Vessel-globular	Vessel-globular	Vessel-globular	Burden basket Flared cone	Vessel-bowl/hat	Burden basket-cone	Burden basket-cone	Burden basket-cone	Burden basket-cone	Burden basket flared cone	Vessel-globular	Burden basket Flat/round bottom	Vessel-globular
Height (mm)	425	222	Unknown	158	185	108	155	458	205	320	262	228	141	75
Max width (mm)	544	305	444	273	203	228	248	466	199	278	295	197	215	168
Mean diameter(mm)	531	260	428	245	206	227	232	448.3	196	255.3	284	187.6	212.3	166
Twining type	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Diagonal	Diagonal	Diagonal	Simple	Simple	Simple	Simple
3 strand twining	Absent	Bottom or rim	Bottom or rim	Absent	Bottom or rim	Bottom or rim	Absent	Absent	Bottom or rim	Absent	Bottom or rim	Bottom or rim	Bottom or rim	Design
Lattice twining	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Base	Absent
Foundation	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks	Sticks
Overlay	None	Double sided	Double sided	Double sided	Double sided	Double sided	None	None	None	None	Single sided	Double sided	Double sided	Single sided
Number of colors	0	2	2	2	2	2	0	1	2	1	1	3	1	2
Design	None	Vertical	Vertical	Floating	Parallel	Parallel	None	Horizontal bands	Horizontal bands	Horizontal bands	Diagonal	Parallel	Elbow	Horizontal bands
Top rim horizontal band	Absent	Present	Present	Absent	Absent	Absent	Present	Absent	Present	Absent	Present	Present	Present	Present
Stitch slant		Up right	Up right	Up right	Up right	Up right	Up right	Up right	Up right	Up right	Down right	Up right	Up right	Up right
Weave quality	Average	Coarse	Average	Average	Coarse	Average	Coarse	Fine	Average	Average	Average	Fine	Fine	Fine
Alder-dyed Woodwardia	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Present	Absent	Absent
Double layer overlay	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Present	Absent	Absent	Absent
Black Designs	None	Dyed redbud	Dyed redbud	Maidenhair fern	Dyed redbud	Dyed redbud	None	Bracken fern	None	Painted	None	Maidenhair fern	Dyed redbud	Maidenhair fern
Warps	Willow	Willow	Unknown	Willow	Willow	Unknown	Hazel	Willow	Willow	Willow	Hazel	Unknown	Unknown	Unknown
Wefts	Willow	Conifer root, Redbud, bear grass	Conifer root, Redbud, bear grass	Redbud, conifer root, maidenhair fern, Phragmites	Redbud, conifer root, bear grass	Redbud, conifer root, bear grass	Hazel	Willow, bracken fern	Willow, bracken fern, redbud	Redbud	Conifer root, bear grass	Woodwardia, bear grass, maidenhair fern, conifer root	Redbud, bear grass, conifer root	Maidenhair fern, bear grass, conifer root
Fag Ends	Bound under	Bound under	Bound under	Bound under	Bound under	Bound under	Bound under	Bound under	Hidden	Bound under	Hidden	Bound under	Hidden	Hidden
Start type	Square 2/4	Cross warps	Cross warps	Cross warps	Unknown	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Square 2/4	Cross warps

ID number	9N	10N	11N	12N	13N	14N	15N	16N	17N	18N	19N	20N	21N	22N
Date	10/6/2017	10/6/2017	10/10/2017	10/10/2017	10/10/2017	10/13/2017	10/13/2017	10/17/2017	10/17/2017	10/17/2017	10/17/2017	10/31/2017	10/31/2017	10/31/2017
Location ID	82-107-297	82-107-534	82-107-267	82-107-264	82-107-431	82-107-10	G-77-110	86/107/296	82-107-278	82-107-295	82-107-254	82-107-219	82-107-303	82-107-318
Tribe	Wintu	Pomo	Northwest	Klamath/Modoc	Northwest	Paiute	Paiute	Klamath / Modoc	Klamath / Modoc	Atsugewi W	Klamath / Modoc	Northwest	Klamath/Modoc	Klamath / Modoc
Language Family	Penutian	Hokan	Multi	Penutian	Multi	Uto Aztecan	Uto Aztecan	Penutian	Penutian	Hokan	Penutian	Multi	Penutian	Penutian
Group	Wintun	Hokan & other	Northwest	Klamath / Modoc	Northwest	Hokan & other	Hokan & other	Klamath / Modoc	Klamath / Modoc	Hokan & other	Klamath / Modoc	Northwest	Klamath / Modoc	Klamath / Modoc
Type	Vessel-globular	Vessel-shallow	Vessel-bowl/hat	Vessel-shallow	Vessel-bowl/hat	Burden basket-cone	Burden basket-cone	Vessel-bowl/hat	Vessel-bowl/hat	Vessel-bowl/hat	Vessel-bowl/hat	Vessel-bowl/hat	Vessel-flower pot	Vessel-flower pot
Height (mm)	250	Unknown	99	90	96	533	563	152	110	147	110	183	100	100
Max width (mm)	286	Unknown	181	215	170	532	590	330	262	155	213	268	228	143
Mean diameter(mm)	260	Unknown	170.6	204	169.6	486	525.67	323.3	248	140	206.7	258	223	131.7
Twining type	Simple	Simple & diagonal	Simple	Simple	Simple	Diagonal	Simple and diagonal	Simple	Simple	Simple	Simple	Simple	Simple	Simple
3 strand twining	Bottom or rim	Bottom or rim	Bottom or rim	Bottom or rim	Bottom or rim	Absent	Absent	Bottom or rim	Design	Bottom or rim	Bottom or rim	Bottom or rim	Bottom or rim	Design
Lattice twining	Absent	Base & design	Absent	Absent	Absent	Absent	Absent	Absent	Base	Absent	Absent	Absent	Absent	Absent
Foundation	Sticks	Sticks	Sticks	Cordage	Sticks	Sticks	Sticks	Cordage	Cordage	Sticks	Cordage	Sticks	Cordage	Cordage
Overlay	Double sided	None	Single sided	None	Single sided	None	None	None	None	Double sided	Single sided	Single sided	None	None
Number of colors	3	1	2	1	2	1	1	2	2	1	3	1	2	3
Design	Zig zag	Horizontal bands	Floating	Zig zag	Floating	Horizontal bands	Horizontal bands	Horizontal bands	Horizontal bands	Elbow	Diagonal	Diagonal	Floating	Horizontal bands
Top rim horizontal band	Present	Present	Present	Present	Present	Absent	Present	Present	Present	Present	Present	Present	Present	Present
Stitch slant	Up right	Down right	Up right	Down right	Up right	Up right	Up right	Down right	Down right	Up right	Down right	Up right	Down right	Down right
Weave quality	Average	Fine	Fine	Fine	Fine	Fine	Fine	Average	Fine	Average	Fine	Fine	Average	Fine
Alder-dyed Woodwardia	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Double layer overlay	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Black Designs	None	None	Maidenhair fern	Tule	Maidenhair fern	None	None	Dyed tule	Dyed tule	None	Maidenhair fern	None	Dyed tule	Dyed tule
Warps	Willow	Willow	Unknown	Tule	Unknown	Redbud	Willow	Tule	Tule	Redbud	Tule	Unknown	Tule	Tule
Wefts	Bear grass, conifer root, Woodwardia	Redbud	Conifer root, bear grass, maidenhair fern	Tule	Conifer root, / bear grass maidenhair ferr	Redbud	Willow, redbud	Tule	Tule	Conifer root, bear grass, Redbud	Tule, porcupine quill, maidenhair fern	Conifer root, bear grass	Tule, porcupine quill	Tule
Fag Ends	Bound under	Hidden	Hidden	Bound under	Bound under	Hidden	Bound under	Bound under	Bound under	Snapped	Bound under	Snapped	Bound under	Bound under
Start type	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Nonintersecting arcs	Radiating	Nonintersecting arcs	Cross warps

ID number	22N	23N	24N	1S	3S	4S	5S	7S	8S	9S	10S	11S	12S	13S
Date	10/31/2017	10/31/2017	10/31/2017	10/9/2017	6/19/2017	6/20/2017	6/26/2017	7/10/2017	7/10/2017	7/10/2017	7/11/2017	7/11/2017	7/25/2017	7/25/2017
Location ID	82-107-318	82-107-339	82-107-287	1980-6-13	1975-2-100	1975-2-123	1974-37-3	1974-37-1	FIC 276	1-1976, FIC 240	1974-32-2-37	1980-6-8	1975-2-21	1974-37-17
Tribe	Klamath/Modoc	Plateau	Klamath/Modoc	Northwest	Washoe	Paiute	Wintu N	Klamath/Modoc	Plateau	Patwin	Pomo	Atsugewi W	Klamath/Modoc	Klamath/Modoc
Language Family	Penutian	Penutian	Penutian	Multi	Hokan	Uto Aztecan	Penutian	Penutian	Penutian	Penutian	Hokan	Hokan	Penutian	Penutian
Group	Klamath/Modoc	Hokan & other	Klamath/Modoc	Northwest	Hokan & other	Hokan & other	Wintun	Klamath/Modoc	Hokan & other	Wintun	Hokan & other	Hokan & other	Klamath/Modoc	Klamath/Modoc
Type	Vessel-flower pot	Vessel-cylinder	Vessel-bowl/hat	Burden basket-wide flat/round bottom	Burden basket-cone	Burden basket-cone	Burden basket-cone	Vessel-tapered in	Burden basket Wide flat/round bottom	Burden basket-cone	Burden basket-bell	Burden basket-Wide flat/round bottom	Vessel-oval	Vessel-bowl/hat
Height (mm)	100	140	97	495	152	647.7	405	88.9	304	222	442	230	113	128
Max width (mm)	143	151	181	728	135	596.9	580	107.95	42.07	216	686	284	257	213
Mean diameter(mm)	131.7	107.5	173.7	318	110	596	580	42.07	127	205	685	249	250	196
Twining type	Simple	Simple	Simple	Simple	Diagonal	Simple	Simple	Simple	Simple	Diagonal	Diagonal	Simple	Simple	Simple
3 strand twining	Design	Absent	Bottom or rim	Absent	Absent	Absent	Absent	Bottom or rim	Absent	Bottom or rim	Absent	Bottom or rim	Design	Absent
Lattice twining	Absent	Absent	Base	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Design	Absent
Foundation	Cordage	Cordage	Cordage	Sticks	Sticks	Sticks	Sticks	Cordage	Cordage	Sticks	Sticks	Sticks	Cordage	Cordage
Overlay	None	None	None	Single sided	None	None	Single sided	None	None	None	None	Double sided	Double sided	Double sided
Number of colors	3	1	2	2	2	1	1	2	1	1	1	1	2	2
Design	Horizontal bands	Floating	Vertical	None	Horizontal bands	Diagonal	Elbow	Horizontal bands	Anthropomorphic	Horizontal bands	Diagonal	Elbow	Horizontal bands	Parallel
Top rim horizontal band	Present	Absent	Present	Present	Present	Absent	Present	Absent	Absent	Absent	Present	Present	Present	Present
Stitch slant	Down right	Down right	Down right	Up right	Up right	Up right	Down right	Down right	Down right	Up right	Down right	Up right	Down right	Down right
Weave quality	Fine	Average	Average	Average	Average	Average	Average	Average	Average	Fine	Fine	Fine	Fine	Average
Alder-dyed Woodwardia	Absent	Absent	Absent	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Double layer overlay	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Black Designs	Dyed tule	Dyed dogbane	Maidenhair fern	None	Bracken fern	None	Dyed redbud	Maidenhair fern	Dyed tule	None	None	Dyed redbud	Dyed tule	Maidenhair fern
Warps	Tule	Reed	Tule	Hazel	Redbud	Willow	Hazel	Tule	Tule	Willow	Unknown	Redbud	Tule	Tule
Wefts	Tule	Reed, dogbane	Tule, maidenhair fern	Hazel, redbud, bear grass	Willow, redbud, bracken fern root	Willow	Conifer root, redbud, bear grass	Tule maidenhair fern	Reed, tule	Willow, redbud	Sedge, redbud	Conifer root, redbud, bear grass	Tule, phragmites	Tule, maidenhair fern
Fag ends	Bound under	Bound under	Bound under	Bound under	Hidden	Bound under	Bound under	Bound under	Bound under	Bound under	Bound under	Hidden	Bound under	Bound under
Start type	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Square 2/4	Unknown	Knot	Unknown	Cross warps	Cross warps	Cross warps	Nonintersecting arcs	Cross warps

ID number	**14S**	**15S**	**16S**	**17S**	**18S**	**19S**	**20S**	**25S**	**26S**	**28S**	**29S**	**30S**	**31S**	**32S**
Date	7/26/2017	7/31/2017	8/1/2017	8/1/2017	8/1/2017	8/7/2017	8/7/2017	8/14/2017	8/15/2017	8/22/2017	8/22/2017	8/22/2017	8/22/2017	8/29/2017
Location ID	1974-37-21	1974-37-24	1975-2-23	1974-37-32	1975-2-35	1983-3-16	1980-6-7	1975-2-119	1974-37-5	1974-37-14	1974-37-13	1974-37-15	1974-37-16	1974-37-18
Tribe	Mountain Maidu	Achumawi E	Klamath/Modoc	Achumawi E	Klamath/Modoc	Klamath/Modoc	Achumawi W	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Atsugewi W
Language Family	Penutian	Hokan	Penutian	Hokan	Penutian	Penutian	Hokan	Penutian	Penutian	Penutian	Penutian	Penutian	Penutian	Hokan
Group	Hokan & other	Hokan & other	Klamath / Modoc	Hokan & other	Klamath/Modoc	Klamath/Modoc	Hokan & other	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Hokan & other
Type	Vessel-globular	Vessel-globular	Vessel-shallow	Vessel-Cylinder	Vessel-Flower pot	Vessel-shallow	Vessel-globular	Vessel-globular	Vessel-shallow	Vessel-bowl/hat	Vessel-globular	Vessel-flower pot	Vessel-flower pot	Vessel-globular
Height (mm)	149	113	96.6	134	62.85	62.16	208	63.38	103	120	76	126	105	130
Max width (mm)	185	195	327	182	124.5	292	258	146.33	392	152	144	144	145	242
Mean diameter(mm)	166	164.6	310	150	119.74	280.3	240	99.89	385.7	133	116.3	133	137.7	142
Twining type	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple
3 strand twining	Bottom or rim	Bottom or rim	Absent	Bottom or rim	Bottom or rim	Absent	Bottom or rim	Bottom or rim	Absent	Bottom or rim	Design	Bottom or rim	Absent	Bottom or rim
Lattice twining	Absent	Absent	Absent	Absent	Base	Absent	Absent	Base	Absent	Absent	Absent	Absent	Absent	Absent
Foundation	Cordage	Cordage	Cordage	Cordage	Cordage	Cordage	Sticks	Cordage	Cordage	Cordage	Cordage	Cordage	Cordage	Sticks
Overlay	Double sided	Double sided	None	Double sided	None	Double sided	Double sided	None	Double sided	Double sided	Double sided	Double sided	Double sided	Double sided
Number of colors	3	1	3	1	2	3	1	3	3	2	2	3	1	1
Design	Horizontal bands	Diagonal	Zig zag	Diagonal	Diagonal	Floating	Zig zag	Horizontal bands	Horizontal bands	Floating	Horizontal bands	Diagonal	Horizontal bands	Vertical
Top rim horizontal band	Present	Present	Present	Present	Present	Present	Present	Absent	Present	Present	Present	Absent	Absent	Present
Stitch slant	Up right	Down right	Down right	Down right	Down right	Down right	Up right	Down right	Down right	Down right	Down right	Down right	Down right	Up right
Weave quality	Average	Average	Average	Average	Fine	Average	Average	Average	Average	Coarse	Average	Fine	Average	Fine
Alder-dyed Woodwardia	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Double layer overlay	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Black Designs	Maidenhair fern	Maidenhair fern	Maidenhair fern	Maidenhair fern	Dyed tule	Maidenhair fern	Maidenhair fern	Dyed tule	Dyed tule	Dyed tule	Maidenhair fern	Maidenhair fern	Dyed tule	Maidenhair fern
Warps	Tule	Tule	Tule	Tule	Tule	Tule	Redbud	Tule	Tule	Tule	Tule	Tule	Tule	Unknown
Wefts	Tule, maidenhair fern. Porcupine quill	Tule, bear grass, maidenhair fern	Tule, maidenhair fern	Tule, bear grass, maidenhair fern	Tule, porcupine quill	Tule, phragmites, porcupine quill, maidenhair fern	Conifer root, bear grass. Maidenhair fern	Tule, maidenhair fern	Tule, phragmites	Tule, phragmites	Tule, phragmites. Maidenhair fern	Tule, phragmites. Maidenhair fern	Tule, bear grass	Conifer root, bear grass, maidenhair fern
Fag Ends	Bound under	Bound under	Bound under	Hidden	snapped	Bound under	Hidden	Bound under	Bound under	Bound under	Bound under	Bound under	Hidden	Hidden
Start type	Nonintersecting arcs	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Nonintersecting arcs	Nonintersecting arcs	Cross warps	Nonintersecting arcs	Cross warps

ID number	**14S**	**15S**	**16S**	**17S**	**18S**	**19S**	**20S**	**25S**	**26S**	**28S**	**29S**	**30S**	**31S**	**32S**
Date	7/26/2017	7/31/2017	8/1/2017	8/1/2017	8/1/2017	8/7/2017	8/7/2017	8/14/2017	8/15/2017	8/22/2017	8/22/2017	8/22/2017	8/22/2017	8/29/2017
Location ID	1974-37-21	1974-37-24	1975-2-23	1974-37-32	1975-2-35	1983-3-16	1980-6-7	1975-2-119	1974-37-5	1974-37-14	1974-37-13	1974-37-15	1974-37-16	1974-37-18
Tribe	Mountain Maidu	Achumawi E	Klamath/Modoc	Achumawi E	Klamath/Modoc	Klamath/Modoc	Achumawi W	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Atsugewi W
Language Family	Penutian	Hokan	Penutian	Hokan	Penutian	Penutian	Hokan	Penutian	Penutian	Penutian	Penutian	Penutian	Penutian	Hokan
Group	Hokan & other	Hokan & other	Klamath / Modoc	Hokan & other	Klamath/Modoc	Klamath/Modoc	Hokan & other	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Hokan & other
Type	Vessel-globular	Vessel-globular	Vessel-shallow	Vessel-Cylinder	Vessel-Flower pot	Vessel-shallow	Vessel-globular	Vessel-globular	Vessel-shallow	Vessel-bowl/hat	Vessel-globular	Vessel-flower pot	Vessel-flower pot	Vessel-globular
Height (mm)	149	113	96.6	134	62.85	62.16	208	63.38	103	120	76	126	105	130
Max width (mm)	185	195	327	182	124.5	292	258	146.33	392	152	144	144	145	242
Mean diameter(mm)	166	164.6	310	150	119.74	280.3	240	99.89	385.7	133	116.3	133	137.7	142
Twining type	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple
3 strand twining	Bottom or rim	Bottom or rim	Absent	Bottom or rim	Bottom or rim	Absent	Bottom or rim	Bottom or rim	Absent	Bottom or rim	Design	Bottom or rim	Absent	Bottom or rim
Lattice twining	Absent	Absent	Absent	Absent	Base	Absent	Absent	Base	Absent	Absent	Absent	Absent	Absent	Absent
Foundation	Cordage	Cordage	Cordage	Cordage	Cordage	Cordage	Sticks	Cordage	Cordage	Cordage	Cordage	Cordage	Cordage	Sticks
Overlay	Double sided	Double sided	None	Double sided	None	Double sided	Double sided	None	Double sided	Double sided	Double sided	Double sided	Double sided	Double sided
Number of colors	3	1	3	1	2	3	1	3	3	2	2	3	1	1
Design	Horizontal bands	Diagonal	Zig zag	Diagonal	Diagonal	Floating	Zig zag	Horizontal bands	Horizontal bands	Floating	Horizontal bands	Diagonal	Horizontal bands	Vertical
Top rim horizontal band	Present	Present	Present	Present	Present	Present	Present	Absent	Present	Present	Present	Absent	Absent	Present
Stitch slant	Up right	Down right	Down right	Down right	Down right	Down right	Up right	Down right	Down right	Down right	Down right	Down right	Down right	Up right
Weave quality	Average	Average	Average	Average	Fine	Average	Average	Average	Average	Coarse	Average	Fine	Average	Fine
Alder-dyed Woodwardia	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Double layer overlay	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Black Designs	Maidenhair fern	Maidenhair fern	Maidenhair fern	Maidenhair fern	Dyed tule	Maidenhair fern	Maidenhair fern	Dyed tule	Dyed tule	Dyed tule	Maidenhair fern	Maidenhair fern	Dyed tule	Maidenhair fern
Warps	Tule	Tule	Tule	Tule	Tule	Tule	Redbud	Tule	Tule	Tule	Tule	Tule	Tule	Unknown
Wefts	Tule, maidenhair fern. Porcupine quill	Tule, bear grass, maidenhair fern	Tule, maidenhair fern	Tule, bear grass, maidenhair fern	Tule, porcupine quill	Tule, phragmites, porcupine quill, maidenhair fern	Conifer root, bear grass. Maidenhair fern	Tule, maidenhair fern	Tule, phragmites	Tule, phragmites	Tule, phragmites. Maidenhair fern	Tule, phragmites. Maidenhair fern	Tule, bear grass	Conifer root, bear grass, maidenhair fern
Fag Ends	Bound under	Bound under	Bound under	Hidden	snapped	Bound under	Hidden	Bound under	Bound under	Bound under	Bound under	Bound under	Hidden	Hidden
Start type	Nonintersecting arcs	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Cross warps	Nonintersecting arcs	Nonintersecting arcs	Cross warps	Nonintersecting arcs	Cross warps

ID number	48S	49S	50S	51S	52S	53S	54S	55S	56S	57S	58S	59S
Date	9/13/2017	9/18/2017	9/18/2017	9/20/2017	9/20/2017	10/2/2017	10/2/2017	10/2/2017	10/2/2017	10/11/2017	10/9/2017	10/11/2017
Location ID	1974-37-10	1974-37-7	1974-37-8	1974-37-2-16	1974-32-2--13	1974-32-2-30	1975-2-37	1983-3-14	1983-3-13	1974-41-7	1974-41-14	1974-41-21
Tribe	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Northwest	Northwest	Shasta	Klamath/Modoc	Northwest	Northwest	Coos	Klamath/Modoc	Klamath/Modoc
Language Family	Penutian	Penutian	Penutian	Multi	Multi	Hokan	Penutian	Multi	Multi	Penutian	Penutian	Penutian
Group	Klamath/Modoc	Klamath/Modoc	Klamath/Modoc	Northwest	Northwest	Northwest	Klamath/Modoc	Northwest	Northwest	Northwest	Klamath/Modoc	Klamath/Modoc
Type	Vessel-flower pot	Vessel Shallow	Vessel Shallow	Vessel-globular	Vessel-globular	Vessel-bowl/hat	Vessel-bowl/hat	Vessel-globular	Vessel-globular	Vessel-cylinder	Vessel-bowl/hat	Vessel-globular
Height (mm)	61	87	93	43	188	106.5	134	79	119	83	113	57
Max width (mm)	78	330	332	260	277	174	330	132	178	128	164	138
Mean diameter(mm)	58.34	325.67	326	204.75	262	173.3	315	129	176	127.3	138	132
Twining type	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Simple
3 strand twining	Absent	Absent	Absent	Bottom or rim	Bottom or rim	Bottom or rim	Absent	Bottom or rim	Bottom or rim	Absent	Bottom or rim	Design; bottom or rim
Lattice twining	Absent	Absent	Absent	Absent	Absent	Bottom or rim, base	Absent	Absent	Design	Absent	Absent	Absent
Foundation	Cordage	Cordage	Cordage	Sticks	Sticks	Sticks	Cordage	Sticks	Sticks	Sticks	Cordage	Cordage
Overlay	None	None	Double sided	Single sided	Single sided	Single sided	None	Single sided	Single sided	Single sided	None	None
Number of colors	1	2	2	3	2	3	2	3	1	1	1	1
Design	Horizontal bands	Horizontal bands	Horizontal bands	Parallel	Diagonal	Zig zag	Floating	Diagonal	Horizontal bands	Horizontal bands	Horizontal bands	Horizontal bands
Top rim horizontal band	Absent	Present	Present	Present	Present	Present	Present	Present	Absent	Present	Present	Absent
Stitch slant	Down right	Down right	Down right	Up right	Up right	Up right	Down right	Up right	Up right	Down right	Down right	Down right
Weave quality	Average	Average	Average	Fine	Fine	Fine	Fine	Fine	Average	Average	Coarse	Fine
Alder-dyed Woodwardia	Absent	Absent	Absent	Present	Absent	Present	Absent	Present	Absent	Absent	Absent	Absent
Double layer overlay	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Black Designs	None	None	None	Maidenhair fern	Maidenhair fern	Maidenhair fern	Dyed tule	Maidenhair fern	None	None	Dyed tule	Dyed tule
Warps	Tule	Tule	Tule	Unknown	Hazel	Maple	Tule	Maple	Willow	Conifer root	Tule	Tule
Wefts	Tule	Tule, phragmites	Cattail, phragmites	Conifer root, bear grass, woodwardia, maidenhair fern	Conifer root, bear grass, maidenhair fern	Conifer root, bear grass, woodwardia, maidenhair fern	Tule	Conifer root, bear grass, woodwardia, maidenhair fern	Conifer root, bear grass	Bear grass, UK	Tule, porcupine quill	Tule
Fag ends	Bound under	Bound under	Bound under	Hidden	Hidden	Hidden	Bound under	Bound under	Bound under	Hidden	Bound under	Hidden
Start type	Nonintersecting arcs	Nonintersecting arcs	Nonintersecting arcs	Cross warps	Cross warps	Cross warps	Nonintersecting arcs	Cross warps	Cross warps	Plaited	Nonintersecting arcs	Nonintersecting arcs

Appendix D

TRIBE ATTRIBUTES

D-1 Achumawi – Pit River

Area	NW corner of Mt. Shasta; SE Bunchgrass Mountain; Cascade Peaks; 3-4 K feet altitude; Pit Rivers
Language Family	Hokan
Distinction	Very fine double overlay
Migrated	9000 – 4000 BC
Tribe Replaced	none
Influenced or Influenced by	Klamath/Modoc; Hupa: Yurok
Stitch Slant	Western - up right; eastern - down right
Warp Materials	Hazel, willow, tule, bulrush
Weft Materials	Conifer root; bear grass; bulrush root; Phragmites; grapevine; split hazel; Tule;
Foundation Type	Sticks (W) or cordage (E)
Typical Weave Types	Plain; diagonal; 2-3 strand, open, close
Other Weave Types	Wrapped twining
Start Type	Cross warp with solid three strand conifer root (concave base)
Number of design colors	One
Design Materials	Bracken fern; bear grass; maidenhair fern
Black designs	Maidenhair fern
Typical Design	Western – diagonal or horizontal zig zag, split parallelograms; Eastern - horizontal bands
Rim Finish	Redbud or Maple wrap – Redbud or Maple rim rods but uncommon; Truncated flush or turned down
Decorative Elements	Porcupine quill; some beads; full twist overlay
Overlay	Full twist; bear grass; maidenhair fern; redbud rarely used as overlay
Typical vessel shape	Broader base and curve in at rim
Typical burden Basket Shape	Modified bell; flared cone; wide top band with design; main design below band
Identifying Attributes	Fewer floating designs than Atsugewi
	Rarely used Redbud or Woodwardia for overlay
	No lattice twining on base
	Warps cut flush

D-2 Atsugewi – Hat Creek

Area	
Language Family	Hokan
Distinction	Very fine double-sided overlay
Migrated	9000 – 4000 BC
Tribe Replaced	None
Influenced or Influenced by	Klamath/Modoc; Hupa; Yurok
Stitch Slant	Down right (W); Down right and up right (E)
Warp Materials	Hazel, willow (W); Tule, bulrush root (E)
Weft Materials	Conifer root, grape, hazel, redbud
Foundation Type	Sticks (western); cordage (eastern)
Typical Weave Types	Plain, diagonal, 2-3 strand, open, close
Other Weave Types	Lattice
Start Type	Raised starting knot in center of inverted cone
Number of design colors	One
Design Materials	Phragmites, bear grass, porcupine quill, maidenhair fern, redbud
Black designs	Maidenhair fern, mud dyed tule
Typical Design	Western – diagonal or horizontal zig zag, split parallelograms; Eastern - horizontal bands
Rim Finish	Chokecherry or willow rim rods; redbud wraps; truncated flush or turned down
Decorative Elements	Porcupine quill, some beads, feathers; full twist overlay
Overlay	Full twist; bear grass, maidenhair, fern Redbud rarely used as overlay
Typical vessel shape	Bowl, flowerpot, globular
Typical burden Basket Shape	Modified bell, flared cone, wide top band
Identifying Attributes	More floating fill designs than Achumawi
	Inverted cone bottom
	Lattice twining on base
	Warps cut flush

D-3 Klamath/Modoc

Area	Upper and lower Klamath Lakes up to Crater Lake; east of upper Rogue River; plateau people
Language Family	Penutian
Distinction	Wokas Processing baskets; may have invented different basket types
Migrated	7000+ years ago
Tribe Replaced	
Influenced or Influenced by	Catlow twining
Stitch Slant	Down right
Warp Materials	Tule cordage, willow
Weft Materials	Tule, conifer root (juniper), split willow,
Foundation Type	Cordage
Typical Weave Types	Plain, diagonal, 2-3 strand, open, close
Other Weave Types	Plain over 1,2,3 warps on bottom
Start Type	Bundle of cordage warps splayed out like sunburst
Number of design colors	1 or more
Design Materials	Tule, white cattail, porcupine quill
Black designs	Dyed Tule
Typical Design	Horizontal lines; spirals, quail motifs, stair step of flint points, spiraling rectangles
Rim Finish	Bent down and secured on inside,
Decorative Elements	Bound down on inside; braided; extended cordage warps
Overlay	Both single and double
Typical vessel shape	Globular storage bowls
Typical burden Basket Shape	Openwork conical burden baskets or close twined cordage with reinforcing rods and strengthened with nettle fiber
Identifying Attributes	Cordage warps
	Klamath used Phragmites (yellowish)
	Decorative baskets done in white cattail fine close work; 2/3 basket designs are black
	Design floats

D-4 Mountain Maidu

Area	
Language Family	Penutian
Distinction	Only tribe to do double layer overlay
Migrated	From western Great Basin
Tribe Replaced	Yana
Influenced or Influenced by	Influenced by Achumawi and Atsugewi
Stitch Slant	Down right; up right rare
Warp Materials	Maple or willow
Weft Materials	Redbud, willow, conifer root, grape, bear grass
Foundation Type	Sticks
Typical Weave Types	Plain, diagonal, 2-3 strand, open, close
Other Weave Types	Wrapped, wicker
Start Type	Cross warp or fan shaped
Number of design colors	One
Design Materials	Bear grass, redbud, bracken fern, maidenhair
Black designs	Maidenhair fern or bracken fern
Typical Design	Horizontal bands or zig zags, some diagonal; designs have Columbia plateau connection
Rim Finish	Warps bent down in pairs over reinforcing rod; no redbud wrap; just below rim were a few rows of twining over two warps.
Decorative Elements	Double layer overlay
Overlay	Both single and double
Typical vessel shape	Globular; only Mountain Maidu made twined cooking pots
Typical burden Basket Shape	Cone
Identifying Attributes	Double layer overlay
	Avoid redbud rim

D-5 Northwest

Area	Karuk, Yurok, Hupa,
Language Family	Hokan, Algonquian, Athapascan
Distinction	Yurok and Wiyot probably brought single overlay
Migrated	Probably from Washington coast; Karuk ancestors 6000 BC; Yurok around 700 AD and Hupa last to arrive
Tribe Replaced	Yukian
Influenced or Influenced by	Wintu, Shasta
Stitch Slant	Up right
Warp Materials	Hazel or willow shoots
Weft Materials	Conifer root, bear grass, maidenhair fern,
Foundation Type	Sticks
Typical Weave Types	Plain, diagonal, 2-3 strand, open, close
Other Weave Types	Lattice twining as part of the design
Start Type	Cross warp
Number of design colors	One or more
Design Materials	Porcupine quill,
Black designs	Maidenhair fern
Typical Design	Horizontal bands of triangles
Rim Finish	Truncated flush
Decorative Elements	Overlay of bear grass, maidenhair fern, woodwardia, porcupine quill
Overlay	Single sided
Typical vessel shape	Variations of globular; bowl
Typical burden Basket Shape	Flat or wide rounded bottom
Identifying Attributes	Half twist overlay; very fine work
	Use of many colors; woodwardia
	Lattice twining as design element

D-6 Nomlaki

Area	Central Sacramento valley and Coast range: two divisions – River occupied present day Tehama County and northwest Glen County; Hill occupied foothills to the summit of the coast range
Language Family	Penutian
Distinction	Very little known about Nomlaki twining but most like Patwin
Migrated	From southern Oregon
Tribe Replaced	Yana, Yuki
Influenced or Influenced by	Maidu, Patwin; did mostly coiling like central California tribes
Stitch Slant	Up right and down right; both directions used on some burden baskets
Warp Materials	Willow, hazel
Weft Materials	Pine root, sedge root
Foundation Type	Sticks
Typical Weave Types	Plain, diagonal, 2-3 strand, open, close (mostly plain twined), lattice
Other Weave Types	Wrapped twining
Start Type	Cross warp
Number of design colors	One
Design Materials	Redbud
Black designs	Redbud wrapped twining
Typical Design	Horizontal bands or blocky groups of triangles or quail plumes arranged around basket
Rim Finish	Truncated flush, rim rod added inside and coiled on
Decorative Elements	Wrapped twining
Overlay	No overlay
Typical vessel shape	Most coiled, few examples
Typical burden Basket Shape	Funnel with extra-long point of three strand twining that flares out at top
Identifying Attributes	Top of burden basket plain twining slant one way; point of burden basket is three strand and slants the opposite direction

D-7 Northern Paiute

Area	Southeastern Oregon, Northern Nevada
Language Family	Uto Aztecan
Distinction	
Migrated	
Tribe Replaced	
Influenced or Influenced by	
Stitch Slant	Up right
Warp Materials	Willow
Weft Materials	Willow
Foundation Type	Sticks
Typical Weave Types	Predominately diagonal twining; plain and three strand
Other Weave Types	
Start Type	Burden Basket-Plain twining over paired warps then 4 rows of 3 strand
Number of design colors	1-2
Design Materials	Bracken fern root, redbud
Black designs	Bracken fern root
Typical Design	Horizontal bands
Rim Finish	Double rim band, willow rod coiled to top row
Decorative Elements	Overpainting
Overlay	None
Typical vessel shape	
Typical burden Basket Shape	Cone
Identifying Attributes	Double rim
	Close twined burden baskets are finished with 4-5 rows of plain twining over two warps called under selvage. Rim rod is added and coiled in place

D-8 Patwin

Area	North End of Sacramento Valley, along east side of Coast Range, to the N E shore of San Francisco Bay
Language Family	Penutian
Distinction	
Migrated	From Oregon from 1500 to 2000 years ago
Tribe Replaced	Miwok
Influenced or Influenced by	Classic Central California style; influenced by Maidu
Stitch Slant	Down Right
Warp Materials	Salix (willow), Corylus (hazel, Scripus(tule)
Weft Materials	Pinus, Picea, Sequoia, Pseudotsuga (Conifer roots), Vitus (grape vine) Carex(sedge), Salix(willow)
Foundation Type	Sticks
Typical Weave Types	Plain, diagonal, 2 -3 strand, lattice, open & close, wrapped
Other Weave Types	Coiling people
Start Type	Cross warp; possible three strand at the beginning
Number of design colors	Usually one in twining
Design Materials	
Black designs	
Typical Design	
Rim Finish	Trimmed or with attached rim whoops sewn on & wrapped.
Decorative Elements	Patwin fancy baskets were coiled
Overlay	None
Typical vessel shape	
Typical burden Basket Shape	
Identifying Attributes	Bulbous end on burden baskets of 3 strand twining

D-9 Plateau

Area	Columbia River plateau on both sides of the river
Language Family	Penutian
Distinction	Trade center
Migrated	Probably from coastal Washington up Columbia River
Tribe Replaced	
Influenced or Influenced by	Influenced by Klamath
Stitch Slant	Down right
Warp Materials	Cordage warps of Indian Hemp (Apocynum) traditionally; also, tule, cattail, hazel, willow root bark, native grasses
Weft Materials	Burr reed (Sparganium), bear grass is a possibility
Foundation Type	Cordage
Typical Weave Types	Primarily wrapped twining
Other Weave Types	Plain and diagonal
Start Type	Cross warp, nonintersecting arcs
Number of design colors	One
Design Materials	Indian Hemp (Apocynum), burr reed, tule, cattail
Black designs	Dyed materials
Typical Design	Large geometric shapes, anthropomorphic shapes, faces (the old ones)
Rim Finish	Braided rims with warps bound down on the interior; sometimes covered with leather or cloth
Decorative Elements	Dentalium shell beads and glass trade beads
Overlay	No overlay
Typical vessel shape	Soft bowl shape
Typical burden Basket Shape	Cylindrical soft sided bags
Identifying Attributes	Wrapped twining

D-10 Pomo

Area	Clear Lake to San Francisco Bay
Language Family	Hokan
Distinction	Equally skilled in twining and coiling;
Migrated	9000 – 4000 BC
Tribe Replaced	Yuki
Influenced or Influenced by	Influenced Wappo, Lake Miwok, Huchnom, Patwin; influenced by Yukian
Stitch Slant	Down right
Warp Materials	Willow or hazel shoots
Weft Materials	Sedge, redbud, bracken fern, bulrush
Foundation Type	Sticks
Typical Weave Types	Plain, diagonal, 2-3 strand, open, close, lattice
Other Weave Types	Designs using weave types and change of direction
Start Type	10 different start types
Number of design colors	One at a time
Design Materials	Red or black on white, usually redbud but occasionally bracken fern or bulrush for black
Black designs	Bracken fern or bulrush root
Typical Design	Horizontal bands and zig zag diamonds
Rim Finish	
Decorative Elements	
Overlay	No overlay
Typical vessel shape	Globular, rounded sides curving out from start in a continuous curve out and then in.
Typical burden Basket Shape	Bell
Identifying Attributes	Bell shaped burden basket
	Very fine quality weaving
	Lattice twining

D-11 Shasta

Area	
Language Family	Hokan
Distinction	Trade center
Migrated	9000 to 4000 BC
Tribe Replaced	
Influenced or Influenced by	Northwest influences Shasta, also Klamath/Modoc
Stitch Slant	Up right
Warp Materials	Hazel or willow
Weft Materials	Conifer root, split hazel, sedge and grape
Foundation Type	Sticks
Typical Weave Types	Plain, diagonal, 2-3 strand, open, close (mostly plain twined), lattice
Other Weave Types	Lattice twining in design
Start Type	Cross warp
Number of design colors	One or more
Design Materials	Redbud; dyed Woodwardia fern; bear grass, maidenhair fern; dyed and undyed porcupine quill
Black designs	Redbud
Typical Design	Horizontal bands of vertical bars; simple patterns
Rim Finish	Truncated; Bent and braided or bent and bound under the wefts; If wrapper, redbud or wild grape
Decorative Elements	Redbud; dyed Woodwardia fern; bear grass and dyed porcupine quill
Overlay	Both single and double (western); single (eastern)
Typical vessel shape	
Typical burden Basket Shape	Eastern Shasta cone shape/flat bottom burden baskets; Western made pointed-bottom burden baskets
Identifying Attributes	

D-12 Washoe

Area	Lake Tahoe (Daowaga) and surrounding areas
Language Family	Hokan
Distinction	
Migrated	Likely from Great Basin Desert
Tribe Replaced	
Influenced or Influenced by	Paiute
Stitch Slant	Open work- down right; Open or close work-up right or down right
Warp Materials	Willow
Weft Materials	Willow or sun burnt willow
Foundation Type	Sticks
Typical Weave Types	Plain, diagonal, 2-3 strand, open, close
Other Weave Types	Coiling
Start Type	Often three strand for strength
Number of design colors	One or more
Design Materials	Redbud, bracken fern,
Black designs	Bracken Fern
Typical Design	
Rim Finish	
Decorative Elements	
Overlay	No overlay
Typical vessel shape	
Typical burden Basket Shape	Cone
Identifying Attributes	

D-13 Wintu

Area	McCloud River
Language Family	Penutian
Distinction	Boundary between twining and coiling; double sided overlay and woodwardia fern; three color designs
Migrated	From southern Oregon 500 AD
Tribe Replaced	Achumawi, Atsugewi, Yana, Chimariko
Influenced or Influenced by	Achumawi, Atsugewi, Yana, Chimariko, Northwest
Stitch Slant	Up right
Warp Materials	Willow, hazel,
Weft Materials	Conifer root, grape, hazel, poison oak, redbud, willow
Foundation Type	sticks
Typical Weave Types	Plain, diagonal, 2-3 strand, open, close (mostly plain twined)
Other Weave Types	Lattice
Start Type	Cross warp
Number of design colors	One or more
Design Materials	Woodwardia, maidenhair fern, redbud, bear grass, porcupine quill
Black designs	Maidenhair fern
Typical Design	Triangle clusters, Floating designs rare
Rim Finish	Hard use - warps bent over reinforcing rod and wrapped usually with grape. Truncated slightly sticking up; double horizontal lines
Decorative Elements	Porcupine quill rare and only McCloud River area; no feathers
Overlay	Double sided except north west Wintu did some single sided
Typical vessel shape	Straighter sides, taller and less broad than Northwest
Typical burden Basket Shape	Cone with upper band; below usually diagonal design
Identifying Attributes	Only Wintu use double overlay with alder dyed woodwardia
	Use of red and black lines common
	Grape wrapped reinforcing rods
	Always three strand just below rim and on base. No bottom design except sometimes a signature

D-14 Yana

Area	Edge of upper Sacramento Valley to the eastern headwaters of the Sacramento River drainage; Mt Lassen; Yahi – Mill and Deer Creeks
Language Family	Hokan
Distinction	Shared large vertical shaped design with narrow horizontal lines surrounded by triangles with Yuki who were likely their neighbors at one time
Migrated	9000-4000 BC; Pushed east out of Sacramento Valley by Wintun migration
Tribe Replaced	Moved into undesirable territory
Influenced or Influenced by	Like Achumawi and Wintu
Stitch Slant	Up right or down right but only one direction per basket
Warp Materials	Hazel shoots, tule or willow
Weft Materials	Conifer root, split hazel, willow, redbud, sedge
Foundation Type	Sticks
Typical Weave Types	Plain, diagonal, 2-3 strand, open, close
Other Weave Types	Lattice reinforcing rods
Start Type	Cross warp with three strand twining
Number of design colors	One
Design Materials	Bear grass, maidenhair fern, redbud
Black designs	Maidenhair fern, bracken fern
Typical Design	Bold; horizontal bands of triangles, both horizontal and vertical patterns
Rim Finish	Truncated or turned down either side and taken into wefting
Decorative Elements	Feathers, small elements
Overlay	Full twist
Typical vessel shape	Barrell shape, medium flexible
Typical burden Basket Shape	Flared cone, three strand start
Identifying Attributes	Semi flexible with reinforcing rods
	Vertical design and parallel design shared with Yahi
	Rough weaving, uneven materials

REFERENCES CITED

Adovasio, J. M.
2010 *Basketry Technology: A Gguide to Identification and Analysis*. Aldine Pub. Co., Chicago.

Anderson, M. Kat
2013 *Tending the Wild: Native American Knowledge and the Management of California's Natural Resources*. University of California Press, Berkeley.

Bedwell, Stephen F.
1973 *Fort Rock Basin:Prehistory and Environment*. University of Oregon Books, Eugene.

Bibby, Brian
2012 *Essential art: Native Basketry from the California Indian Heritage Center*. Heyday, Berkeley.

Camp, Anna
2017 Catlow Twine Basketry through Time and Space: Exploring Shifting Cultural Boundaries through Prehistoric and Ethnographic Basketry Technology in the Northwestern Great Basin, PhD Dissertation, Department of Anthropology, University of Nevada, Reno.

Cressman, L. S.
1943 Results of Recent Archaeological Research in the Northern Great Basin Region of South Central Oregon. *Proceedings of the American Philosophical Society* 86: 236-246.

D'Azevedo, Warren L. and William C. Sturtevant (editors)
1986 *Handbook of North American Indians Volume 11*. Smithsonian Institution, Washington.

Dawson, L.E.
1978 Personal communication to K. Whistler regarding similarities between Yokuts baskets and archaeological basketry from Oregon. Berkeley: R H Lowei Museum of Anthropology, University of California.

Delacorte, M. G. and M. E. Basgall
2012 Great Basin-California/Plateau interactions along the western front. In *Meetings at the Margins: Prehistoric Cultural Interactions in the Intermountain West*, edited by David Rhode, pp. 65-91. University of Utah Press, Salt Lake City.

Delancey, Scott
2018 Evidence for Inland Penutian. *Anthropological Linguistics* 60: 95-109.

Delancey, Scott and Victor Golla

1997 The Penutian Hypothesis: Retrospect and Prospect, *International Journal of American Linguistics* 63: 171-202.

Dixon, R. B. and A. L. Kroeber
1913 Relationship of the Indian Languages of California. *Science* 37(945):225-225.

Elsasser, A.B.
1978 Basketry. In *Handbook of North American Indians, California*. Volume 8, edited by William C. Sturtevant and Robert F. Heizer, pp. 626-641. Smithsonian Institution, Washington, DC.

Farmer, Justin F.
2010 *Basketry Plants Used by Western American Indians: A Study of Traditional North American Indian Basketry and Plant Materials used to Create Them with Photos showing Characteristics of the Major Plant Materials used by Basket Makers*. Justin Farmer Foundation, Fullerton.

Fowler, Catherine S. and Don D. Fowler
2008 *The Great Basin: People and Place in AncientTtimes*. School for Advanced Research Press, Santa Fe.

Golla, Victor
1997 The Alsea-Wintuan connection. *International Journal of American Linguistics* 63: 157-170.

2011 *California Indian Languages*. University of California Press, Berkeley.

Griset, Suzanne
1993 C. Hart Merriam : The Naturalist as Ethnographer. *Museum Anthropology* 17: 33-40.

Hattori, Eugene Mitsuru
1982 *The Archaeology of Falcon Hill, Winnemucca Lake, Washoe County, Nevada*. Nevada State Museum Anthropological Papers No 18, Carson City, Nevada.

Heizer, Robert F.
1949 The Archaeology of Central California I; The Early Horizon. Berkerly; *University of California Anthropological Records* 12: 1-84.

Houck, Max M.
2009 *Identification of Textile Fibers*. Woodhead Publishing, Manchester.

Hughes Richard E.
1992 California Archaeology and Linguistic Prehistory. *Journal of Anthropological Research* 48: 317-338.

Jackins, Ira and Margot Schevill
1993 *Museum Anthropology in California, 1889-1939*. Council for Museum Anthropology, Arlington, VA.

Jennings, Jesse D., Carol J. Condie, Don D. Fowler and J. M. Adovasio
1986 *Anthropology of the Desert West : Essays in Honor of Jesse D. Jennings*. University of Utah Press, Salt Lake City, Utah.

Jordan, Peter and Stephen Shennan
2003 Cultural Transmission, Language, and Basketry Traditions amongst the California Indians. *Journal of Anthropological Archaeology* 22: 42-74.

Moratto, Michael J. and David A. Fredrickson
1984 Chapter 11, Linguistic Prehistory, *California Archaeology*. Academic Press, Orlando.

Moser, Christopher L
1989 *American Indian Basketry of Northern California: Catalog for the Exhibition of "American Indian Basketry of Northern California" from the Permanent Collection of the Riverside Municipal Museum, December 12, 1989 to December 30, 1990*. Riverside Museum Press, Riverside, Calif.

Navajo School of Indian, Basketry
1971 *Indian Basket Weaving*. Dover Publications, New York.

Newman, Sandra Corrie
1992 *Indian Basket Weaving: How to Weave Pomo, Yurok, Pima, and Navajo Baskets*. Northland Printing, Flagstaff.

O'Neale, Lila M.
1932 *Yurok-Karuk Basket Weavers*. University of California Publications in American Archaeology and Ethnology 32(1).

Schaffer, Erika
1981 Fiber Identification in Ethnological Textile Artifacts. *Studies in Conservation* 26: 119-129.

Shanks, Ralph and Lisa Woo Shanks
2006 *Indian Baskets of Central California: Art, Culture, and History; Native American Basketry from San Francisco Bay and Monterey Bay North and East to the Sierras*. University of Washington Press, Seattle.

2010 *California Indian Baskets: San Diego to Santa Barbara and Beyond to the San Joaquin Valley, Mountains and Deserts*. Costaño Books/University of Washington Press, Seattle.

2015 *Indian Baskets of Northern California and Oregon*. Costaño Books/University of Washington Press, Seattle.

Sturtevant, William C, and Robert F. Heizer (editors)
1978 *Handbook of North American Indians.* Volume 8. Smithsonian Institution, Washington, D.C.

Usner, Daniel H.
2012 An Ethnohistory of Things: or, how to Treat California's Canastromania. Ethnohistory 59:441-463.

Washburn, Dorothy K.
1987 The Neighbor Factor: Basket Designs in Northern and Central California. *Journal of California and Great Basin Anthropology* 9:146-173.

Whistler, Kenneth W
1977 Wintun Prehistory: An Interpretation based on Linguistic Reconstruction of Plant and Animal Nomenclature. *Proceedings of the Annual Meeting of the Berkeley Linguistics Society* 3:157-174.