THESIS

NORTHERN COLORADO WICKIUPS: RESEARCH AND DOCUMENTATION OF A DETERIORATING CULTURAL RESOURCE

Submitted by

Annie E. Maggard

Anthropology Department

In partial fulfillment of the requirements

for the Degree of Master of Arts

Colorado State University

Fort Collins, Colorado

Summer 2011

Master's Committee:

Advisor: Jason LaBelle

Janet Ore
Jason Sibold

ABSTRACT

NORTHERN COLORADO WICKIUPS:

RESEARCH AND DOCUMENTATION OF A DETERIORATING CULTURAL RESOURCE

Wickiups are potentially the most endangered archaeological resources in Northern Colorado, as well as throughout the Rocky Mountains. Several presumed wickiups, both recorded and unrecorded, are located in Northern Colorado (defined here as bounded by Larimer, Boulder, Gilpin, Clear Creek, Grand, Routt, and Jackson counties). The purpose of this thesis project is to identify and share as much information as possible from these imperiled resources, as well as develop hypotheses regarding their cultural and spatial contexts, before they disappear from the archaeological record altogether.

This research is approached with several objectives: to inventory previously recorded wickiup sites within the seven-county study area, to revisit and document a sample of those sites, as well as a sample of previously unrecorded sites, and to analyze structural and environmental characteristics of Northern Colorado sites, utilizing Geographic Information Systems (GIS) to make generalizations about their location and potentially predict the occurrence of undiscovered wickiup sites.

Results show a significant variation in wickiup sites throughout Colorado, with Northern Colorado structures displaying a set of characteristics distinct from those

wickiups described elsewhere in western Colorado by the Dominguez Archaeological Research Group in their Colorado Wickiup Project (2005). This project situates Northern Colorado wickiups within the context of that research, and provides a model for the accelerated documentation of rapidly deteriorating wickiups sites, which may inform future research and aid in the development of a over-arching management plan for perishable wooden structures in Colorado.

ACKNOWLEDGEMENTS

First and foremost, I have Dr. Jason LaBelle to thank for his guidance and continuous support of my thesis research. He renewed my interest in archaeology at a time when I had experienced only frustration and was ready to abandon the pursuit of a master's degree altogether. From the moment I became his student, he challenged me. I credit him with instilling in all of his students a will to succeed, and for always pushing me to complete this project – even when I pushed back. The other members of my committee were also instrumental in my success; Dr. Jason Sibold was always ready with great ideas, and Dr. Janet Ore provided a unique perspective that my thesis would have been lesser without. The Anthropology Department has been incredibly supportive, and funding provided by the Karen S. Greiner Endowment was crucial in the success of this project.

I owe a debt of gratitude is Mark Dunning, foreman of Big Creek Ranch, where several of the wickiups discussed in this thesis are located. Mark was incredibly hospitable, allowing me to visit the ranch on several occasions, as well as escorting me to the often-remote sites (not to mention towing my truck out of a ditch when the need arose). So much of the research presented in this thesis would not have existed without his knowledge and whole-hearted support of archaeological investigation.

Curtis Martin and Richard Ott of the Dominguez Archaeological Research Group also encouraged my work from the very start, and shared invaluable data from the *Colorado Wickiup Project* with me. I thank them for allowing me to tag along for a day of wickiup documentation in Rocky Mountain National Park, which shaped much of my

interpretation of Northern Colorado wickiups. Mike Metcalf also provided important information in support of my work, sharing literature and photographs from his documentation of wickiups that I revisited in 2010. Garry Weinmeister was very generous in providing additional personal photographs from the Weinmester wickiup. The late John Slay kindly shared anecdotes regarding the Crosier Mountain sites, and I am honored to have had the opportunity to speak with him before he passed away.

Mary Sullivan and the Colorado Office of Archaeology and Historic Preservation were incredibly helpful in the location of site forms and literature. She and her staff made the file search component of my thesis much less painful and much more productive. I would also like to thank the authors of individual site forms that were utilized in my research. Their efforts in recording wickiups in Northern Colorado have ensured that valuable archaeological information will be preserved for many generations to come. Arapaho/Roosevelt National Forest and Medicine Bow National Forest personnel were especially helpful in sharing their knowledge of wickiups in my seven-county study area, and without their cooperation this project would not have succeeded.

Several people who had no stake in my project helped tremendously anyway (and learned more than they wanted to know about wickiups in the process). Lucy Burris consistently went well above and beyond her duties as a GIS lab monitor. I couldn't have completed this project without her patience and willingness to teach. Rick Gumina also very graciously consulted with me on my project's data and statistics (at the last minute, no less), and directed me to the Graybill Statistics Laboratory, where Amber Hackstadt provided excellent guidance for the statistical analyses necessary in my research.

I am incredibly grateful to fellow graduate students Jenn Long, Rickey Kadlac, and Jason Chambers, who voluntarily took time from their own research to assist in my fieldwork. Besides being great archaeologists, they are great company, and I'm so glad that they lent their time to this project. It wasn't just current anthropology students who supplemented and supported my work – CSU alumni Jillian Bechberger and Marcy Reiser were both very accommodating in accessing National Forest literature for me; Marcy also provided more than one well-timed pep talk and helped me put this whole project in perspective. Paul Burnett shared data for my earliest attempts at GIS modeling and also provided much-needed encouragement.

There are additional friends and family without whose support this thesis would have never seen the light of day. Anyone who knows me, knows that I like to do things the hard way – writing a master's thesis included. I'm sure that often made things hard for everyone around me, and for their continued support I can't thank them enough. My boyfriend, David Swanson, gave me the advice I perhaps needed most, telling me to "drink more coffee and work harder." His tough love was one of the greatest motivations for finishing this project, and I appreciate it more than he likely knows. Rae Mosher and Bonnie Gibson provided a lot of the intangibles, as well as moral support that I couldn't have done without.

Jess Anderson deserves an entire paragraph. Her encouragement and companionship throughout my three years at CSU, and especially in the last month of frantic writing in our "lair" at GSB 350, truly pulled me through. I couldn't ask for a better friend to have shared this experience with me.

Finally, I can't thank my family enough. For making me read as a child, for letting me run around in the woods and play in the dirt, and, later, for not questioning me when I decided to make a career of it—for keeping food on my table and a roof over my head in the meantime. None of this would be possible without them. I'd like to dedicate this thesis to my grandfather, Frenchie "Paw" Maggard, who passed away while I was writing it; he always believed in me, and gave me reason to believe in myself.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Perhaps the most immediately imperiled archaeological resources in Northern Colorado, and indeed throughout the Rocky Mountains, are wickiups, a type of conical aboriginal wooden structure of Native American construction. For this very reason, Native American wickiup sites were included on a list of Colorado's Most Endangered Places, compiled by Colorado Preservation, Inc (Martin et al. 2005:2).

Several presumed wickiups, both recorded and unrecorded, are located in Northern Colorado (defined here as bounded by Larimer, Boulder, Clear Creek, Summit, Grand, Routt, and Jackson counties). Many of these wickiups were recorded decades ago, or are known only anecdotally by archaeologists. The purpose of this thesis project is to identify and collect as much information as possible from these endangered resources, as well as develop hypotheses regarding their cultural and spatial contexts, before they disappear from the archaeological record altogether.

Background

Recently, the efforts to document and research these rapidly deteriorating and disappearing structures have been spearheaded by the Dominguez Archaeological Research Group (DARG) through their *Colorado Wickiup Project*, supported by The

Colorado State Historical Fund and the Bureau of Land Management. DARG's work, however, has been focused nearly exclusively on wickiups located on the Western Slope of Colorado.

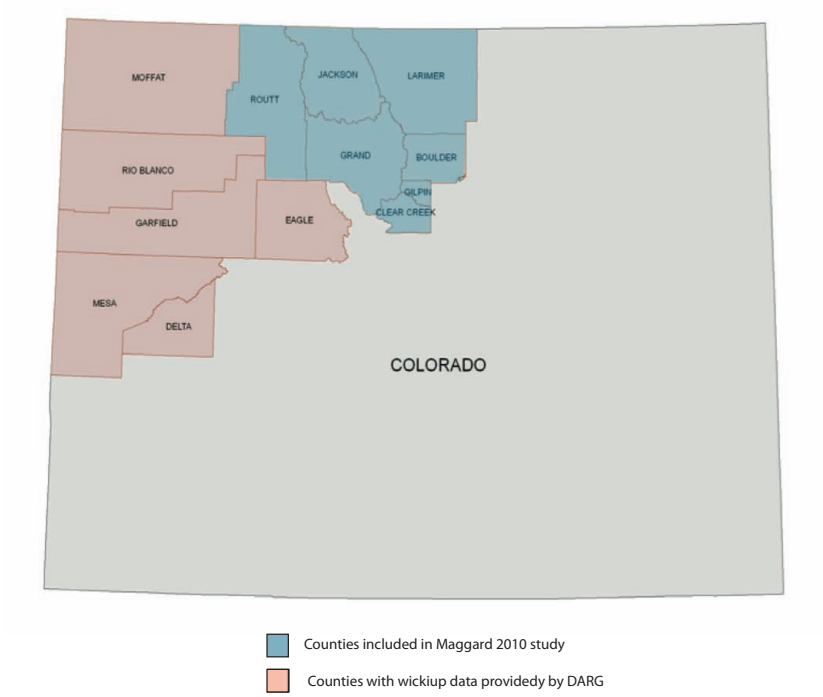


Figure 1.1. Location and extent of study area and areas sampled in previous study

The term "wickiup" encompasses several types of protohistoric and historic structures of Native American cultural affiliation and occupation associated with the Protohistoric period, which is defined in regional literature as beginning in 1540 (Gilmore et al, 1999).

Although there is much variation in the construction of wickiups, they share several common characteristics. They typically take the form of conical lodges comprised of varying numbers of timber poles of any number of tree species, and may

also incorporate support trees or be constructed in “lean-to” fashion. They are often found in forested areas at a sub-alpine elevation and tend to be located at the margins of wooded areas.

Their use(s), as well as their specific cultural origin and antiquity, have been and remain debated in the literature, and much stands to be learned from additional study. Several factors, especially their structural fragility and alarming rate of natural and cultural destruction, make their study a particularly timely and urgent one, and have inspired this thesis research on the wickiups of Northern Colorado.

Cultural Context

Although the origins of wickiups are greatly debated, it is important to briefly consider the cultural connections to these structures as they relate to the purpose of our study. The Protohistoric period was one of rapid and substantial cultural interaction and change, and wickiups in particular have the potential to provide insight into how those changes were affecting Native Americans in Northern Colorado. This thesis does not endeavor to provide a chronology of Native American populations in the area, but extensive histories of Native Americans in the West, and specifically in Colorado, have been compiled and provide further context for the current study (Lowie 1954, Hughes 1987, Crum 1996, Cassells 1997).

Figures 1.2 and 1.3 illustrate simplified ranges of Native American groups at the latter end of the Protohistoric period and into the Reservation period, which appears to be the timeframe for wickiup construction (Martin et al. 2005). These maps illustrate the many cultural groups in the vicinity of Northern Colorado, and show why assignments of

cultural affiliation to wickiup sites based on territory alone may not be clear-cut. Although wickiup construction is typically attributed to Utes, Figure 1.2 shows that the boundaries of several cultural groups meet in Northern Colorado.

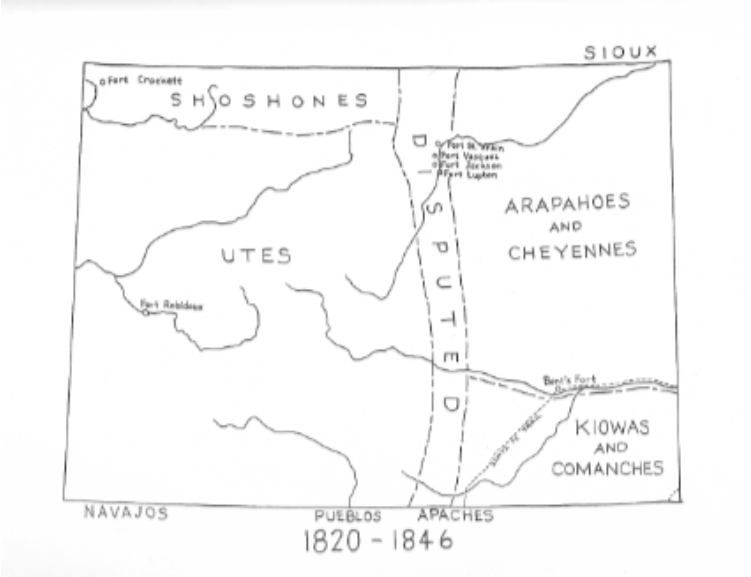


Figure 1.2. Native American ranges in Colorado, 1820-1846 (Hughes 1987)

An understanding of the movement of various groups of Native Americans, particularly Utes, across the Colorado landscape is necessary in determining not only the potential ethnic origin of wickiups, but also their function, whether it be hunting, shelter in war-time, or primary habitation. Figure 1.4 shows a detailed break-down of Ute territory, and illustrates the extent of ranges for tasks such as hunting, which may have brought Utes into Northern Colorado, where the structures studied herein are located.

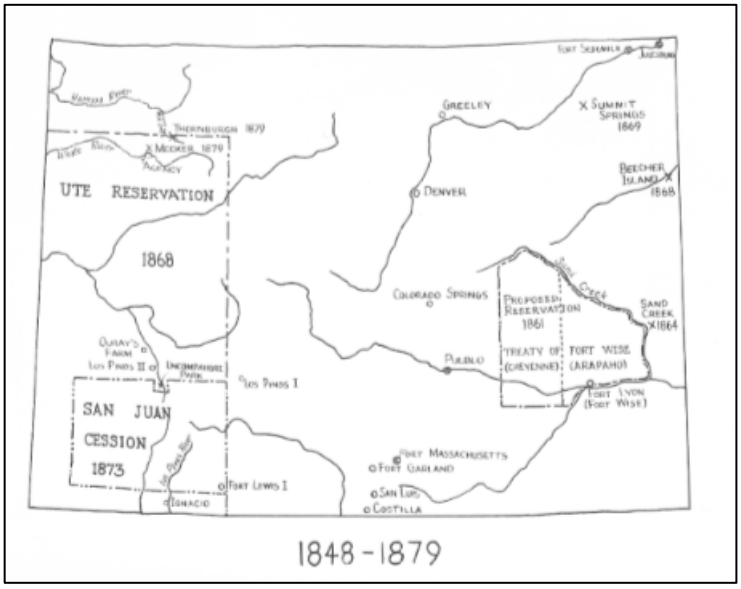


Figure 1.3. Native American Ranges in Colorado, 1848-1879 (Hughes 1987)

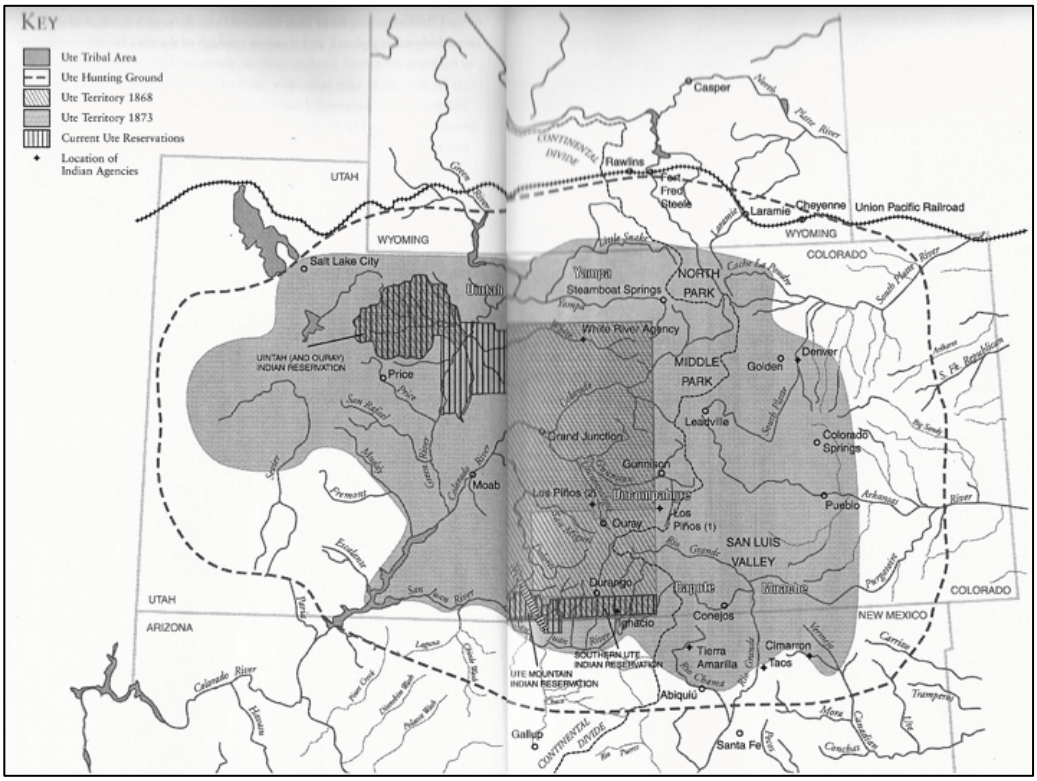


Figure 1.4. Detailed map of Ute territory and range (Decker 2004)

It is important to consider the current consensus of the Colorado archaeological community on the topic of wickiups and their cultural origins. Northern Colorado wickiups are briefly mentioned in *Colorado History: A Context for the Platte River Basion* (Gilmore et al. 1999) in discussions revolving around the Protohistoric period of the region. Chapter author Bonnie Clark refers to five specific wickiup sites in the Platte River Basin, which are mentioned later in the site inventory in this current study, and illustrates difficulties in assigning dates or cultural affiliation to the sites, although she suggests Protohistoric sites in the area are "mostly likely" Ute (1999:324). She makes this suggestion with the caveat that Native American territories overlapped heavily at the time, and that the sites may have been utilized by Comanche, Shoshone, or Arapaho peoples. The historical context published by the Colorado Council of Professional Archaeologists also deals with protohistory and with wickiup sites. In *Colorado History: A Context for Historical Archaeology* (Church et al. 2007), wickiups are mentioned in terms of identifying Ute habitation remains. This publication focuses most of its attention on Ute culture history, and only those structures on the Western Slope are assigned a cultural affilation. Arapaho, Comanche, and Shoshone sites are described as "primarily-teepee based ephemeral households" and are discussed separately from wickiups, which appear to be restricted to Ute habitations in this study (1999:100). Understanding the role of wickiups in the cultural context of Protohistoric Colorado allows us to attempt to better understand the people who inhabited them, and serves as one of the driving topics in the development of research questions for this project.

Research Questions

Collaborators involved in DARG's wickiup study identify several key research themes driving their study, including chronometric dating of wickiups, study of the Ute cultural complex and concomitant subsistence/settlement patterns, wickiup variability, and spatial understanding of intra-site structure (Martin et al. 2005:36). The research goals of this thesis project primarily involve developing a cultural and environmental context for the known Northern Colorado wickiups, and further informing DARG's studies of variability, investigating structural and environmental similarities and differences between Northern Colorado wickiups and those recorded in Western Colorado. The present study is focused around the following questions:

1) *How do wickiups of Northern Colorado fit within the protohistoric and historic cultural complexes of the southern Rocky Mountain region?*

As discussed above, wickiups in Northern Colorado have not been assigned a specific cultural complex with certitude, although Ute, Arapahoe, Shoshone, and Cheyenne origins have been suggested. A comparative study of structural characteristics of Northern Colorado and Western Colorado wickiups may show whether they share similarities in construction; ethnohistorical accounts that detail the origin of several Northern Colorado wickiups may also be used to address their cultural affiliation.

There have been notable debates as to whether ethnic affiliation is even a worthwhile research interest to begin with. Stiger published an article in *Southwestern Lore* in 1998 arguing that the distinction between Ute and Navajo archaeological remains

could not yet be made with any great confidence, going on to say that "ethnic explanations are of little utility for explaining the past" (Stiger 1998: 5). However, it is certainly important to determine whether Northern Colorado wickiups bear strong similarity to those of surrounding regions in terms of living populations of Native Americans. This is especially relevant where consultation with Native American tribal entities in cultural resource management is concerned. The importance of the inclusion of Native American stake-holders in management decisions is discussed further as another research objective. Identification of cultural affiliation is the first step in the process of protecting the heritage of living Native American peoples. Thus, the present project will focus primarily on placing wickiup sites within the cultural traditions of previously-studied groups based on structural characteristics and ethnohistorical accounts of their origin.

2) *What environmental elements do Northern Colorado wickiups have in common with one another and with Western Colorado wickiups, and what generalizations can we make about their function and temporality based upon these characteristics?*

Another topic of interest in much historical and current wickiup research is the environmental setting of conical timbered structures, and what that landscape can tell archaeologists about their use and origin. Although some similarities in wickiup site location seem to exist in relation to topography and landform, wickiups are found in a wide range of landscapes. Several environmental characteristics, including distance to

water and distance to forest edge, have been suggested as potential constraints on the location of wickiups, and these will be further explored using GIS applications.

Environmental setting is especially important in the investigation of collapsed wickiups, as well as those that have been entirely destroyed since their documentation. Although the remains of many wickiups in Northern Colorado may maintain little structural integrity, the location itself may still be used to determine their function or cultural affiliation. Researchers may not be able to perform analysis on structural elements that have been altered or destroyed, but interpretations about the structure within its environment can still be made.

3) What environmental and human factors pose the greatest risk to aboriginal wooden structures, and what management decisions and preservation measures can best mitigate those threats, so that further research and/or interpretation may be carried out?

Both the material composition and location of wickiups puts them at an intrinsic and significant risk for destruction. Three particularly urgent threats to extant aboriginal structures, both recorded and unrecorded, include natural wood deterioration and weathering, wildfire, and human activities including prescribed burning, timber removal, and recreation.

Wildfire is perhaps the most pressing of threats to wickiups, as most of these structures, especially those found in Northern Colorado, are located within or near heavily forested areas with significant wildfire potential. Many of these environments

have also been affected in recent years by Mountain Pine Beetle (*Dendroctonus ponderosae*) outbreaks, which kill a significant number of trees in Colorado annually (Leatherman et al. 2007). A study of the 1988 fires in Yellowstone National Park showed that Mountain Pine Beetle outbreaks increased the likelihood of forest destruction by wildfire, even among areas of forest that were already vulnerable to fire due to drought (Lynch et al. 2006). Mountain Pine Beetle kill also leads to deadfall, which threatens wickiup structures located in heavily forested areas.

Human activity is also quickly impacting wickiup sites, as Federal lands are increasingly frequented by those utilizing parks and national forests for hiking, mountain biking, backpacking, horseback riding activities, motorcycle and all-terrain vehicle (ATV) riding, and off-road use of 4-wheel drive vehicles.

One of the goals of this project is to determine purposes and priorities for the protection of the most threatened wickiup sites, which may help guide managing agencies' decisions. These recommendations will take into account the involved agency's project goals, time and funding constraints, as well as the input of stakeholders. Stakeholders may include government officials, Native American tribal entities, academic or professional researchers, private landowners, and concerned members of local communities. It is vital that the research and information gathered regarding the potential preservation of wickiup sites keep in mind the public's role in archaeological interpretation and stewardship.

Research Approaches

This project was carried out in three phases, each of which focused on a different approach to information collection: background research and literature review, field documentation, and GIS mapping and analysis.

Background research and literature review provided context for Northern Colorado wickiup sites that were to be studied, and also involved the identification of all Northern Colorado wickiups sites already on record in OAHP files. This information was included in all comprehensive analyses.

Field research involved the extensive documentation of a selected subset of wickiup sites. This documentation was guided by recording criteria outlined out by DARG in their Recommended Field Techniques (Martin et al. 2006) and included documentation in the form of site records, plan and profile maps, and extensive photographs.

Finally, information collected from field research was not only documented in terms of traditional site maps, but was graphically represented, analyzed, and integrated into spatial models utilizing Geographic Information Systems (GIS). These data and subsequent analyses were used to create thematic maps of wickiup site location and concomitant environmental characteristics, as well as predictive models that may aid researchers in approximating wickiup site location probability.

Thesis Organization

Chapter 2 is a review of scholarly literature concerning conical timbered structures in Northern Colorado and surrounding areas of Wyoming and Montana. The dominant themes of previous wickiup research are identified, and their application to a study of Northern Colorado wickiups is discussed. Special attention is paid to the Dominguez Archaeological Research Group's assessments and studies, as this thesis project uses their research method as its model.

Chapter 3 provides a summary of recorded wickiup sites in the Northern Colorado study area, which includes Larimer, Boulder, Clear Creek, Grand, Routt, and Jackson counties, as identified through a search of state files, as well as data from the Colorado State University Laboratory of Public Archaeology Repository. A summary reference guide is provided for these sites, including photographs and brief descriptions of each site. Characteristics of the group of sites as a whole are also summarized and discussed, especially as they compare to the previously recorded wickiups on the Western Slope.

Chapter 4 details field research carried out in 2010, including thick description and associated documentation of all aboriginal structure sites recorded by the author. Relevant field measurements, photographs, diagrams, and maps are included in this section.

Chapter 5 discusses the development and results of a GIS model built using wickiup location and attribute data garnered from Northern and Western Colorado sites, analyzed according to environmental variables with the potential to affect wickiup site location. These analyses inform the understanding of spatial patterning of wickiup sites in

Northern Colorado as it relates to wickiups in other Rocky Mountain regions, and informs management considerations suggested in the following chapter.

Chapter 6 applies data gleaned from fieldwork and analysis to the management of wickiups in Northern Colorado. This chapter addresses modern issues and confounding factors affecting wickiup identification, specific threats to known wickiup sites, and strategies for determining high-probability areas for new site location. Priorities for research and preservation strategies are discussed in light of the research questions presented here, and potential mitigation strategies are presented.

Conclusions drawn in this study of Northern Colorado wickiups are presented in Chapter 7; research questions are revisited and future research directions are discussed, including those specific to Northern Colorado and those pertaining to the archaeological record as a whole.

CHAPTER TWO

A HISTORY OF WICKIUP DOCUMENTATION AND RESEARCH

Conner and Halverson remarked in 1969 that "conical timbered lodges on the Northwestern Plains and in the Northern Rocky Mountains have been mentioned by innumerable explorers, fur traders, squaw men, and ethnographers" (1969:6). These structures, also referred to as wickiups, have been interpreted colloquially as war lodges, hunting lodges, and long-term habitations, and have been discussed intermittently in the archaeological literature as well. The following review discusses general ethnohistorical references to wickiups, as well as previously published scholarly work on wickiups in the Rocky Mountain region of Montana, Wyoming, and Northern Colorado. The dominant themes of previous research are identified, and their application to a study of Northern Colorado wickiups is discussed, especially in reference to further research potential for wickiups in this region.

Previous Study

Ethnohistorical Accounts in the 19th and 20th Centuries

Reports of wickiups exist primarily in ethnohistorical literature prior to the mid-20th century. Before researchers and scholars became aware of the structures, explorers and curious local historians made many references to wickiups or conical timbered

habitations. Because ethnohistoric accounts of the time tended to focus on one area (often the hometown or ranch of the author), some regions are better represented than others in terms of ethnohistory. Wickiups discussed and photographed by early explorers and historians in the Northern Colorado study area include those found in the Estes Park/Rocky Mountain National Park area, as well as those in Walden/North Park area. Ethnohistoric accounts of the wickiups of North Park which will be discussed in greater detail in a later chapter, as these structures still stand and were revisited by the author.

The wickiups of Rocky Mountain National Park have a long history of documentation; perhaps the earliest reference to—and earliest photograph of—such a structure is included in an 1889 historical account by Frederick Chapin. He documents a "wickyup" near what is now downtown Estes Park, which "had stood there longer than the oldest settler knew" (1987:120). A photograph of the same structure is later referred to as "Hallett's Wickiup" in A.F. Hallett's *Book of Historical Rocky Mountain Views* (Butler 2004:19).

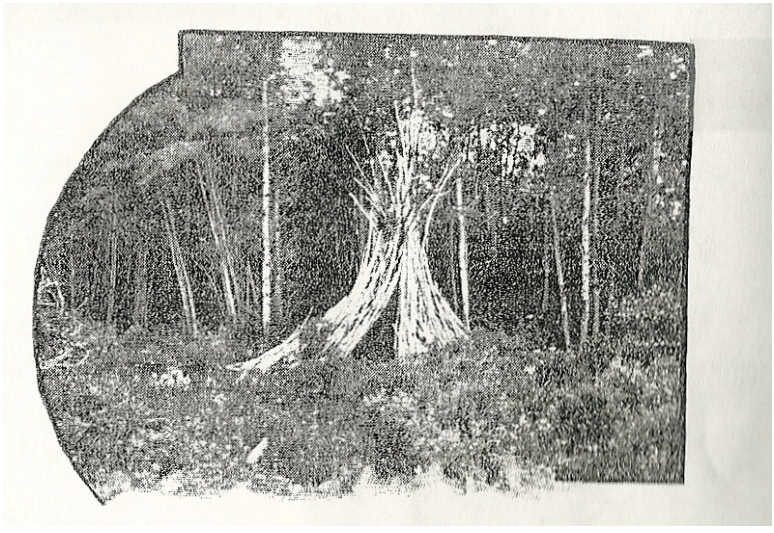


Figure 2.1. Wickiup photograph taken from Chapin (1889)

Several other sources related to the ethnohistory of Rocky Mountain National Park also discuss wickiups. McBeth's 2007 *Native American Oral History and Cultural Interpretation of Rocky Mountain National Park* includes a pre-1900 photograph of a wickiup located along the Fall River, which is on file at the Estes Park Museum.

Figure 2.2. Wickiup photograph taken from McBeth (2007), dated pre-1900

The National Park Service maintains an excellent collection of historical documentation of the Park, spanning from the late 19th to early 21st centuries (Rensch 1935, Beals 1936, Buchholz 1983, Brett 2003, Mcbeth 2007); this current review should not be considered and exhaustive list of ethnohistorical mention of wickiups, but a brief examination highlighting several well-known publications that make note of the structures.

Beyond references specific to the Park, a 1936 field guide published by the U.S. Department of the Interior, *Ethnology of Rocky Mountain National Park: The Ute and*

Arapaho, discusses a form of housing utilized by Ute, as per conversations with Ute Reservation informants of the time. This description appears to refer to Utes throughout Colorado, and also probably refers to wickiups:

> *The Ute of Ignacio, Colorado, remembered a brush or bark-covered structure as preceding their use of the plains tipi. At Ouray, the Ute, as late as 1912, were using a structure which differed from the tipi in having a brush cover and which was said to be the old style.* (*Beals 1936)*

One of the first truly archaeological reports of wickiups is found in Huscher and Huscher's overview of wooden structures in a 1943 issue of *Southwestern Lore* – although they are identified as hogans in this article, several are likely wickiups. The first of many scholarly studies of wooden structures in the Rocky Mountain Region, Huscher and Huscher's investigation provided one of the only synthetic reviews of brush habitations at the time, and is also unique in that its focus is on structures found in Colorado.

Wickiup Research in the 20th Century

Scholarly wickiup research in the 20th century primarily refers to structures found in Montana and Wyoming, and falls into two main categories: site-specific studies and synthetic regional studies. Site-specific studies, which first began to be published mid-century, typically give a thick description of a previously-unrecorded timber shelter in some type of site report format (Des Rosier 1965, Mulloy 1965, Conner 1966a, Conner 1966b, Conner and Halverson 1969, Carbone 1972, Johnson 1972, Moe 1974, Hamilton

1973, Conner 1974, Davis 1975, Davis and Scott 1987, Johnson 1988, Pallister 1992, Murcray 1993, Loendorf 1996). These articles often include information on environmental setting, as well as construction material and dimensions of structure; however, many of the wickiups documented are collapsed, and such measurements have been approximated. Several reports even describe structures that no longer exist or cannot be located; these reports, such as Conner's 1966 "Recollection of a Wickiup," rely on anecdotal evidence from local informants in the reconstruction of former site conditions. A summary of these site-specific articles and some of the basic information they contain is included in Appendix A.

The second type of report on conical timbered structures that was often published in the 20th century includes more synthetic studies addressing the wickiup sites of a region, the boundaries of which may be defined in several different ways. Kidwell (1969) and Wenker (1992) both address wickiup construction on a large scale, covering the entirety of the Northwestern Plains, while Ewers (1944) and Voget (1977) discuss wickiups of the Crow and Blackfeet cultural groups, and Wierzbinski (1965) and Zier (1987) focus their studies according to ecological boundaries, cataloging the wickiups of a particular river drainage or mountain range. Few articles prior to the 1970's address such synthetic site description, so it appears that a shift in research focus occurred at this time, with emphasis placed on understanding wickiups within their regional context, and attempting to synthesize and generalize information about their characteristics. One notable exception to this case is the previously mentioned study by Huscher and Huscher (1943) that describes "hogans" throughout Colorado; some of these reports describe what archaeologists would now call wickiups, but other sites consist of structures that would

fall into different categories according to delineations by current researchers, which are discussed further below.

The trend toward synthetic research with Joanne Sanfilippo's 1998 master's thesis, *Ute Wickiups or Navajo Forked-Stick Hogans: Determining Ethnicity Through Architecture in the Archaeological Record* and with the most comprehensive discussion of wickiups to date, DARG's *Colorado Wickiup Project* (Martin et al. 2005).

Sanfilippo's thesis investigated 132 aboriginal wooden structures; her work contrasts structural characteristics of Ute wickiups of Colorado and Navajo hogans from Black Mesa in northeastern Arizona. Although her inventory of Colorado wickiups identified several wickiups that are located in Northern Colorado and are discussed in this thesis, the majority of structures addressed by Sanfilippo for comparative purposes are located in western Colorado. DARG's *Colorado Wickiup Project*, although also anchored on the Western Slope of Colorado, nonetheless provides a catalog of wickiup sites throughout the state. The first stages of their research primarily focused on inventory and strategic planning regarding wickiup documentation, while later volumes present examples of the more thorough recordation style warranted by the rapidly-deteriorating archaeological record and lacking site documentation as they discovered in their inventory of existing wickiup site records.

In another important study, Butler (2004) discusses the construction of a modern experimental wickiup constructed by a crew recording an aboriginal wickiup in Rocky Mountain National Park. This investigation represents one of the first attempts to understand wickiup form and function through empirical and experiential approaches to

materials and construction, although at its heart, the research hearkens back to functional questions asked by the very first scholars of wickiups in Colorado.

Research Themes

Structure Function and Variability

The most common questions asked by early researchers of conical timbered lodges were, "what is a wickiup?" and "what is its use?" Their purpose has primarily been described in terms of activity relationships, with support for hunting, trapping, war parties, and ritual ceremonies (Martin et al. 2005:14); many scholars also address whether the lodges were used as long-term habitation by an established group, or as short-term shelter built out of necessity by nomadic subgroups of a population. Buchholtz's *Rocky Mountain National Park: A History* points out that "they [Utes and Arapaho] left some well-worn trails, a few pine pole wickiups, bits of pottery, and some lost or discarded hunting equipment and tools" (1983). He suggests that one reason the Ute built wickiups was that "permanent dwellings were unnecessary since these people were nomadic." It is generally agreed that wickiups were utilized for short periods (Sanfilippo 1998, Martin et al. 2005); in his 2004 experimental wickiup study, Butler also suggests that their short occupation may be the reason for paucity of artifacts at most wickiup sites.

In McBeth's 2007 *Native American Oral History and Cultural Interpretation of Rocky Mountain National Park,* Alden Naranjo, a Southern Ute, says of wickiups:

> *I saw a plant there [Horseshoe Park wickiup] that they could have used at that time—walking up here just come up here and recognize some of the plants that they used. That's why I'm saying maybe this was just a hunting camp that they used. Maybe they stayed here in the fall*

> *also maybe they came here early in the spring 'cause it's low enough for—have been a medicine lodge, you know, it could have been anything—it could have been a moon lodge also. (McBeth 2007)*

Another common research theme in later studies addresses wickiup variability, especially where the definition of a wickiup is concerned in relation to other types of Native American architecture. DARG researchers compile a glossary of the uses of the term "wickiup," drawing on previous literature and attempting to differentiate wickiups from other protohistoric wooden structures; they turn to a description by Lipe (1999) as a summary of common site characteristics:

> *These sites typically contained one to six wickiups. Wickiups usually consisted of three to 22 poles in a conical arrangement and served as the interior support for a perishable (e.g., bark) or portable (e.g., animal skins) exterior covering. Living conifer trees, or even boulders, were commonly incorporated into the strucures. Features are not common at wickiup sites, those found are usually hearths or charcoal concentrations. (Lipe et al. 1999: 362)*

DARG researchers then point out that this description of wickiup characteristics applies primarily to known Ute architectural characteristics, which leads to the question of whether structure variability can be ascribed, and to what to degree, to differences between ethnic groups. This is another topic heavily discussed in the literature, both in early years of wickiup discovery and documentation and in current research. Whether the structures that archaeologists today term wickiups – conical wooden structures – were constructed by ethnic groups other than the Ute is a question addressed by many previous

authors, and a topic of interest in the writing of this thesis, primarily in terms of the range of structural variability that can be ascribed to cultural difference.

Determining Cultural and Ethnic Origins of Wickiups

One of the most dominant themes in past research of conical timbered shelters concerns the question of their cultural affiliation. Wickiups in Montana and Wyoming are variously attributed in the literature to Tukudika Shoshone, Lemhi Shoshone, Kutenai, Blackfeet, Crow, Piegan, and even Sioux peoples. However, the majority of researchers support Shoshonean origins, with the exception of articles written particularly toward Crow and Blackfeet structures (Ewers 1944, Voget 1977). The latter are supported primarily by ethnoarchaeological arguments, while the former tend to rely on structure characteristics and other archaeological evidence.

The authors cited here employ several lines of evidence in their arguments for ethnic affiliation for particular structures, including construction materials and style, as well as environmental setting and known ranges of specific protohistoric ethnic groups. While the main argument in the literature from Montana and Wyoming revolves around Shoshonean versus Crow and Blackfeet origin for conical timbered structures, structures in Colorado – especially those recorded in Western Colorado by DARG – are assumed to be of Ute origin, although the authors acknowledge that Kidwell (1969) points out that the term "wickiup" was used by Ute, Paiute, Shoshone, and Apache (2005: 12). Wickiups in Northern Colorado have not been assigned a specific cultural complex with the same degree of confidence as those in Montana, Wyoming, and Western Colorado. Arguments for Ute, Arapaho, Shoshone, and other origins will be considered in this

thesis' analysis of Northern Colorado wickiups. It is the opinion of this author that the pursuit of understanding ethnic affiliation of wickiups is an important one, not as an explanation in itself, but as a starting point for the understanding of wickiup variability in terms of both cultural difference and environmental constraints.

Evaluating Environmental Influence on Wickiup Location

Many early syntheses of wickiup studies attempted to determine environmental commonalities to wickiup sites, and what those characteristics could tell archaeologists about their function. One of the environmental attributes considered by most report authors was topography or landform. Des Rosier describes a site in a "bottom… back from the edge of a clearing" (Des Rosier 1965:14), and Conner's Russian Creek wickiup and is located in a canyon (1965). Other sites are found on hillslopes or ridges (Moe 1974, Murcray 1993). One aspect of conical timbered lodge location that is common to most all wickiup sites is distance to water. All sites published in Montana, Wyoming, and Northern Colorado are found within a very short distance of nearby streams, often on terraces just above them (Davis and Scott 1987) or within one hundred feet upslope of the stream channel (Conner 1966, Moe 1974, Pallister 1992, Hamilton 1973). A notable exception to this trend is Emil's Lodge, which is located on "an extensive ridge… overlook[ing] a large stretch of grassy plains," the nearest water source being "one-half mile to the northwest" (Conner 1974: 23). Loendorf also notes that Lloyd's Timber Structure, while located on a terrace above the bottom of Sykes Canyon, is not served by a perennial water source aside from the Bighorn River, which is two miles to the west (1996:67). It is also possible that Wickiup Cave, which is located on a steep slope of Big

Sheep Creek Canyon, is situated several hundred vertical feet from Big Sheep Creek, although the author does not indicate its distance from nearest water source (Davis 1975). Butler's overview of structures in Rocky Mountain National Park points out that "some are found near water whereas others are situated some distance away" (2004:20); it seems that little consensus has been reached in archaeological literature regarding wickiup location in relation to distance from water source.

Another environmental characteristic often discussed by archaeologists in their reports on wickiup sites, and one that is often quite similar between sites, is vegetative cover. As with distance to water, Davis' Wickiup Cave (1975) and Conner's Emil's Lodge prove exceptions to the rule of vegetative cover common to most Northern Rocky Mountain and Northwestern Plains wickiup locations. Nearly all reported conical timbered lodges are located in heavily forested areas, typically comprised of coniferous species (Conner 1966a, Pallister 1992), or aspens (Johnson 1972). Many reports simply describe the wickiup construction site as heavily timbered without indicating stand characteristics or species (Des Rosier 1965), while some go into greater detail, describing dense stands of Lodgepole pine and Douglas fir (Davis and Scott 1987). Even Davis' Wickiup Cave, though obviously not timbered itself, is located within a short distance from heavily forested slopes (1975:297).

In his discussion of Emil's Lodge environment in comparison to a site at Thirty Mile Mesa, Conner makes several points regarding their setting within the landscape that may apply to a great many wickiups in the region. He notes:

> *Both are situated in or adjacent to good grass. Both are on high ground where winter winds would keep the snow cover removed or at least to a minimum. Neither is situated in a swale*

> *where snow melt or run off would make the lodge or its close surroundings wet during a chinook or spring melt. The lodge at 30 Mile Mesa is situated to take full advantage of the warmth of the afternoon sun. Emil's lodge would receive most of the afternoon warmth, missing only the final and cooler rays of the sun. Both are near places where snow would drift in the winter. Both are sufficiently close to flowing water if the distance of many tipi ring sites in southern Montana from flowing water can be taken as a valid criterion. Both sites have excellent dry fire wood supplies. Both are situated in big game areas. (1974:36)*

More recent commentary has also been made on the environmental commonalities of wickiup location. There is certainly agreement that environment pays a key role in wickiup location; Greubel argues that "wickiup spatial patterning…within environmental situations appear to be less variable than the architecture itself" (Martin et al. 2005:26). Sanfilippo points out that 99 percent of the wickiup sample in her study are found "above lower terrain" (1998:365). In a statement specific to the wickiups of Rocky Mountain National Park, Butler writes that "site location… is on benches or terraces, or near ridge lines in the trees, but always above and near open meadows" (2004:20). DARG's summary of environmental characteristics of several re-evaluated sites in Western Colorado suggests that wickiup location may be based upon the preferential selection of boundary areas between different ecological zones:

> *The camps were supported by the exploitation of a variety of environmental zones and the diverse biotopes within the surrounding region that would have provided a wide range of seasonal and year-round resources — including riparian resources in canyons along the main creeks and rivers, the sagebrush grasslands, the pinyon- juniper forest, and the berry-producing shrub communities situated on*

> *the slopes of the higher elevations. (Martin et al. 2006:91)*

Although this commentary refers to wickiups located specifically in Western Colorado, this pattern may prove to apply to wickiups throughout the Rocky Mountain region, and specifically in the Northern Colorado study area addressed in this thesis. Environmental setting certainly presents itself as a promising area of future research, especially given the tools archaeologists now possess that enable robust spatial analysis and the creation of robust predictive models for site location.

Context for Current Research

In light of over one hundred and fifty years of wickiup research, this thesis focuses on further exploring dominant themes of past investigation, while augmenting documentation and analysis with newly available technology. DARG's initial report (Martin et al. 2005) states that the greatest research need is accelerated documentation of wickiup sites; thus, the research undertaken here was framed in such a context. Research includes fieldwork components that address previously under-recorded structures, as well as the application of the DARG research model in region with known but previously un-recorded structures. An inventory of previously recorded Northern Colorado sites (which has grown since Sanfilippo's 1998 catalog) is provided, while additional field documentation is presented in later chapters. Both studies completed in 2010 follow DARG's recommended field techniques (Martin et al. 2005). This additional documentation of Northern Colorado wickiups, along with spatial analysis, serves to continue the increasingly synthetic examinations of aboriginal wickiups in Colorado.

Contextualized by the research of the past centuries, the approaches of this study involve further exploration of structure function and variability, cultural affiliation, and environmental setting, while giving significant weight to the renewed importance of accelerated site documentation and preservation as indicated by the most recent inventories of wickiup sites and their records.

CHAPTER THREE

NORTHERN COLORADO WICKIUP SITE INVENTORY

The first step taken in the research of wickiups in Northern Colorado, in following with DARG and Sanfilippo's work, was the inventory of known recorded wickiup resources within the seven-county study area to be addressed in this thesis. A site list was created from files in databases at the Colorado State Office of Archaeology and Historic Preservation (OAHP); these files were compiled from file search request made for site forms containing the words "wickiup," "aboriginal wooden structure" and "conical timbered lodge." This file search, completed by OAHP personnel, returned 33 sites; however, forms for one of those sites, 5BL58, could not be located by OAHP or Arapaho/ Roosevelt National Forest archaeologists. It is included in the total site count but not included in quantitative analyses requiring further information about the site or structure since it is unavailable. An additional site, 5JA1942, is a recent record and was not returned in the OAHP file search but is described in a document provided by Dr. Jason LaBelle; a Compass search confirmed that this was a wickiup site, and it is included in total site count. Attributes of each of these sites were coded in Excel; this table can be viewed in its entirety in Appendix A. A summary of recorded sites and analyses is provided below.

Summary of Recorded Sites

The purpose of the following summary is to compile all known data on Northern Colorado wickiups in one location as an aid to future researchers. All data provided in this section is accessible via OAHP databases, but has not been synthesized and presented as a whole to date. The table below lists the number of sites returned by the OAHP file search according to county.

County	Number of Sites
Boulder	2
Clear Creek	1
Grand	4
Jackson	2
Larimer	24
Routt	1
Total	34

Table 3.1: Count of Northern Colorado sites by county

Figure 3.1 shows all sites in the seven-county study area, according to coordinates listed in original site forms. In the interest of succinct reference for the author, as well as future researchers, site forms have been condensed into brief site summaries, which include only the most standardized information common to wickiup records in Northern Colorado: number of structures, structure condition, construction style, pole numbers, pole species, associated artifacts and/or features, and cultural/ethnic affiliation and time period as indicated on site forms. A small photograph of the structure(s) is also included when available. For cases in which a site has been revisited or re-evaluated, the most recent findings are presented.

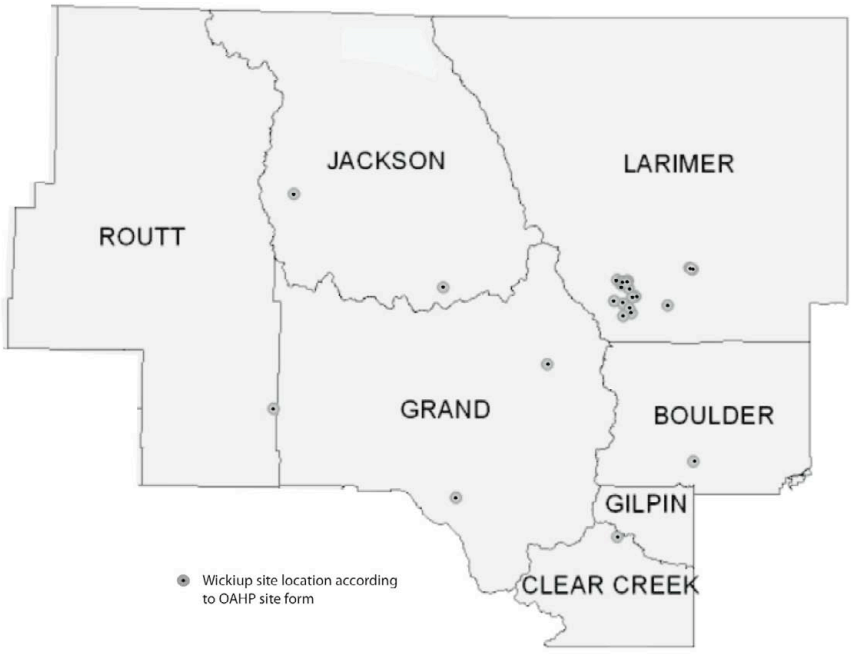


Figure 3.1. Map of wickiup sites according to OAHP state files

Site summaries are provided below, organized alphabetically by county, and then chronologically according to recordation date. The information provided is based entirely on the knowledge and opinion of those recording the sites and completing site forms, and not on the knowledge or opinion of this author.

5BL58 – One wickiup of 40-50 aspen poles. No further site information available.

5BL59 – Standing lean-to wickiup of 40-50 poles against pine support tree. Steel axe cuts present. Historic Native American or Euro-American origin.

5CC1347 (Lombard Wickiup) – Standing lean-to wickiup of more than 50 poles against lodgepole pine support tree with bent-pole entrance. Of late-19th-century Ute, Arapaho, or Cheyenne origin.

Figure 3.2. 5CC1347 overview taken from 2005 site form

5GA975 – Free-standing wickiup comprised of approximately 20 standing and fallen aspen and lodgepole pine poles. Axe cuts on nearby stumps. Possible associated buck-and-pole fence located approximately 25 meters away. Historic Euroamerican origin.

5GA2688 – Lean-to wickiup comprised of four aspen poles. Modern Euro-American origin.

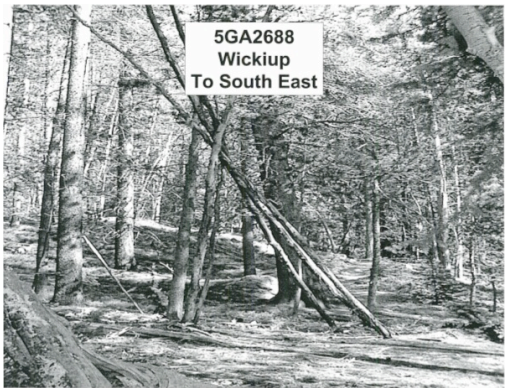


Figure 3.3. 5GA2688 overview taken from 2002 site form

5GA2732 – Free-standing wickiup constructed of lodgepole pine poles. Cobble-lined hearth and historic cans associated with structure. Modern Euro-American origin.

,

Figure 3.4. 5GA2732 overview taken from 2002 site form

5GA2733 – Fully collapsed free-standing lodgepole pine wickiup. 1 slab Lyons sandstone associated with structure. Historic Euro-American origin.

Figure 3.5. 5GA2733 overview taken from 2002 site form

5JA651 (East Branch Wickiup) – Partially collapsed lean-to wickiup constructed of 34 aspen poles supported by a lodgepole pine. Site revisits indicate increasing deterioration. Possible cut pole ends. Native American origin, potentially Ute. Construction date estimated at 1870 – 1890 based upon dendrochronological dating of support tree and nearby trees.

Figure 3.6. 5JA651 overview taken from 2002 reevaluation form

---

5JA1942 – Partially collapsed lean-to wickiup constructed of 8 lodgepole pine poles supported by dead Ponderosa pine. Axe-cut or sawn pole ends. Proto-historic to historic Native American origin.

Figure 3.7. 5JA1942 overview taken from site form

5LR615 (Weinmeister Wickiup) – Fully collapsed lean-to wickiup of more than 50 aspen poles originally supported by standing dead aspen. Photograph predates archaeological investigation, at which point wickiup was found to be fully collapsed. Tin can found 10 meters from structure. Protohistoric Ute origin according to most recent site re-evaluation.

Figure 3.8. 5LR615 photo taken and provided by Garry Weinmeister (1979)

5LR1197 – Nine standing and partially collapsed wickiups constructed of between 2 and 10 aspen poles apiece supported by live trees, brush, and large rocks. Late Prehistoric to Protohistoric origin.

Figure 3.9. 5LR1197 overview taken from 1988 site form

5LR1198 – Five standing and partially collapsed wickiups constructed of between 4 and 12 aspen poles apiece supported by live trees, brush, and large rocks. Late Prehistoric to Protohistoric origin.

Figure 3.10. 5LR1198 overview taken from 1988 site form

5LR1199 – Three standing and partially collapsed wickiups constructed of aspen poles supported by live trees, brush, and large rocks. Late Prehistoric to Protohistoric origin.

5LR1200 – Standing lean-to wickiup constructed of aspen poles supported by a live Ponderosa pine. Late Prehistoric to Protohistoric origin.

Figure 3.11. 5LR1200 overview taken from 1988 site form

5LR2115 (Aspenglen Wickiups) – One collapsed lean-to wickiup (photo predates collapse) and two collapsed free-standing wickiups constructed of between 10 and 15 aspen poles. Dendrochronological and charcoal samples collected. Protohistoric Ute or Arapaho origin.

Figure 3.12. 5LR2115 overview taken from 1996 site form

5LR2180 – Collapsed wickiup of approximately 70 aspen poles. One 30 to 40-centimeter granitic cobble associated with structure. Protohistoric origin.

5LR3857 – Collapsed aspen pole wickiup inferred from 75 by 40-meter scatter of aspen deadfall within Ponderosa pine forest. Simple granite stone-lined hearth associated with poles. Early historic Native American origin.

Figure 3.13. 5LR3857 overview taken from 1998 site form

5LR4460 (Hidden Valley Wickiups) – One partially collapsed lean-to wickiup constructed of 17 aspen poles and one fully collapsed free-standing wickiup also constructed of aspen poles. Flaked glass and quartz biface found in vicinity of structures; nearby stump axe-cut. Historic Ute origin.

Figure 3.14. 5LR4460 overview taken from 1999 site form

5LR4499 – Partially collapsed lean-to wickiup constructed of approximately 70 aspen poles. Test excavation of wickiup interior revealed a fully-intact cobble-lined hearth below a layer of duff and topsoil. Historic Ute origin according to dated radiocarbon sample taken from wickiup pole end.

Figure 3.15. 5LR4499 overview taken from 1999 site form

5LR4503 – Fully collapsed wickiup constructed of 16 aspen poles. Historic Native American or Euro-American origin.

Figure 3.16. 5LR4503 overview taken from 1999 site form

5LR4509 – Standing lean-to wickiup. One chert flake associated with structure. Protohistoric origin.

Figure 3.17. 5LR4509 overview taken from 1999 site form

5LR4512 – Standing lean-to wickiup. Historic Ute origin.

5LR4513 – Partially collapsed lean-to wickiup constructed of 46 aspen poles. Protohistoric Ute origin.

Figure 3.18. 5LR4513 overview taken from 1999 site form

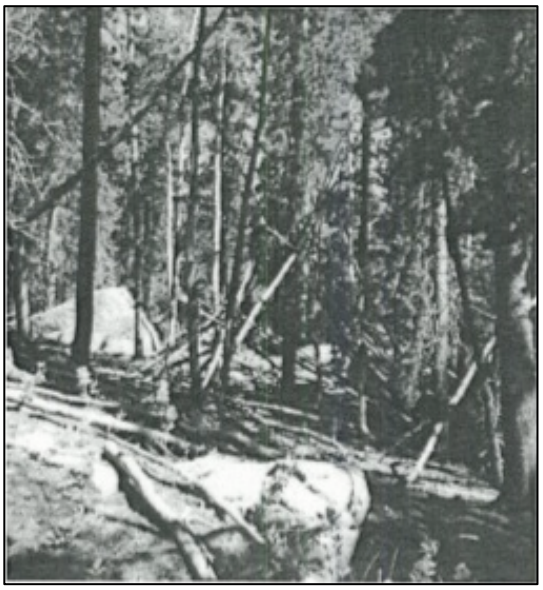
5LR4531 – Partially collapsed lean-to wickiup constructed of pine poles. Three Kremmling chert flakes associated with structure. Historic Euro-American origin.

Figure 3.19. 5LR4531 overview taken from 1999 site form

5LR4548 – Partially collapsed lean-to wickiup constructed of pine poles. Protohistoric to historic Native American origin.

Figure 3.20. 5LR4548 overview taken from 1999 site form

5LR4570 -- One partially collapsed lean-to pine pole wickiup of suspected historic Native American origin and one “copycat” free-standing pine pole wickiup of suspected modern Euro-American origin.



5LR4570 overview taken from 1999 site form

5LR6962 – Collapsed wickiup constructed of pine poles. Granite tipi ring and modern stone hearth associated with structure. Prehistoric to historic Native American or Euro-American origin.

5LR6962 overview taken from 2000 site form

5LR7002 – Free-standing wickiup constructed of 34 pine poles. Bottle glass, baling wire, and red brick associated with structure. Modern Euro-American origin.

5LR7002 overview taken from 2000 site form

5LR7009 – Collapsed aspen pole wickiup. 19th-century Ute origin.

5LR7009 overview taken from 2000 site form

5LR9914 – Free-standing wickiup constructed of 10 aspen poles. U-shaped cribbed wooden structure associated with wickiup. Modern Euro-American origin.

Figure 3.25. 5LR9914 overview taken from 2000 site form

5LR10229 – Partially collapsed lean-to wickiup constructed of 51 aspen poles. Historic Euro-American origin.

Figure 3.26. 5LR10229 overview taken from 2001 site form

5LR10292 – Standing lean-to wickiup constructed of 30 aspen poles. Modern Euro-American origin.

5LR11792 – Partially collapsed free-standing wickiup constructed of 21 aspen poles. Located adjacent to a two-track jeep trail. Modern origin.

Figure 3.27. 5LR11792 overview taken from 2007 site form

5RT807 (Little Rock Creek Wickiup) – Lean-to wickiup constructed of more than 50 aspen poles. Modern trash associated with site and vandalism evident. Historic Ute origin.

Figure 3.28. 5RT807 overview taken from 2005 site reevaluation form

---

In addition to this simple inventory and summary of sites that is intended to introduce archaeologists to the wickiups of Northern Colorado, several quantitative and qualitative analyses were carried out to determine whether any trends could be identified in the wickiups' structural and environmental characteristics, based on the available data.

Quantitative Analysis – Site Organization and Structure Characteristics

Structure Count

The first table below provides data on the number of structures per site for Northern Colorado, followed by a table summarizing DARG's data for structure numbers

(Martin et al. 2005). Wickiup sites in Northern Colorado seem to be heavily predisposed to consist of single structures. Only 6 of 34 sites with data regarding number of structures contain more than one structure; this constitutes only 18 percent of the sample. In other words, 82 percent of Northern Colorado wickiup sites contain only one structure.

Number of structures per site	Number of sites	Percentage of total sites
1	28	82
2	2	6
3	2	6
5	1	3
9	1	3
Total sites	34	100

Table 3.2: Northern Colorado structure counts

Number of structures per site	Number of sites	Percentage of total sites
1	164	59
2	31	11
3	20	7
4	7	3
5	4	1
6-9	14	5
10-15	4	1
20	1	0.5
52	1	0.5
80	1	0.5
Unknown	31	11
Total sites	278	99.5

Table 3.3: DARG structure counts (Martin et al. 2005)

In contrast, 66 percent of sites in DARG's entire Colorado sample contain one structure (Martin et al. 2005). Moreover, the maximum number of structures recorded in one site in Northern Colorado is only nine, whereas DARG's sample includes sites with 20, 52, and 80 structures, indicating a much larger range of structure numbers. However, only 2 percent of DARG's sample of sites contain more than the greatest number of structures in Northern Colorado sites. Given the range of structure counts in the entire state compared to Northern Colorado, it does seem that settlement patterns and site

organization in Northern Colorado is different from other areas, which may result from variation in structure and/or site function, or may be related to population size or environmental constraints unique to the region. One aspect DARG addresses that may apply to Northern Colorado wickiup sites is that of the "off-reservation" Utes:

> *Another aspect of Ute settlement that this author feels is significantly in need of research is that of post-1881 off-reservation encampments. It is known and accepted that not only did Ute peoples venture off of the reservations for hunting, ritual, and recreation (annual trips to Glenwood Springs are well documented), and occasional raiding, but also individuals and groups remained off reservation full time in "refugee" situations for years after the "final removal" of the Utes in 1881. (Martin et al. 2005:41)*

Given our knowledge of small groups of Utes venturing east of reservations in Western Colorado, it is possible that small sites in Northern Colorado with few structures represent those small, especially nomadic groups that were moving across the landscape for hunting or other activities. The paucity of large village sites east of the Continental Divide can also perhaps be explained by the fact that Utes were building wickiups in Northern Colorado at a time when all of the large groups had been moved to the reservation. This would, however, represent a great travel distance from the Ute reservation in southwestern Colorado. It may be more likely that the small sites in Northern Colorado instead represent the habitations of small task groups that ventured away from the larger populations in a pre-reservation Ute society.

Associated Artifacts and Features

One commonality among many previously recorded wickiup sites, both in Northern Colorado and throughout the state, is a dearth of artifacts and features associated with the structures. Artifacts associated with Northern Colorado wickiups are summarized in the table below.

Site	Associated Artifact(s)
5GA2733	1 slab Lyons sandstone
5LR615	1 tin can
5LR2180	1 30-40cm granitic cobble
5LR4460	flaked glass, flaked stone, unmodified glass
5LR4509	1 grayish-white chert flake
5LR4531	3 Kremmling chert flakes
5LR7002	bottle glass, baling wire, red brick

Table 3.4: Artifacts associated with Northern Colorado sites

Of all Northern Colorado sites, 67 percent have no associated artifacts or features. Only four sites contain more than one artifact, and only two sites contain more than one class of artifact. No sites contain known temporally or culturally diagnostic prehistoric or protohistoric artifacts. Non-diagnostic prehistoric flaked stone and several types of historic artifacts are associated with several sites; however, assignment of temporal and cultural affiliation based upon these artifacts should be made with care, even in the most general sense, as Sanfilippo points out that Ute often used both Euro-American and scavenged prehistoric items in their own material culture (1998:28). Even artifacts traditionally considered diagnostic of Ute habitation, including ceramics, have been shared with Paiute, Shoshone, and Navajo peoples, further complicating matters (1998:29).

Additionally, few features are associated with Northern Colorado wickiup sites. Features associated with wickiup sites are summarized below.

Site	Associated Feature(s)
5GA2732	cobble-lined hearth
5LR3857	granite stone hearth
5LR4499	cobble-lined hearth
5LR6962	granite tipi ring, modern stone hearth
5LR9914	u-shaped wooden feature

Table 3.5: Features associated with Northern Colorado sites

The only non-hearth prehistoric feature noted on site forms is a partially sedimented granite tipi ring at 5LR6962. The U-shaped wooden feature referred to in 5LR9914 is described as historic to modern Euro-American. Neither of these sites can be dated according to feature association.

Associated features given special consideration by previous researchers are hearths, both internal and external to wickiup structures. Four Northern Colorado sites include hearth features. 5GA2732 includes a cobble-lined hearth 2.5 meters in diameter, but the site is reported as being historic Euro-American in origin, and the hearth is estimated at no older than 50 years BP. 5LR3857 references a heavily silted granite stone hearth 0.7 meters in diameter located approximately 50 meters outside of a pole scatter that is interpreted as a collapsed wickiup; the site is reported as early historic of unknown aboriginal origin. 5LR4499 is a partially collapsed wickiup that was excavated, revealing an intact cobble-lined hearth with charcoal deposits. C-14 dating of two samples of this charred material indicated modern origin (60±40 years BP); however, investigators suggest that these dates were the result of a contaminated sample. The site as a whole was assigned Ute cultural affiliation based on a sample taken from the branch tip of a structural pole, which was C-14 dated at 150±40 years BP. 5LR6962 is described as having a simple rock-lined historic and/or modern hearth containing eroded charcoal; the site form notes that the hearth may be aboriginal, but reused historically. Butler (2004:

20) also refers to a "possible external hearth/charcoal stain" near wickiup remains at 5LR2115, although the site form only mentions charcoal samples.

In contrast, there is evidence for external hearths at 70 percent of wickiup sites in Sanfilippo's dataset , with 26 percent of wickiups containing internal hearths (1998:350-351). It is difficult to interpret the occurrence or function of hearths at these Northern Colorado sites, especially given questions of their antiquity. Butler suggests that "lining a hearth with rocks seems to be an historic American habit" (2004:24) if that is the case, modern and historic Euro-American "wickiups" may be distinguished by their stone-lined hearths. However, it is important to consider that hearth morphology, as well as much Native American material culture of the Protohistoric period, was likely influenced by Euro-American contact and trade. The presence of Euro-American-style features and artifacts should not disqualify a site as aboriginal, not only because these items may have found their way into Native American trade networks by the time wickiups were being constructed, but also because the sites may have been reoccupied by Euro-Americans after being built by Native Americans. It is possible that wickiup sites encountered and interpreted by archaeologists are in fact palimpsests, reflecting more than one occupation by more than one group of people over time.

When considering artifact and feature presence for Northern Colorado wickiup sites, we must also recognize the constraints of available data. Very few wickiup sites in Northern Colorado have been tested, much less excavated – in fact, only one site report in this sample, 5LR4499, included the excavation of test units. It is entirely possible that further testing and excavation would uncover temporally and culturally diagnostic artifacts, such as those encountered at wickiup sites on the Western Slope. Absence of

artifacts and features in surface survey should not be regarded as lack of evidence for cultural deposits in these cases.

Construction Style

The majority of Northern Colorado wickiups, as illustrated in the chart below, appear to be constructed in a lean-to fashion; that is, supported by a larger tree or rock, and not self-supporting.

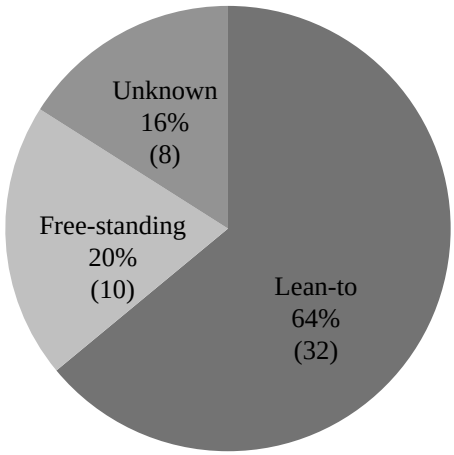


Figure 3.29. Northern Colorado wickiup construction styles

There are likely several factors influencing this apparent construction preference. One may be comparative ease of construction; a Northern Ute informant notes that "building a wickiup against a living tree is easier and the tree provides better support for the structure when it is windy" (Sanfilippo 1998:59). Butler, in light of his crew's construction of an

experimental wickiup, points out that lean-to style wickiups need only one person to construct, while free-standing wickiup construction "requires at least two people, or someone with great agility" (2004:21).

Several confounding factors in the archaeological understanding of wickiup construction style should also be considered. Lean-to wickiups may be more well-preserved in the archaeological record, as their design perhaps withstands greater environmental influences such as wind and surface erosion, and are then more readily identified by archaeologists than collapsed wickiups. It is also possible, as discussed further below, that some structures recorded as lean-to wickiups with very few poles were not cultural remains at all, but resulted from deadfall. For example, if two or three dead trees fall against a rock outcrop or against a live tree, they may be mistakenly recorded as a lean-to wickiup; however, it is very unlikely that several trees will fall to form a free-standing structure, so there is not a chance of mistakenly recording a free-standing wickiup. This bias toward lean-to wickiups in false wickiup recordation may have skewed structural style proportions and led to an appearance of structural style preference where there is none.

Structural Pole Numbers

The number of poles utilized in the construction of Northern Colorado wickiups varies widely. The graph below illustrates the number of wickiups with given numbers of structural poles (standing and fallen).

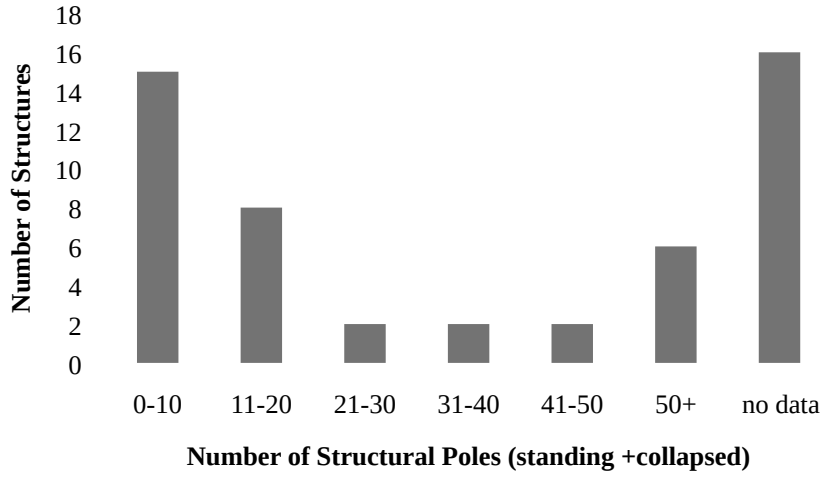


Figure 3.30. Frequency of Northern Colorado structures according to number of structural poles

Although the above graph appears to suggest that wickiups with few poles (<10) are most common, several factors may have influenced these numbers. Because so many of the wickiups studied here were discovered in a highly deteriorated and/or vandalized condition, it is likely that fewer poles are discovered than were used in the original construction. Many reports, especially those including follow-up site visits and reevaluations, cite the removal of poles as a form of vandalism or structure modification. Another possible source influencing this number is that some of the wickiup sites reported may have not been cultural remains at all, but are simply "eco-facts" of deadfall that appeared to have been placed in a conical configuration. These deadfall "structures" would certainly have fewer than ten poles, given the number of trees likely to fall on a single "support" tree. DARG researchers discuss such a site encountered in their own work:

> *DARG research associates had the opportunity in June 2006 to investigate several sites in Dry Creek Basin in southwest Colorado which were reported to have wickiups present. Our examination of the "wooden features" on these sites revealed that virtually all of them were either natural tree falls or accumulations of modern fence posts and not of aboriginal cultural origin. (Martin et al. 2006:84)*

Further site revisits and re-evaluation of previously recorded wickiups is deemed necessary to determine an accurate pole count of many of the structures in Northern Colorado; whether non-cultural remains have been included in this sample or not, the fact remains that pole counts are lacking entirely for 32 percent of previously recorded wickiups. Unfortunately, it is likely that many of these wickiups are no longer standing. It may, however, still be possible to determine rough pole counts based on fallen wickiup remains.

If a small number of poles does in fact predominate in the construction of wickiups in Northern Colorado even when eco-facts and deteriorated structures are considered, we must question, as suggested by DARG, whether these structures served the same functional purposes as presumed habitations with a greater number of poles (Martin et al. 2005:41). Given photographs of many structure provided above, as well as the author's experience recording new wickiup sites that are described in subsequent chapters, it seems that Northern Colorado wickiups do, in fact, tend to have more structural poles than wickiups of western Colorado. Sanfilippo shows that of wickiups in Colorado with a recorded pole count (n=98), only 16 percent are constructed of more than 10 poles. Of that 16 percent, 31 percent are located in Northern Colorado as defined by the six-county study area addressed in this thesis (1998:396). One potential reason

for greater numbers of poles in Northern Colorado wickiups is the increased availability of potential structural poles in Northern Colorado ecosystems, especially in the form of aspen, which often grow in groves of like diameter and height. More accessible forest resources would make the addition of a larger number of poles to a wickiup structure more feasible in Northern Colorado than in many locations on the Western Slope. Structural pole number may also be a functional attribute of Northern Colorado wickiups; it may be that addition of structural poles increases the protection of inhabitants from wind or cold weather and was more necessary at higher elevations and in more extreme temperatures common in Northern Colorado. Thus, although data provided here show that the number of poles most common in Northern Colorado wickiups is fewer than 10, further recordation and analysis is needed to determine whether that statistic is a result of confounding factors in preservation and documentation.

Structural Pole Species

Wickiups in Northern Colorado are overwhelmingly constructed of aspen poles; the remainders are constructed of pine, typically lodgepole, although the species of pine is often not indicated in site forms. This category is one of the few in which Northern Colorado wickiups differ markedly from their Western Colorado counterparts, which are primarily constructed of pinyon and juniper (Sanfilippo 1998, Martin et al. 2005); this is almost undoubtedly due to local resource availability in the Northern Colorado study area. Although this explains the lack of juniper and pinyon wickiups in Northern Colorado, it does not explain the preponderance of aspen in wickiup remains, as opposed to many other locally available timber types. Perhaps the greatest difference in aspen,

compared to many other trees located in same ecological zones, is that it is a hardwood, and the only hardwood available in the higher-altitude regions of the study area (USDA 2007).

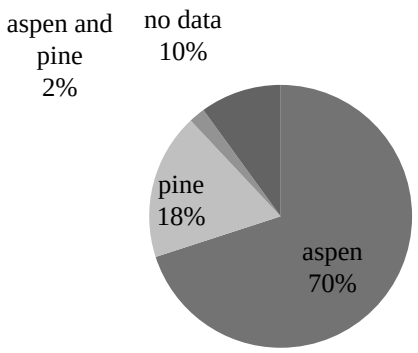


Figure 3.31. Proportion of Northern Colorado structures according to pole species utilized

According to experimental study, aspen is sturdy but nearly effortless to uproot when dead, and also known to stand for 50-100 years after dying, thus providing a ready supply of dry and easily removed wood for wickiup construction (Butler 2004).

Although the reasons for preferential use of aspen for wickiup construction are numerous, one caveat should be made regarding previous documentation: it is possible that wickiups recorded in Northern Colorado are assumed to be of aspen construction because that was the precedent set in the recording of early structures, and because it is difficult to discern the species of long-dead trees used in wickiup construction. This could result in a disproportionate number of aspen pole wickiups recorded archaeologically, and is something to be considered for the accuracy of future documentation efforts. According to forester Clinton Lester, there are several

characteristics of softwoods and hardwoods that may aid in their identification in the archaeological record. Although it is difficult to differentiate between these species after bark has been removed or has decayed, there are still a few markers that may remain. The branch pattern of pine and aspen are somewhat visually dissimilar; pine branches are evenly spaced both horizontally and vertically, while aspen branches are more randomly dispersed. Although branches will likely be removed or decayed at the time of recording, branch marks are typically still visible. Furthermore, pine, as a softwood, has a generally smoother or "cleaner" appearance than aspen, which may display more splits and checks, or blemishes in the surface grain. Finally, archaeologists should take into account hat hardwoods decay much more slowly than softwoods; therefore, a preservation bias may be at play in the disproportionately high incidence of aspen pole use in wickiup construction (Clinton Lester, personal communication, April 6, 2011). As with the study of many of the structural characteristics listed above, the analysis of wickiup pole species would benefit from a revisitation and re-evaluation of all Northern Colorado wickiups, and a subsequent update of quantitative data.

Quantitative Analysis – Site Setting and Environmental Characteristics

Vegetation

Understanding the location of wickiups in relation to different vegetation communities is a worthy topic of investigation, and may indeed provide further evidence elucidating the functional role of the structures; however, the wide range of quality in the recordation of vegetation on site and near site for wickiups in Northern Colorado complicates this study.

Although descriptions of vegetation types in previous site records was not deemed to be standardized enough to warrant a quantitative investigation of their relationship to wickiup location, some basic trends may be identified using site forms. It appears that one of the most common categories of vegetation type on or near wickiup sites is some type of conifer community. If lodgepole pine, ponderosa pine, unidentified pine, and mixed conifer descriptors are combined, their occurrence as a primary vegetation type constitutes 91 percent of the dataset. However, most sites have several types of trees and grasses listed as on-site or surrounding vegetation, and it is difficult to determine whether these conifers are in fact the dominant species or are simply present in the vicinity of the wickiup. The options for vegetation descriptions differ widely across site forms, and vegetation types are reported with varying degrees of specificity. This topic is further explored in Chapter 5, where wickiup location is considered in relation to vegetation layers in a GIS, which removes some of the element of variation based on differences between recorders and site form options.

Elevation

Perhaps one of the most interesting patterns observed in this dataset is the distribution of wickiup structures on the landscape in terms of elevation preference. Of 30 sites in the dataset with elevation information available, 23 sites, or 76% of the sample, are located between 2500 and 2700 meters in elevation.

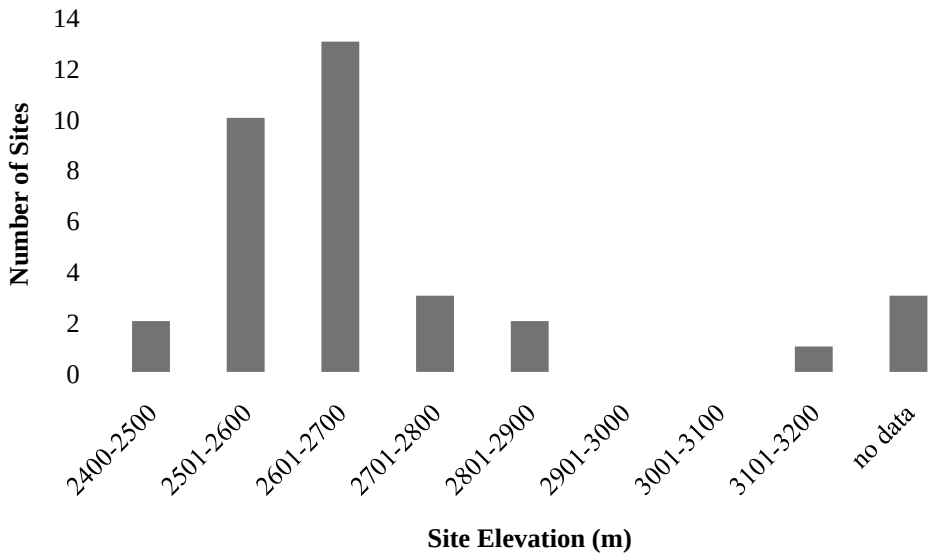


Figure 3.32. Frequency of Northern Colorado sites according to site elevation

A table summarizing elevation of Sanfilippo's wickiup dataset shows that only 6 percent of all Colorado wickiups fall into the 2500-2700 meter elevation range that is so often utilized for the location of Northern Colorado wickiups (1998:367). Fifteen percent of wickiups in DARG's sample fall within this zone between 8000 and 9000 feet, which encompasses the 2500-2700 meter range, as well as several hundred feet above and below that band (2005:11). Whether the elevation preference is tied to another environmental variable, such as vegetation type, is unclear based on site form analysis alone. This phenomenon is further explored and interpreted through GIS and statistical applications in Chapter 6.

Distance to Water

Archaeologists have often suggested that wickiups overwhelmingly co-occur with water sources, particularly perennial streams, as discussed in literature reviews in the previous chapter ; however, analysis of all northern Colorado wickiups implies that this may not be the case.

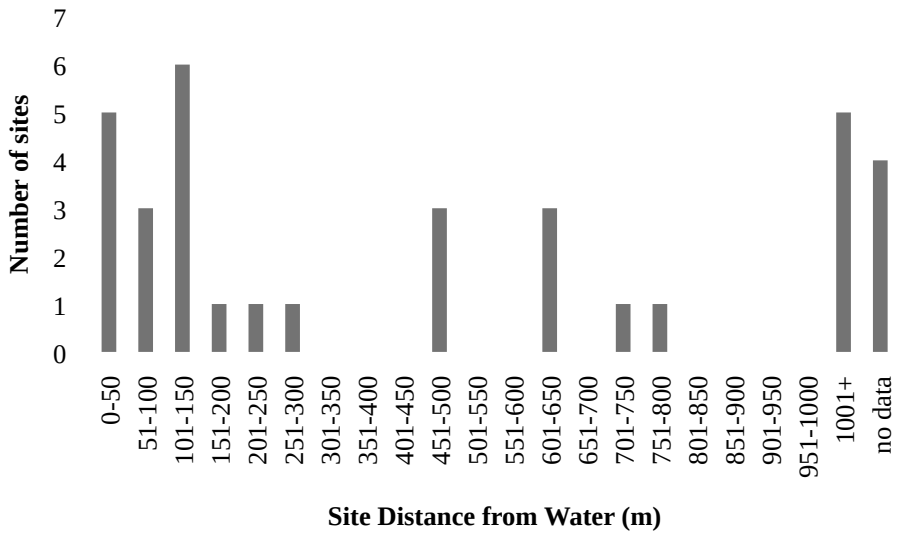


Figure 3.33. Frequency of Northern Colorado sites according to site distance from water

The fact that the same number of wickiups are located within 50 meters of a water source as those more than a kilometer from a water source is worth noting. Butler points out that wickiups in Rocky Mountain National Park are located both very near water sources and somewhat far from water (2004). Perhaps this apparent independence from water can be accounted for by the temporary nature of wickiup habitation. Water may not have been as important for the location of wickiups as more permanent settlements, in which case a great distance from water could prove an impediment to comfortable or practical subsistence. It is also possible that the opposite ends of the spectrum represent the

difference between seasonal habitations; for example, summer habitations may be preferentially located near water, where water was less necessary in winter habitation location because of snowmelt.

We should, however, keep in mind that this analysis was completed utilizing site form data for distance to water, which many archaeologists will agree is often estimated in the field, especially in cases where the nearest water source cannot be easily seen or paced. As with vegetation and elevation, more in-depth and empirical calculations regarding wickiup site distance from water using GIS data are discussed in Chapter 5.

Qualitative Analysis – Cultural Affiliation and Period

Two of the most-debated interpretations of Northern Colorado wickiups, and perhaps those that have the most research potential, are interpretations of cultural affiliation and historic period association/age of structures. Unfortunately, these characteristics are afforded perhaps the least standardization in documentation. Of the Northern Colorado structures with data recorded for potential cultural affiliation, seven are indicated as Ute, one as Ute or Arapaho, and one as Ute, Arapaho, or Cheyenne. Three are indicated only as Native American, while five are considered Native American or Euro-American. Nine are recorded simply as Euro-American. Justification is rarely given for these cultural assignments; they are likely based, as Sanfilippo notes (1998:324), on historic Native American territorial ranges. In the case of presumed Euro-American affiliation, limited deterioration of structure or presence of historic artifacts is often cited – the latter argument is especially problematic, as discussed previously in relation to artifact association.

For wickiups with the archaeological period recorded, dates range from prehistoric to modern, and usually include some range between the two (i.e., "late prehistoric to Protohistoric" or "prehistoric to historic"). Like cultural affiliation, period designations are loosely assigned; they are typically based on assumed age of wickiups as a structural form in general, and often supported by degree of pole wood deterioration. Only one wickiup site, 5LR4499, has been radiocarbon dated, and its dating is problematic: a date from a charred pole end (150±40 B.P.) and a date from the excavated interior hearth (60±40 B.P.) differ, and potentially indicate modern origin for part or all of the wickiup remains according to the original investigators. 5JA651 is dated at 1870-1890 based upon dendrochronological dating of its support tree, as well as trees in the surrounding stand; however, dating of living elements typically only supplies an earliest-possible-construction date (as the support tree must have been living at the time of the wickiup's construction), and does not constrain structure age at the latter end.

Chronometric dating of wickiups is further complicated by the "Old Wood Problem," which is the term for difficulties in dating wickiup remains due to the potential for structural materials to have been dead for a long period prior to the wickiup's construction, thus creating a deceptively early date when analyzed by radiocarbon or dendrochronological techniques (Martin et al. 2005:36). This issue will be discussed at greater length in subsequent chapters, primarily in reference to the dating potential for new structures recorded in 2010, as well as where research objectives in structure management are concerned.

Discussion

Although structural and environmental data was limited in many cases, these analyses provide a starting point for future research by indicating potential trends in Northern Colorado wickiup construction and location, and identifying areas in need of further investigation.

One of the most important conclusions to be drawn regarding Northern Colorado wickiups, based on this inventory, is the pressing need for further research and documentation for the majority of sites, especially if their records are to be brought up to par with DARG's field documentation standards (Martin et al. 2005). An inventory of Northern Colorado site forms shows significant discrepancies in quality of recording, primarily related to time elapsed since their original documentation. Many sites do not have photographs or structure sketches, which are instrumental in the study of wickiup variability. Other data not recorded on most site forms includes pole count, structure dimensions, and support tree or structural pole measurements. Changes in site forms since wickiups were first recorded in the 1960s have encouraged more thorough documentation; however, many recording techniques are still not standardized, which makes summary analysis of their characteristics difficult, as well as biased toward sites with the most available information. The Aboriginal Wooden Structure Component Form (AWSCF), introduced by DARG in 2005 and updated several times since then, provides the most thorough template for wickiup recordation, and addresses many of the problems in recordation standards discussed above.

The next chapter presents the results of two case studies investigating Northern Colorado wickiups, including the Crosier Mountain case study and the Big Creek/State

Line Case Study, both of which will be discussed at greater length and which incorporate DARG's recommended field techniques and consider the need for standardized documentation as evidenced by the inventory completed here.

CHAPTER FOUR

2010 FIELD RESEARCH

The earliest stages of this research involved literature review, file searches, and a summary analysis of wickiup sites in Northern Colorado. The results of this research made evident two potential approaches for further contributing to the overall knowledge of wickiups in Northern Colorado: the relocation and re-evaluation of previously recorded sites, and the preliminary documentation of anecdotally-known but previously unrecorded sites. In order to explore both approaches and determine the advantages and disadvantages of each, wickiup sites that fell into both of these categories were chosen for further field research in 2010, and divided into two distinct case studies.

Site Selection

The Crosier Mountain Case Study involved the relocation and re-evaluation of a group of four wickiup sites recorded in 1988 on the Roosevelt National Forest, while the Big Creek/State Line Case Study involved consultation with local informants and subsequent recording of a group of four previously unrecorded wickiup sites on private land in North Park, as well as the relocation and re-evaluation of one nearby site that was recorded in 1985, located just across the Wyoming border in the Medicine Bow National Forest.

The Crosier Mountain sites were chosen for relocation and re-evaluation for several reasons. The four sites, which are all located within a 1-kilometer radius, encompass eighteen structures described in 1988 field reports. The potential to revisit a large number of structures in a relatively small area was appealing from a practical standpoint; these four sites alone contained 35% of the total recorded wickiups in Northern Colorado. Furthermore, the 22 years elapsed since the first documentation of the wickiup sites presented an opportunity for investigation of structural deterioration over time.

On the other hand, the Big Creek/State Line sites were chosen primarily because anecdotal reports and photographs of the wickiups indicated that they exhibited exceptional structural integrity. A rich ethnohistorical record and the enthusiasm of local informants added to the appeal of these sites from a research standpoint. Because several of the sites are located on private land, it was especially important that the author took advantage of access granted and the cooperation of landowners, as the sites might not always be accessible to researchers. At the time that the Big Creek/State Line sites were chosen, the only known mention of the sites was in a 1972 *Southwestern Lore* article; no known OAHP records for the sites existed. Although further archival research and literature review turned up two short site forms for one of the four sites, it was clear that documentation was overwhelmingly lacking for the sites in question, and that thorough documentation of the structures would provide a significant and timely contribution to the archaeological record of wickiups in Northern Colorado.

Field Methods

Field recording, testing, and collection protocols followed those recommended by DARG (Martin et al. 2005). In the case of the Crosier Mountain wickiups, UTM coordinates, site location maps, and site photos were used in attempts to relocate the previously-recorded sites. Some site forms listed two sets of UTM coordinates: map coordinates and GIS coordinates. Both sets were used when wickiups could not be easily located. Point locations for sites and individual structures, as well as other identifying features such as roads, were taken using a Garmin Rino handheld GPS unit in the NAD27 Continental United States (CONUS) datum.

Appropriate state forms were completed for each wickiup site visited. OAHP site re-evaluation forms were completed for existing sites, and Aboriginal Wooden Structure Component Forms were completed for all sites. Sketch and location maps for new sites were drawn in the field to place structures within the context of the greater landscape; these paper maps were later refined in the lab using Google Earth imagery and GPS locations in order to create the most accurate geographical representation of site surroundings. Paper maps were then scanned and transformed using Adobe Illustrator software. In addition to simple plan views of structures included in site location maps, standing wickiups were drawn in profile, and these sketches were digitized in Adobe Illustrator. These diagrams are included alongside photographs in the following site summaries.

Digital photographs of all sites and structures were taken with a Sony DSC-W120 camera; black and white analog photographs were taken with a 35mm Nikon EM single lens reflex camera using 400-speed Kodak film. Film photography was used to limit

depth of field where digital photographs failed to distinguish wickiups from their surroundings. This technique, suggested by DARG (Martin et al. 2005: Appendix D-1), was necessary in the documentation of many structures encountered during 2010 fieldwork, as they were located in areas of heavy vegetation. Metric scales were included in photographs where appropriate and feasible.

Data was recorded for all measurements required by the Aboriginal Wooden Structure Component forms. Metric tape measures were used for measurements such as pole length, while metric fabric tapes were used to determine values such as circumferences more accurately.

Trowel tests were conducted on existing sites, as recommended by DARG (Martin et al. 2005). This testing involved removing surface duff to determine whether artifacts or features, such as hearths, were present on the floor of the wickiup, and did not include subsurface testing. No other forms of testing or excavation took place. No diagnostic artifacts were encountered in the course of site relocation and recording, and no cultural materials were collected.

Crosier Mountain Case Study

The Crosier Mountain sites are shown in context below; these are four wickuip sites containing 18 structures, which were originally recorded by the Forest Service in 1988. The purpose of 2010 fieldwork was to relocate these sites, bring records up to DARG standards, and report on the condition of the wickiups, as 22 years had elapsed since their original evaluation.

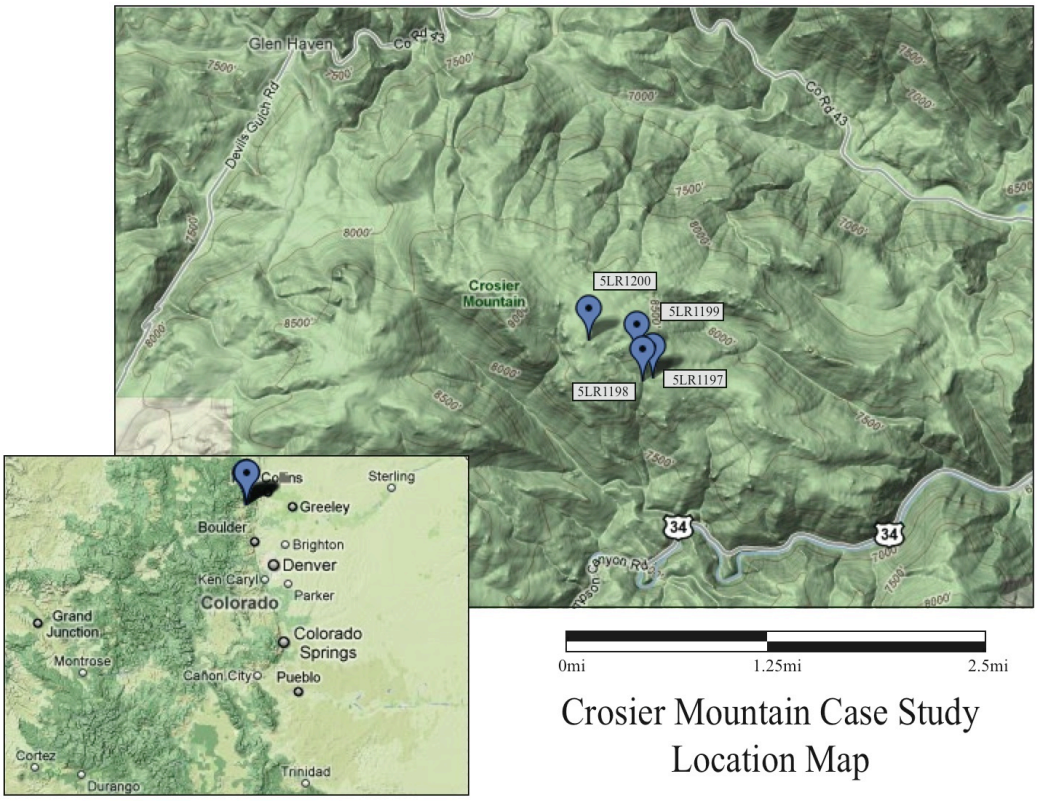


Figure 4.1. Crosier Mountain Case Study location map

Environment

The wickiup sites at Crosier Mountain are located within the subalpine meadows and nearby the dense fir and lodgepole forests characteristic of the crystalline subalpine forest ecoregion (Omernik 1987), although in this specific area the meadows may in fact result from modern fuel reduction activities. The ecoregion's typical granite outcrops also figure heavily into the environment of the Crosier Mountain sites: the sole structure relocated in 2010 fieldwork is protected by one such outcrop. The average elevation of the Crosier Mountain sites is 2560 meters (8400 feet) above sea level. The nearest permanent water source to the Crosier Mountain wickiup sites is the Big Thompson

River, which runs approximately 1930 meters south and downslope; water flows intermittently in Long Gulch, which lies 1200 meters southwest and downslope from the sites. Although no wildlife was observed during 2010 fieldwork, butchered remains of a hunted elk discovered in the vicinity of the sites suggest that elk (*Cervus canadensis*) populate the area seasonally.

Previous Records

The Crosier Mountain wickiup sites 5LR1197, 5LR1198, 5LR1199, and 5LR1200 were originally recorded in April of 1988 by United States Forest Service archaeologist John Slay during a 345-acre survey mandated in advance of a proposed controlled burn. More than 20 years later, a Forest Service crew led by archaeologist Marcy Reiser returned to Crosier Mountain to relocate wickiup structures for the purpose of the proposed 2009 Glen Haven fuels reduction project, which was later postponed. This USFS fieldwork was completed on June 16th and 23rd, 2009. None of the previously recorded sites were located by the crew; one wickiup structure was encountered, but believed to be a new site. This structure was not recorded due to time constraints (Marcy Reiser, personal communication, March 1, 2011).

The author's 2010 fieldwork at Crosier Mountain was carried out with the purpose of continuing the relocation and reevaluation efforts of the 2009 Forest Service crews. This survey was completed over June 6th, 20th, and 21st by the author, along with CSU graduate students Jen Long and Rickey Kadlac, who volunteered to assist in survey, relocation, and recording of sites. Jen Long was also a member of the 2009 Forest

Service crew that resurveyed Crosier Mountain, and assisted in identifying previously surveyed areas.

5LR1197 and 5LR1198

No wooden pole structures were located within a 500-meter radius of the UTM coordinates (GIS-corrected or uncorrected) provided on the 1988 site forms for either 5LR1197 or 5LR1198. The dominance of grassy vegetation and lack of mature trees in the vicinity of the 1988 UTM coordinates suggests that the area had burned in recent years, perhaps during the controlled burn proposed in 1988. Photographs taken in 1988 and included in the 5LR1197 and 5LR1198 site forms show mature lodgepole forest, very different from the primarily herbaceous present-day vegetation, dominated by grasses and low forbs. Although several lodgepole stands remained, no cultural remains were identifiable. Because the 2009 U.S. Forest Service crew did systematic pedestrian survey of this area, 2010 fieldwork only involved only a brief informal survey in the area adjacent to the original GPS locations, which also turned up no structures.

5LR1199

The only structure encountered during 2010 fieldwork is located 158 meters to the southwest of the UTM coordinates provided for 5LR1199 on the 1988 site forms. This is the structure that was located in 2009 by Forest Service crews and was deemed to be a new site unrelated to those recorded in 1988. However, given the proximity of the 1988 UTMs to the structure located in 2010, it is the author's opinion that the structure located in 2010 is one of three listed for 5LR1199 on the 1988 site form. This structure appears

to be the only structure remaining of those previously recorded on Crosier Mountain. Because photographs of the 5LR1199 site that were taken in 1988 did not accompany the site record and could not be located by the author or by Forest Service personnel, it is difficult to determine whether the structure located in 2010 is the same as one of those recorded in 1988. The 1988 form discusses three structures, whereas only one structure was located in 2010.

This structure consists of 12 standing aspen poles and 4 collapsed aspen poles. Standing poles are supported by one living Ponderosa pine tree and are arranged in a semi-circular wind-break fashion. Pole length ranges from 2.5 to 3.0 meters, while pole diameter ranges from 3 to 8 centimeters. The diameter of the support tree is 40 centimeters; its height is estimated at 10 meters.

Figure 4.2. 5LR1199 overview facing south. Taken by Annie Maggard on 6/6/10.

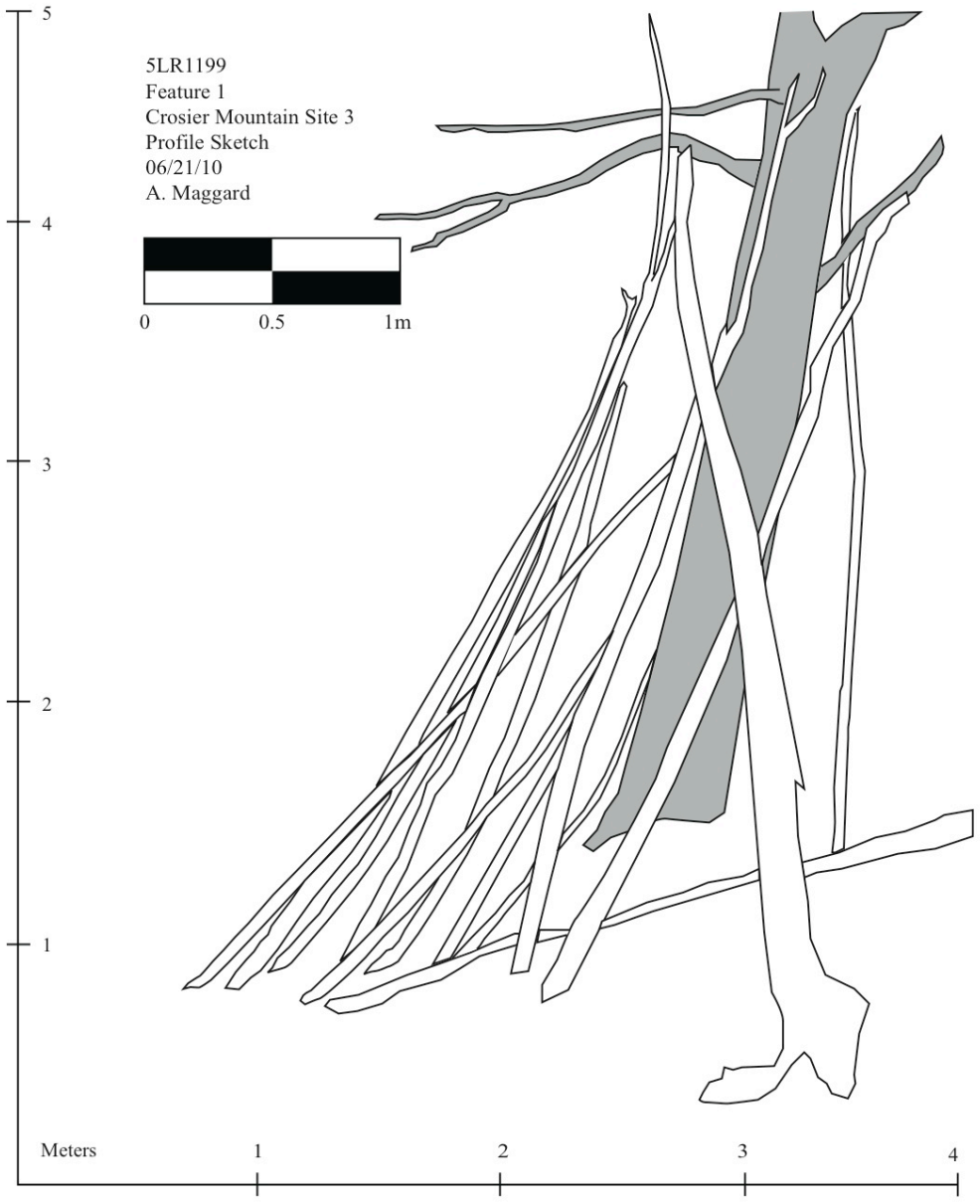


Figure 4.3. 5LR1199 profile diagram

5LR1200

Although a wooden pole structure was located within 100 meters of UTM coordinates for 5LR1200, examination of the wickiup's construction as well as photos from the 1988 record of the site suggest that this structure is not only modern, but supported by a different tree than the original structure. 2009 Forest Service crews led by Marcy Reiser also believed this structure to be modern (Marcy Reiser, personal communication, March 1, 2011). The background of photos taken in 1988 indicate only one mature Ponderosa pine, while the structure found in 2010 is supported by a mature Ponderosa pine with several mature trees less than 5 meters away, which would have been evident in the 1988 photograph if the structure's location were the same.

Figure 4.4. Overview of modern structure near 5LR1200 coordinates facing north. Taken by Annie Maggard on 6/21/10.

The height of the structure—well below two meters—as well as the limited pole decay and the haphazard arrangement of vertical and horizontal supports, which are illustrated in the photo below, suggest that the structure bears greater resemblance to a modern hunting structure or "copycat" wickiup than an aboriginal wickiup.

Figure 4.5. Detail view of modern structure facing east. Taken by Annie Maggard on 6/21/10.

In summary, only one of the 18 structures recorded in 1988 was relocated, and even this could not be identified as one of those originally documented with any certainty. It is possible that fire, whether natural or cultural, may to be to blame for the destruction of the Crosier Mountain wickiup sites. USFS personnel confirmed that there have been several small wildfires in the vicinity since 1988, as well as a "fairly large" prescribed burn in 1998 (Marcy Reiser, personal communication, May 19, 2011). It seems that a large prescribed fire in the immediate area of the previously recorded structures within the last fifteen years would leave a more markedly scarred landscape than was

encountered in 2010 fieldwork, so other causes such as natural structure deterioration or blow-down should also be investigated.

Big Creek/State Line Case Study

The Big Creek/State Line sites are shown in context below; these are four wickiup sites containing six structures, which were mentioned in various publications and documents over the past century, but were only officially recorded by the author in 2010, and given temporary site number with the prefix BCSL (Big Creek/State Line). One additional site, 48CR4312, is a previously recorded wickiup site in Wyoming just across the border from the BCSL sites that was added to this case study due to its proximity to the unrecorded sites. The purpose of this fieldwork was to locate the four sites as reported by informants, record them according to DARG standards, and determine future research potential for the structures, as well as relocate 48CR4312 and determine its relationship to the BCSL sites.

Location and Environment

Three of the Big Creek/State Line wickiup sites are located northwest of Cowdrey, Colorado in North Park on property owned by the Big Creek/State Line Ranch, and are accessible via CO-125N toward Saratoga, Wyoming. The fourth site is located northeast of Cowdrey adjacent to the North Sand Hills Special Recreation Management Area (SRMA) administered by the Bureau of Land Management on Colorado State Forest land. These wickiups are all situated within the Wyoming Basin shrub steppe ecoregion as defined by Omernik (1987), in the North Platte River drainage. It is the

nearest perennial water source for several of the sites, running downslope of all structures.

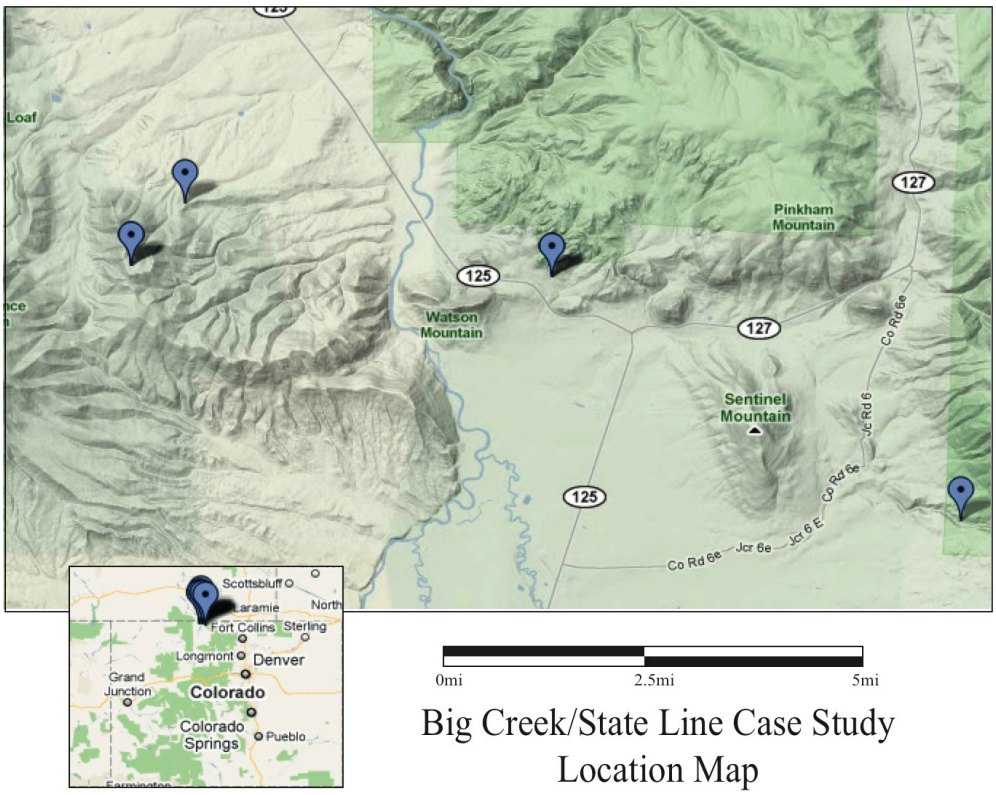


Figure 4.6. Big Creek/State Line Case Study location map

The greater environment of the North Park basin, and of the site's location, is typical of the ecoregion: open, high-elevation, and dominated by sagebrush. It is also surrounded by mountainous ecoregions to the north, south, east, and west; the mountain ranges to the south and west form the Continental Divide.

The only wildlife observed at the sites during fieldwork were pronghorn (*Antilocapra americana*), mule deer (*Odocoileus hemionus)*, and coyote (*Canis latrans*); however, the area is well-known among local hunters for elk (*Cervus canadensis)* and

black bear (*Ursus americanus*) populations. In his ecoregion assessment, Primm notes that "native herbivory is a somewhat distinctive factor in this shrub steppe ecoregion, since most of the ecoregion is in close proximity to extensive mountain ecoregions supporting large herds of migratory ungulates" (2001).

Previous Records and Ethnohistory

The Big Creek/State Line wickiups were brought to the attention of the author and Dr. Jason LaBelle by Dr. Ryan Byerly. Byerly was made aware of these wickiups by local informant Mark Dunning, foreman of the Big Creek Ranch, while working on the nearby Coffin Kill site (5JA7). Although it appeared that no official record of the Big Creek/State Line wickiups existed, the author soon found many references to these structures both in ethnohistorical accounts and academic literature.

The photo in Figure 4.7, provided by Mark Dunning, is dated "Summer 1921." It is believed to be a photograph of a wickiup that was recorded in the 2010 field season as BCSLW4, discussed at length later. This is one of the earliest photographs of wickiups in North Park, and is not found in any other publications known to the author.

An ethnohistorical account of North Park entitled *Where the Rockies Ride Herd* includes the photograph below, which shows two wickiups photographed in 1903; these may or may not be among those recorded in 2010 (Payne 1965). He refers to the structures as "Ute teepees," suggesting in the text that even at the time his account was published their remains may have been destroyed.

Figure 4.7. 1921 photograph of unidentified site at Big Creek, courtesy of Mark Dunning

The wickiups in Figure 4.8 photo, do, however, bear resemblance to structures recorded as BCSLW5 and BCSLW6 during 2010 fieldwork. An undated 8mm film taken by the Coffin family that shows images of wickiups in North Park is also housed at the Fort Collins Museum; the wickiups shown in this film are likely those located on land now owned by the Big Creek/State Line Ranch and recorded in 2010 fieldwork.

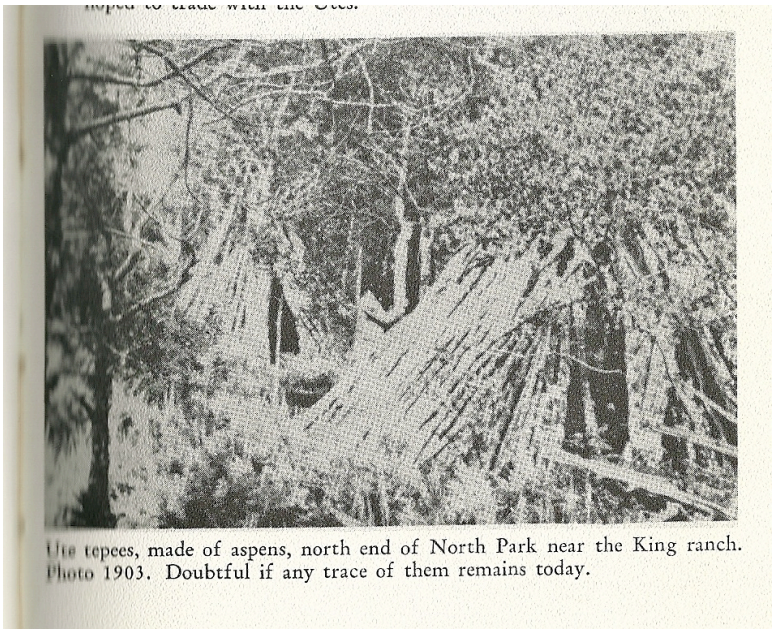

Ute tepees, made of aspens, north end of North Park near the King ranch. Photo 1903. Doubtful if any trace of them remains today.

Figure 4.8. 1903 photograph of unidentified site in North Park taken from Payne (1965)

In a 1972 article published by *Southwest Lore*, C. Ralph Johnson documents the efforts of several members of the Colorado Archaeological Society (CAS), as well as Department of Game, Fish, and Parks officers and the North Park Game and Fish Association to document and protect five "tipis" that they feared were in danger of destruction due to cattle and deer grazing. They were informed of and escorted to these structures by Don Gore of Walden, Colorado. Of the structures Johnson discusses, it appears that A-1, A-2, B-1, C-1, and C-2 refer to wickiups recorded in 2010 as BCSLW5, BCSLW6, BCSLW4, BCSLW1, and BCSLW2, respectively. Johnson suggests that the structures are either hunting outposts or war lodges, and believes they originate either from Ute tribes or from tribes of the Northwest Plains (1972:99). Johnson also found evidence for an interior hearth in one of the structures (A-1, or BCSLW5), and suggested that further investigation and excavation might provide clues as to their function. After

documenting the structures, Johnson's crew erected a permanent barbed-wire fence around the pair to ensure their protection from grazing livestock.

In the same year, Michael Metcalf recorded the structures that Johnson refers to as A-1 and A-2 that are referred to in this thesis as BCSLW5 and BCSLW6, in what would later become the North Sand Hills SRMA. In these site forms and site card, located by Dr. Jason LaBelle at the CSU Laboratory of Public Archaeology, the site is labeled "5JK102," which has been crossed out to read "5JA102" on some portions of the form. This site cannot be found in the OAHP database, as "JK" is not a valid county code in, and "5JA102" is not a wickiup site; it appears that these records may have never made it into state databases. Metcalf discussed the site with the author and shared several photographs taken in the winter of 1971-1972, one of which is provided below.

Figure 4.9. 1971 photograph of 5JK102 (Metcalf)

Sanfilippo's 1998 thesis refers to wickiup site 5JA572 in North Park, which was not returned in the original OAHP file search or included in the inventory discussed in Chapter 3. A Compass search of this site number returns a one-page "Inventory Form of Historic Places" completed by John Sanders of the North Park Ranger District in 1974. It refers to five deteriorating pole teepee structures, fenced to prevent grazing. No photographs or sketches are included in this site record, but the UTM location of the BCSLW5&6 site, which plots within 200 meters of 5JA572 coordinates, suggests that 5JA572 refers to one or both of the wickiups described here. No other records or anecdotal reports indicate five structures at that location, so it is difficult to determine what relationship those structures may have had to the two structures consistently mentioned in other records.

Perhaps one of the most thorough and valuable references to the North Park wickiups is provided by North Park native Hazel Gresham in her 1975 history entitled *North Park.* Although sources of her information regarding the origin and history of the wickiups are not identified, the ethnohistorical account echoes many previous authors' assertions regarding the wickiups' age, cultural affiliation, and use. The photo below appears to be of the structure labeled BCSLW1 in 2010 fieldwork. The excerpt following it describes family oral histories involving the Ute occupants of the wickiups, and how they may have come to be located in North Park.

A Tee Pee on the Kuster Place

Figure 4.10. Photograph of North Park wickiup taken from Gresham (1975)

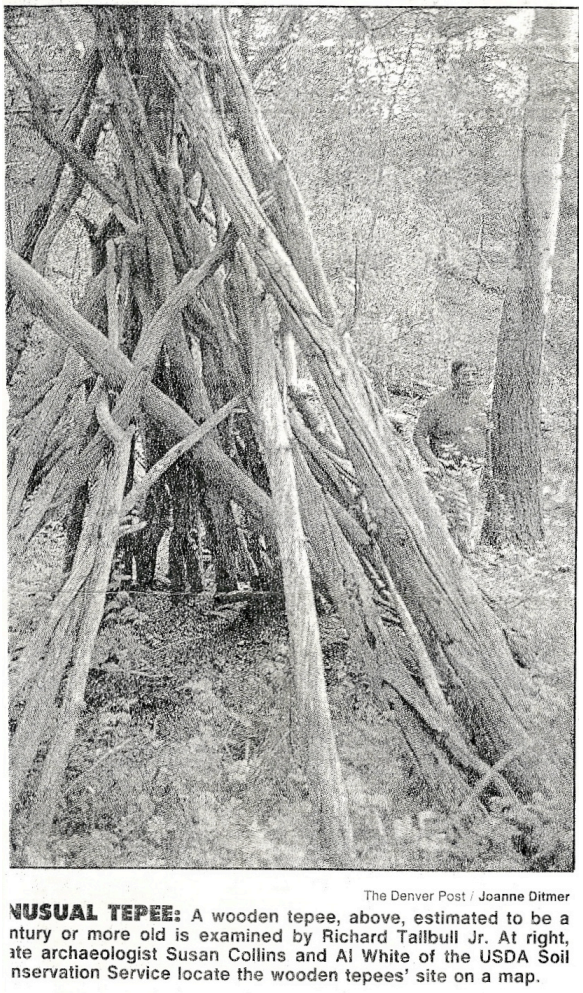
"As I said earlier, the Indian was probably the first man to inhabit North Park. It is believed there were various tribes—Crows, Sioux, Cheyennes, Arapahoes and Utes, but mainly the last two. It is not known exactly when they first came, but according to authorities on Indians, it was probably within the last one hundred and twenty-five years. They frequented it only in the summer time, mostly for hunting purposes. (Some folks say the Indians were smarter than the Whites for they knew enough to leave before the long, severe winters came.)

There is evidence that these roving hunters made camps and trails all over the Park. There are two tee-pees still standing on the Corrie Kuster place in the Three Mile area

> *and one on the State Line Ranch, formerly owned by Harry Hunter. There were two tee-pees on the Payne Ranch in early days but probably no visible signs of them now. There is still evidence of tee-pees in the South End on the Fuller Ranch. There are rings, made of rock on the Brands Ranch, also some on Independence Mountain above the old Fischer place.*
>
> *Arrow heads have been found in all areas. The sand hills have been favorite hunting spots for many folks. A place of particular interest is the site of a Communal Hunt where the buffalo were stampeded into an impolement of posts. This site is on the old Frank McCasland place (now owned by the Gates Rubber Co.) near the Platte River. There is a record of more than 3500 points screened from this spot (some of the arrow heads are on display at the Fort Collins Museum).*
>
> *Not too far from this site of the Communal Hunt, a burial tree stands. There is another burial tree near Pinkhampton. A few burial grounds have been located in North Park, too. A few pieces of Indian pottery have been found, also beads and a few other articles of Indian origin.*
>
> *North Park was the scene of at least one bad Indian Massacre, which took place on Independence Mountain. From news items found in the Laramie Daily Sentinel the date of this massacre is placed as July 4 1870" (Gresham 1975:11-12).*

The next reference to these wickiups appears in an article in the *Denver Post* from August,1989, which details a visit to several wickiups in North Park by state archaeologists and tribal members. The photograph below, taken from the article,

appears to show the wickiup recorded in 2010 as BCSLW4, which collapsed in 2009, just a year preceding its formal documentation.



The Denver Post / Joanne Ditmer

NUSUAL TEPEE: A wooden tepee, above, estimated to be a ntury or more old is examined by Richard Tailbull Jr. At right, ate archaeologist Susan Collins and Al White of the USDA Soil nservation Service locate the wooden tepees' site on a map.

Figure 4.11. Photograph of North Park wickiup taken from Denver Post article (Ditmer 1989)

Sanfilippo makes mention of several potential North Park wickiups that may not be included in her Colorado wickiup database (1998:318); her data refers to three sets of potential wickiups. One of these references comes from a Denver Public Library photo, which is also included in DARG's third volume (Martin et al. 2006) and shown below. This photo appears to be of wickiups BCSLW5 and BCSLW6, which were previously recorded by Johnson (1972) and Metcalf (1972)..

Plate A.
Ute shelters in North Park, Colorado, ca. AD 1880 - 1910. The large number of poles used in these structures possibly provided self-covering shelter. From Western History/Genealogy Dept., Denver Public Library.

Figure 4.12. Photograph of North Park wickiups from Denver Public Library Collections (Martin et al. 2006)

Given the history of anecdotal accounts and various academic mentions of wickiups in North Park, the goal of 2010 fieldwork was to account for and relocate all previously identified sites, record these sites to DARG field standards, and determine how these sites compare to past descriptions. The table below compares structure numbers assigned in 2010 to sites and structures identified in previous site records, to the best knowledge of this author.

Maggard 2010	Johnson 1972	Metcalf 1972	OAHP
BCSLW1	C-2	--	--
BCSLW2	C-2	--	--
BCSLW3	--	--	--
BCSLW4	B-1	--	--
BCSLW5	A-1	5JK102/5JA102	5JA572
BCSLW6	A-2	5JK102/5JA102	5JA572

Table 4.1. Site/structure number comparison

2010 fieldwork was carried out on July 21st and 22nd, August 29th and 30th, September 12th and 13th, and October 10th of 2010. Local informant Mark Dunning escorted the author to all sites, and provided invaluable knowledge of ethnohistorical accounts and site history. The descriptions below summarize site characteristics and measurements of structures as recorded in 2010.

BCSLW1&2 – Road 49311 Site

BCSLW1 is the larger of the two structures at this site, and is a self-supporting or freestanding conical arrangement of 189 aspen poles, 188 of which are standing. Although the majority of poles are simply leaned against one another at the top of the structure, a forked pole in the center-right of the interior of the structure (as viewed from the entrance) supports several of the innermost poles. The top end of this pole is sawed, which suggests that it may be a later addition to the structure; however, Johnson (1969) notes the forked pole, so it has been a part of the structure since at least the 1960's. Pole length ranges from 1.1 to 5.2 meters, while mid-pole diameter ranges from 3 to 12 centimeters.

It is not possible to determine the end treatments of the majority of the poles, as they are deeply embedded in duff; however, no evidence for sawn or cut ends exists (aside from the sawn forked pole). The entrance of the structure is formed by a simple, upside-down V-shaped gap in poles. No floor treatment could be determined; however, no trowel testing or subsurface testing was carried out at this structure in order to preserve the integrity of floor treatments or thermal features, should they exist. The interior of the wickiup reaches 2.9 meters, allowing standing headroom for at least one person of average height, as well as sitting room for several people. The interior surface area of the structure is 7.5 square meters.

This wickiup appears to exhibit incredible structural integrity; the poles are solidly embedded, and, though deterioriating (as evidenced by cracking along the grain, as well as lengthwise grain separation), do not seem to be sagging or in danger of collapse. Many standing dead aspens around the structure, do, however pose a threat, should they fall. Downed trees have fallen across the barbed wire enclosure in several places.

Figure 4.13. Overview of BCSLW1 facing southwest. Taken by Annie Maggard on 7/22/10.

Figure 4.14. Detail of sawn support pole at BCSLW1, oblique view. Taken by Annie Maggard on 6/22/10.

Figure 4.15. BCSLW1 profile diagram

BCSLW2 is the smaller of the two structures, and is a self-supporting or freestanding conical arrangement of 94 poles, none of which are completely collapsed. Like BCSLW1, this structure contains an interior forked support pole with a sawn end that supports many of the outer poles. It should also be noted that there several large, sawn aspen logs scattered on the ground outside the barbed wire enclosure near Wickiup 2 – these logs are greater in diameter than any of the poles making up the wickiup, which suggests that they may have been cut well after the wickiups were constructed .

It is not possible to determine the end treatments of the majority of the poles, as they are deeply embedded in duff; however, no evidence for sawn or cut ends exists (aside from the sawn forked pole). Pole length ranges from 1.3 to 4.3 meters and mid-pole diameter ranges from 4 to 12 centimeters.

The entrance of the structure is formed by a simple, upside-down V-shaped gap in poles. No floor treatment could be determined; however, no trowel testing or subsurface testing was carried out in this structure in order to preserve the integrity of floor treatments or thermal features, should they exist. The interior of the structure is much smaller than BCSLW1, with a headroom of 1.9 meters and an interior surface area of 5.7 square meters; this difference may be due to the greater deterioration of BCSLW2. W2 also leans at a much greater angle than W1, exhibiting a significant eastward sag, as well as greater (non-entrance) gaps between outer structural poles. It is possible that the lean is caused by collapsed poles, or by sagging of individual poles. It should be noted that Johnson's 1969 documentation cited 132 poles in this wickiup, while this study found only 94. It is possible that poles have been removed in the interim and have affected the stability of the structure. Although collapsed poles are not evident in the immediate

vicinity of the wickiup, it is possible that poles were removed and transported. BCSLW2 is also in danger of destruction from the dead aspen surrounding it.

Figure 4.16. BCSLW2 overview facing west. Taken by Annie Maggard on 6/22/10.

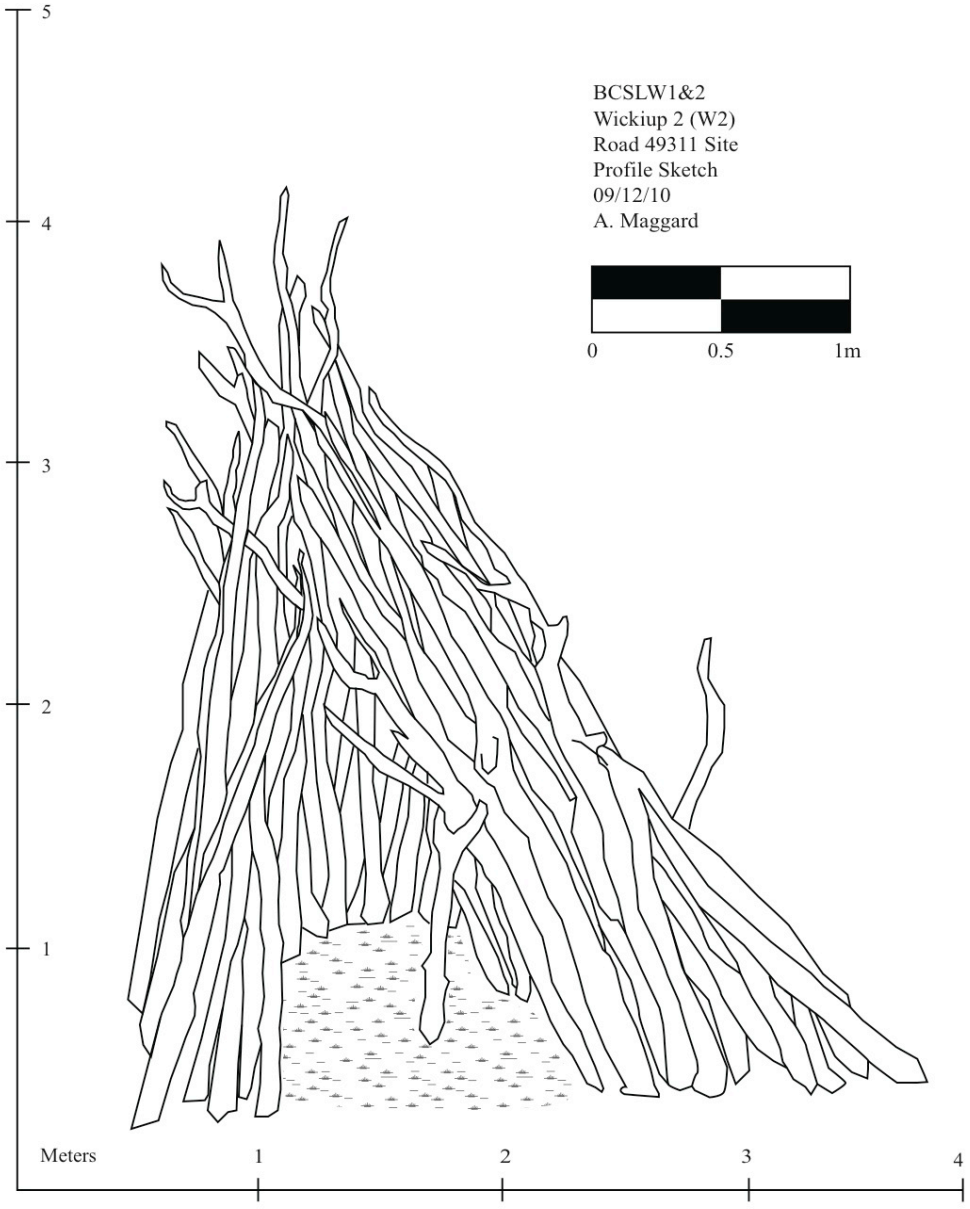


Figure 4.17. BCSLW2 profile diagram

Figure 4.18. BCSLW21&2 site sketch/location map

BCSLW3 – Ridgetop Site

The Ridgetop Site consists of one conical structure comprised of 42 aspen poles, all of which are supported by a dead but standing Ponderosa pine tree. No fallen poles appear in the immediate vicinity of the structure. Pole lengths range from 1.5 to 5 meters, while mid-pole diameters range from 3 to 10 centimeters. Nearly all structural poles are supported by a single westward-oriented limb, which was 8 centimeters in diameter and 2.9 meters above the base of the support tree. The diameter of the support tree is 86 centimeters; its height is estimated between 8 and 9 meters. Due to slope at the base of the support tree and distance of structural pole ends from the base of the support tree, most upper structural pole ends contact the support tree between 2.8 and 3.6 meters from the base. The interior of the wickiup is delineated only by pole extent, and is roughly circular, with a north-south diameter of 3.2 meter and an east-west diameter of 3.3 meters with a headroom height of 2.9 meters. No surface treatment or modification of the interior is evident. There is also no evidence for outer covering of the structural poles. Poles exhibited deterioration in the form of lengthwise wood grain separation, cracking across the grain, and lichen growth. However, the structure is well preserved in general. One of the greatest threats to this structure's integrity is the dead Ponderosa pine supporting the structural poles, as the wickiup would be destroyed if this dead tree were to fall.

Figure 4.19. BCSLW3 overview facing southwest. Taken by Annie Maggard on 8/30/10.

Figure 4.20. BCSLW3 detail illustrating lean-to construction style facing east. Taken by Annie Maggard on 8/30/10.

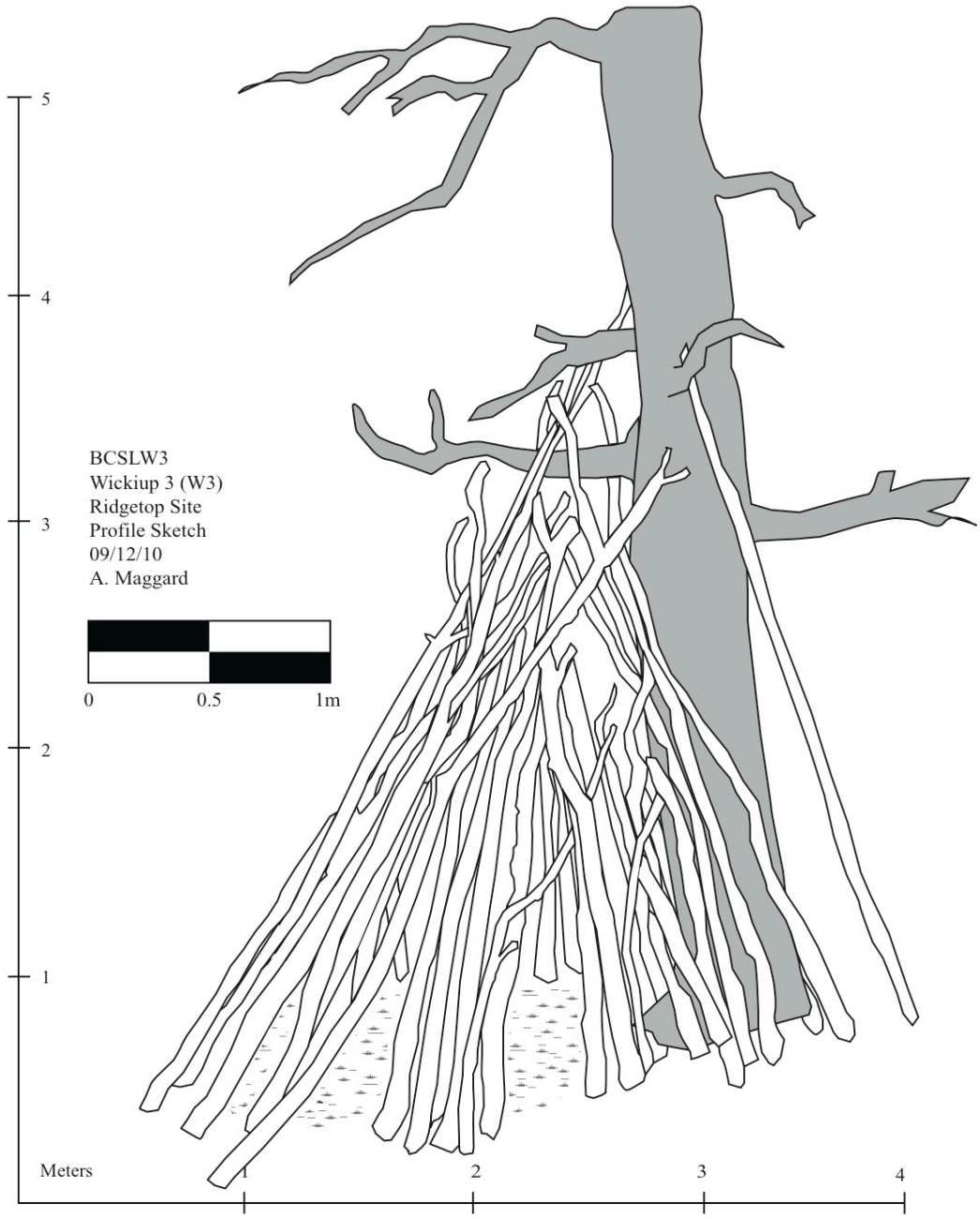


Figure 4.21. BCSLW3 profile diagram

Although no artifacts were observed within 100 meters of the structure, the informant pointed out an "eagle trap" located upslope of the wickiup. This feature consists of large stones piled in a semi-circular fashion. According to the informant, children would hide in such blinds with bait in order to catch eagles. In his *Rocky Mountain National Park: A History,* Buchholz describes just such an activity, explaining:

> *"It was common for Indians to seek high country locations, conceal themselves in a brush covered pit, and lure eagles toward a hunk of meat placed as bait upon the brush. Ethnologist Alfred Kroeber explained: 'Only certain men could hunt the eagle. For four days they abstained from food and water. They put medicine on their hands. In four days they might get fifty or a hundred eagles.'…mountains or high country ridges might well have been used for snaring eagles, creatures considered so valuable because of their decorative feathers." (Buchholz 1983)*

This site type was described comprehensively by Allen as observed among the Hidatsa along the Missouri River in North Dakota (1983). The tradition of eagle trapping had been mentioned by explorers as early as Lewis and Clark (1983:4) and the site pattern Allen uncovered revolves around the sacred activity. The similarity of North Park structures to both the conical timbered lodges and eagle traps described and photographed by Allen, as well as their pattern on the landscape, is striking. Photographs of timbered lodge and eagle trap examples included in Allen (1983) are included below, followed by a photograph of the feature located near BCSLW3, as well as a drawing of an eagle trap from Buchholz (1983). If these North Park structures are in fact representative of the same eagle trapping tradition, interesting inferences may be made concerning the

communication and relationships of Native American groups in North Park with cultural groups much farther east on the Plains.

Figure 4.22. Example of Hidatsa lodge located in North Dakota (Allen 1983)

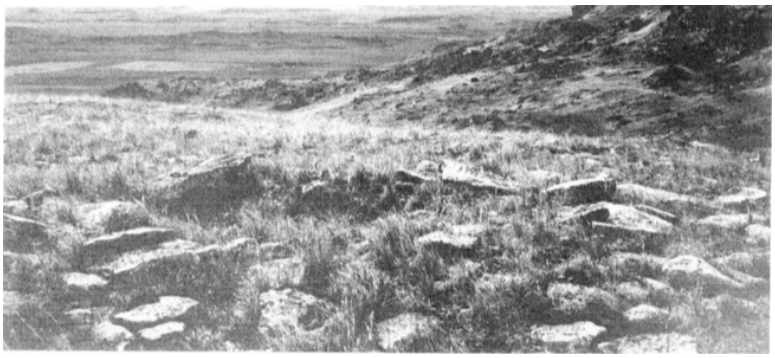


Figure 4.23. Example of Hidatsa eagle trap structure located in North Dakota (Allen 1983)

Figure 4.24. Stone feature/possible eagle trap located near BCSLW3 facing south. Taken by Annie Maggard on 7/21/10.

Figure 4.25. Ethnohistoric eagle trap illustration taken from Buchholz (1983)

Although the structures of BSCLW3 bear strong resemblance to those described by Allen (1983), the stone structure may also be a potential vision quest site as referred to in the 1989 Denver Post article, which mentions “on a jutting promontory, a ring of stones tentatively identified as a Vision Quest site, where an individual would go to meditate and receive divine guidance.” Whether the structures at BCSLW3 are related to vision quests, eagle trapping, or some other ritual activity is yet to be determined, but research potential for this group of structures is certainly great.

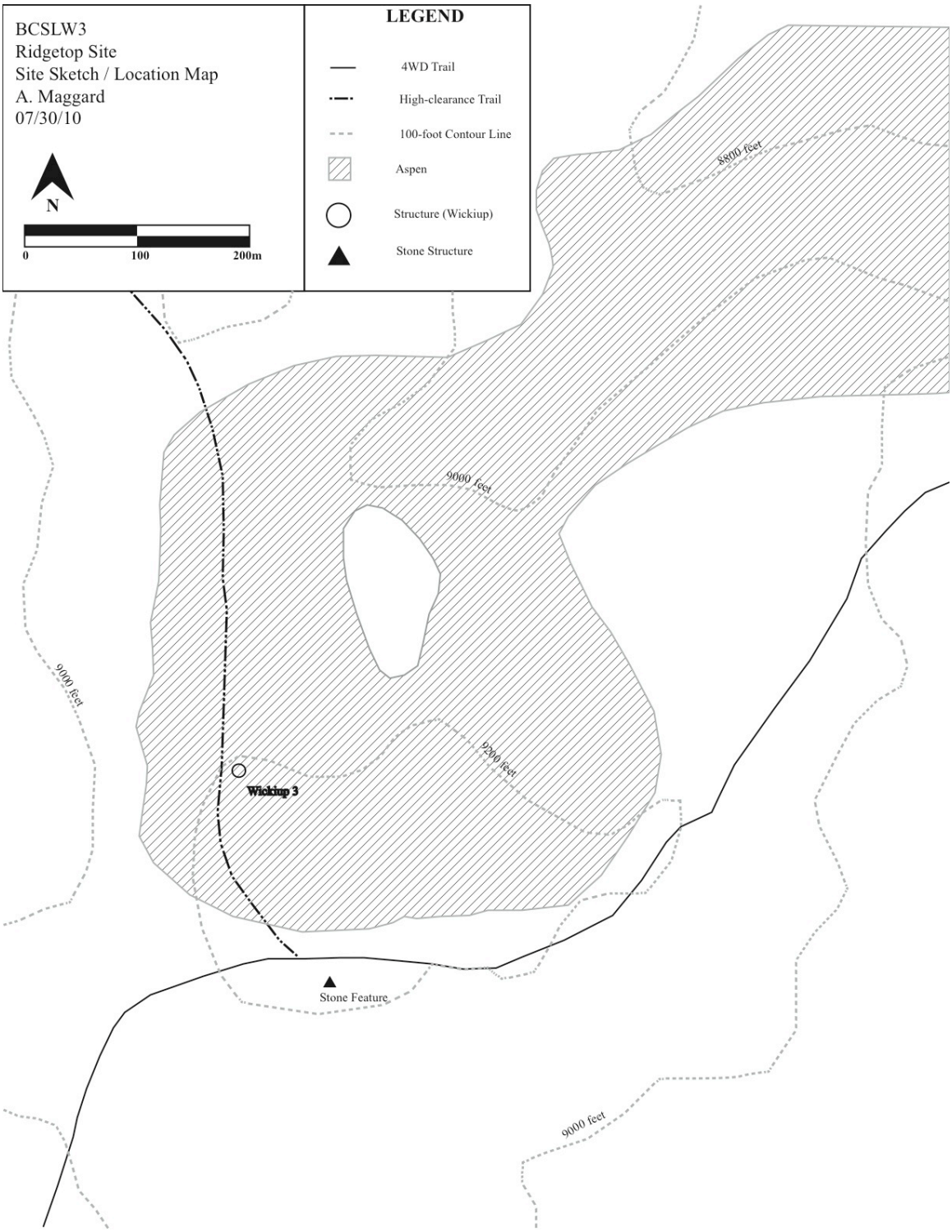


Figure 4.26. BCSLW3 site sketch/location map

BCSLW4 – Aspen Draw Site

Photos of this wickiup were taken by the landowner less than a year prior to the fieldwork dates completed for this thesis. When the author revisited the site in July, 2010, a large dead aspen had fallen on the wickiup and caused it to collapse. The following photograph of the standing structure were provided by Mark Dunning.

Figure 4.27. Photograph of standing structure taken by informant (later recorded as BCSLW4)

Some characteristics of the wickiup have been inferred from these photographs; however, most documentation and all measurements presented here are based on the collapsed wickiup, as this was the condition of the structure when fieldwork was undertaken in 2010.

Photographs taken before the wickiup's collapse indicate that it was free-standing and did not require a support tree in its construction. The collapsed remains of the

wickiup recorded in 2010 consisted of 32 aspen poles ranging in diameter from 5 to 16 centimeters and ranging in length from 1.9 to 5.7 meters. These poles showed several signs of aging and deterioration, including crumbling, lengthwise wood grain separation, separation across the wood grain, moss and lichen growth, and advanced decomposition. The most advanced decomposition was exhibited by poles that were closest to the ground following collapse, suggesting that the collapse of the structure likely accelerated the poles' deterioration.

Figure 4.28. Overview of BCSLW4 collapsed remains facing east. Taken by Annie Maggard on 7/21/10.

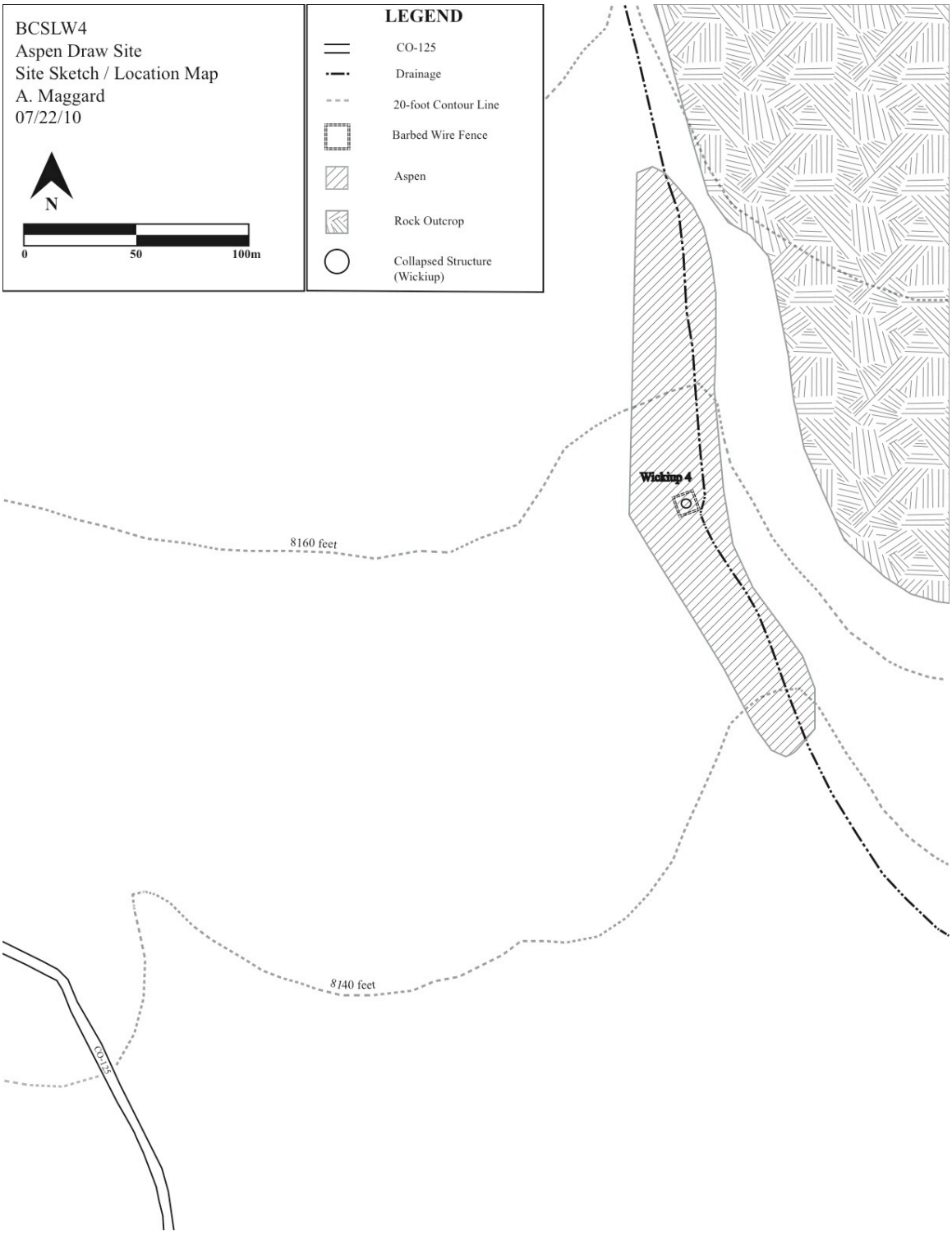


Figure 4.29. BCSLW4 site sketch/location map

BCLSW5&6 – Sand Dunes Site

The Sand Dunes Site consists of two partially-collapsed freestanding conical structures in a small grove of aspen and juniper. Wickiup 5 is comprised of 107 aspen poles, 20 of which are on the ground and 87 of which remain leaning against other structural poles. Pole length ranges from 1.0 to 5.5 meters, while pole diameter ranges from 5 to 12 centimeters. Although the structure is collapsed, an "interior" of the wickiup is still apparent, although the floor plan cannot be determined; Metcalf (1972) described it as circular. No surface treatment or modification of the interior is evident. An entrance to the wickiup is not discernible due to the structure's collapse, but Metcalf's report indicated a "space between poles" (1972). There is no evidence for outer covering of the structural poles. Poles exhibited deterioration in the form of lengthwise wood grain separation, cracking across the grain, and lichen growth.

Figure 4.30. BCSLW5 overview facing south. Taken by Annie Maggard on 9/13/10.

Figure 4.30. BCSLW5 overview facing southwest. Taken by Annie Maggard on 9/13/10.

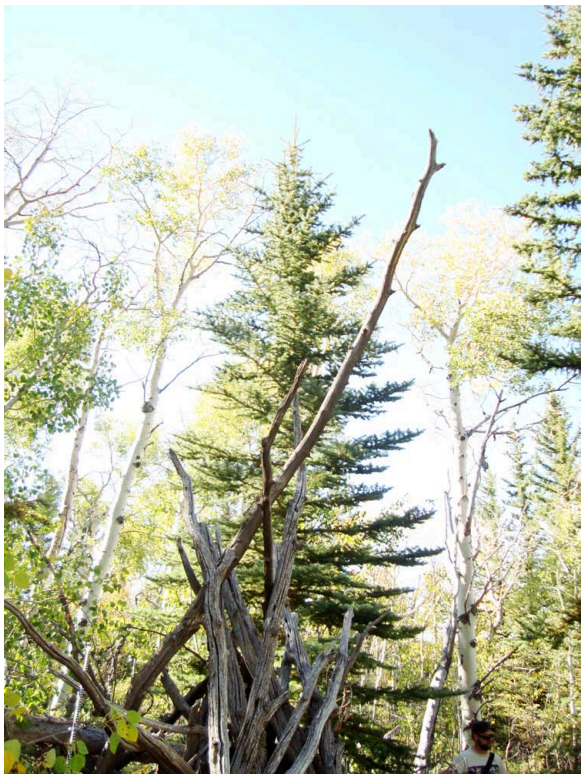


Figure 4.31. BCSLW5 detail showing long “hanger” pole facing south. Taken by Annie Maggard on 9/13/10.

Wickiup 6, located approximately five meters northwest of Wickiup 5, is comprised of 107 aspen poles, 15 of which are on the ground and 92 of which remain leaning against other structural poles. Pole length ranges from 1.0 to 5.3 meters, while pole diameter ranges from 4 to 12 centimeters. Although the structure is collapsed, an "interior" of the wickiup is still apparent, although the floor plan cannot be determined; Metcalf (1972) described it as circular. No surface treatment or modification of the interior is evident. An entrance to the wickiup is not discernible due to the structure's collapse, but Metcalf's report indicated a "space between poles" (1972). There is no evidence for outer covering of the structural poles. Poles exhibited deterioration in the form of lengthwise wood grain separation, cracking across the grain, pole sagging, and lichen growth.

Figure 4.32. BCSLW6 overview facing southeast. Taken by Annie Maggard on 9/13/10.

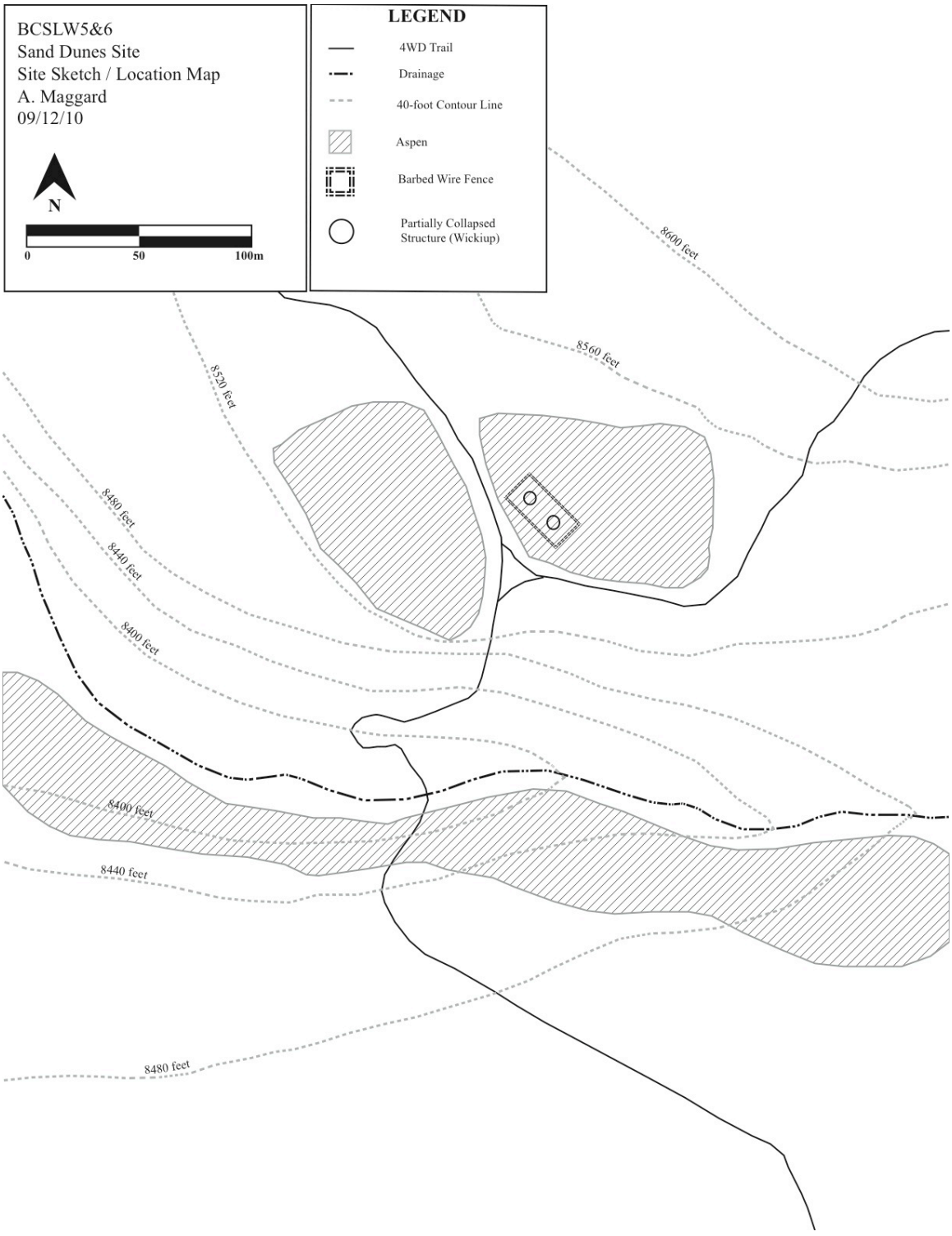


Figure 4.33. BCSLW5&6 site sketch/location map

48CR4312 – Elkhorn Creek Site

The Elkhorn Creek Site, previously recorded in 1985 by the USFS as the Elkhorn Indian Lodge Site (48CR4312), is located just across the Colorado-Wyoming border in the Medicine Bow National Forest. Because of its proximity to the wickiup sites listed above, it has been included as this case study as both a comparison to the Big Creek/State Line structures and an investigation of wickiup deterioration, as 25 years had passed since its original documentation.

The site consists of one conical structure comprised of 242 aspen poles, 205 of which are supported by a live Douglas fir tree and 37 of which are fallen. Pole length ranges from 2.3 to 5.6 meters, while pole diameter ranges from 4 to 15 centimeters. The diameter of the support tree is 50 centimeters; its height is estimated at 12 meters. An entrance in the shape of an inverted "V" is present, and measures 3.3 meters high by 2.5 meters wide at the ground surface. Distance of structural pole ends from the base of the support tree ranges from 1.4 to 3.6 meters, with poles closest to the support tree on the western half of the structure. Upper structural pole ends contact the support tree 4.2 meters from the base at an approximate angle of 45 degrees. The interior of the wickiup is delineated only by pole extent, and is roughly circular, with a north-south diameter of 4.9 meters and an east-west diameter of 4.4 meters with an approximate floor area of 17.3 square meters and a headroom height of 3.3 meters. No surface treatment or modification of the interior is evident. There is possible evidence for outer covering of the structural poles in the form of smaller poles collapsed into interior poles. Poles exhibit deterioration in the form of lengthwise wood grain separation on some poles, as well as

lichen growth. Thirteen granite slabs inside the structure may be cultural remains, but it is not possible to determine their origin without further investigation.

Although photos of the structure recorded in 2010 and photos from the 1985 site form look similar, the 1985 site form describes the structure as having 144 poles, while a count in 2010 resulted in 242 poles. It is possible that the previous recorder did not consider some shorter poles inside the structure to be structural poles, or possible that the structure has been modified since the 1985 recording.

Figure 4.34. 48CR4312 overview facing northeast. Taken by Annie Maggard on 10/10/10.

Site name	Total Poles	Standing Poles	Collapsed Poles	Construction Type	Min. Pole Length (m)	Max. Pole Length (m)	Min. Pole Diameter (cm)	Max. Pole Diameter (cm)	Entry Dimensions (base width x height)	Entry Aspect	Interior Height (m)	Floor Area (m^2)
5LR1199	16	12	4	Lean-to	2.5	3.0	3	8	N/A	N/A	1.5	1.8
BCSLW1	189	188	1	Freestanding	1.1	5.2	3	12	1.2 x 2.7	NE	2.9	7.5
BCSLW2	94	94	0	Freestanding	1.3	4.3	4	12	1.0 x 1.8	E	1.9	5.7
BCSLW3	42	42	0	Lean-to	1.5	5.0	3	10	N/A	N/A	2.9	8.3
BCSLW4	32	0	32	Freestanding (Collapsed)	1.9	5.7	5	16	N/A	N/A	N/A	N/A
BCSLW5	107	87	20	Freestanding (Partially Collapsed)	1.0	5.5	5	12	N/A	N/A	N/A	N/A
BCSLW6	107	92	15	Freestanding (Partially Collapsed)	1.0	3.5	4	12	N/A	N/A	N/A	N/A
48CR4312	242	205	37	Lean-to	2.3	5.6	4	15	2.5 x 3.3	S	3.3	16.9

Table 4.2: Summary quantitative characteristics and measurements for 2010 fieldwork sites

Discussion

Table 4.2 summarizes site characteristics that allow us to place the structures recorded during 2010 fieldwork into a greater Northern Colorado context. According to available data, the structures recorded by the author appear to share many characteristics with previously recorded Northern Colorado sites. These sites and structures also differ in a few key ways. Perhaps the most obvious of these is in structural pole count; structures recorded in 2010 have on average a much higher number of poles than structures recorded previously in the study area. This apparent dissimilarity, barring functional, cultural, or environmental differences, may be a result of increased documentation, as many previously recorded Northern Colorado structures do not have data concerning pole count. The difference may also be due to the significant degree of structural integrity exhibited by 2010 sites. We may be able to attribute this increased degree of preservation to the fact that the are located on privately-held land and have been consistently protected from many of the natural and cultural agents that threaten wickiups.

It is fairly obvious, as can be seen from field photos alone, that the wickiups recorded in North Park in 2010 represent a different type of habitation structure than those that have been encountered on the Western Slope of Colorado. The key question, then, is whether these differences are simply a manifestation of variability in wickiup construction by the same groups of people, whether they reflect the utilization of available local resources, or whether the structures were in fact built by distinct cultural groups and have only been referred to in aggregate because an accurate taxonomy of wooden structures has not yet been created.

One of the most important lessons to be taken from 2010 fieldwork is the urgency with which archaeologists should be investigating wickiups in Northern Colorado; the recent collapse of the BCSLW4 and the complete deterioration and/or destruction of at least 17 NRHP-eligible wickiups at Crosier Mountain is something that cannot be taken lightly. The loss of these resources demonstrates the pressing need to make the location of unknown sites a management priority, as well as to thoroughly inventory known sites to ensure that they are monitored and protected, preventing further obliteration of these rapidly perishing cultural remains.

CHAPTER FIVE

GIS ANALYSIS AND PREDICTIVE MAPPING

In order to most accurately analyze wickiup location in relation to environmental setting, a Geographic Information System (GIS) was developed which contains information regarding both the structures' location and characteristics, as well as environmental data for the landscapes on which they are located. Performing data analysis in ArcGIS to compare environmental variables lowers the incidence of variation based on human error in recording, and also allows for greater sophistication in investigation and statistical processing of quantitative data. Environmental variables specifically investigated include elevation, distance to water, and distance to forest edges. These variables were chosen based on re-occuring assumptions made about wickiup location in the archaeological literature, as well as observations made during 2010 fieldwork. The GIS analysis involves the quantification of these variables, and subsequent statistical testing to determine their influence on wickiup site location.

Development of the GIS

Dataset

Wickiup sites used in this sample include those from OAHP site forms, new sites recorded in 2010 fieldwork, and a sample of Western Colorado sites verified by DARG's research since 2005, which include sites in Eagle, Delta, Garfield, Mesa, Moffat, and Rio

Blanco counties. Of the 33 OAHP sites, five were removed from the dataset because site forms indicated that their origin was modern Euro-American. Of six 2010 sites, the Elkhorn Creek site was removed because its location across the Wyoming state line would have complicated statistical analyses utilizing Colorado data layers. After these sites were removed, the wickiup dataset for GIS analysis totaled 71 sites – 33 in Northern Colorado and 38 from Western Colorado. Those sites are listed below by source and county.

DARG Sites
5ME469
5RB509
5RB4543
5RB530
5RB568
5RB2929
5RB2930
5RB4027
5RB4331
5RB4338
5RB5611
5RB129
5MF2631
5MF3737
5MF4368
5RB18
5RB53
5RB58
5RB144
5GF3003
5ME6908
5ME14071
5RB266
5RB2624
5RB4799
5ME15794
5ME15907
5ME14258
5ME14259
5ME14260
5ME15282
5ME15283
5ME469
5DT1538
5EA2740
5GF3442
5GF2333
5GF308

OAHP Sites
5BL59
5CC1347
5GA2733
5GA975
5JA1942
5JA651
5LR10229
5LR11792
5LR1197
5LR1198
5LR1200
5LR2115
5LR2180
5LR3857
5LR4460
5LR4499
5LR4503
5LR4509
5LR4512
5LR4513
5LR4531
5LR4548
5LR4570
5LR615
5LR6962
5LR7009
5LR9914
5RT807

Maggard 2010 Sites
BCSLW1&2
BCSLW3
BCSLW4
BCSLW5&6
5LR1199

Data Processing

In order to analyze data consistently across data sources, all wickiup site locations were converted from their native datum into a common datum and projection (WGS 1984 UTM Zone 13). A random point set was then created for comparison of wickiup site distribution and normal distribution of random locations on the landscape. This random set included 10,000 random points generated within the 12-county study area (Western and Northern Colorado). These points, taken together, serve as the "control" group in our analyses of wickiup location; 10,000 samples of elevation, distance from water, and distance from forest edge measurements create a distribution curve against which to compare the same measurements for the 71-point wickiup site sample. The sites in the wickiup sample are shown below, color-coded by source.

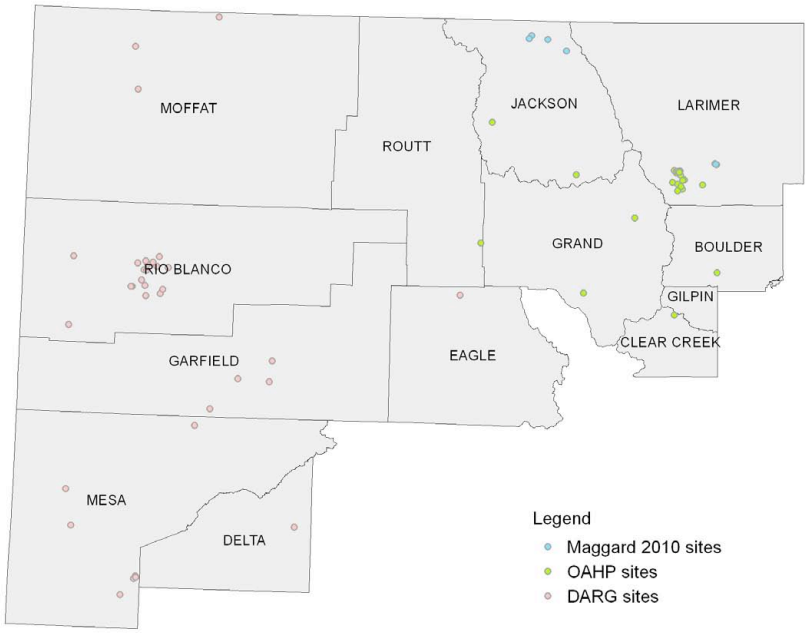


Figure 5.1. Map of wickiup sites used in GIS analysis

Environmental Variables

Elevation

In order to compare elevation of wickiup sites with random point locations, the elevation of each point location on the landscape needed to be assigned to all points in both sets. A 30-meter digital elevation model (DEM) was downloaded from the National Elevation Dataset and mosaicked into an integrated DEM that covered the entire project area, including counties in the Northern Colorado study area and all Western Colorado counties in which DARG sites were located. The DEM was projected into WGS-1984 in order to match the dataset projection, and was clipped to county lines.

The continuous raster DEM provided unique elevation values for every point on the landscape. Using an extract-data-to-point function in ArcGIS Spatial Analyst, all points were assigned elevation values based on the corresponding value of the DEM pixel where each point was located. This data was added to the attribute tables of both the wickiups dataset and the random dataset point layers. The DEM and wickiup dataset points are shown below.

After elevation data was recorded for all points, the raster was reclassified into elevation "bands" for the purpose of statistical analyses. This reclassification converted the raster landscape with unique values for every pixel into a set of elevation bands in 100-meter intervals. These values ranged from 14, which represented pixels in the 1300 to 1400 meter range, to 42, which represented pixels in the 4100 to 4200 meter range. As an example, a wickiup point that was located at 2495 meters in elevation was given the

elevation class 25. As with the raw elevation data, this information was extracted to wickiup points and random points and appended to their attribute tables.

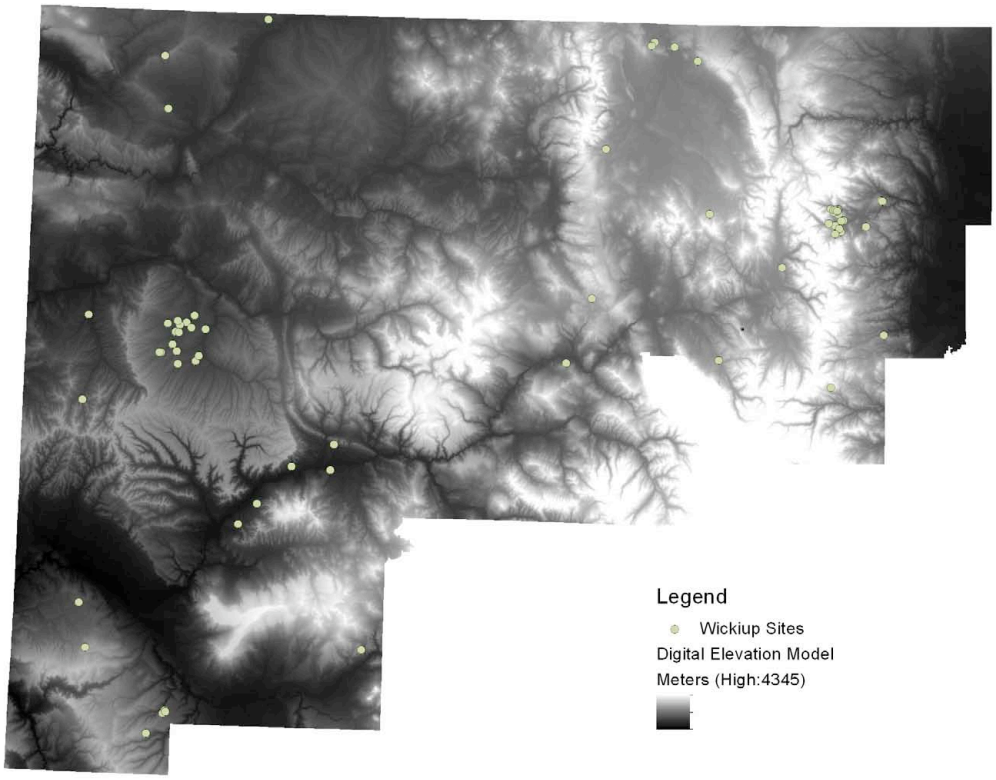


Figure 5.2. Digital Elevation Model with wickiup site location overlay

Distance to Water

Distance to water comparisons were made by comparing metric distances to nearest water sources for wickiup and random point locations. A USGS data layer containing water bodies and a stream/river data layer, both digitized at a 1:24,000 scale, were downloaded, and all man-made water sources, such as canals and reservoirs, were deleted from the data layer. A raster-calculated distance layer was then created which

determined distance from each pixel to the nearest water source, and resulted in metric values, which were also represented graphically by a color ramp, as seen below. As with elevation, distance to water was first extracted to all data points as a raw measurement; this value was appended to attribute tables. Then water distances were classed into 100-meter bands. These values ranged from 1, indicating 0 to 100 meters from water, to 25, indicating 2400 to 2500 meters from water. These distance to water class values were also extracted to wickiup and random dataset points and were appended to their respective attribute tables for statistical analyses.

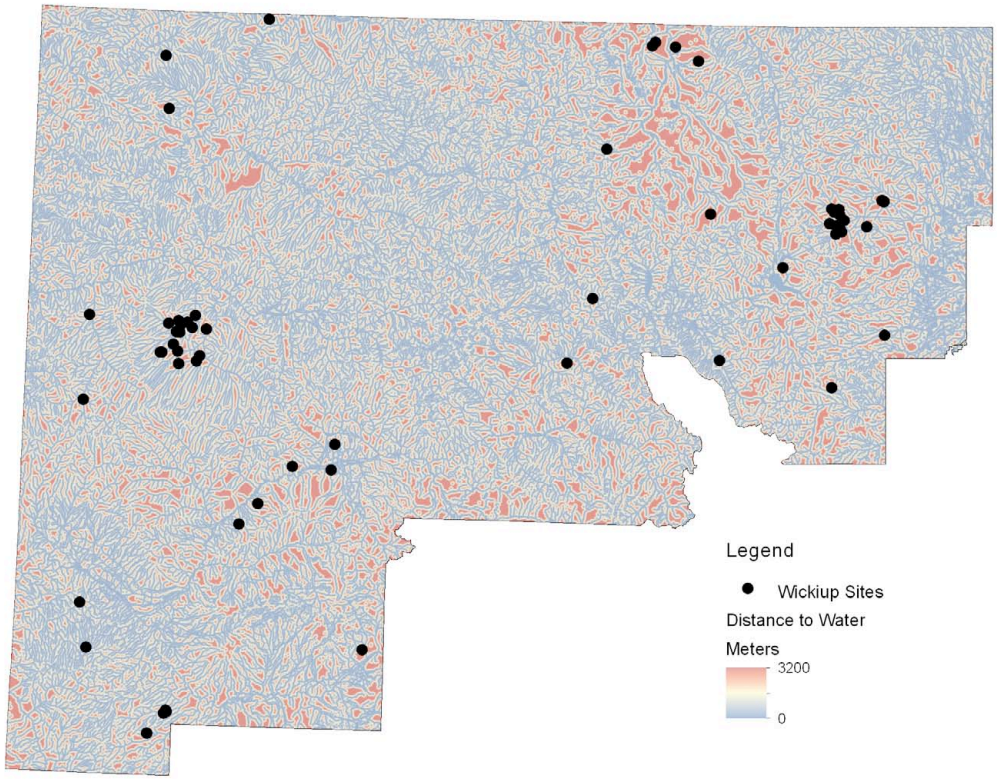


Figure 5.3. Distance-to-water raster with with wickiup site location overlay

Forest Edges

Another variable explored in this GIS analysis is distance from wickiup sites within forests to the outer edges of those forests. The figure below shows forested areas, as well as all wickiup sites. In order to analyze this variable, the wickiup point set and the random point set were first modified to only include points that were located within forests. Then, an outline of forest edge was created using the forest cover dataset, which was derived from CO-GAP Project data.

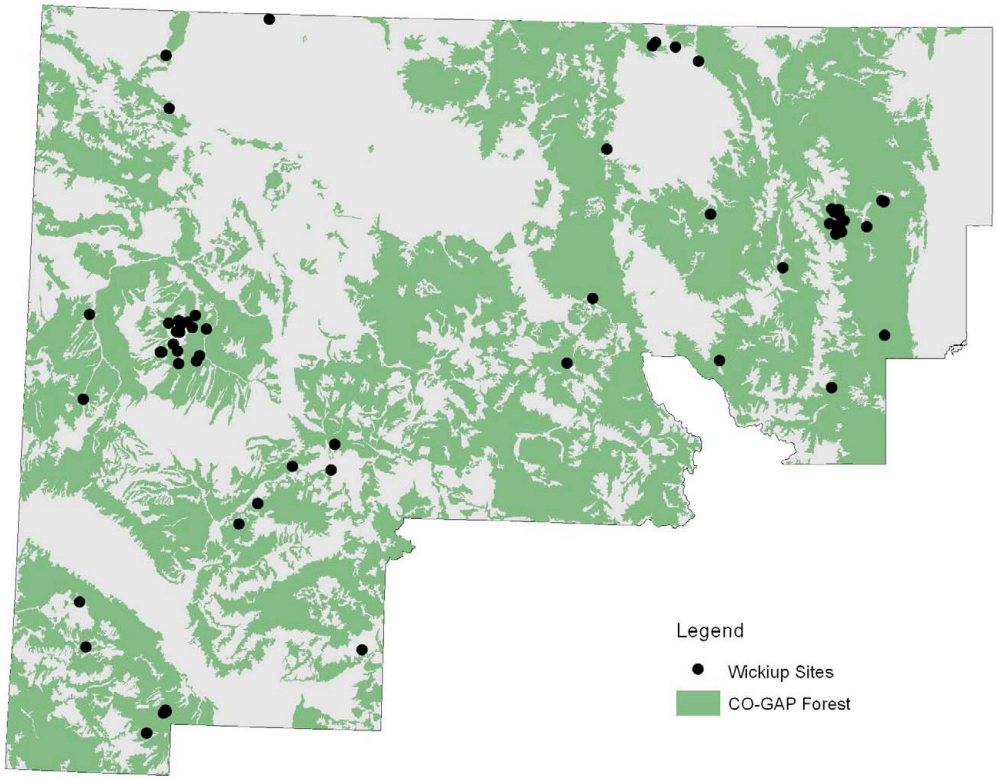


Figure 5.4. Forest cover map with wickiup site location overlay

After the forest outline was created, a distance raster was calculated that measured distance from all in-forest wickiup and random points to the nearest point on the forest outline. That data was extracted to all points. As with other variables, distance to forest edge was also reclassified into 100-meter bands for the purpose of statistical analyses. The results of the distance to forest edge raster calculation are shown below.

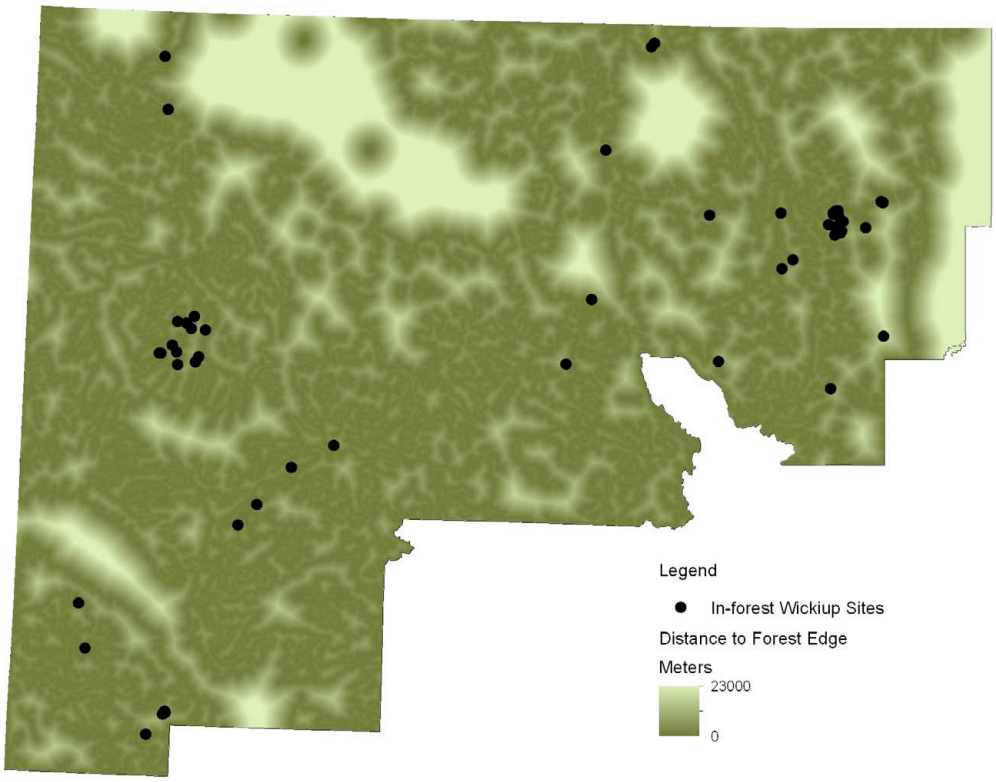


Figure 5.5. Distance-to-forest raster with in-forest wickiup site location overlay

Other Variables

Several other environmental variables may be related to wickiup location but were ultimately not used in statistical analyses; one of the most of interesting of those related to game ranges. This analysis was pursued due to the suggestion of some that wickiups represent hunting lodges; this can perhaps be tested by determining whether wickiup site location is correlated in any way with the population of game, as well as their seasonal migratory pathways. Although some modern game range data is available, several confounding factors were identified that may have significantly skewed a statistical investigation of the game ranges as they relate to wickiup location. This data, downloaded from the Colorado Division of Wildlife, refers to modern patterns; while some factors influencing these ranges are undoubtedly similar to those in play in Protohistoric times, others are certainly affected by modern phenomena; the constriction of game ranges around Estes Park in response to human presence and changing food resources is one example. However, the data layers are shown below for reference. In both figures the blue areas represent mule deer ranges and the yellow areas indicate elk ranges, while the green areas indicate overlap in the ranges of the two species. It does seem that wickiup sites may relate to game, especially where boundaries between summer and winter ranges occur—further investigation is certainly warranted.

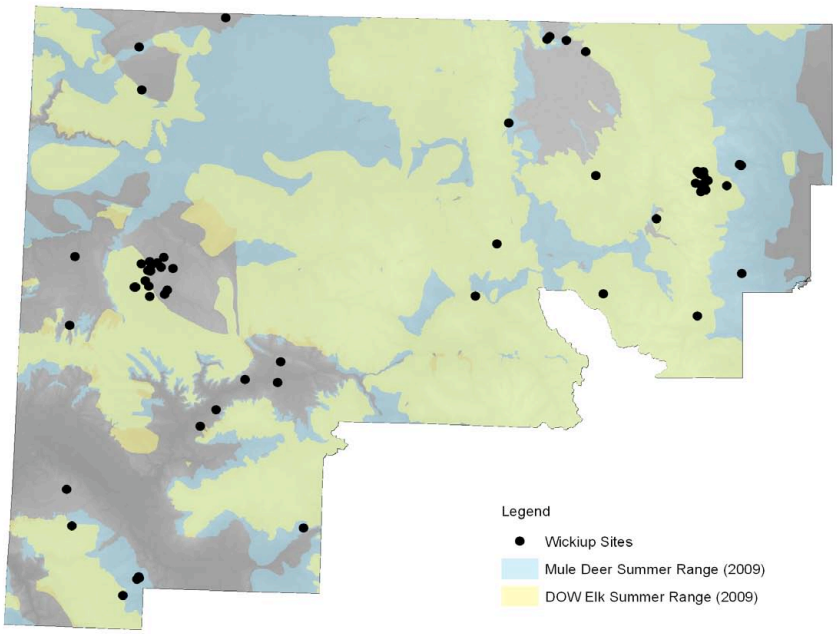


Figure 5.6. DOW summer elk and mule deer ranges with wickiup site location overlay

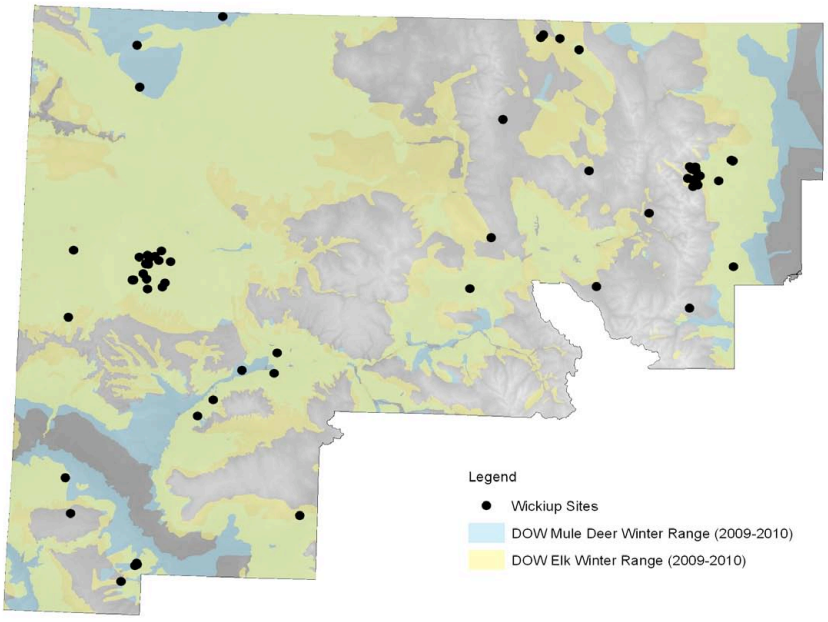


Figure 5.7. DOW winter elk and mule deer ranges with wickiup site location overlay

Statistical Analysis

Statistical testing of wickiup location as compared to random distribution of sites was necessary to determine whether significant differences existed between incidence of sites in relation to each of the variables listed above. This was accomplished using the non-parametric two-sample Kolmogorov-Smirnov test, as well as a parametric Chi-squared test of proportions. Both of these tests, as well as the results that can be gleaned from them, are further discussed below in reference to each variable.

Elevation

A two-sample Kolmogorov-Smirnov test was performed on the distribution of elevation classes among the wickiup points and random points using the *R* statistical package; results indicate a significant difference between the elevation of wickiup locations as opposed to random locations on the landscape.

Figure 5.8 shows another comparison of the distributions based on 1000-point subset of the Kolmogorov-Smirnov test results; here, random sites are represented by the dotted line, while wickiup sites are represented by the solid line. The normal distribution curve created by the random point dataset is clearly offset by the wickiup points' curve, which has peaks at approximately 2100 and 2700 meters; these results will be further refined using a two-sample tests of proportions.

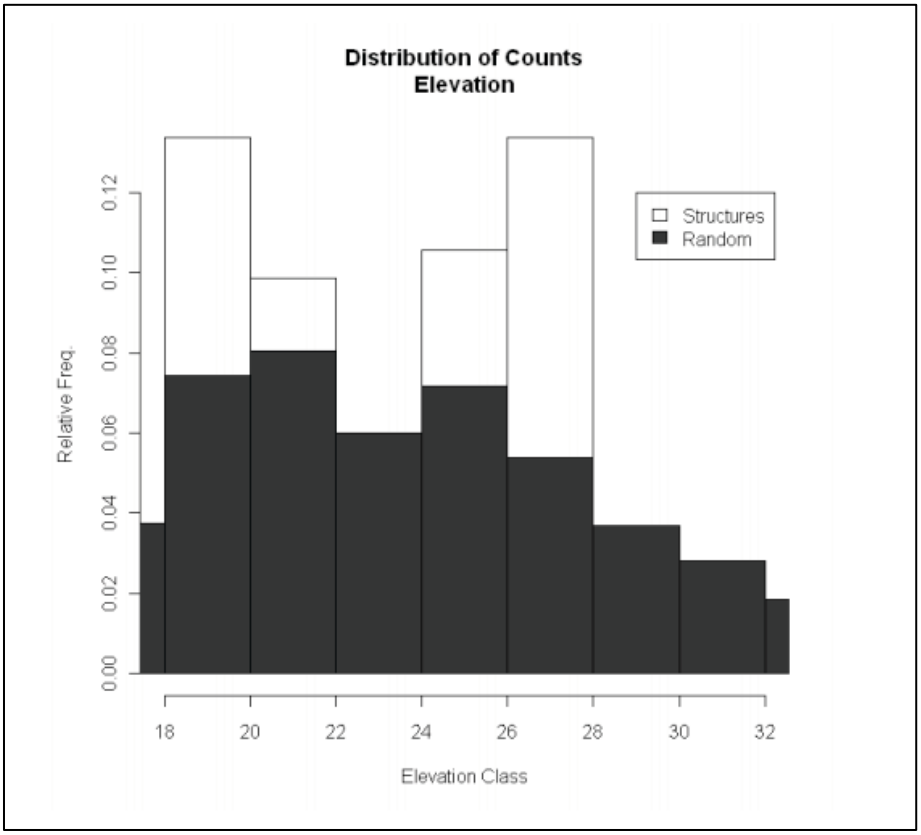


Figure 5.8. Chart illustrating results of two-sample K-S test on elevation data

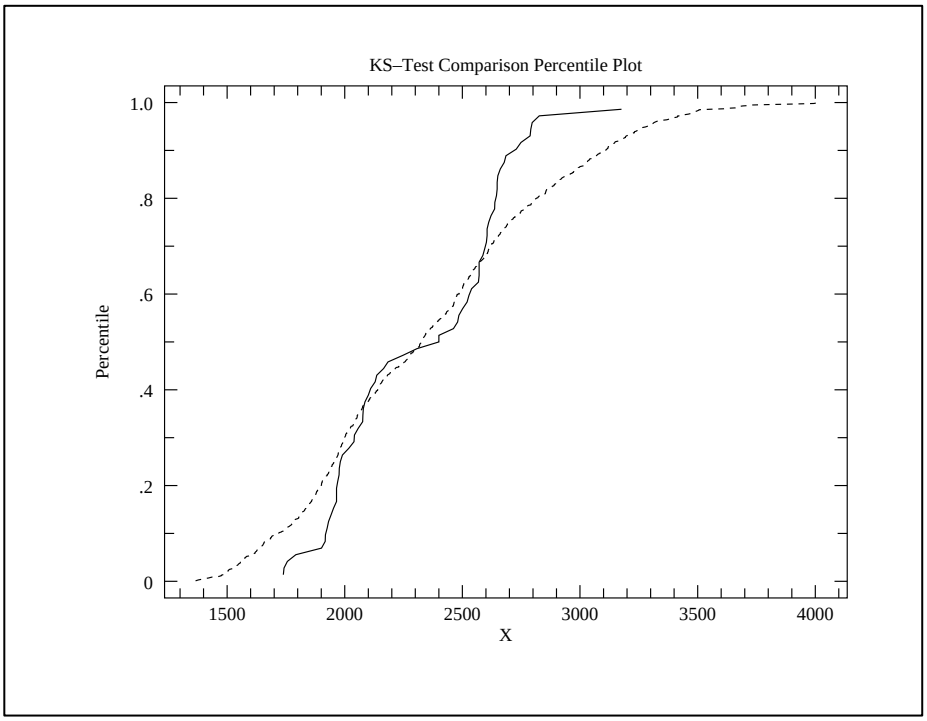


Figure 5.9. Plot illustrating results of two-group z-test of proportions on elevation data

A two-sample z-test of proportions was calculated for each elevation class sampled (Dimension Research 2005); this showed specifically for which elevation bands the data between the two distributions (random elevations and wickiup elevations) differed significantly. The results of that test are shown in Table 5.1.

Elevation Range (m)	Random Location %	Wickiup Location %	Test Statistic	Significant at $\alpha = 0.05$?
1401 – 1500	2	0	0.777	N
1501 – 1600	3	0	1.131	N
1601 – 1700	3	0	1.131	N
1701 – 1800	4	6	0.552	N
1801 – 1900	6	0	1.877	Y
1901 – 2000	9	21	3.298	Y
2001 – 2100	9	13	0.964	N
2101 – 2200	7	7	-0.233	N
2201 – 2300	6	1	1.521	N
2301 – 2400	6	1	1.521	N
2401 – 2500	7	7	-0.233	N
2501 – 2600	7	14	2.063	Y
2601 – 2700	6	20	4.664	Y
2701 – 2800	5	7	0.497	N
2801 – 2900	4	1	0.984	N
2901 – 3000	3	0	1.131	N
3001 – 3100	3	0	1.131	N
3101 – 3200	3	1	0.636	N
3201 – 3300	2	0	0.777	N
3301 – 3400	2	0	0.777	N
3401 – 3500	1	0	0.246	N
3501 – 3600	1	0	0.246	N

Table 5.1 Results of z-test for proportions for elevation data

Although the results shown above, performed using a z-test calculator (Dimension Research 2005), show that the distributions differs significantly for four different elevation classes, a two-proportion test performed using the *R* statistical package, which used a Chi-squared test of proportions and accounted for multiple comparison error using

the Bonferroni correction (Abdi 2007), determined significant difference between the two samples for only two classes – 20 and 27, which correspond to the elevations between 2000 and 2100 meters, and 2600 and 2700 meters, respectively. The results of that test are shown below, with the significantly differing proportions indicated by red asterisks. This test was two-tailed, meaning that the difference between the proportions may have been negative or positive. In both of these cases, however, we can see that the difference was negative when random proportions were tested against wickiup proportions, meaning that the proportion of wickiups in a given elevation class were higher than they should have been, if they were distributed randomly across the landscape. Nine percent of random points fell within the 2000-2100 meter elevation band, whereas 21 percent of wickiup points were located in that class. Six percent of random points were within the 2600-2700 meter elevation class, while 20 percent of wickiup points were located in that elevation band.

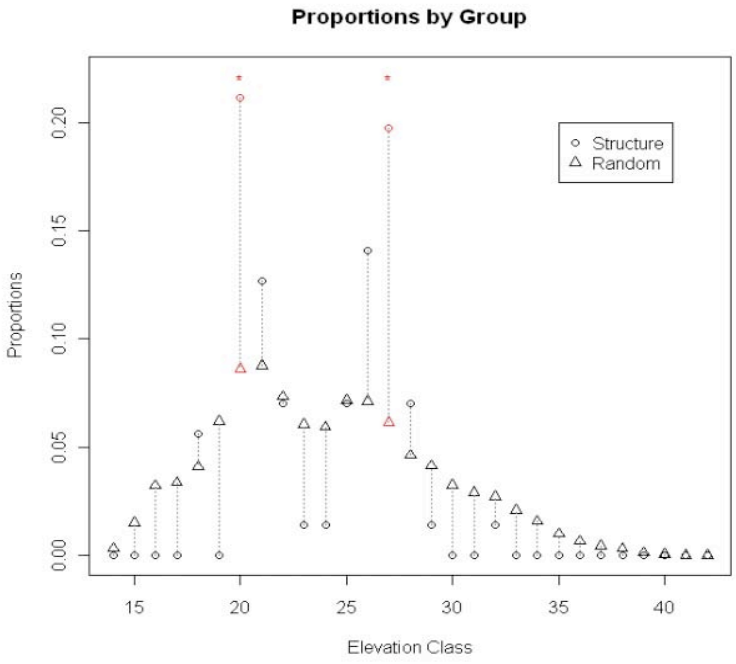


Figure 5.9. Plot illustrating results of Chi-squared test of proportions on elevation data

This statistical analysis has shown with 95 percent confidence that wickiups occur between 2000 and 2100 meters and 2600 and 2700 meters more often than they should, given a random distribution; thus, special attention to this set of elevations may aid in the of potential wickiup sites. These results are discussed in greater depth subsequently as they apply to predictive mapping.

Distance to Water

As with the elevation data, a two-sample Kolmogorov-Smirnov test was performed on distance-to-water measurements for both datasets. Unlike the elevation distributions, distance-to-water distributions for the random point set and wickiup point set were not significantly different, as illustrated in Figure 5.11. The fact that random and wickiup locations were so similar suggests that wickiups are not preferentially located near (or far from) water. Although it has been suggested that wickiups are often located close to water, it appears that there is simply more available habitation space near water sources than far away from water, as can be seen in the histogram below.

In order to clarify and further support these results, the parametric and more sensitive z-test of proportions was performed on each distance-to-water class. This test returned three cases of significance. In these cases, random points were located within a particular class in a few cases, but that small number of cases still rounded down to zero percent of the total sample. Although only one structure was located within the given distance from water in each case, the small sample size (N=71) allowed that wickiup to account for one percent of total points. This, in turn, caused proportions to differ

significantly. However, given the results of the Kolmogorov- Smirnov test, as well as the small number of outlying structures, it still appears that distance to water is not a constraining factor in wickiup site location.

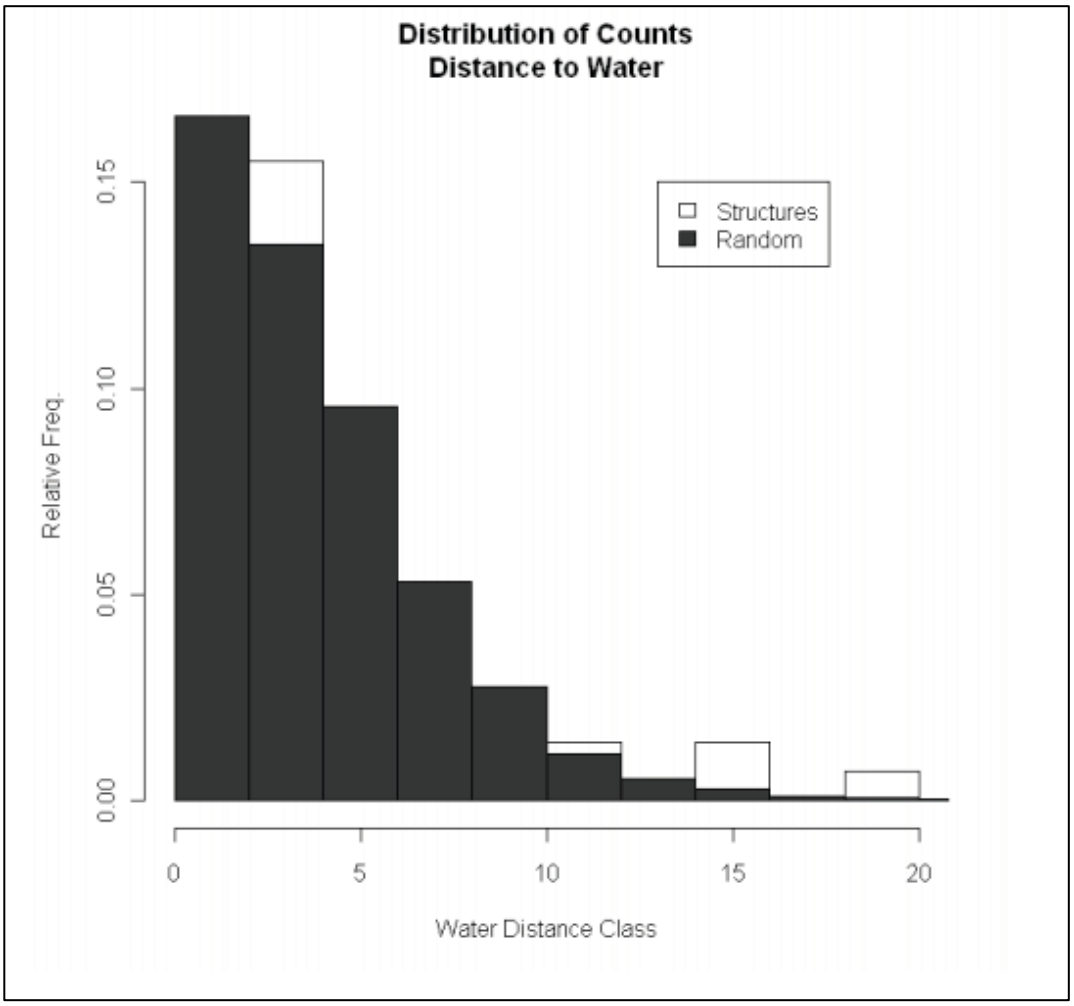


Figure 5.11. Chart illustrating results of two-sample K-S test of distance-to-water data

Distance from Water (m)	Random Location %	Wickiup Location %	Test Statistic	Significant at $\alpha = 0.05$?
0 – 100	19	18	0.062	N
101 – 200	15	14	0.070	N
201 – 300	15	20	1.008	N
301 – 400	12	11	0.075	N
401 – 500	10	10	-0.198	N
501 – 600	9	7	0.379	N
601 – 700	6	4	0.457	N
701 – 800	5	4	0.112	N
801 – 900	3	3	-0.349	N
901 – 1000	2	1	0.175	N
1001 – 1100	1	1	-0.598	N
1101 – 1200	1	1	-0.598	N
1201 – 1300	1	0	0.246	N
1301 – 1400	0	0	N/A	N/A
1401 – 1500	0	1	2.45	Y
1501 – 1600	0	1	2.45	Y
1601 – 1700	0	0	N/A	N/A
1701 – 1800	0	0	N/A	N/A
1801 – 1900	0	0	N/A	N/A
1901 – 2000	0	1	2.45	Y
2101 – 2200	0	0	N/A	N/A
2201 – 2300	0	0	N/A	N/A
2301 – 2400	0	0	N/A	N/A
2401 – 2500	0	0	N/A	N/A

Table 5.2 Results of z-test for proportions for distance-to-water data

Distance to Forest Edge

A two-sample Kolmogorov-Smirnov test comparing distance to forest edge for wickiup and random locations returned very similar results to the distance to water tests; no significant difference was found between the two groups. As with access to water, it has often been speculated that wickiups are preferentially located within forests but near forest edges, and that the proportion of wickiups located in that zone would be reflective of that preference. However, it appears that the majority of available landscape within forests is, in fact, within a very close distance of forest edge, as shown in the histogram

below. This suggests that while wickiups are often located near a forest edge, much more of the landscape fits into that category than archaeologists realize. Unfortunately, due to the ubiquity of this distance-to-forest-edge class, the variable cannot be used to predict future wickiup location sites.

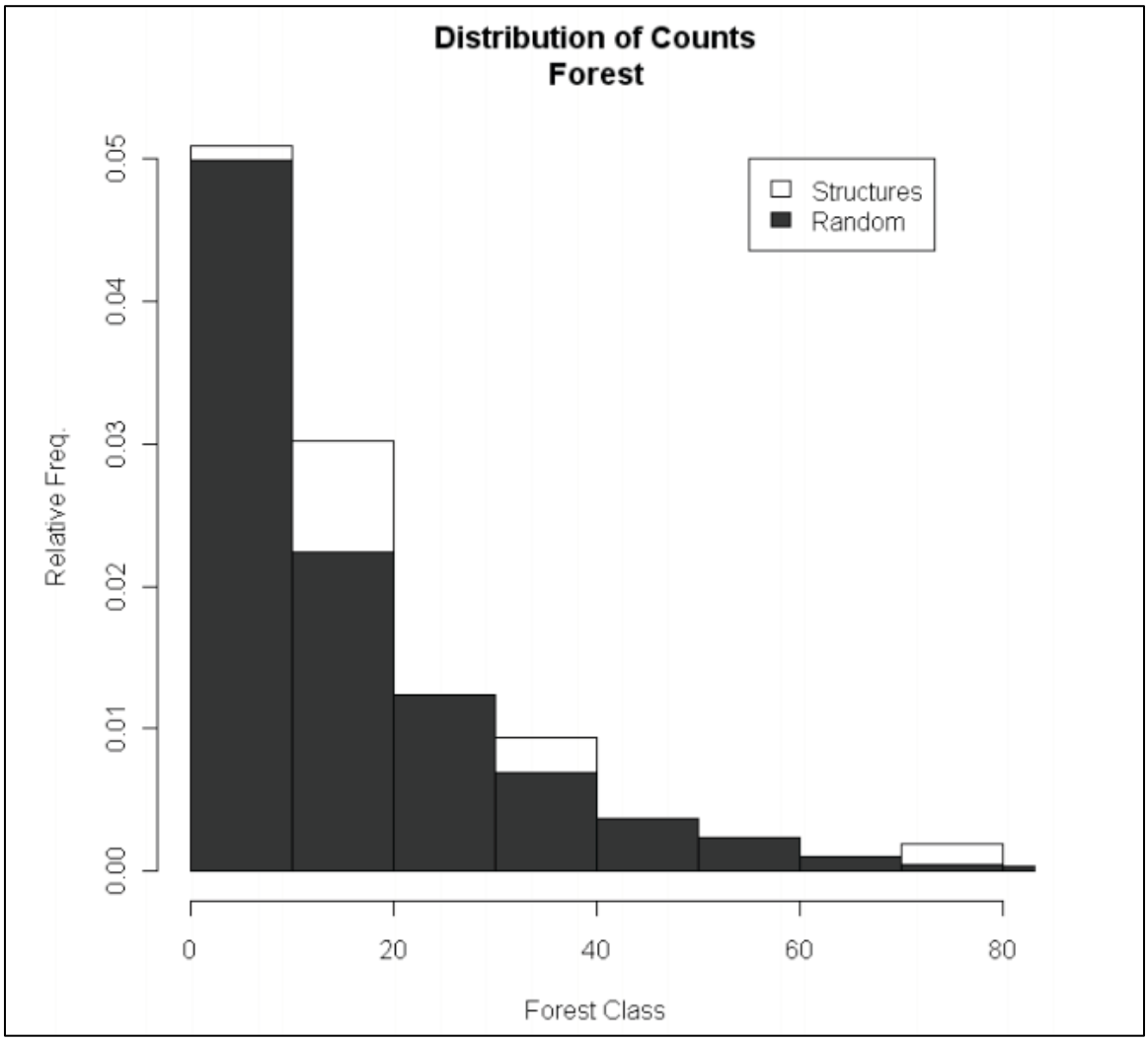


Figure 5.12. Chart illustrating results of two-sample K-S test of distance-to-forest-edge data

Predictive Mapping

As the only variable of those studied that proved to significantly constrain the location of wickiups, elevation was the only variable available for predictive mapping.

The figure below shows a digital elevation model with significant elevation bands highlighted (2000-2100 meters in blue and 2600-2700 meters in light blue). This narrowing of high-potential areas for wickiup location may aid land managers in prioritizing study areas and directing survey and sampling resources where the discovery and protection of wickiup sites is most likely.

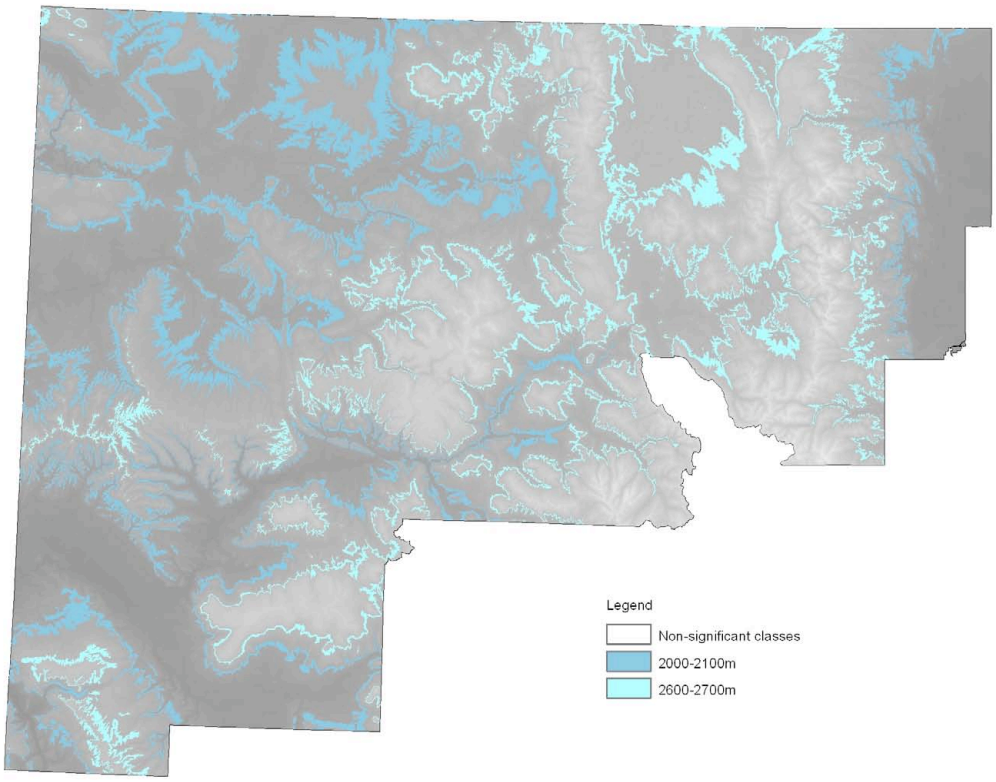


Figure 5.13. Map highlighting significant elevation classes (2000-2100 meters and 2600-2700 meters) according to DEM reclassification

The reasons for this elevation preference are not clear; however, there are several possibilities. These particular elevation bands may be chosen because they exhibit greater

aspen growth, as aspen are often used in the construction of wickiups in Northern Colorado, and those building the structures are unlikely to carry building materials far from their source. The figure below shows the significan elevation bands in relation to aspen cover, as drawn from CO-GAP Project data, which is shown in dark gray. The potential correlation between elevation preference and other environmental variables is certainly a study that would benefit from further research.

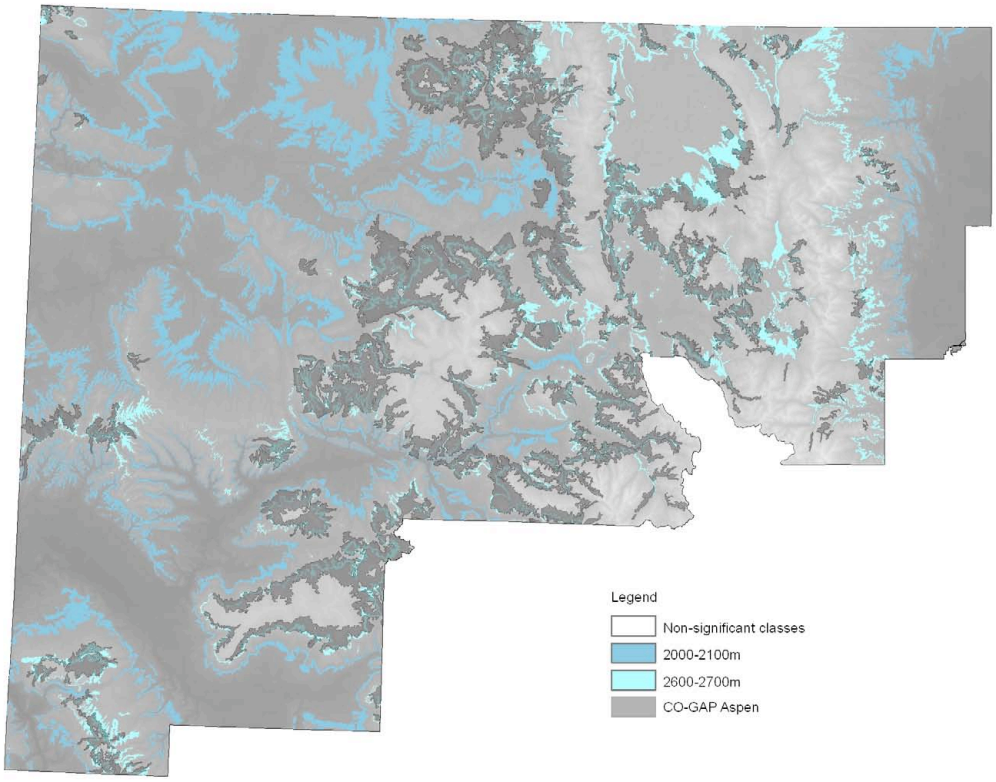


Figure 5.14. Map highlighting significant elevation classes with an aspen forest cover data overlay

One caveat should be considered before this prediction of elevation preference put into practice. Although the wickiup dataset clearly shows an inclination toward two

particular elevation ranges, we should consider the effect of the original dataset's limitations and biases on that preference. Because an element of survey bias certainly entered into the identification of the particular wickiup sites included in the dataset, statistical analyses of their locations may reproduce those biases rather than identify true preference, thus making an environmental characteristic that is in fact related to survey coverage appear to be significantly correlated with the presence of wickiups; any model making use of a biased sample will certainly recapitulate that bias in further predictions for site location.

Sampling issues between the two groups of sites used likely affected environmental variables other than elevation, and the results gained from this large-scale but low-resolution study should be interpreted with caution. The stark difference between available resources and landscape alone suggest that future study may benefit from reconsidering these statistical analyses at a smaller scale and finer resolution -- at the very least, future study should divide Western Slope sites and Northern Colorado sites into two separate study groups for comparison. Because these groups were considered together in the analyses performed by this author, important environmental differences between the two major groups may have been under- or over-represented.

Although elevation was the only significant variable in wickiup site location identified in this current study, there are countless environmental variables with available environmental data that further analysis may prove significant. Indeed, site location analysis and predictive mapping may be one of the most valuable tools for managers to optimize resource allocation in areas most likely to yield wickiup sites, and further

research using GIS is recommended to enhance our over-arching understanding of wickiup location in relation to the environment.

CHAPTER SIX

MANAGEMENT AND PRESERVATION CONSIDERATIONS

Given our understanding of wickiups as perishable and endangered cultural resources, one undertaking that must supplement any analysis of their characteristics is a plan to further manage and protect them. The first step in this plan, as was carried out herein, is to complete a comprehensive inventory of previously recorded sites. While their revisitation and reevaluation is important for resource managers to undertake, the timely location and documentation of previously unrecorded sites is also highly important. Strategies for identifying, recording, and preserving these structures are addressed in the following chapter.

Identification of Wickiups

Although the encounter and subsequent identification of a conical wooden teepee structure during archaeological survey seems fairly straightforward, there are several factors that confound the positive identification of new and/or previously recorded wickiups. Identification is typically complicated by structures that resemble wickiups but have one or more problematic aspects that bring their antiquity into doubt. These structures fall into two categories: structures that have been built in modern times to look like aboriginal wickiups, and aboriginal wickiups that have been inhabited, vandalized, or modified in modern times. This may include addition or subtraction of structural poles,

replacement of fallen or collapsed poles, or complete rebuilding of the aboriginal structure.

Modern Structures

One only need to turn to site forms of previously recorded structure for evidence of speculation regarding structures that may be modern; it has often been suggested that many structures recorded as wickiups could be "Boy Scout wickiups," or structures built recreationally in historic times to resemble aboriginal wickiups. DARG researchers suggest that wickiups may have been constructed in modern times "by non-natives as part of wilderness survival schools and Boy Scout exercises" (Martin et al. 2005:14).

A review of literature written for evident of such Boy Scout construction reveals little; an article on "how to make a tent" is included in first five editions of Boy Scouts of America *Boy Scout Handbook,* which were printed between 1910 and 1959. No mention of lean-to construction is mentioned in later editions of the handbook. The lean-to diagram is pictured in Figure 6.1. Although this doesn't resemble the conical structure of a wickiup, it is possible that collapsed Boy Scout lean-tos could resemble collapsed wickiups, due to the parallel alignment of poles in both types of structures.

However, research into modern survivalist and "primitive craftsman" literature has shown that wickiup construction is a popular hobby (Elpel 2002, Jamison 2006, Rost 2007, Jamison 2007); these craftsmen build conical wooden structures that they identify as wickiups, and which often look startlingly similar to aboriginal wickiups (some much more so than others). The photos below are taken from two different how-to books; one

of these books has an entire chapter devoted to constructing historically-accurate wickiups (Jamison 2006).

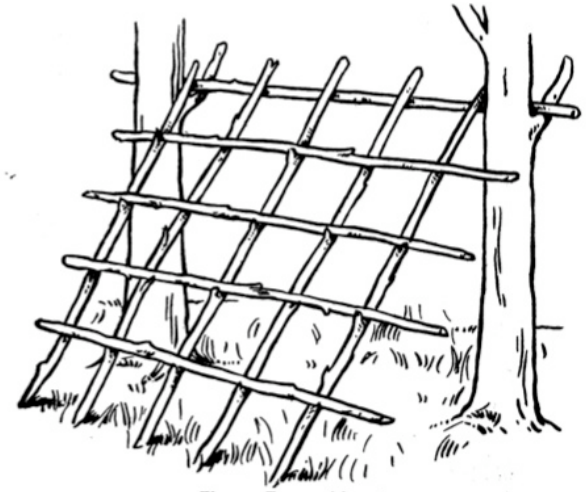


Figure 6.1. “How to make a tent” diagram from Boy Scouts of America Handbook (BSA 1911)

Figure 6.2. Modern recreational wickiup photograph taken from Jamison (2006)

Figure 6.3. Modern recreational wickiup photograph taken from Jamison (2007)

Another source for wickiup-like modern structures is hunting blinds. Newton et al. discuss the identification of historic hunting structures in the identification of aboriginal wooden features (1997). The photo below shows a structure spotted by the author on Big Creek Ranch while recording the aboriginal wickiups there; informant Mark Dunning explained that the conical structure was a modern hunting blind used during elk season.

Figure 6.4. Modern hunting blind on the Big Creek Ranch

Modern Modification of Aboriginal Structures

Sometimes obvious signs of modern vandalism and/or occupations of wickiups are present. These can include modern trash or the use of modern barbed wire or baling wire to support structural elements. This type of human impact particularly complicated the identification of aboriginal wickiups, because it can be difficult to determine whether the structure was recently built, or is a modified aboriginal structure. As such, wickiups should not be dismissed as modern solely because historic Euro-American artifacts or modern trash is present on the site. Signs of aging can be helpful in these cases, including degree of structural pole and/or support tree deterioration, as well as surrounding sedimentation and embeddedness of structural poles and interior space of the wickiup.

Modern or Aboriginal?

Because decisions regarding the recordation of a potential wickiup site must often be made in the field without the benefit of independent dating techniques, it is difficult to determine a set of standards for differentiating modern and aboriginal remains. There are several characteristics that can disqualify a structure as aboriginal; however, the lack of these characteristics does not necessarily qualify it as aboriginal.

Throughout the course of research and fieldwork, the author has gained a few practical insights into the identification of modern structures. Although there is no method for determining whether a structure is absolutely aboriginal, there are two wickiup characteristics that will indicate that a structure is absolutely modern. Those include the use of young, unlimbed structural poles, as seen in the photo of a modern wickiup at Dutch George Flats in Figure 6.5, and the utilization of very young support trees, which could not have existed prior to modern times. Although these indicators may apply to only a few structures encountered by archaeologists, they provide a means to quickly rule out some potential "wickiups" as non-cultural remains or modern cultural remains. Other indicators which are less definitive, but should give cause for concern in the recording of a wickiup, include the use modern structural elements like baling twine, barbed wire, and other modern materials, as well as substantial structure size and structural symmetry, as seen in the second photo below. Given our current lack of understanding of the range of variability in wickiup construction, it seems best to record all potential wickiup sites for two reasons. All sites should be recorded because archaeologists still know too little about how to differentiate modern wickiups from aboriginal wickiups, and not recording seemingly modern sites puts us at risk of not

recording truly aboriginal sites. We should also record apparently modern sites because this will prevent confusion in future research; a great example of this practice is recordation for site 5LR11792, which was included in the Northern Colorado site inventory. This site was recorded in 2007 by the Colorado Historical Society and Office of the State Archaeologist of Colorado as a modern structure, and evidence for the structure's modern origins is provided on site forms. This documentation will prevent future researchers from re-recording or re-considering this wickiup, and also ensures that documentation exists in the case that its modernity is later questioned.

Figure 6.5. Modern recreational wickiup near Dutch George Flats, Roosevelt National Forest (photograph by Jason Chambers)

Figure 6.6. Modern recreational wickiup near Pinkham Mountain (photograph by Chaz Evans)

Wickiups and the National Register of Historic Places

Once identified, one particularly significant aspect of preservation involves the potential for aboriginal wooden structures to be listed on the National Register of Historic Places, and afforded the subsequent protection that designation entails. This undertaking constitutes the first step between positively identifying a site and ensuring that that site, once documented, will be recognized and protected in the future.

Eligibility Considerations

In their outline of historic property evaluation, Hardesty and Little (2009) list five steps in the process of determining National Register of Historic Places (NRHP) eligibility. The first involves categorization of the property in question, which is not

necessarily straightforward in the case of aboriginal wooden structures. Wickiups are typically categorized as sites, which are "location[s] of a significant event or prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself maintains historical or archeological value regardless of the value of an any existing structure (Hardesty and Little 2009: 17). The term "structure" here is somewhat misleading, as structure is actually another category, which describes an entirely different type of property, such as a large-scale engineering project. Although not traditionally considered "buildings," aboriginal wooden structures would technically fall under the definition for such as provided in 36 CFR 60.4, which includes "a structure created to shelter any form of human activity…" The categorization of property should follow with the eligibility criterion being applied, which we will discuss in greater detail subsequently.

The second step, which involves placing potentially eligible properties within historical context, is fairly straightforward in the case of aboriginal wooden structures; the applicable context study for most of these structures in Northern Colorado would be those published periodically by the Colorado Office of Archaeology and Historic Preservation; because wickiups vary in age, either the Platte River Basin prehistoric context (Gilmore et al. 1999) or the general historic context for the state may be appropriate (Church et al. 2007).

Applying the Criteria

The third, and perhaps most important, step of the eligibility process involves the evaluation of significance under the National Register Criteria. Aboriginal wooden structures are typically determined eligible for listing on the National Register of Historic

Places under Criterion D, or based upon their value as archaeological resources that "have yielded, or may be likely to yield, information important in prehistory or history" (Hardesty and Little 2009: 50). The point at which aboriginal wooden structure sites have become too disturbed or deteriorated to garner any accurate contextual or archaeological knowledge from their remains is an important distinction to make when Criterion D is being applied in the argument for National Register listing.

Another avenue that resource managers may explore in order to increase the number of NRHP-eligible aboriginal wooden structures is to investigate their potential eligibility under Criterion C, or as structures that "embody the distinctive characteristic of a type, period, or method of construction; represent the work of a master; possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction" (Hardesty and Little 2009: 49). Most relevant in this case, especially where arguments for eligibility within a particular historical context are concerned, is the importance of wickiups as an architectural form unique to the Protohistoric period of the American West, and the ways in which specific aboriginal wooden structures may illustrate that period and its construction methods.

After the National Register Criteria have been applied to a potentially eligible wickiup site, National Register exclusions that may disqualify the site must be considered. The only case in which this step may affect aboriginal wooden structure sites is if the structure was not in fact aboriginal, but a modern replication of an aboriginal design, in which case the structure would be both a reconstruction and possibly a structure less than fifty years old, both of which would deem that a property ineligible for listing on the National Register. This step in the eligibility process evidences the

importance of creating a standard method for properly identifying modern wickiup replications, although the DARG protocol is described as “when in doubt – record it” (Martin et al. 2005: 43).

The fifth and final step of the NRHP eligibility determination process involves an evaluation of the structural integrity of a given property, and a decision regarding its potential to convey historical significance. Four substeps are outlined, which guide the resource manager in determining what is significant, what structural elements must exist to convey that significance, and whether a given structure contains those elements with a sufficient level of integrity. The authors also advise creating a scale of comparison for levels of integrity of a particular resource, which is very much applicable in the case of wickiup sites. Given the perishable nature of the components of aboriginal wooden structures, as well as the generally fragile construction that characterizes them, very few, if any, pristine examples exist, so it seems wise to consider relative integrity in lieu of absolute integrity for this purpose.

Larimer County Wickiups: An Example

Considering an example of the eligibility determinations for aboriginal wooden structures within Larimer County allows us a glimpse of the state of both wickiup recordation and NRHP eligibility assessments. Twenty-four Larimer County wickiup sites are currently on file at the Colorado Office of Archaeology and Historic Preservation (OAHP). Of these, six sites are officially eligible for listing on the National Register of Historic Places, eight need further data for an eligibility determination, and ten are officially not eligible. The NRHP status of Larimer County aboriginal wooden

structures is summarized in Table 6.1. In this table, green labels represent NRHP-eligible sites, yellow labels represent sites that need data to make an official determination, and red labels indicate sites that have been determined NRHP-ineligible. It should be noted that the eligibility determinations listed below refer only to the opinion and decisions of the original site recorders and not this author.

Site Number	Land Ownership	Recording Agency	Recording Date	Eligibility Determination	Eligibility Determination Date
5LR615	Rocky Mountain NP	NPS	1980	Eligible – Officially	1998
5LR1197	Arapahoe and Roosevelt NF	USFS	1988	Eligible – Officially	1989
5LR1198	Arapahoe and Roosevelt NF	USFS	1988	Eligible – Officially	1989
5LR1199	Arapahoe and Roosevelt NF	USFS	1988	Eligible – Officially	1989
5LR1200	Arapahoe and Roosevelt NF	USFS	1988	Eligible – Officially	1989
5LR2115	Rocky Mountain NP	NPS	1996	Needs Data – Officially	1996
5LR2180	Rocky Mountain NP	NPS	1997	Needs Data – Officially	1997
5LR3857	Rocky Mountain NP	UNC	1998	Needs Data – Field	1998
5LR4460	Rocky Mountain NP	NPS	1999	Eligible – Officially	1999
5LR4499	Rocky Mountain NP	UNC	1999	Needs Data – Field	1999
5LR4503	Rocky Mountain NP	UNC	1999	Not Eligible – Field	1999
5LR4509	Rocky Mountain NP	UNC	1999	Needs Data – Field	1999
5LR4512	Rocky Mountain NP	UNC	1999	Not Eligible – Field	1999
5LR4513	Rocky Mountain NP	UNC	1999	Not Eligible – Field	1999
5LR4531	Rocky Mountain NP	UNC	1999	Not Eligible – Field	1999
5LR4548	Rocky Mountain NP	UNC	1999	Needs Data – Field	1999

Site Number	Land Ownership	Recording Agency	Recording Date	Eligibility Determination	Eligibility Determination Date
5LR4570	Rocky Mountain NP	UNC	1999	Not Eligible – Field	1999
5LR6962	Rocky Mountain NP	UNC	1999	Needs Data – Field	1999
5LR7002	Rocky Mountain NP	UNC	1999	Not Eligible – Field	1999
5LR7009	Rocky Mountain NP	UNC	1999	Needs Data – Field	1999
5LR9914	Rocky Mountain NP	NPS	2000	Not Eligible – Isolated Find	2000
5LR10229	Rocky Mountain NP	NPS	2001	Not Eligible – Isolated Find	2001
5LR10292	Rocky Mountain NP	NPS	2001	Not Eligible – Isolated Find	2001
5LR11792	Larimer County	OSAC/CAS	2007	Not Eligible – Field	2007

Table 6.1: NRHP eligibility of Larimer County wickiup sites

This summary of site forms illustrates several trends in the recording and NRHP eligibility determination of aboriginal wooden structures in Northern Colorado. The large number of sites recorded by the University of Northern Colorado in 1998 and 1999 during their systematic survey of Rocky Mountain National Park suggests that many wickiups may remain undiscovered in the absence of complete coverage of previously un-surveyed areas. Although many of these sites needed further data in order for an eligibility determination to be made, the sheer number of sites is telling, and suggests that many sites may have been destroyed before survey was ever carried out. It is also surprising that none of the sites recorded after 1988 were determined eligible for the NRHP, which perhaps is a sign of differences in researcher opinion regarding NRHP eligibility, or perhaps changing opinions of researchers over time. Another interesting trend that can be seen in Table 6.1 is the correlation between recording agency and

eligibility determination. All sites in Larimer County recorded by the USFS were determined eligible, while most National Park Service recorders and University of Northern Colorado investigators determined that sites needed data or were ineligible. This correlation may reflect agency philosophies, resources allotted to the recording of the sites and subsequent NRHP follow-up, or may simply be coincidental.

It should be noted that one of these sites, 5LR615, was determined not eligible when recorded in 1980, but was determined officially eligible based on a revisit and evaluation for a prescribed burn nearly twenty years later. Aboriginal structures sites such as this one, which have been located but not adequately recorded or recently revisited, should be of the highest priority to agencies assessing the archaeological resources of their land holdings. We also now know that all but one possible structure of the 18 eligible structures at sites 5LR1197, 5LR1198, 5LR1199, and 5LR1200 have been destroyed, illustrating the need not only to identify and record sites, but strictly monitor those that may be eligible for the NRHP and are especially useful from a research standpoint.

The National Register potential for sites recorded in 2010 should be addressed as well. Of the Crosier Mountain sites originally determined eligible by the USFS (5LR1197, 5LR1198, 5LR1199, and 5LR1200), only one potential site remains. The single structure at 5LR1199 should still be considered potentially eligible for the NRHP under Criteria C and D, although it is the opinion of this author that perhaps testing should be carried out to determine the likelihood of subsurface cultural deposits. Although the structure itself may embody a unique construction style, which would make it eligible for the NRHP under Criterion C, the antiquity of the site and a stronger

argument for eligibility may be established by providing evidence for cultural remains, and thus information important to a Criterion D determination.

The other previously recorded structure that was revisited in 2010, 48CR4312, was determined field eligible in 1986. Given that the structure exhibits very little deterioration since that time, and that integrity of the structure is remarkable among wickiup sites in the region, this author suggests that the site continue to be considered NRHP eligible under both Criteria C and D. Like all sites recorded in 2010, little is known about subsurface deposits at 48CR4312, but the potential for the recovery of archaeological remains that would place the site within the greater cultural context of the region certainly exists.

Of the six structures recorded in 2010 as part of the Big Creek/State Line case study, it is the opinion of the author that five of those structures are eligible for NRHP listing – BCSLW1, BCSLW2, BCSLW3, BCSLW5, and BCSLW6. Only the completely collapsed wickiup, BCSLW4, is unlikely to provide further useful information or warrant significant preservation measures. The other structures are incredibly well-preserved and have the potential to tell us a great deal about both wickiup construction and the way of life of their inhabitants, both through structural elements and possible sub-surface deposits. These structures and their surroundings contain valuable data that makes them eligible for NRHP listing and protection under both Criteria C and D.

The eligibility determination process brings up a potentially contentious issue regarding private properties and NRHP listing, as well as inclusion of information about sites on private land in OAHP databases and elsewhere. Because BCSLW1, BCSLW2, BCSLW3, and BCSLW4 are located on private land, permission must be granted by the

landowner to provide any information or documentation to local, state, or federal government agencies or research partners. Many landowners are concerned about privacy and the rights they feel may be violated if they allow researchers or government personnel to document archaeological resources on their properties and potentially share that information with others. At the time of writing, decisions regarding the sharing of information for the privately located Big Creek/State Line wickiups had not yet been reached. Several options may exist to preserve the research potential of wickiups without intruding on landowners, including partial inclusion of files in the OAHP database that may only be accessed with special permission. Coordination and cooperation with landowners to support wickiup research while protecting privacy and interests may become a key factor in their continued preservation in the future.

Preservation of Wickiups

Threats

Both the material composition and location of aboriginal wooden structures puts them at an intrinsic and significant risk for destruction; Native American wickiup sites were included on *Colorado's Most Endangered Places List* by Colorado Preservation, Inc. in 2003 (Martin et al. 2005: 2). Particularly urgent threats to extant aboriginal structures, both recorded and unrecorded, include wildfire, deadfall, natural wood deterioration and weathering, and human activities including prescribed burning, timber removal, and recreation.

Wildfire is perhaps the most pressing of threats to aboriginal wooden structures, as most of these structures, especially those found in Northern Colorado, are located

within or near heavily forested areas with significant wildfire potential. Many of these environments have also been affected in recent years by the Mountain Pine Beetle (*Dendroctonus ponderosae)* kill, increasing fuel loads. Another result of pine beetle kill is a significant increase in potential deadfall that may affect wickiup structures. BCSLW3, one of the structures recorded in the Big Creek/State Line Case Study, is supported by a dead Ponderosa pine. BCSLW4 was crushed by a fallen dead aspen; this incident was unrelated to pine beetle kill but demonstrates the inherent threat of dead trees surrounding wickiups. All structures recorded in the course of 2010 fieldwork were within reach of at least one dead and/or decaying tree. Removing these trees may prove to be one of the most efficient and effective means of protecting endangered wickiups.

Beyond the wholesale collapse of a structure, the deterioration and weathering of its individual elements poses a threat to the overall integrity of a structure. Table 6.2 details condition of wickiups examined in 2010 as determined according to natural deterioration indicators.

	Lengthwise grain separation	Cracking across grain	Sagging	Crumbling	Highly decomposed	Lichens	Moss
5LR1199	X						
BCSLW1	X	X	X	X	X		
BCSLW2	X	X	X	X	X	X	X
BCSLW3	X	X				X	
BCSLW4	X	X		X	X	X	X
BCSLW5	X	X				X	
BCSLW6	X	X	X			X	
48CR4312	X					X	

Table 6.2: Signs of deterioriation in 2010 field site structures

If we assume that wood weathering and deterioration affects wickiups in much the same manner as historic buildings composed of untreated timber, many of the same agents causing decay and compromising structural integrity apply. These can include pest infestation, dry rot, wet rot, and other decay-causing fungi, as well as natural heartwood decay and non-biological weathering agents (Ridout 2000). Because poles and supports comprising aboriginal wooden structures may be constructed from trees of several different species depending on their location, including lodgepole, aspen, pinyon, juniper, and others (Martin et al. 2005), considerations for both softwood and hardwood decay must be taken into consideration. Although some species used in wickiup construction, including juniper, are very resistant to heartwood decay, others, including lodgepole pine, are only slightly resistant, and much more prone to this type of deterioration (Clinton Lester, personal communication, April 10, 2011).

Human activity is also quickly impacting aboriginal wooden structure sites, as Federal lands are increasingly frequented by those utilizing parks and national forests for hiking, mountain biking, backpacking, and horseback riding activities. Motorized vehicle use, such as 4WD off-roading and ATV riding, also has the potential to negatively impact wickiup sites. Wickiups on private land may be affected by grazing animals and other forms of agriculture and livestock activities; the erection of fences around wickiups at the Big Creek Ranch provides an excellent example of proactive preservation of structures on private land.

Defining Purposes for Preservation

Once threat to a wickiup site has been established, as it will be in nearly every case because of the composition and location of the structures, purposes and goals for preservation should be determined. These determinations should take into account the involved agency's project goals, time and funding constraints, as well as the input of stakeholders. Stakeholders may include government officials, Native American tribal entities, academic or professional researchers, and concerned members of local communities. It is vital that each of these groups becomes a part of the consultation process where the preservation of aboriginal wooden structures is concerned. Although it was not legally required of their project, the researchers of DARG illustrate the importance of collaboration and consultation within and among these groups, especially Native American tribes, stating that

> "In the initial phase of the project, we contacted members of the Southern Ute Tribe, the Ute Mountain Tribe, and the Northern Ute Tribe to introduce ourselves, to inform them of our efforts, and to explore opportunities for on-going collaboration and information sharing. We have become aware, in due course, of several dimensions of our study – bureaucratic, political, cross-cultural and professional – which present differences of opinion in some cases, and even religious beliefs in others. We therefore made a strategic decision to move slowly, deliberately, and with respect in these areas, feeling the need to have in hand the body of knowledge presented in this report before moving forward. With that requirement now met, we plan to further explore opportunities we see for on-going collaboration and information exchange in the interpretation and preservation of the rich cultural legacy that wickiups and other aboriginal wooden structures represent in the state (Martin et al. 2005: 45-46)."

Many scholars have addressed the controversial issue of Native American involvement in archaeology and its interpretations (Stoffle and Evans 1990, Ferguson

1996, Zedeno et al. 1997, Swidler et al. 1997, Gulliford 2000, Jameson 2004, Merriman 2004, King 2008), and an exhaustive treatment of Native American issues in historic preservation cannot be covered here. However, needs and wishes of stakeholders, especially Native American groups, must be taken into consideration when determining the most appropriate course of action for an aboriginal wooden structure site. One example of informal Native American consultation was included in the 1989 Denver Post article on North Park wickiups referened previously. The article notes that members of eight different modern Native American tribes were included in the site visit, and state archaeologist Susan Collins lauded the collaboration, pointing out that

> "This is fairly revolutionary. Urban Native Americans looking into their own history, pulling in professionals, and drawing from local amateur historians. That's a three-way partnership that is very, very rare. And very powerful. All have their own information to contribute, and it's working here (Ditmer 1989:3)."

This interaction provides a good example of positive relationships with Native American tribes and archaeologists, and the type of cooperation that agencies should strive for in dealing with aboriginal cultural remains and descendant populations.

Of course, complete preservation is the most desirable outcome of the decision-making process regarding an endangered aboriginal wooden structure. The participating agency must ask, however, what the purpose of that preservation is, if it is feasible, and what exactly must be preserved to fulfill that purpose. Is the structure being preserved for the sake of cultural continuity in relation to a particular Native American tribe's history, as with a Traditional Cultural Property (Hardesty and Little 2009: 56), and thus must be avoided entirely, and remain unaltered and given restricted tribal access? Or is it being salvaged for the sake of data, and most important to archaeologists who wish it to

remain in its context and perhaps hope to extract information from it via excavation or sampling? Perhaps it is being preserved in the name of public education, and its role is as a learning tool, in which case it ought to be reconstructed and made in some way accessible to the greater public, as well as interpreted to that end. Each of these scenarios engenders different heritage resource management values and requires different prioritization in terms of resource preservation, and suggests different methods for reconstructing, whether literally or figuratively, the aboriginal wooden structure in question.

There is certainly discord in the archaeology and historical preservation communities regarding the proper aims for preservation, and many of these controversies stem from the concepts of cultural property and heritage ownership, as well as the historical disadvantage of many indigenous populations in situations concerning resources attributed to their ancestors. Given these divisive, politically charged, and often emotional issues, it may be very difficult for cultural resource managers to determine the appropriate course of action.

Potential Stabilization and Reconstruction Measures

Should an interested stakeholder and/or responsible agency determine that reconstruction or preservation of a wickiup in situ is the preferred management action, many options are available to support the integrity of that structure. Although no precedent has been set for altering aboriginal wooden structures as a preservation measure, resource managers should consider the subsequent impacts on the structure, as well as the potential value of

cultural significance or archaeological data being protected, and determine whether this might be an appropriate method of preservation.

One of the most imminent threats to wickiup structures is simply collapse, whether caused by nearby deadfall or the deterioration inevitable with time. It appears, however, based especially on data gathered through the Big Creek/State Line Case Study, that self-supporting wickiups not affected by deadfall may in fact remain standing over a long period, if not affected by animals or human factors listed as threats in previous discussion. One of the first steps in protecting structures in wooded areas may be to remove the most threatening nearby trees, particularly those that are already dead. The erection of a fence to protect wickiups from grazing cattle at the Big Creek Ranch is also a great example of a simple preservation measure that may significantly lengthen the lifetime of a wickiup.

Wood deterioration may or may not affect an aboriginal wooden structure given many contributing factors based on its location, including climate attributes such as temperature, humidity, and precipitation, as well as biological characteristics of its milieu, such as presence of insect decay agents and fungal elements. If a wickiup possesses significant structural integrity (in other words, is not fully collapsed) but suffers from some degree of deterioration within the wood itself, several treatments are available which may halt further damage from decay. Although many wood preservation chemicals are intended only for modern timber pretreatment, and are highly toxic and would be unsuitable for use with aboriginal wooden structures, some remedial surface treatments for water resistance can be formulated with organic compounds including paraffin waxes or resins, silicones, and other stabilizers (Richardson 1993).

One method currently applied for decay prevention of in-use power poles includes the application of "pole bandages" with osmotic treatments including fluoride salt pastes and tar-oil formulations, which diffuse into the wood fiber to protect it from fungal and insect agents (Richardson 1993: 71). Any such treatments, however, intrinsically alter the fabric of the structure, and it may be argued that this type of preservation is more detrimental to the structure, in terms of cultural significance, than allowing the structure to deteriorate naturally.

Protecting wooden structures from wildfire presents an even greater challenge, but several techniques are available that would allow resource managers to route fire away from aboriginal wooden structures when necessary. Fuel removal and fuelbreaks of various types may be employed as they would be in the protection of modern homes at the wildland/urban interface (Agee et al. 1999), or fire retardant chemicals may be applied to the structures to provide defense against heat and flame. Fuelbreaks are described by Agee et al. as "areas manipulated for the common purpose of reducing fuels to reduce the spread of wildland fires" (1999: 55). By altering the amount of combustible material located within a particular range of a threatened structure, fuelbreaks remove the fuel element of the fire triangle and indirectly protect structures from ignition.

Retardant chemicals, on the other hand, treat the structure itself and are applied directly to the structure. They may be applied superficially or through pressure impregnation, and can include Oxylene, Minolith, Celcure F, Pyrolith, Fyre Prufe, Minalith, Pyresote, or some combination of those compounds (Richardson 1993). Pressure impregnation of aboriginal wooden structures with fire retardants would not be desirable or feasible for their protection, as it requires the dismantling of structural

elements, and thus removal from their archaeological context. Surface treatment, however, may provide a viable option for guarding wood against wildfires without affecting the structural and contextual integrity of the site.

Finally, protecting aboriginal wooden structures from destruction during prescribed burning or timbering activities primarily requires knowledge of the structures' existence and avoidance or protection via the fire retardation methods described above. Site degradation as a result of recreational activity is much more difficult to quantify and to prevent; however, knowledge and recordation of structure location and degree of disturbance, along with frequent revisits and re-evaluations, would allow agencies to better protect the resources on their lands, and to determine if recreational activities are putting a particular aboriginal wooden structure site at undue risk. Restricting access to sites by rerouting hiking, mountain biking, or horseback riding trails may prevent heavy disturbance to wickiups once they are located.

One important consideration for preservationists who might employ any of the techniques above is whether any of these treatments or policies will affect the structure's NRHP eligibility based on the Secretary of the Interior's Standards for the Treatment of Historic Properties (Hardesty and Little 2009). Another key consideration involves consulting parties, and the effects of prescribed treatments or policies on those groups, especially as they may apply to religious access to sites as dictated by the American Indian Religious Freedom Act (AIRFA) (King 2008).

Discussion

Given the above inventory of Northern Colorado wickiups, including a more in-depth field evaluation of eight structures, it is clear that determining appropriate preservation measures is secondary to locating and describing at-risk structures. Although the study of wickiups should not be equated with salvage archaeology, it is important to preserve information concerning wickiups before we begin the task of preserving their physical remains.

The Larimer County example given above illustrates the state of identification and recordation of aboriginal wooden structures in Northern Colorado; much is left to do where simple location and re-evaluation of known sites is concerned, as well as wholesale survey for unrecorded sites. Documentation is clearly the first and most important step in preserving wickiups, and the information and cultural value they may contain, for generations to come. DARG's Colorado Wickiup Project has provided an invaluable model for this most vital step in the timely understanding of aboriginal wooden structures.

Once wickiup sites have been identified and documented to a satisfactory degree, however, it is the responsibility of cultural resource managers to make decisions about what to *do* with them. The methods described above for determining cultural significance and research potential, evaluating possible threats to sites, and creating preservation priorities may guide agencies in making difficult management decisions about aboriginal wooden structures sites in Northern Colorado, which undoubtedly contain vast potential for archaeological investigation, as well as significant meaning for the Native American cultures to which they are tied.

CHAPTER SEVEN

CONCLUSIONS

This thesis research represents a first attempt at synthesizing and understanding the wickiups of Northern Colorado. Although few definitive answers were found in terms of original research questions, a great deal of information was compiled that may be consulted and built upon by future researchers. That compilation of data also allowed several generalizations to be made in terms of the research areas that were developed at the outset of the project.

Revisiting the Research Questions

How do wickiups of Northern Colorado fit within the protohistoric and historic cultural complexes of the southern Rocky Mountain region?

The comparison of inventoried Northern Colorado wickiup sites and 2010 wickiup sites with the western Colorado sample suggests that structural characteristics of the Northern Colorado are specific to the area. Whether these differences are related to functional variability, cultural affiliation, or environmental resource availability is unknown. However, the author suspects that cultural affiliation may have more influence on structural differences than archaeologists have previously allowed. Although many ethnohistoric accounts support a Ute origin for many Northern Colorado wickiups, they

appear to be structurally more similar to the Shoshonean and Arapaho structures of Wyoming and Montana, even sharing many characteristics with Hidatsa structures of North Dakota. Since established Ute territory does not extend into these areas, we must consider whether structural similarities are in fact related to available construction materials and other environmental constraints rather than cultural preference. If environmental variables affect wickiup form more than ethnic affiliation of their inhabitants, we must turn to different sources in order to assign cultural affiliation. Although the movement of Utes across territorial boundaries in Colorado is one possible explanation for wickiups in Northern Colorado, it is also likely that other groups created conical timbered structures, whether as a result of exchange of ideas and technologies or by independent design.

What environmental elements do Northern Colorado wickiups have in common with one another and with Western Colorado wickiups, and what generalizations can we make about their function and temporality based upon these characteristics?

Many environmental characteristics thought to constrain wickiup location, such as distance to water source and distance to forest edge, failed to stand up to statistical testing in the case of Northern Colorado wickiups. Although many wickiups are in fact located near water sources and forest edges, so much of the landscape fits into these descriptions that they can hardly be considered unique to wickiup sites. Elevation did tend to significantly affect wickiup site location, although it is unclear what might be causing this preference, and whether elevation constraints may also be tied to other environmental variables such as forest type. Nonetheless, utilizing our knowledge of favored elevations

for wickiup location allows us to predict areas of high probability for site location by characterizing the landscape in terms of elevation ranges. Statistics aside, one revelation reached in the course of this thesis research was the degree of environmental difference in wickiup location that could simply be ascribed to regional ecological characteristics and available habitation locations. The difference in overall environment and thus in wickiup site characteristics between Northern Colorado sites and those on the Western Slope illustrates the need for localized and comparative studies.

What environmental and human factors pose the greatest risk to aboriginal wooden structures, and what management decisions and preservation measures can best mitigate those threats, so that further research and/or interpretation may be carried out?

Although many known threats to wickiups have been identified by previous research, inventorying known Northern Colorado sites and attempting to relocate and reevaluate several of these sites in 2010 provided sobering evidence that the need for accelerated documentation and programmatic preservation is urgent. Given the Mountain Pine Beetle outbreak in Northern Colorado, the most imminent threats to known wickiup sites are likely deadfall and/or wildfire resulting from stand mortality. Reevaluating at-risk wickiups and putting protection measures in place is vital to the preservation of known sites. The continued identification and adequate documentation of new wickiup sites should be another management priority; training in appropriate identification techniques and recommended recording methods for both government and private survey crews will increase the quality of wickiup records for future study. The fact that the majority of documentation included in this thesis comes from structures on privately-held

land illustrates the need to work with the public in the encouragement of wickiup preservation and protection. The Big Creek/State Line case study provides an excellent example of both proactive measures taken by landowners to protect wickiups on private land, and of the benefits of collaboration between landowners and archaeologists.

Future Research

Although much of the effort and resources in the current study of wickiups is directed at accelerated documentation and inventory of sites, and rightly so, significant research potential exists beyond simple recordation. Studies of structural variability and cultural affiliation will only become more robust as the wickiup dataset grows. Ethnohistorical research is incredibly valuable in the study of wickiups, and it is likely that undiscovered local resources still exist and should be pursued. More intensive research in the form of testing and excavation is certainly necessary, as so few Northern Colorado sites have been properly investigated. Especially well-preserved wickiups, like those recorded at Big Creek/State Line in 2010, deserve further attention; it seems likely that excavation and sampling at these sites may uncover cultural remains that will help answer questions regarding the structures' period and cultural affiliation. Using C-14 and dendrochronological dating to determine the antiquity of wickiup sites, although proven problematic in the past, is still a promising avenue of investigation. Supplementing current databases with information on the capability of dating particular wickiup structures, such as the presence of axe-cuts, charcoal, or other diagnostic elements, will help bridge the gap between recordation and research potential.

Archaeologists should continue to also keep in the mind the investigative potential for wickiup sites that only contain wickiup remains or tales of a once-standing wickiup—location data alone may be able to tell us a great deal about wickiup function as our GIS models and environmental analyses of wickiups become more sophisticated. More localized and comparative models are needed to refine spatial studies of wickiups, and collation of data between various researchers and Federal agencies will aid in their creation.

This study has only scratched the surface of wickiup research, even in Northern Colorado; it is the humble hope of the author that it may inform and inspire future research that will increase our understanding of wickiups in terms of their inhabitants, as people who came before us and whose cultural remains evidence our collective history.

REFERENCES CITED

Abdi, H.
2007 *The Bonferonni and Sidak Corrections for Multiple Comparisons*. Sage, Thousand Oaks, CA.

Agee, J. K. a. B. B., M.A. Finney, P.N. Omi, D.B. Sapsis, C.N. Skinner, J.W. van Wagtendonk, C.P. Weatherspoon
2000 The Use of Shaded Fuelbreaks in Landscape Fire Management. *Forest Ecology and Management* 127:55-66.

Allen, W.
1983 Eagle Trapping along the Little Missouri River. *North Dakota History: Journal of the Northern Plains* 50(1):4-22.

Anonymous
2011 K-S Test Calculator. In *Tools for Science*. Saint Benedict and Saint John's University.

Beals, R. L.
1936 *Ethnology of Rocky Mountain National Park: The Ute and Arapaho*. Department of the Interior: National Park Service.

Boy Scouts of America Editorial Board.
1911 *The Official Handbook for Boys*. 1st edition.

Brett, J. A.
2003 Ethnographic Assessment and Documentation of Rocky Mountain National Park. Department of Anthropology, University of Colorado at Denver.

Buchholz, C. W.
1983 *Rocky Mountain National Park: A History*. Colorado Associated University Press.

Butler, W. B.
2004 An Experimental Wickiup. *Southwestern Lore* 70(1).

Carbone, G.
1972 An Amateur's General Surface Report of the Tongue River Drainage Area. *Wyoming Archaeologist* 15(4):6-17.

Cassells, S.
1997 *The Archaeology of Colorado*. Johnson Books, Boulder, CO.

Chapin, F.
1998 *Mountaineering in Colorado: The Peaks about Estes Park*. Universty of Nebraska Press, 1987, Lincoln.

Church, M., S. G. Baker, B. Clark, R. F. Carrillo, J. Horn, C. D. Späth, D. Guilfoyle and S. Cassells
2007 *Colorado History: A Context for Historical Archaeology*. Colorado Council of Professional Archaeologists, Denver.

Conner, S. W.
1966 Recollections of a Wickiup Site. *Archaeology in Montana* 7(4):15-17.

1966 The Russian Creek Wickiup Site. *Archaeology in Montana* 7(1):8-12.

1974 Emil's Lodge. *Archaeology in Montana* 15(3):23-39.

Conner, S. W. and S. D. Halverson
1969 Slim Buttes Lodge. *Archaeology in Montana* 10(1):1-13.

Crum, S.
1996 *People of the Red Earth: American Indians in Colorado*. Ancient City Press, Santa Fe.

Davis, C. M.
1975 Wickiup Cave. *Plains Anthropologist* 2(79):297-305.

Davis, C. M. and S. A. Scott
1987 The Pass Creek Wickiups: Northern Shoshone Hunting Lodges in Southwestern Montana. *Plains Anthropologist* 32(115).

Decker, P.
2004 *"The Utes Must Go!": American Expansion and the Removal of a People*. Fulcrum Publishing, Golden, CO.

Department of the Interior
1954 *Natural History Handbook Number Three: Rocky Mountain National Park*. National History Handbooks. Department of the Interior (Government Printing Office), Washington, D.C.

Des Rosier, F. L.
1965 Kutenai War Lodges? *Archaeology in Montana* 6(1):14-15.

Dimensions Research
2005 Z-Test for Two Proportions Calculator. <http://www.dimensionresearch.com/resources/calculators/ztest.html>

Ditmer, J.
1989 Ancient tepees awe visitors. In *Denver Post*, Denver.

Elpel, T. J.
2002 *Participating in nature: Thomas J. Elpel's field guide to primitive living skills*. HOPS Press.

Ewers, J. C.
1944 The Blackfoot War Lodge: Its Construction and Use. *American Anthropologist* 46(2):182-192.

Ferguson, T. J.
1996 Native Americans and the Practice of Archaeology. *Annual Review of Anthropology* 25(1):63-97.

Fremont, J. C.
1845 *Report of the Exploring Expedition to the Rocky Mountains*, Washington, D.C.

Gilmore, K., M. Tate, M. Chenault, B. Clark, T. McBride and M. Wood
1999 *Colorado History: A Context for the Platte River Basin*. Colorado Council of Professional Archaeologists, Denver.

Gresham, H.
1975 *North Park*. Steamboat Pilot, Steamboat Springs.

Gulliford, A.
2000 *Sacred Objects and Sacred Places: Preserving Tribal Traditions*. University Press of Colorado, Boulder.

Hamilton, A. L.
1973 Michigan Creek Wickiup. *All Points Bulletin, Denver Chapter of Colorado Archaeological Society* 10(12):5-7.

Hardesty, D. H. and B. J. Little
2009 *Assessing Site Significance: A Guide for Archaeologists and HIstorians*. Alta Mira, Toronto.

Hoefer, T. III, S. D. Creasman, D. Murcray and J. Bozovich
1992 The South Baxter Brush Shelter Site: An Early Shoshonean Occupation in Southwest Wyoming. *Wyoming Archaeologist* 36(3):47-69.

Hughes, D.
1987 *American Indians in Colorado*. Pruett Publishing, Boulder, CO.

Huscher, B. H. and H. A. Huscher
1943 The Hogan Builders of Colorado. *Southwestern Lore* 9(2):1-92.

Jameson, J. H. (editor)
2004 *The Reconstructed Past: Reconstructions in the Public Interpretation of Archaeology and History*. AltaMira, Lanham, MD.

Jamison, R.
2006 *The Best of Woodsmoke: A Manual of Primitive Outdoor Skills*. Skyhorse Publishing Incorporated, Cedar Fort.

Jamison, R. and L. Jamison
2007 *Primitive Skills and Crafts: An Outdoorsman's Guide to Shelters, Tools, Weapons, Tracking, Survival, and More*. Skyhorse Publishing Incorporated, Cedar Fort.

Johnson, A. M., K. J. Feyhl, S. W. Conner and M. B. Bryant
1988 The Cremation of Two Early Historic Timbered Structures in the Bull Mountains. *Archaeology in Montana* 29(1):97-115.

Johnson, C. R.
1972 A Study of North Park Tipis. *Southwestern Lore* 37(4):93-101.

Kidwell, A. S.
1969 The Conical Timbered Lodge on the Northwestern Plains. *Archaeology in Montana* 10(4):1-49.

King, T. F.
2008 *Cultural Resource Laws and Practice*. 3rd edition. AltaMira, Lanham, MD.

Leatherman, D., I. Aguayo and M. TM
2007 Mountain Pine Beetle. In *Colorado State Forest Fact Sheets*. Colorado State University Extension Service, Fort Collins.

Lipe, W., M. Varien and R. Wilshusen
1999 *Colorado Prehistory: A Context for the Southern Colorado River Basin*. Colorado Council of Professional Archaeologists, Denver.

Loendorf, L. L.
1996 Two Deadfall Timber Structures in the Bighorn Canyon National Recreation Area, Montana. *Archaeology in Montana* 37(1):67-86.

Lowie, R.
1954 *Indians of the Plains*. American Museum Science Books. The Natural History Press, Garden City, NY.

Lynch, H., R. Renkin and R. Crabtree
2006 The influence of previous mountain pine beetle (Dendroctonus ponderosae) on the 1988 Yellowstone fires. *Ecosystems* 9:1318-1327.

Martin, C., R. Ott and N. Darnell
2005 *The Colorado Wickiup Project Volume 1: Context, Data Assessment and Strategic Planning*. Dominguez Archaeological Research Group, Grand Junction, CO.

Martin, C., R. Ott and N. Darnell
2005 *The Colorado Wickiup Project Volume III: Recordation and Re-evaluation of Twelve Aboriginal Wooden Structure Sites in Eagle, Garfield, Mesa, and Rio Blanco Counties, Colorado*. Dominguez Archaeological Research Group, Grand Junction, CO.

McBeth, S.
2007 *Native American Oral History and Cultural Interpretation in Rocky Mountain National Park*. Report prepared for National Park Service and University of Colorado, Greeley, CO.

Merriman, N. (editor)
2004 *Public Archaeology*. Routledge, New York.

Moe, R. B.
1974 Two Cribbed Log Structure Sites. *Archaeology in Montana* 15(2):27-34.

Murcray, D.
1993 Assessment of the Newly Discovered Upper Powder Spring Sites: A Hunting Complex in Southwest Wyoming. *Wyoming Archaeologist* 37(1):13-26.

Newton, R., S. Morris and K. Keim
1997 Recognition of Certain Wooden Structures as Historic Features Associated with Trapping *Archaeology in Montana* 38(1):67-79.

Omernik, J.
1987 Ecoregions of the Coterminous United States. *Annals of the Association of American Geographers* 77(1).

Pallister, P. D.
1992 The Bull Mountain Wickiup and Dry-Laid Masonry Structures: A Tukudika Complex? *Archaeology in Montana* 33(2):33-59.

Payne, S.
1965 *Where the Rockies Ride Herd*. Sage Books, Denver.

Primm, S.
2001 Wyoming Basin shrub steppe (NA1313). In *World Wildlife Report*. World Wildlife Fund.

Rensch, H. E.
1935 *Historical Background for the Rocky Mountain National Park*. Field Division of Education. U.S. Department of the Interior: National Park Service, Berkeley.

Richardson, B. A.
1993 *Wood Preservation*. Third Edition ed. E & FN Spon., New York.

Rost, A.
2007 *Survival Wisdom & Know-How: Everything You Need to Know to Thrive in the Wilderness*. Black Dog Publishing.

Sanfilippo, J.
1998 *Ute Wickiups or Navajo Forked-Stick Hogans: Determining Ethnicity Through Architecture in the Archaeological Record*. Unpublished MA Thesis, Department of Anthropology, Northern Arizona University.

Scheiber, L. and M. Mitchell (editors)
2010 *Across a Great Divide: Continuity and Change in Native North American Societies, 1400-1900*. The University of Arizona Press, Tucson.

Stiger, M.
1998 Distinguishing Ute and Navajo Archaeological Remains. *Southwestern Lore* 64(2):1-20.

Stoffle, R. W. and M. J. Evans
1990 Holistic Conservation and Cultural Triage: American Indian Perspectives on Cultural Resources. *Human Organization* 49(2):91-99.

Swidler, N., R. Anyon, and A. S. Downer (editor)
1997 *Native Americans and Archaeologists: Stepping Stones to Common Ground*. AltaMira, Toronto

United States Department of Agriculture
2007 *The Encyclopedia of Wood*. Skyhorse Publishing Incorporated.

Voget, F. W.
1977 Timber Shelters of the Crow Indians. *Archaeology in Montana* 18(2):1-18.

Wenker, C. T.
1992 Native American Timber Structures of the Northeastern Plains. *Archaeology in Montana* 33(1):5-29.

Wierzbinski, F. A.
1965 Habitations and Habitation Sites on the Yellowstone River. *Archaeology in Montana* 6(1):4-13.

Zedeno, M. N., D. Austin and R. Stoffle
1997 Landmark and Landscape: A Contextual Approach to the Management of American Indian Resources. *Culture and Agriculture* 19(3):123-129.

Zier, C. J.
1987 Notes on Aboriginal Structures of Protohistoric or Historic Age in the Big Horn Mountains of Wyoming. *Archaeology in Montana* 28(1):72-81.

APPENDIX A

Summary Wickiup Data

Site Number	County	# Structures	(#Poles)	Pole Species	Topography	Vegetation	Elevation	Dist. Water	Construction
5BL58	Boulder	1	UNK	UNK	UNK	UNK	UNK	UNK	UNK
5BL59	Boulder	1	40-50	aspen	flat-to-sloping	aspen	UNK	UNK	lean-to
5CC1347	Clear Creek	1	UNK	lodgepole	slope	lodgepole	3158	120	lean-to
5GA2688	Grand	1	4	aspen	ridge slope	lodgepole	2831	645	lean-to
5GA2732	Grand	1	UNK	lodgepole	hill	lodgepole	2583	110	free-standing
5GA2733	Grand	1	UNK	lodgepole	ridge slope	lodgepole	2572	220	free-standing (collapsed)
5GA975	Grand	1	20	aspen, lodgepole	ridgetop	lodgepole	2652	800	free-standing
5JA1942	Jackson	1	8	lodgepole	slope	mixed conifer, aspen	UNK	20	lean-to (partially collapsed)
5JA651	Jackson	1	34	aspen	knoll	lodgepole, aspen	2816	12	lean-to (partially collapsed)
5LR10229	Larimer	1	51	aspen	steep slope	ponderosa pine	2530	1400	lean-to (partially collapsed)
5LR10292	Larimer	1	30	aspen	slope	mixed conifer, aspen	2585	730	lean-to
5LR11792	Larimer	1	21	aspen	slope	mixed conifer, aspen	2633	UNK	UNK

Site Number	County	# Structures	(#Poles)	Pole Species	Topography	Vegetation	Elevation	Dist. Water	Construction
5LR1197	Larimer	9	10; 8; 11; 12; 12; 6; 10; 2; 5	aspen	ridgeline	ponderosa pine, aspen	2560	1200	lean-to (partially collapsed)
5LR1198	Larimer	5	10; 4; 7; 8; 12	aspen	ridgeline	ponderosa pine, aspen	2560	1200	lean-to (partially collapsed)
5LR1199	Larimer	3	UNK	aspen	ridgeline	ponderosa pine, aspen	2630	1200	lean-to (partially collapsed)
5LR1200	Larimer	1	UNK	aspen	ridgeline	ponderosa pine	2660	1100	lean-to
5LR2115	Larimer	3	15; 10; 10	aspen	slope; hill/moraine	ponderosa pine	2573	60	lean-to; free-standing (collapsed); free-standing (collapsed)
5LR2180	Larimer	1	70	aspen	ridge	ponderosa pine	2657	500	collapsed
5LR3857	Larimer	1	UNK	aspen	terrace	ponderosa pine	2488	60	collapsed
5LR4460	Larimer	2	17	aspen	slope	ponderosa pine	2736	120	lean-to (partially collapsed); free-standing (collapsed)
5LR4499	Larimer	1	UNK	aspen	slope; hill	ponderosa pine	2624	UNK	lean-to (partially collapsed)
5LR4503	Larimer	1	16	aspen	moraine	blue grama, ponderosa pine, aspen	2575	134	collapsed
5LR4509	Larimer	1	UNK	UNK	terrace	aspen, ponderosa pine	2621	110	lean-to

Site Number	County	# Structures	(#Poles)	Pole Species	Topography	Vegetation	Elevation	Dist. Water	Construction
5LR4512	Larimer	1	UNK	UNK	moraine	ponderosa pine	2575	641	lean-to
5LR4513	Larimer	1	46	aspen	moraine	ponderosa pine, aspen	2613	639	collapsed
5LR4531	Larimer	1	UNK	pine	moraine	ponderosa pine	2498	50	lean-to (partially collapsed)
5LR4548	Larimer	1	UNK	pine	hillslope	lodgepole, ponderosa pine	2605	161	lean-to (partially collapsed)
5LR4570	Larimer	2	UNK	pine	bench	ponderosa pine, aspen	2675	452	lean-to (partially-collapsed); free-standing
5LR615	Larimer	1	50+	aspen	draw	ponderosa pine	2536	300	free-standing (collapsed)
5LR6962	Larimer	1	UNK	pine	valley	mixed conifer	2604	118	collapsed
5LR7002	Larimer	1	34	pine	terrace	lodgepole, blue grama	2622	67	free-standing
5LR7009	Larimer	1	UNK	aspen	terrace	lodgepole, aspen	2682	38	collapsed
5LR9914	Larimer	1	10	aspen	hillslope	mixed conifer	2768	457	free-standing
5RT807	Routt	1	50+	aspen	terrace	lodgepole	2798	25	lean-to

Table A.1. Summary of Northern Colorado site characteristics and measurements

Author	Year	Site Location	State	# Structures	Building Material	Environment	Features	Artifacts	Culture	Comments
Des Rosier	1965	St. Mary's Lake	Montana	2	unidentified poles, duff	heavily timbered bottom 100 ft from clearing	hearth	UNK	Kutenai	
Conner	1966	Russian Creek	Montana	1	deadfall lodgepole	bottom of canyon near creek, timbered to north	hearth	UNK	UNK	axe cuts on two poles
Conner	1966	Fergus County	Montana	1	deadfall poles	coniferous forest near stream coulee	UNK	UNK	UNK	anecdotal report - no structure remains
Conner and Halverson	1969	Slim Buttes	South Dakota	1	aspen poles	wooded grove near ravine	Stone circle	UNK	Plains Indian	
Johnson	1972	North Park	Colorado	5		draw in aspen grove; deep ravine; ridge	UNK	Yes	UNK	
Hamilton	1973	Michigan Creek	Colorado	1	deadfall aspen poles	100 feet above creek in heavy timber	hearth	No	UNK	
Conner	1974	Musselshell County	Montana	1	deadfall poles, juniper support, sandstone slabs	south edge of ridge overlooking plains	UNK	UNK	Blackfeet or Crow	truncated cone structure
Moe	1974	Musselshell County	Montana	3 (2 sites)	deadfall poles, sandstone slabs	gradual slope above water-eroded coulee	UNK	UNK	UNK	cribbed log structure
Davis	1975	Big Sheep Creek Canyon	Montana	1	timbers, shorter sticks, bine	limestone cave	curvilinear rock wall	lithics, bone awls	Tukudika Shoshone	

Author	Year	Site Location	State	# Structures	Building Material	Environment	Features	Artifacts	Culture	Comments
					boughs, rocks					
Zier	1987	Big Horn Mountains	Wyoming	3 sites	Fir, spruce, lodgepole pine	crest of ridge	hearths	cairns, chert flake	UNK	axe cuts
Davis and Scott	1987	Pass Creek Canyon	Montana	2	timbers, sticks, boughs, slabs of bark	forested terrace near south bank of creek	UNK	UNK	Tukudika Shoshone	
Pallister	1992	Bull Mountain	Montana	1 wickiup	poles, bark slabs	old fir forest near water	hearth	UNK	Tukudika Shoshone?	
Hoefer et al.	1992	South Baxter	Wyoming	1 site	UNK	UNK	UNK	UNK	Shoshone	
Murcray	1993	Upper Powder Spring	Wyoming	5-6	UNK	hollow protected by rock face on spine of ridge	one external hearth, one internal hearth	UNK	UNK	
Loendorf	1996	Sykes Canyon	Montana	3 (2 sites)	UNK	small terrace above canyon floor	possible double hearth	lithics (surface and excavated)	Shoshoni/Crow/Piegan/Sioux?	

Table A.2. Summary of literature review site characteristics, when given

APPENDIX B

2010 Analog Field Photographs

Figure B.1 BCSLW1 overview toward entrance facing southwest. Taken by Annie Maggard on 9/12/10.

Figure B.2. BCSLW1 overview toward rear of structure facing northeast. Taken by Annie Maggard on 9/12/10.

Figure B.3. BCSLW2 overview facing rear of structure illustrating significant lean/sag in structure, looking north-northeast. Taken by Annie Maggard on 9/12/10.

Figure B.4. BCSLW3 overview facing southwest. Taken by Annie Maggard on 8/30/10.

Figure B.5. BCSLW5 overview facing south. Taken by Annie Maggard on 9/13/10.

Figure B.6. BCSLW6 overview from northwest. Taken by Annie Maggard on 9/13/10.