Critical Technological Approaches in Heritage Research:

Mapping Cultural Resources of the Black Butte River

By

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ABSTRACT

Purpose of the Study: As we move into the digital age of mapping, the use of technologies such as GIS are becoming common place. Yet critical assessment of mapping practices and associated technologies is lacking. The idea of taking a critical technological approach to our spatial analysis and documentation identifies bias and limitations in how we interpret archaeological data. By critically evaluating the use of mapping in heritage research, a greater body of discourse can be developed and help future researchers to be more precise and objective in their use of these technologies.

Procedure: Presented here is a case study of mapping cultural resources in the Black Butte River watershed to illuminate Native American settlement patterns. The case study is developed in two parts. First, I identify the existing themes in interpretations of Native American settlement patterns. Second, I provide a multi-scalar analysis that compares the narratives of these themes with their corresponding maps. For this analysis, density maps of known resources, organized by age identifiers, are key elements for interpreting settlement patterns in the watershed.

Findings: Comparison between the existing narratives of Native American settlement patterns and the corresponding maps reveal discrepancies that tend to homogenize interpretations of Native American culture both across California and within smaller regions. Where specific themes of settlement are concerned, the resource density maps lend support to a well distributed occupation of the watershed as opposed to isolated distributions centered within a given region. This lends support to the idea of small polities of Native American communities distributed across the landscape.

Conclusions: Critical analysis of mapping and mapping technologies help to uncover discrepancies between heritage narratives and the maps that represent those narratives. As mapping technologies become readily available through GIS applications and locational data is digitized, heritage researchers should be aware of the perspectives represented in their maps. Not only for the sake of heritage discourse, but also with the understanding that the maps we create can convey these perspectives to the public.

MA Program: Cultural Resources Management
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Acknowledgement

This thesis is dedicated in loving memory of

Susan Diane Denham 1956 - 2005

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Chapter 1: Introduction

This thesis presents the methods and applications of mapping in heritage research through a critical technological approach with a case study focusing on mapping Native American cultural resources to interpret settlement patterns. Approaches of this type argue that mapping technologies and the corresponding representations of cultural phenomena conveyed through them are inherently vehicles for conveying theoretical perspectives of the researcher. In this thesis, I demonstrate how theoretical perspectives are conveyed through mapping, and how these visual representations can create and promote ambiguous representations and interpretations of Native American cultures across California. At a time when researchers are often using mapping technologies to aid in interpretation and presentation of data, more critical discourse of mapping as a practice is needed. I present to you an alternative approach, interpretation, and representation of the data that has been *previously* collected for California generally, and more specifically the Yukian language area of the Black Butte River (BBR) watershed.

In this thesis I will use the term *heritage* as an inclusive term to refer to projects of various lines of inquiry that deal with narratives of the past and *heritage researchers* to refer to those people who manage and study cultural resources in contexts including but not limited to archaeology. Though much of the data used in my analysis is archaeological in nature, the Cultural Resource Management (CRM) industry has lately been expanding the definitions of what constitutes cultural resources, the types of data included in cultural studies, and the role of heritage researchers in practice. The trend toward expanding definitions and roles has been attributed in part to legislative and regulatory contexts in which archaeological resources and other heritage-related resources have become regarded as non-renewable. In essence, we currently view cultural resources as scant and irreplaceable, similar to views on natural resources. Additionally, consultation with local stakeholders including Native Americans is also increasing with the development of these regulatory contexts.

In many ways, the role of heritage managers is changing in conjunction with the growth of the field. Consultation with Native Americans and various stakeholder groups, public outreach, and multi-vocal interpretations have become integral to the permitting process for planning, development, and other undertakings. Heritage managers are using new technological applications to aid in what can often seem an overwhelming process and an incredible amount of information to manage. Mapping is at the forefront of these technologies and creative heritage practices.

Mapping technologies and the visual representations we produce with them can convey the conscious and subconscious theoretical perspectives of heritage researchers. Through a critical technological approach, we can reveal discrepancies between interpretations of cultural data as presented in textual narratives and the maps which visually represent them. Specifically, the case study and analysis presented here is focused on how we interpret the distribution of Native American archaeological resources within the BBR watershed. Thus, I present a critical technological approach to mapping in two basic phases: 1) by identifying major trends in the interpretation of Native American archaeological resources; 2) through a multi-scalar analysis of mapping, including a meso-level analysis with density maps created for this thesis.

Research Questions

As defined here, a critical technological approach is intended to reveal pre-conceived theoretical perspectives embedded in the maps that illustrate archaeological, historical, and ethnographic knowledge, and to present alternate, sometimes multi-vocal or immersive, interpretations for the same phenomena. Such approaches can take a wide variety of forms and are currently being engaged in many recent research-based and heritage-focused projects. An overview of such applications is presented in Chapter 2, with the intent of highlighting projects that may have similar objectives or outcomes to this one.

With respect to the case study, there are a number of historically important maps of California, and the region, that have greatly influenced the ways in which we organize knowledge of Native American linguistics, sociopolitical organization, settlement distributions, and historical events. My argument is that the pre-conceived theoretical perspectives from which these maps were derived has substantially affected our current interpretations of past events and social patterns. To test this, I propose to use the BBR watershed as a study area, and to address three primary research questions. First, do we see organizational bias or interpretive limitations, in several of the most significant maps in California, and regional, historical and archaeological research? To test this, I will summarize and review the major themes and concepts related to the distribution of Native American settlement, linguistics, and social organization, prior to, during, and after Euroamerican colonization. I will identify several examples of these themes and how they have been represented spatially for California in general and for the BBR watershed. I will then compare them to the distributions and densities of known archaeological sites to infer whether the historically-mapped constructs reflect the site distributions from the current data. If there are differences between what is known archaeologically and what is represented in the historical maps, we can then identify or suggest the causal factors for these discrepancies.

Second, are there other interpretations (than those identified in prior mapping) which can account for the observed archaeological patterns? Referring to the major themes and concepts of Native American settlement during the study periods, it may be possible to identify existing ideas of social organization, interaction, trade, or conflict which account for observed archaeological patterns in the BBR watershed. From these I will draw some interpretations of what we should expect to see under different scenarios and then compare those scenarios to the identified data. If there is reasonable correlation between the archaeological data and one or more themes of settlement, then we can propose new approaches which may be better equipped to represent those themes spatially, using mapping technologies, and determine if they might, or might not, apply outside of the BBR watershed. If no reasonable correlation can be identified, we might consider that new ideas for understanding and representing past knowledge may be in order.

Third, are there ways in which we might reduce the impact of pre-conceived theoretical constructs in heritage-based mapping? Within our current approaches to heritage-based mapping, there is a heavy reliance on pre-existing data, syntheses, and spatial constructs, to guide the recordation and interpretation of new data. I review the existing mapping practices to determine if the outcomes from either of the first two research questions would have a demonstrable effect on current Heritage literature and interpretations for the BBR watershed. If our existing knowledge and interpretations are biased by current mapping practices, then I will make recommendations for ways in which to mitigate biased outcomes and acquire data that derives from a more comprehensive theoretical perspective and may be multi-vocal.

Chapter Organization

The second chapter of this thesis provides a review of theoretical literature and research projects that attempt to critically engage heritage data with mapping technologies and define the idea of a critical technological approach. Approaches of this type, concerned with the use of technologies to record and manage heritage, are becoming crucial to the practice of CRM. Although methodological discussions of the use of mapping and GIS technology are common, far fewer researchers critically evaluate the theoretical implications of mapping technology and how it might affect the discipline as a whole.

Chapter 3 presents background information on the BBR watershed (Figure 1) as a case study, the methods used in this analysis, and highlights the importance of heritage mapping in California. The current state of heritage-based mapping in California is exemplified by the California Historical Resources Information System (CHRIS). Establishing the importance, scope, and methods are the focus of this chapter. Additionally, limitations to the study are also discussed.

Chapter 4 presents major themes in the interpretation of Native American settlement and their associated cultural resources in the project area. These include ethnographic, archaeological, and historical interpretations, along with past and modern descendent community Native American land management practices. These major themes are typically represented with mapped depictions of historic settlement locations and the known archaeological resources which correspond with them.

A multi-scalar analysis of known cultural resources is presented in Chapter 5. At the macro level, analysis focuses on the relationships between the historical and theoretical narratives and their corresponding visual representations through mapping. Discrepancies are identified, and their implications discussed with respect to the research questions outlined above.

Meso level analysis uses GIS density maps of cultural resources within the watershed to test the perspectives and theories from the previous chapter. Three density maps based on rough time periods for the resources are presented and discussed.

The closing chapter of this thesis consists of my conclusions and recommendations for future heritage mapping approaches.

Figure 1: Vicinity of the Black Butte River Watershed in California

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Chapter 2:
Critical Technological Approaches in Mapping

Amid changing attitudes toward a broader version of heritage, archaeology, public history, and CRM, the definitions of whom and what the practice of these fields constitute are also growing (Clark 2008; Fairclough 2008). Here I will use the term heritage inclusively to encompass the various fields and institutions that work with cultural materials, peoples including stakeholders and communities, research and interpretation. In essence, I am using the term to refer to those academic disciplines and working practices that create narratives of the past, to acknowledge and attempt to incorporate these perspectives in this research.

The broadening of the role of heritage managers has included much discussion of increased public participation and influence over local heritage spurring critical discourse over the issues of authority, inclusivity, accessibility, and interpretation (Blakey 2010; Jameson 2008; Morgan et al. 2006; McGhee 2012; McManamon 2008). Interwoven with this broadening sense of heritage are topics of the applicability of technologies in heritage studies and their ability to facilitate and promote solutions to the issues above. While the focus of this chapter is on mapping technologies, many authors include these types of themes with the uses of mapping in practice and the topics are briefly discussed.

Critical Technological Approaches

Critical technological approaches refers to a contemporary discourse that examines the relationship between heritage theory and heritage practice to critically address the role of technology throughout the research process including products of interpretation and understanding public interest and opinion. Studies of this vein include a wide array of topics combined with various technical methods. The most critical of these follow a particular technology or group of technologies, like mapping, through past research to understand how they were used to create representations. They conclude with examples on how technological advances may improve the quality and clarity of visual representations for future research. I use the term *critical* because typically these articles discuss how the application of a technology to data sets illuminate some aspect of that data, or in general help to make sense of a given set of data and how this affects our understanding of the past. Discussion in this type of discourse includes a wide range of topics such as: collections management, data management, visual interpretations, exhibit design, mapping etc.

In addition, I include authors who critically analyze the use of technology in various heritage related contexts. These authors consider observances on the ability of technologies to transmit ideas for instance, or the use of technologies in recreating objects and landscapes of the past. Though these authors may not necessarily apply a technology to data, their approach examines the use of technologies critically, and they are carefully discussing the application of technologies in heritage and heritage management.

For instance, Praetzellis et al. (2007) present the results of a long-term heritage program, or collection of projects, as a result of the Loma Prieta earthquake in 1989. Interested local citizens and heritage managers from operations such as the Anthropological Studies Center (ASC) and Caltrans helped to create various forms of civically engaged heritage research and interpretation that sought to benefit the local community of West Oakland. One of the successful products resulting from this research was a video on the historic archaeology of the area, released by Caltrans in 1999 and described as follows: "The short documentary [*Privy to the Past: Historical Archaeology of West Oakland, California*] provides an introduction to the field of historical archaeology- the study of the recent past using the familiar artifacts that people left behind. Caltrans distributed the video to the local community and further afield; it has become a favorite in introductory college archaeology courses." (Praetzellis et al. 2007: 122). In addition, video was used to record interviews and other interesting data throughout the research process. Though the use of video as data collection and presentation was integral to discussion of the issues in heritage, explicit discourse on this relationship was not an integral part of the article. To what degree is the application of a technology, in this case video, within the contemporary heritage context successful in promoting the types of change mentioned above?

Some practitioners view the relationship between technological advancement and "Changing Aspirations" in heritage management as "mundane" (Fairclough 2008:301). There is a growing body of research however, that identifies technology and technological approaches as essential to the advancement of linking theory and practice. Topics of discussion in this vein of thought include mapping and survey (Fitzjohn 2007; Gillespie 2011; Hacugüzeller 2012; Opitz and Limp 2015), creating inclusive/participatory heritage management practices (Cameron and Kenderdine 2007; Giaccardi 2012), and the impact of popular multi-media on public perceptions of heritage and heritage management projects (Finn 2001; Hamilakis 2000; Harrison 2010; Talalay 2003; Shipley 2015). Indeed, Fairclough (2008:301) continues to write that the "mundane" technological applications of IT systems and GIS, "both change how the heritage resource is defined and offer new opportunities to deal with it." It is the relationship between technological applications and how we use them to interpret and represent data that concerns this research. The following section explores current mapping technologies and their applications in heritage contexts.

Changing Perceptions of Mapping and Survey

The technological methods of mapping and survey have long held place in the practice of various forms of heritage research and management. To examine technologies in mapping and survey I refer to the term High-Density Survey and Measurement (HDSM) as presented by Opitz and Limp (2015) as a preferred term to encompass a range of current mapping technologies that produce data and interpretations, often visual in representation. Their annual review presents the most recent collection of HDSM methods including technologies such as Light Detection and Ranging (LiDAR), real-time kinematic global navigation satellite system (GNSS) survey, robotic total stations, and photogrammetry (Opitz and Limp 2015). Much of the work in these areas has been publicly funded in Europe (Opitz and Limp 2015: 349-350), and the United States (Giradino 2011). Applications of GIS technologies will also be discussed in this section however, discussion of participatory GIS is limited to the section of this review that concerns inclusive and participatory heritage (*see* Elwood 2006, Purser 2012). Detailed explanation of the new technologies will also be limited in this section as to more explicitly highlight the use of technological approaches to expand our understanding of heritage resources around the globe.

The successful use of technological applications in achieving various research goals have come with heated discourse and strong criticism, in the fields that comprise heritage and others including geography (Hacugüzeller 2012; Purser 2012). For the sake of space, we will not rehash the decades-long discourse here however, a rather bare-bones rendition must be noted for context. Critical discourse in this area often directs attention to the way in which researchers apply GIS technologies that perpetuate epistemologies that include “representationalist preoccupations” (Hacugüzeller 2012:252). Positivist, male dominated ideologies, issues of adequacy of goals and outcomes, and issues of authority are perpetuated in GIS-aided representations. Practitioners are criticized for applying new technologies in perpetuation of the same old paradigms, resulting in products of interpretation that do the same.

Authors like Hacugüzeller (2012:256) seek to further understand how the "GIS map will similarly lend itself to ever differing sets of practices, representations, political and ethical concerns or discourses as we keep on editing it and as its contexts inevitably keep on changing across time and place together with its archaeological relevance and our archaeological research questions". This sentiment of examining the way in which technologies of mapping are challenging existing paradigms is echoed in Opitz and Limp (2015) with a broadened reference to technologies through discourse on HDSM, and in various articles of the edited volume by Cameron and Kenderdine (2007) that discuss landscape level approaches, 3D models, and virtual reality.

Hacugüzeller (2012:256) and Opitz and Limp (2015:351) agree that explicit discourse on the analytical and interpretive potential of these technologies is lacking. Opitz and Limp (2015:351) refer to this level of discourse as "scattered throughout archaeology and that archaeologists using HDSM in important analytical and interpretive ways are not talking about HDSM explicitly." I will proceed with discussion closely following the concepts presented by Opitz and Limp on HDSM (2015) and then discuss landscape approaches using 3D modeling, virtual reality (VR), and forms of augmented reality as discussed by various authors (Cameron and Kenderdine 2007; Keay et al. 2014; Vadala and Milbrath 2014; Vadala and Milbrath 2016; Vadala 2015).

High-Density Survey and Measurement

Opitz and Limp (2015:348) define HDSM as "at the most basic level, all the technologies [that] record relative *x, y, z* positions on the surfaces of an entity or entities. […] we exclusively consider the *x, y, z* data and their derivatives." For the purposes of this review HDSM refers to the applied technological approaches to the methods of mapping and survey in contemporary heritage practices including archaeology. Derivatives are the visual aids, the *maps*, and can include 3D models, LiDAR, GIS maps, and photometry. Analysis includes landscape level, site-level, and object level data and products that are visual in nature. Discussion moves through the application of HDSM in various sub-disciplines and lines of thought including zooarchaeology and bioarchaeology, geoarchaeology and archaeological stratigraphy, contextual topography, and embodied approaches. Though each section ends in an acknowledgement of a lack of critical assessment to which HDSM contributes to the broader theoretical goals of archeology and heritage, three discrete impacts to the respective fields are presented (Opitz and Limp 2015:358).

The first impact is that the application of HDSM can be broad and inclusive in a multidisciplinary sense, as well as effective in bridging divides between sub disciplines. Second, HDSM can allow us to separate the methods of measurement and data, from interpretations and information "as we attempt to escape from the subconscious assumptions that we impose on the archaeological record." (Opitz and Limp 2015:359). In this way, we can become more conscious of the interpretations of our methods; what Hacugüzeller (2012) refers to as a shift toward non-representational thinking. The third contribution or impact relates to the ability of HDSM technology to examine space and form in archaeology. The tools offered by HDSM technologies have the ability to provide "careful observation and consideration of these basic archaeological dimensions" (Opitz and Limp 2015:359). Unfortunately, this area is also reported as lacking in practice but clearly this review represents a body of literature that is pursuing the application of HDSM technologies in changing the way we perceive mapping and survey in general. Direct and explicit discourse centered on this relationship is often a suggested goal for continued, self-reflexive examination.

Applications in Landscape Approaches, 3D models, and Virtual Reality

Perhaps the most successful applications of current mapping and survey technologies at a critical level have occurred in conjunction with landscape level or macro level approaches to cultural interpretations. These studies are pushing the boundaries of what constitutes mapping and survey, as well as changing our perceptions and interpretations of these methods. Please note that most, if not all, of these studies involve the manipulation of some type of *x*, *y*, *z*, data through technologies that produce a derivative or interpretation of that data that is visual in nature as previously mentioned.

For instance, satellite remote sensing and GIS have allowed for the mapping of technologies such as LiDAR and satellite imagery, effectively allowing archaeologists to visually identify the landscapes of the past around the world (Fitzjohn 2007; Parcak 2009). In combination with ground-based remote sensing and testing, results of pilot programs such as the study by Keay et al. (2014) in Portus, Italy have produced a more comprehensive record of historic landscapes by identifying archaeological features of the historic Roman port town. This study recognizes the importance of applied HDSM technologies as rapid mapping tools in transforming approaches to Classical archaeology (Keay et al. 2014:29). Success was apparent in the multi-scalar approach afforded by the combination of technologies in creating ranges of contextual landscapes. Such landscapes are used to study ancient settlement patterns and larger urban infrastructures. Note that in this case study HDSM technologies did not replace field survey and testing completely but were used to complement and direct on the ground identification of cultural landscapes. This study explicitly discusses the results of the conscious use of HDSM in achieving advanced levels of understand and context in such landscapes.

In similar fashion researchers are taking an even more dynamic approach to applied technologies and landscape by producing GIS reconstructions, exemplified by recent work at Cerros, Belize (Vadala and Milbrath 2014). This study contributes an analysis of ideological transmission at an early Mayan site in connection to monumental architecture (Vadala and Milbrath 2014). GIS reconstructions of the ancient Mayan landscape of built environment combined with archeoastronomy and view-shed analysis were used to map the alignment of buildings based on astrological events. The authors identify a correlation between the emergence of agriculture and development of an agricultural calendar with the alignment of temple structures over time. It is theorized that as the Maya turn to agriculture, the construction and use of monumental architecture also changes. This stands as an excellent example of research that begins to achieve the critical analysis and combinations of data as described by Hacugüzeller (2012) and Opitz and Limp (2015), by using mapping technologies to reexamine our diachronic understanding of Maya architecture.

The last section in *Theorizing Digital Cultural Heritage: A Critical Discourse* (Cameron and Kenderdine 2007:301-455) is focused on the application of technologies predominantly in the museum industry, for creating *virtual heritage* for museum visitors to experience. The term is used throughout the chapters to describe virtual reality or augmented reality models meant to interpret visual and spatial data to convey an immersive experience, with one article considering the use of artificial intelligence (Barceló 2007). For instance, Kenderdine (2007) discusses the use of panoramic landscapes as immersion into virtual space, both contemporarily with digital technologies and in the past. Champion and Dave (2007:341) investigate place making and sense of place in virtual heritage and argue for hermeneutic qualities in virtual places including exclusively online environs. Critical discussion is also presented that analyses how information is presented in virtual heritage (Forte 2007) and the pitfalls or disappointments of virtual heritage as a valuable tool for learning and conveying information (Flynn 2007). Common criticism includes the perpetuation of visual grandeur in place of meaningful information.

This conglomeration of articles represents a very tangible application of a suite of technologies used to immerse the audience in a virtual heritage experience. The article by Refsland, Tuters, and Cooley (2007) begins to change the perspective from passive audience to collaborative participant in the creation of heritage through the mapping of urban spaces. This transition from virtual heritage as an immersive experience to a participatory experience of collaborative mapping blurs the lines between information and audience and questions the role of heritage managers in the process of creating heritage.

Authority and Access

Traditional roles of authority and access from a heritage perspective, both in research and management settings, are challenged by the notion of inclusive and participatory projects. This plays out in particularly interesting ways when considering applied technological approaches. The first of two recurring themes of this discourse can be paraphrased as follows: If a goal of inclusive and participatory projects involving applied technological approaches is to realistically achieve said goals, then those participating must be equally footed in knowledge of the technologies being applied to the project. Typically speaking the authors find that authority in this regard is not equally shared, thus perpetuating the role of heritage researchers as authority figures, cast in the role of technical expert (Purser 2012; Silbermen and Purser 2012; Brown 2007). Following this reasoning, if true and equal collaboration is to occur, knowledge of a technological application must be coupled with equal access to those technologies, access to data (Cameron and Kenderdine 2007), and input into what data counts as relevant or important to mapping a landscape (Scott 2002). Some authors research the combination of these problems and addresses them in tandem.

One particularly explicit example of this combination comes from Deidre Brown (2007) and the Maori from New Zealand. Brown (2007:77) theorizes on collaborative potential between "museum professionals, curators, Maori participants, software and hardware industries, and academics" based on bicultural pilot projects. Discussion involves a high level of authority granted to the Maori in most, if not all levels of research. For instance, Maori informants were highly involved in deciding how to digitize "customary Maori performance" (2007:84-87). Traditional ideologies on death taboos, tribal narratives, and customary Maori hierarchies within portraiture are some of the considerations afforded to plans of digitization in effort to extend authority to the Maori. In terms of access, legal and ethical concerns are considered with discussion on how to go about granting access to the Maori while ultimately restricting other types of access through ownership and intellectual property rights (Brown 2007:87-89). Perhaps the most overarching unifying theme found in these types of articles echoes previous authors by explicitly identifying the potential of new technologies to perpetuate old stereotypes and "decontextualize" representations (Brown 2007:87).

Contributing to these overarching themes within the broader discourse is a discussion of these elements through contemporary video games (Gardner 2007). In most, if not all of the contemporary video games involving content developed through knowledge of cultural heritage, the player is immersed in representations of war, colonization, imperialism and or the development of civilization. In many scenarios these games implicitly and explicitly perpetuate popular ideological motives that are often at odds with contemporary discourse of heritage issues (Gardner 2007:270). Thus, in promoting unilinear ideologies, such as advancement through stages of civilization, popular views as opposed to professional views are reinforced and reiterated interactively through game play (Gardner 2007:269). Of course, the player is overwhelmingly cast in a role of supreme power such as a pharaoh, king, or emperor etc. Gardner calls for an increase of interaction between the heritage community and video game development, fully realizing the potential for impact in popular interest and opinion in cultural heritage (2007:271).

Summary

The suite of publications presented here clearly demonstrates the interest and acknowledgement of critical studies concerning the role of technologies in Heritage research. Authors concerned with this emerging body of research are growing more aware of the benefits, problems, and issues presented by various technological applications. Many of these authors call for more critical analysis, and more active participation in the processes that are being developed, by heritage managers themselves, vested communities, and various commercial and institutional interests. At a time when technology changes rapidly, the range of possible applications to cultural heritage also changes. Collectively, this body of research represents a group of scholars who anticipate such change and are actively seeking to discuss the benefits and challenges inherently linked with it. In preparation for changes in mapping technologies, we should critically assess how we have and are currently using these applications. To demonstrate how this can be addressed I will use the BBR watershed as a case study in the critical assessment of mapping for the project area.

Chapter 3: Background, Significance and Methods

To answer the need for more critical evaluation of the application of mapping methods and technologies in heritage research, I present a case study focused on mapping of Native American resources in the Black Butte Watershed. This chapter provides background information on the project area and natural setting, discusses the significance of mapping cultural resources in California, and establishes the methods for a multi-scalar analysis.

Study Area

The study area for this research is the Black Butte River and its associated watershed, located in Glenn, Lake, and Mendocino counties in northern California. It lies within the boundaries of the Mendocino National Forest (MNF) and flows for 25 miles from its headwaters in the south to the confluence of the BBR and the Middle Fork of the Eel River in the north. Early topographic maps refer to the watercourse as South Fork of the Middle Fork Eel River (GLO plat map 1878 T23N R11W; *also see Figure 5*). In fact, the Black Butte and its associated watershed are a part of the greater Eel River drainage system, which has been noted for rapid erosion (Wagner and Rowe 1977).

The Black Butte River travels through the following USGS CA 7.5' topographic quadrangles from south to north: Kneecap Ridge, Hull Mountain, Plaskett Meadows, Plaskett Ridge, Mendocino Pass and Newhouse Ridge. Additionally, some cultural resources included in this study are also located on the Thatcher Ridge, CA 7.5' quadrangle.

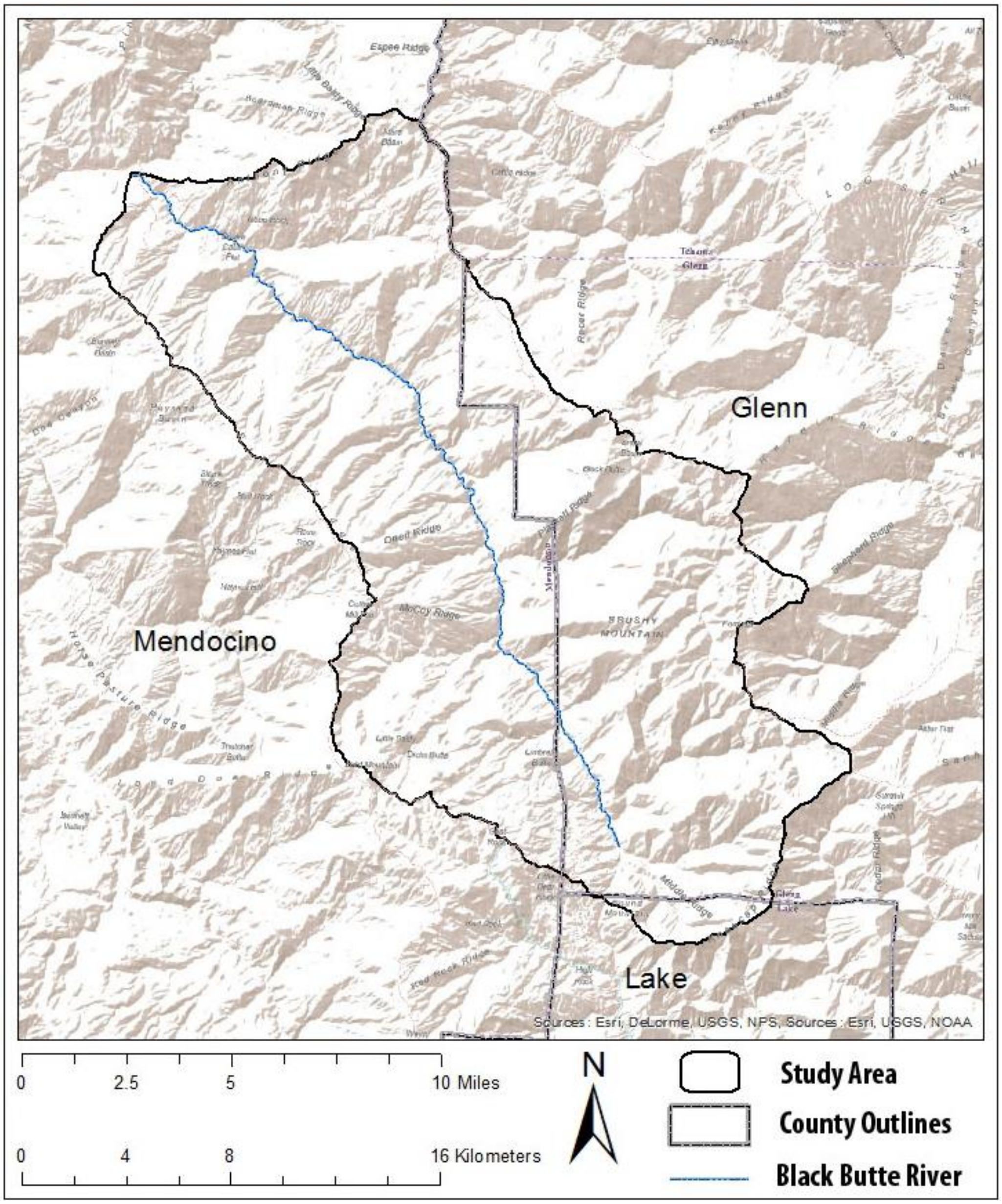


Figure 2: Study Area

Environmental Overview

The Black Butte River and its watershed spans approximately 26 miles, starting in the south and draining north-northwest into the Middle Fork of the Eel River and reaches widths of approximately eight miles. The watershed is part of the greater Eel River drainage system; noted for quickly eroding topography (Wagner and Rowe 1977) and unstable geomorphology.

This phenomenon is due to unstable soils and periodic flooding events and causes observable changes of topography in relatively short periods of time (Edwards 1966). Inevitably, these conditions have been noted to damage archaeological features (Dugas et al. 2014; Edwards 1966; Treganza et al. 1950).

The watershed is bounded by steep slopes, to the east by the apex of the North Coast range and to the west by Etsel Ridge. Elevation change ranges reach approximately 6,000 feet. Though the topography that forms the canyon is steep in many places, the dramatic elevation changes create a multitude of topographic features including large trending ridgelines and a range of mid-slope terraces. The river itself culminates in a relatively large and flat riparian area formed at the confluence of the Black Butte, and Middle Fork Eel rivers. This results in a wide variety of ecological niches or microenvironments.

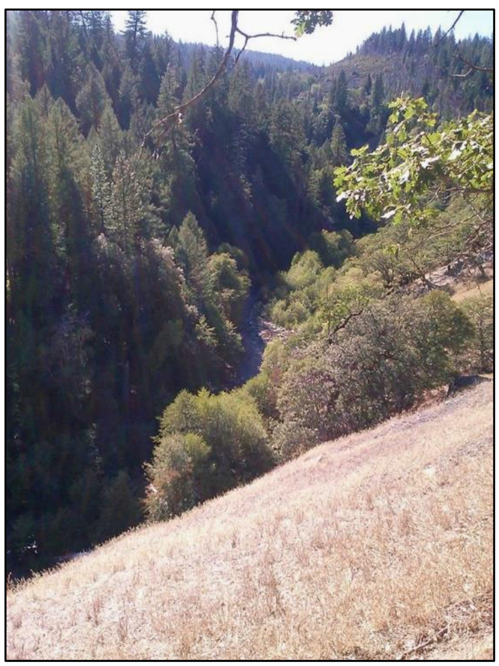


Figure 3: Photograph of the Black Butte River watershed. Notice the drastic elevation changes within the canyon.

Typical characteristics of the microenvironments of the project area include: mixed conifer forests with springs and streamside woodlands, oak woodland, mixed grasslands and oak savannah, rocky areas and cliffs, and a riparian belt that follows the river (partially from Brown 2003[1957]). Due to topographic variations along the riparian belt, the width of this area reaches up to several hundred meters, contributing to a wide range of ecotones where the slopes and terraces of the canyons meet the winding, sandy elevations of the river's banks. The banks appear to be constantly changing, likely due to a combination of rapidly eroding and unstable geomorphology, and periodic flooding events that have been described as causing relatively catastrophic change within the riparian areas (Dugas et al. 2014; Edwards 1966).

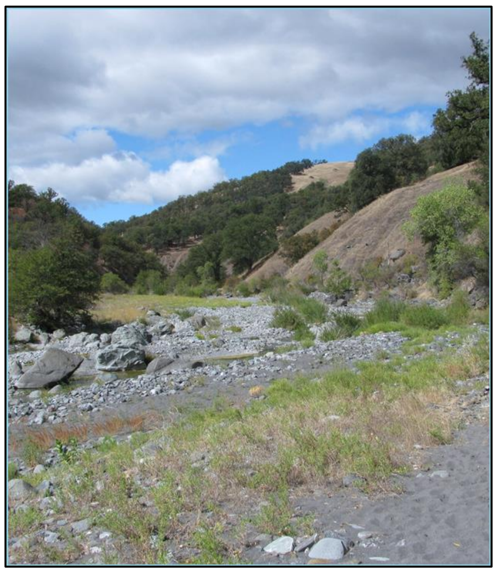


Figure 4: Oak Savannah with Riparian Area in Foreground.
Photo courtesy of Mike Dugas.

Significance of Mapping Cultural Resources

This section examines the importance of mapping in California's heritage research. Because mapping is such an expansive subject, I will use the California Historical Resources Information System (CHRIS) to discuss the significance of mapping throughout the state. This system is essential to heritage projects in a regulatory context but also serves as a clearing house for heritage data and plays a key role in a diverse array of heritage-based projects and research.

Though much of the data maintained by the CHRIS is archaeological by definition, this is broadening in accordance with contemporary changes in heritage management.

Mapping in the CHRIS

Maps and the process of mapping are essential to operations of the CHRIS. This system is operated by the state of California and is comprised of three entities: The Office of Historic Preservation (OHP) which oversees the system, nine Information Centers (ICs) distributed across the state which maintain the data, and the State Historical Resources Commission.

The nine ICs across the state operate to maintain and provide access to the CHRIS for public and private sector heritage projects. They do this by maintaining records for individual cultural resources known as *resources*, and reports know as *studies*. Reports are often related to specific CRM projects but also include general and academic research specific to an ICs service area. Each center responsible for maintaining the actual records, as well as the corresponding database. Combined, these resources and studies are used in a wide variety of regulatory projects to meet compliance standards for the National Historic Preservation Act at a national level, and the California Environmental Quality Act at the state level. Additionally, the ICs often work with local governing bodies to insure compliance at the county and city levels.

Maps are an important part of this process in two basic ways. First, the main reason maps are significant to the process is that the locations of resources and studies are maintained on official base maps, which are used to access this information in the database. When a researcher has a defined project area, they compare the location of their project to the base maps to identify previously recorded resources and the corresponding documentation. At the completion of a project, the researcher will then send a study with records for any additional resource identified during the project. The ICs will then process these documents and add locational information to the base maps as necessary. Typically, the ICs delineate resource and study locations onto USGS 7.5-minute topographic quadrangles. With the prevalence of GIS technologies in heritage projects, practitioners are often using alternative base maps including aerial imagery. Along with this trend, the OHP and the ICs are undergoing a major effort to digitize locational information for resources and reports. To summarize, the process of mapping is essential to the CHRIS because information in the database is accessed through locational information maintained on official base maps, and the use of GIS to accommodate these efforts is growing.

To a lesser degree of importance but significant nonetheless, the ICs have developed a fairly large collection of maps that are available to use for reference. These often include historical maps such as General Land Office plats and United States Geological Survey quadrangles, and the maps produced by heritage researchers in the past. These historical maps are often used to assess the cultural sensitivity of a given location. Particularly of interest to this research are maps that include information on the locations of Native American resources, such as ethnographic maps that depict village locations. The maps discussed in the next chapter fall into this category, and most are available for reference at the corresponding IC.

Methods

The first step in this process was to gather information and maps relating to the distribution of Native American settlement, linguistics, and social organization. This included research at Sonoma State University and the Northwest Information Center (NWIC), Chico State University and the Northeast Information Center (NEIC), the Mendocino National Forest

Supervisor's Office in Willows, CA, to locate academic, CRM based, and popular interpretations of Native American culture and corresponding examples of mapping. Additionally, I obtained the publication and map by Essene (1942) by scouring the Society for California Archaeology's book room at an annual conference as this particular publication was difficult to locate otherwise.

Next, I reviewed these sources to identify overarching themes in the narratives and maps which are discussed in Chapter 4. This involved reviewing many publications and their maps to form some sort of categorization with which to base my analysis, including those for California overall, and for research concerning the BBR watershed specifically. The major themes I chose to discuss are as follows: Ethnographic Interpretations, Archaeological Interpretations, Native American Land Management Practices, and Yuki Region in the Historic Period. These themes were chosen to represent as much of the literature I reviewed as possible, and to include a variety of perspectives that also had corresponding maps representative of each category. They collectively cover narratives from the prehistory of the Yukian region through the historic period to the 1870s.

To test for theoretical bias in the maps from these major themes, I then researched the known cultural resources that fall within the boundaries of the BBR watershed to use as my data set. These records were obtained from the Northwest and Northeast ICs, and Mendocino National Forest. They represent Native American and Historical resources recorded over the last 50 plus years, predominantly due to CRM projects, and are archaeological in nature. With the assistance of Dr. Thomas G. Whitley, I used these resource records to create resource distribution and density maps for three basic chronological periods. This allowed for comparison of the spatial distributions suggested and presented in the major themes, against the currently known data set. These maps are based on locational and age information for each resource, as described below, and the analysis is presented in Chapter 5. Additionally, I include a macro level discussion of the maps used to represent the prehistoric distributions of Native American groups in California in general, by comparing specific maps against the general themes and perspectives from the narratives.

In total, 299 resources were used in the creation of the resource density maps. Organizing the data took several steps and followed the official processes of the ICs as stated in the *Information Center Rules of Operation Manual* (*see www.ohp.parks.ca.gov*). First, I compared resource records obtained from MNF against the resource records at the NWIC and NEIC. This enabled me to identify resources that had not been added to the CHRIS, and to update resource records as necessary. Next, the resources were digitally mapped by myself and IC staff members based on the locational information provided by MNF. The locations of each resource were checked by IC staff and then added to the database in GIS.

Once the resources were updated and mapped, I used the *Age* identifier from the CHRIS database to code each resource into one of three basic categories including prehistoric (PRE), multicomponent (MUL), and historic (HIS), (*refer to* Appendix A *for a table of the resource Primary Numbers and associated age coding*). Prehistoric resources are those that have cultural materials associated with Native Americans, multicomponent refers to resources with both prehistoric and historic materials, and historic resources include those that have no Native American cultural materials observed.

This data was then used to run a kernel density analysis with an output resolution of 10m and a search radius of 2500m for each of the categories. As the resources were mapped as polygons, they first had to be converted to point data to run the analysis. The output is a series of three maps that display the density of resources across the study area. The results of this analysis are compared against existing interpretations of resource distribution and discussed in Chapter 5. Based on these densities we can get an understanding of settlement patterns within the watershed over time, but this schematic has its limitations.

Limitations

As with any research, there are limitations to this study. My analysis and interpretations are limited to the mapping of existing resource with studies referenced as necessary. Linear resources were excluded from the kernel density analysis as they would have skewed the results. The recorded linear features consist of historic roads and trails with no prehistoric linear resources for comparison. This is by no means to say that linear resources are not important, but rather the work necessary to build the data set for analysis is beyond the scope of this research. Isolates were also excluded unless they had an associated record on file as no other documentation for isolates exists at the ICs and no isolate information was obtained from MNF. The distinction between ages is another major limitation. Each category is based on an interpretation of the cultural materials that comprise a resource and are just as much based on cultural affiliation as with an actual age of occupation. In this fashion *prehistoric* correlates with Native American resources, *multicomponent* with resources that have both Native American and Euroamerican cultural materials, and *historic* with resources that have only Euroamerican materials. These time markers are useful in a broad sense to show changes in settlement patterns over time but are limited in that they are not distributed over time in equal intervals. Further teasing of time intervals into smaller or standardized intervals could be possible through relative and chronological dating methods but is outside the scope of this study.

Chapter 4: Cultural Contexts and Settlement Patterns

This chapter presents some cultural contexts of the BBR watershed and adjacent region. Due to the nature of this research I will tend to focus on large-scale context and historical events with interpretations of Native American cultures in the project area. The following sections are organized into four very general views of cultural context for the Yuki language area: ethnographic interpretations, archaeological interpretations, historical interpretations, and Native American land management practices. Variance between perspectives about the people and events of the region will be highlighted in part to critique the relationships between these narratives and the maps that accompany them. Typically, analysis and discussion of habitation across a landscape has been centered around the location of cultural resources, with emphasis on the locations of villages. Terminology used to reference a village location varies along with the places that they reference.

Throughout heritage literature on the region, the places that Native Americans lived, worked, prepared food, and practiced culture have been referred to in several ways that include confusing terminology with little description of their differences. Terms include camp, rancheria, village, and habitation site. I use the term *village* to reference what have been identified and recorded as single archaeological resources, these are represented in the CHRIS database as containing elements of prehistoric habitation. I use the term *habitation* in the archaeological jargon use, which refers to those resources that show evidence of human occupation without necessarily being an ethnographic village site or camp. Prehistoric habitation resources are commonly identified through features such as house pits or depressions in the soil (Kruchten 2008), and domestic refuse such as debitage, fauna remains, and midden deposits

(Chazine 2005). Despite this distinction, the divide is ambiguous and difficult to distinguish within the prehistoric resource records. Thus, the verbiage may not actually distinguish any significant factors between resources and as previously stated, all prehistoric resources were mapped for resource density analysis in Chapter 5.

Ethnographic Interpretations

The earliest academic research about the Native Americans who once inhabited the BBR organized California Indian cultures according to language families (Kroeber 1976 [1925]). The Yukian language family was spoken by various groups of people along the Middle and South Forks of the Eel River and associated watershed, with a smaller group of Yukian speakers on the coastline, called the Coast Yuki generally (refer to Figure 5 below). The Huititno'm are known to have inhabited the BBR watershed (Foster 1944), and the Native American resources that fall within the study area are generally attributed to this group of Yukian speakers.

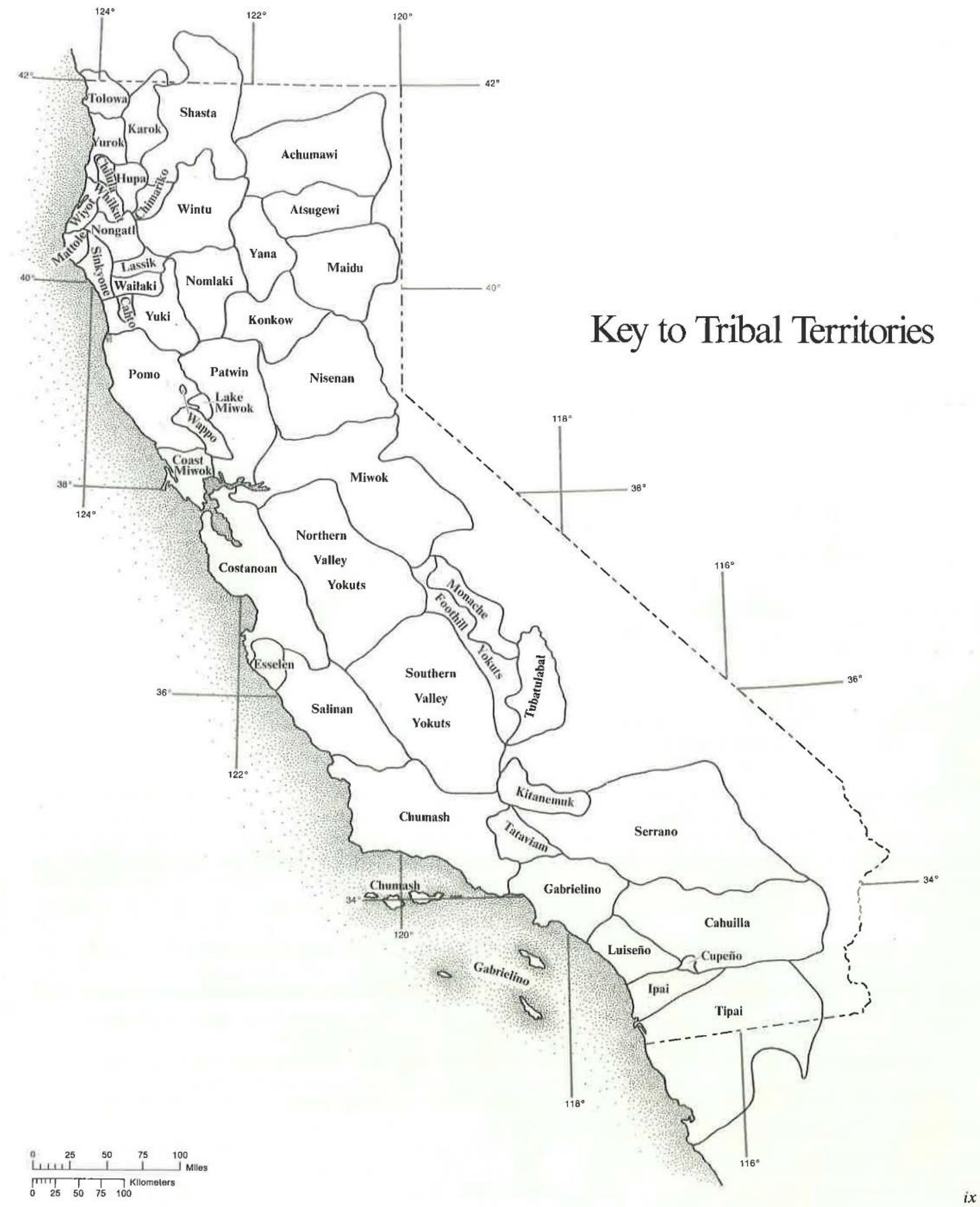


Figure 5: Key to Tribal Territories by Heizer (1978:*ix*).

Kroeber (1976 [1925]) created the basic map of California Indian language families that is still used to define the cultural affiliation of heritage materials. Further maps of the Yuki ethnographic area also based on this publication (see Figure 5 above). The accompanying narrative of Yuki culture provides insight to understanding early representations of Yukian groups through mapping. In his section on "habitat" (1976[1925]:160-161) Kroeber writes:

> "The native did not think, like modern civilized man, of his people owning an area circumscribed by a definite line, in which there might happen to be one or many water courses. This would have been viewing the land through a map, whether drawn or mental; and such an attitude was foreign to his habit."

He continues to describe Yukian speakers as being loyal to the village of their birth, their territory comprised of the watershed in which it is located or a portion thereof. Kroeber proclaims that the Yuki have no understanding of the concept of a map whatsoever, for *civilized* versions of maps have arbitrary boundaries that are created through mapping constructs and represented by maps in a physical sense. In contrast to the civilized map, the Yukian territorial boundaries are characterized as simple minded in intellect and irregular in form because they tend to follow features of the landscape like rivers or ridgelines.

The Yukian perspectives of landscape and ownership are also characterized as simple minded and irregular. The notion of isolated groups or tribelets, separated by geographical features is offered and propagated throughout the narrative. Each tribelet is thought to be independent politically but also isolated socially and geographically. Correlating with this sense of isolation are relatively low population estimates. The result being an interpretation of a relatively low population spread out over the landscape. Despite the descriptions of the Yukian cultural landscape, specific locational information for resources like habitation sites are not represented on the maps (see Figures 5 and 6).

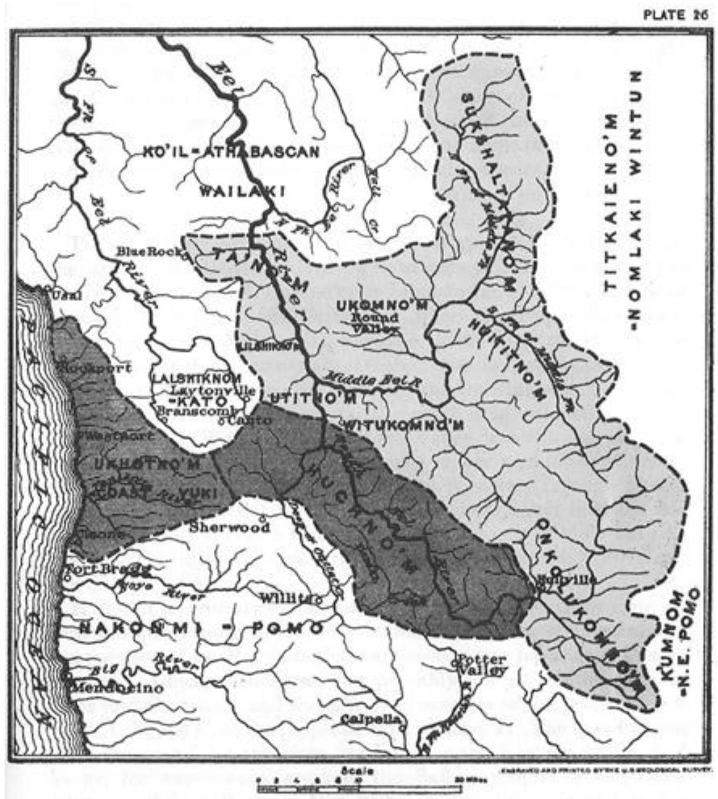


Figure 6: Major Yukian Subdivisions (Kroeber 1976[1925]:159).

Subsequent research presents subgroup locations with maps displaying village site locations (see Figure 7 below). Four village locations are marked within the Huititno'm boundaries. The boundaries of the subgroups themselves are credited to the natural environment (Foster 1944:161):

"It is natures fault, and not any intricacy of the Yuki mind or subtlety of Yuki institutions, if this extraordinarily compact and unitary fact takes form on our maps in the shape of a meaninglessly curved, indented and irregular border."

Thus, the overall effect of these publications and their respective maps is to display isolated clusters of village locations within relatively expansive ethnographic territories. It is stated that two out of the 20 marked village locations were physically visited by the author; the others are approximated locations “based upon hearsay” (Foster 1944: 157). The locations are based on locational information provided by two informants.

Foster plots the four Huititno’m village locations clustered, relatively, to a 4-mile-long stretch of the river (see Figure 7 below). They appear to represent a clustered core in the center of the Huititno’m territory. The locations are placed along the southern section of the river, far from the borders of other groups or their villages. This correlates well with the narrative portrayed of the small isolated bands of Indians with low population densities.

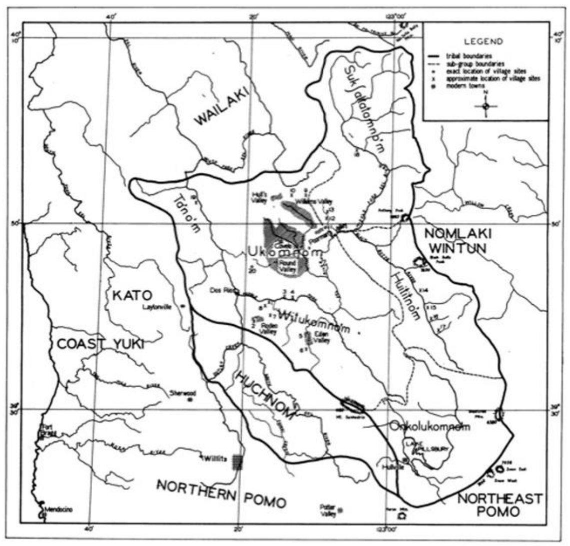


Figure 7: Principal Subgroups of the Yukian Language Family
(Foster 1944: map 1, facing page 155). Note the plotted village locations.

Additionally, the element of time or any chronological sequences specific to village locations within a subgroup boundary are absent from discussion excepting a range of statements regarding very specific examples, which are divided into ‘then’ and ‘now’ dichotomies:

“Elk were supposed to have been occasionally found in the hills in pre-white times, and tradition is that they were hunted much as deer. No Yuki today has ever seen an elk in the wild state.” (Foster 1944:163).

“Seaweed and kelp were traded from the Huchnam before the period of Yuki journeying to the coast.” (Foster 1944:167).

Ethnographic information presented in these publications is difficult to place chronologically. Relative chronology is discussed through language variation, but it is the archaeological data that has provided some baseline information on the chronologies of past habitation on the BBR. These are discussed in the following section.

In summation, two points are pertinent to understanding ethnographic interpretations of the Yukian understanding of landscapes, and the cognitive maps that make sense of those landscapes. First, early researchers assert that Yukian speakers have very little understanding of cognitive or physical landscapes or maps. This idea of cognitive disability prevails in discourse concerning their understanding of landscapes in any way. Second, this research interprets Yuki borders as culturally meaningless, placing emphasis on their correlation with natural topography. Village locations are plotted in the interior of subgroup boundaries, with narratives that portray isolated groups with low population densities. Following this line of thought, we would expect the plotted resource distributions in the density maps to be distributed in isolated clusters. Resources should be clumped together toward the center of the watershed, following the banks of the river. If the major Yukian subdivisions were isolated from one another geographically and socially, resource densities should be distanced from the borders of the watershed that form the Huititno'm boundaries.

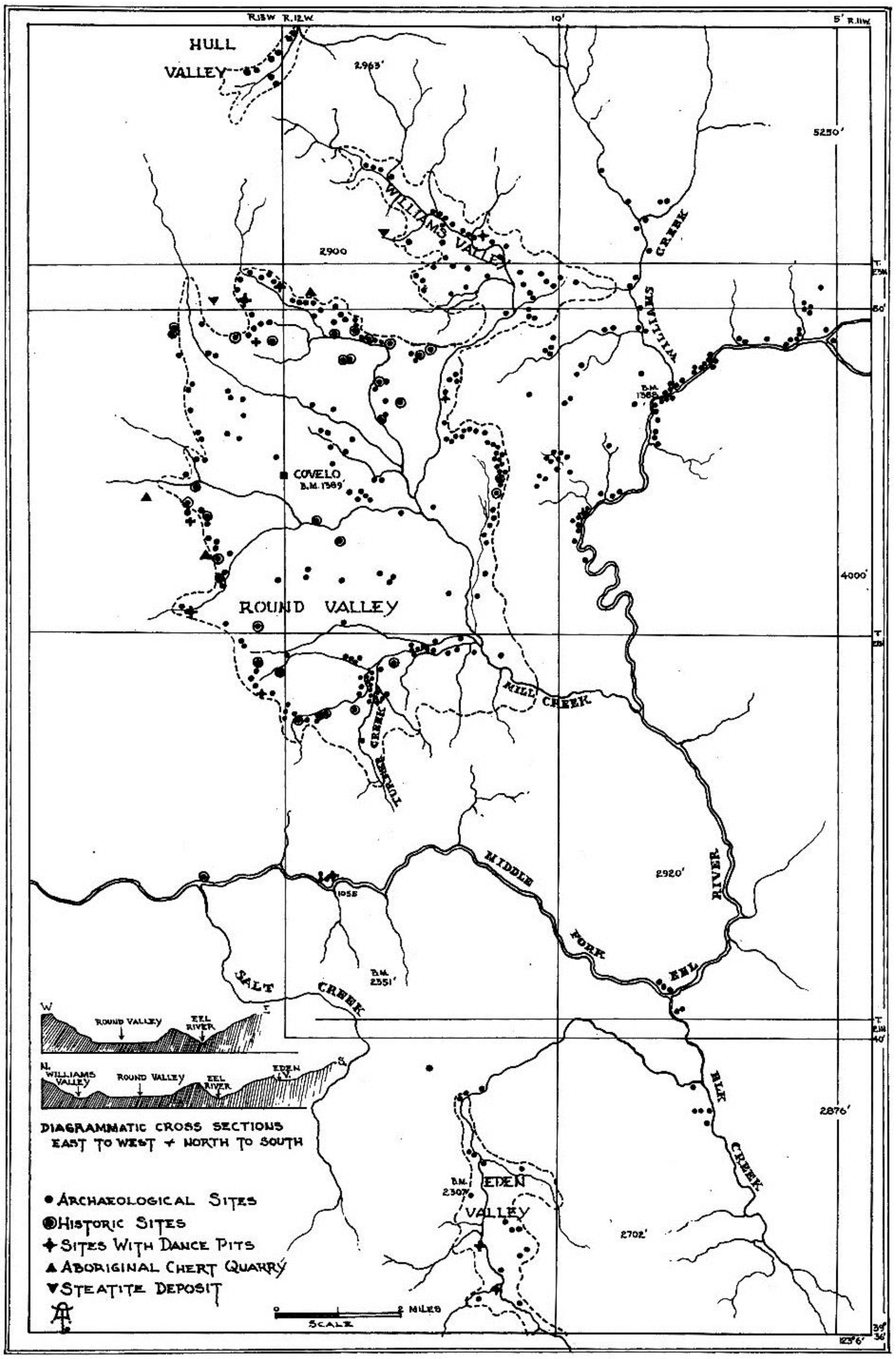
Archaeological Representations

Early archaeological research built upon ethnographic research, adding diachronic elements to our understanding of the Yukian past (Treganza et al. 1950). In the introduction, the authors reference previous ethnographic research within the study area. Noting the work of Foster specifically, (Treganza et al. 1950:113) and build upon it:

"Foster, for example, provides data on 25 historic sites in Williams and Round Valleys." Specific reference to historic village sites highlights the placement of resources into two distinct chronological categories: historic and prehistoric. Ethnographically identified locations are placed into the historic bucket, and the archaeological village locations into the prehistoric. The locations of resources are separated into these categories for purpose of comparison to "make possible a correlation of anthropological theory and archaeological fact" to shed light on Yukian prehistory (Treganza et al. 1950:113; see Figure 8 below).
This marks a definitive chronological distinction for the resources collectively. Though the categories provide relative chronological categories, no specific dates are given. All Yukian cultural resources tend to be lumped into the prehistoric category by archaeologist whom have since added relative and absolute dates to the culture chronology.

Archaeologists have since continued to place Native American resource locations into the prehistoric category, with little representation of their role in the historic period. Focus has been centered on the prehistory of Native cultures with researchers developing more intricate chronological sequences for the Yukian language area and California in general (Fredrickson 1973; Heizer 1978; Moratto 1984). Research more specific to the BBR watershed and surrounding region (Dugas et al. 2014; Holson 1988; Huberland 1988; Price 1994) are also primarily concerned with prehistory and tend to support more distributed settlement patterns as opposed to ethnographic interpretations (Huberland 1988).

Fredrickson (1973) provides a chronology for the North Coast Ranges, which includes three broad periods from which a general sense of culture change over time can be categorized. These categories are predominantly based on stone tools, obsidian hydration, and C-14 dating. The Paleo-Indian Period dates from 10,000BC to 6,000 BC and is characterized by fluted points and crescents (Fredrickson 1973:208-214). The inference of big game hunting with atlatl and dart is made based on these points, with ground stone artifacts being "quite rare or absent" (Fredrickson 1973:211). The Archaic Period is divided into the Lower and Upper Archaic, based on the change from mano and metate to mortar and pestle respectively (Frederickson 1973). The Lower Archaic extends from 6,000 BC to 2,000 BC, the Upper Archaic from 2,000 BC to around 300 AD. The Emergent Period begins in AD 300 with the use of hopper mortars and continues until historic times. These periods also have a variety of projectile points arranged into typologies with a general trend: typically, they get smaller in size over time.



Distribution of Archaeological Sites

Figure 8: Distribution of Archaeological Sites (Treganza et al. 1950:vi).

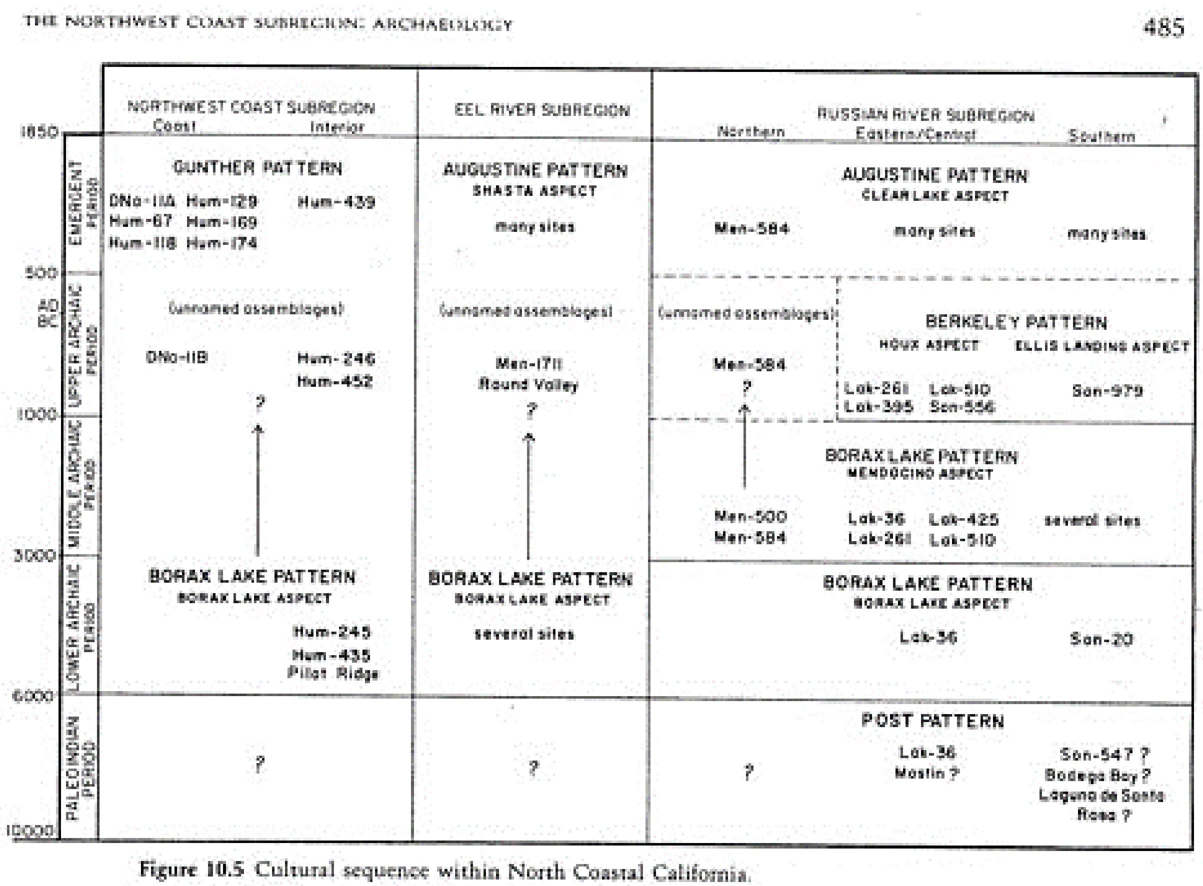


Figure 9: Culture Sequence within North Coastal California
(Fredrickson in Moratto 1984:485).

The use of these broad periods is consistent in the subsequent literature for the archaeology of this area (Dugas et. al 2014; Holson 1988; Huberland 1988; Price 1994). The general chronological periods have undergone only minor changes. The greatest change in schematic for chronologies based on stone tools is in the *"pattern"* (Fredrickson 1973:117). Developing the parameters of these patterns based on changes in stone tools and associated cultural materials is the next step in creating solid chronologies for smaller regions.

Huberland (1988) has added to this dialogue in her examination of sites on Etsel Ridge by expanding upon the various patterns she identified and interpreting settlement patterns of this trending ridgeline. Results of her study show that Etsel Ridge was intensely occupied over several periods of prehistory, and that settlement patterns do not always match earlier ethnographic or archaeological interpretations. This research suggests that the ridge was more intensely occupied over the archaic periods while the habitation locations along the confluence of the Black Butte and Eel River occurred later in time, possibly in the emergent period. She hypothesizes that archaic settlement patterns on the ridgeline are related to the trade of Borax Lake Obsidian, Etsel Ridge serving as a major trade corridor.

Collectively, this body of research develops a more intricate chronological sequence of Yukian cultures and reflects a greater diversity in resource distribution across the landscape. Though much of the discussion is focused on individual site locations and assemblages, several examples challenge the notion of small and isolated groups presented by ethnographic interpretations. For example, the map by Treganza et al. (1950:vi) in Figure 8 displays clusters of Native American resources located throughout the region. The resources are widely distributed across the study area and seem to almost overlap each other. Rather than being isolated to interior subgroup boundaries they are plotted in many areas including valley floors, along waterways, and heavy concentrations in the interface between Round Valley and the surrounding foothills. Analysis of settlement patterns on Etsel Ridge by Amy Huberland (1988) demonstrates a similar pattern. Resources are densely distributed across Etsel Ridge, a broad trending ridgeline located between the BBR and Round Valley. The use of this ridgeline prehistorically is in direct conflict with ethnographic interpretations as the ridge forms the western boundary of the Huititno'm territory, separating them from several of the Yukian subgroups. Given these interpretations, distributions of resources in the BBR watershed as presented in the density maps should not strictly follow boundary lines and are likely to overlap them.

Native American Land Management Practices

This section introduces a slightly differing perspective concerning the ways that Native Americans interacted with their environments, and the ways in which tribelets interacted with each other. They focus on Native American land management practices, and the intensity to which ecological niches and resources were used. This type of perspective explains land management and cultural practices as a part of an ecological system, or what has been previously described as the 'natural' world. Narratives such as this can help to extend the focus beyond boundaries of a single resource and help to make sense of the spaces between them. It takes an active perspective on the relationship between human populations and the environment; an interactive perspective.

Recent work by Lightfoot and Parish (2009;7) presents a synthesis of California Indians with the purpose of building upon earlier works that attempt to force California Indians into previously developed classical ideas of bands, tribes, chiefdoms, and states. California in general had many unique social organizations with a large population, likely due to intensified foraging techniques and land management practices. Social and political organizations were centered around polities called tribelets, relatively small and scattered around the landscape (Lightfoot & Parish 2009:34-36). These small polities are not described as desolate and alone as interpreted in earlier interpretations (Foster 1944; Kroeber 1976[1925]). Various activities brought smaller groups together including trade partnerships, ceremonies, and trade fairs. Note that the idea of tribelets is common in the literature mentioned in the literature discussed above however, the nuances between a *tribe* and a *tribelet* are focused and explicitly stated. Further discussion on this concept is discussed in the analysis in Chapter 5.

The map below demonstrates the distribution of tribelets scattered across the landscape in the San Francisco Bay (SFB) area (see Figure 10). The name of each group is displayed in the location of the tribelets territory and is approximately placed in the location of a primary habitation location. Though these tribelets would have shared larger language family categories as previously discussed, the general understanding is that each group spoke a different dialect, if not an outright unintelligible language from the next. Notice the density of tribelets compared to large language groupings as previously mentioned.

Figure 10: Tribelets in the SFB Area. (Lightfoot and Parrish 2009:34)

M. Kat Anderson (2005) adds to this perspective with her book *Tending the Wild, Native American Knowledge and the Management of California's Natural Resources.* She writes about many techniques used throughout California to manage resources for food and the production of material culture, with a predominant focus on flora. Topics include harvesting, burning, irrigating, pruning and coppicing, sowing, tilling, transplanting, and weeding. This is again, a synthesis of California Natives that promotes them as very active and knowledgeable managers of, especially plant materials for a variety of cultural uses, not just food. For example, Chapter 7 is dedicated to the cultivation of shrubs and trees which were often used in material goods such as basketry and bows and arrows (Anderson 2005:209-239). The amount of knowledge that went into selecting, storing, and preparing these materials for use is astounding. It is in these narratives where she provides a richer content than Lightfoot and Parrish (2009).

Together these authors represent a definite shift from the idea of isolated groups stuck to the inside of a territorial boundary with limited interaction. The point here is to move away from homogenous categories of “tribes” or large regional groups and view Native peoples as “complex hunter-gathers” (Lightfoot and Parrish2009:4) or proto-agriculturists and horticulturalists (Anderson 2005:240-248). In moving away from homogenization of cultural landscapes, we also are moving away from the homogenization of these groups’ settlement patterns. Framing Native groups as active land managers helps to make sense of cultural resources across a landscape, as compared to interpretations of closed boundaries and isolated groups. Considering these views, the distributions of resources in the prehistoric density maps will be located throughout all areas of the watershed, reflecting the use of a variety of ecological niches within a given territory. This concept expands on the ideas presented in archaeological interpretations mentioned in the previous section by focusing on cultural practices rather than artifact assemblages.

Yuki Region in the Historic Period

With the arrival of Euroamericans in the 1850s, the settlement and subsistence patterns of the Yukian cultures were drastically and permanently altered from hunting and gathering to an agricultural landscape. The first documented Euroamericans to locate Round Valley and the adjacent areas including the BBR watershed were Pierce and Frank Absill in 1854, while attempting to locate a navigable route between Sonoma and Trinity counties (Bauer 2009; Miller 1974). Like so many others, the Absill family had migrated to California during the Gold Rush, then relocated to Bodega Bay. The brothers quickly realized the potential of this region for agriculture and were immediately involved in the slave trade of Yukian women and girls, though they may have been preceded by other slave traders (Bauer 2009:33-34). Word of the lush valleys and plentiful waterways spread quickly after the brothers left the valley and as early as 1856 (Madley 2008:310), white Americans were beginning to settle in Round Valley and the general region. This included herding livestock in the general region and, pertinent to this research, in the riparian area that creates a natural passage from the confluence of the BBR and the Middle Fork Eel River, into Round Valley proper.

Early attempts were made by the Federal Government to secure a 102, 000-acre reservation in Round Valley, originally named the Nome Cult Farm (Bauer 2009), but by 1887 settlers had moved in and occupied approximately 90 percent of the original boundaries (Adams and Schneider 2011). Though the population of settlers was considerably smaller than the existing Yukian populations, the newcomers were eager to claim and develop the fertile lands. From the original formation of the reservation in the 1850s to the official reduction in acreage in 1888, a span of about 30 years, Yukian cultures were forced into an agricultural lifestyle. Some were able to scratch out a living by remaining on the reservation but were continually plagued by a severe lack of federal support, and by the destructive efforts of white settlers who ruined crops and used the land for their own agricultural enterprise (Bauer 2009). Settlers were also actively involved in killing off Native Americans through violent conflicts (Madley 2008). Additionally, during this time the reservation was used to relocate Native American groups from across Northern California including Yuki, Atsugewi, Nomlaki, Wailaki, and Maidu speakers, which further complicated issues on the reservation. Most of these groups were relocated great distances from their traditional territories and found themselves competing against each other and Euroamerican settlers for scant resources. Those native peoples who did not work on the reservation farm typically became laborers for other farmers. Children were often taken from their families and forced into servitude in settler's homes or sold into slavery.

The result of these events was the quick decimation of the Yukian population (Madley 2008; Tassin 1887). Researchers have come to summarize this as genocide, not only by settlers in Round Valley but also by the state sanctioned Eel River Rangers who actively worked to exterminate Native Americans along the Eel River from 1859-1860 (Madley 2008:319). These acts of outright violence, combined with a complete reorganization of settlement, altered the Yukian cultures in perpetuity. Although it is difficult to assess the number of Yukian lives lost during these conflicts, it estimated that the total population was reduced by 90 percent (Madley 2008:328). The almost complete destruction of these peoples is astounding but those who survived were eventually forced to relocate to the Round Valley Reservation. Today, the surviving members of the Yukian speakers, along with the relocated groups mentioned previously, form the federally recognized Round Valley Indian Tribes which is a sovereign nation of confederated tribes (refer to *www.rvit.org*).

Given the drastic decline of Yukian populations in such a brief period, we would expect the density maps to reflect this decline. Resource densities across the watershed should decrease from the prehistoric to multi-component maps overall. Additionally, there may be differences in the distribution of historic resource densities that reflect changes in settlement and subsistence strategies. Agricultural practices required large land holdings on which to grow crops and graze livestock. Homesteads would likely be spread out from one another to accommodate this need. Thus, we would expect that the historic period resource distributions will show decreased densities across the watershed.

Summary

This chapter summarizes the dominant themes of settlement patterns for the Yuki language area in heritage research. Early researchers characterized the region as comprised of relatively small, isolated groups of people with centralized village locations and little contact with outside groups. Archaeological interpretations of the region have typically focused more on site specific interpretations and the building of chronological sequencing of stone tool types and amassed a large amount of information on the resources present within the study area a general region that do not always agree with ethnographic interpretations. Some more recent researchers have framed Native Americans as active land managers who lived in small independent polities that were scattered around the landscape. Far from isolated groups, these independent polities are thought to have interacted frequently for a variety of social and economic purposes. The settlement of Round Valley and adjacent areas by Euroamericans completely changed the settlement patterns of the Yukian cultures and replaced a hunter gather cultural landscape with agriculture and led to a loss of 90 percent of the Native population in 30 years.

Given the drastic decline of Yukian populations in such a brief period, we would expect the density maps to reflect this decline. Native American resource densities across the watershed should decrease between the prehistoric and multi-component maps. Additionally, there may be differences in the distribution of resource densities that reflect the changes in settlement and subsistence strategies as the Yukian populations were replaced by Euroamericans. Agricultural practices including farming and grazing livestock required relatively large expanses of land. Given these changes in landscape use, historic resource distributions should be spaced farther from each other than the prehistoric resource distributions. Th.us, a steady decline in resource density and distribution across the watershed is expected as we move through the three chronological periods

Chapter 5: Analysis Through Mapping

After discussing various perspectives and interpretations of native cultures, this chapter presents a critical analysis of these perspectives through a multi scalar critique of mapping. I discuss discrepancies between the narratives presented of indigenous cultures and the maps that visually represent them. Critique comes at two basic levels of mapping including meso, and micro scales relative to the project area, with results of the resource density maps discussed in the meso section. Assuming that maps are vehicles for conveying theoretical positions the focus of this chapter will be on identifying correlations and discrepancies between the narrative themes identified in the previous chapter and the corresponding maps.

Theoretical Framework for Analysis

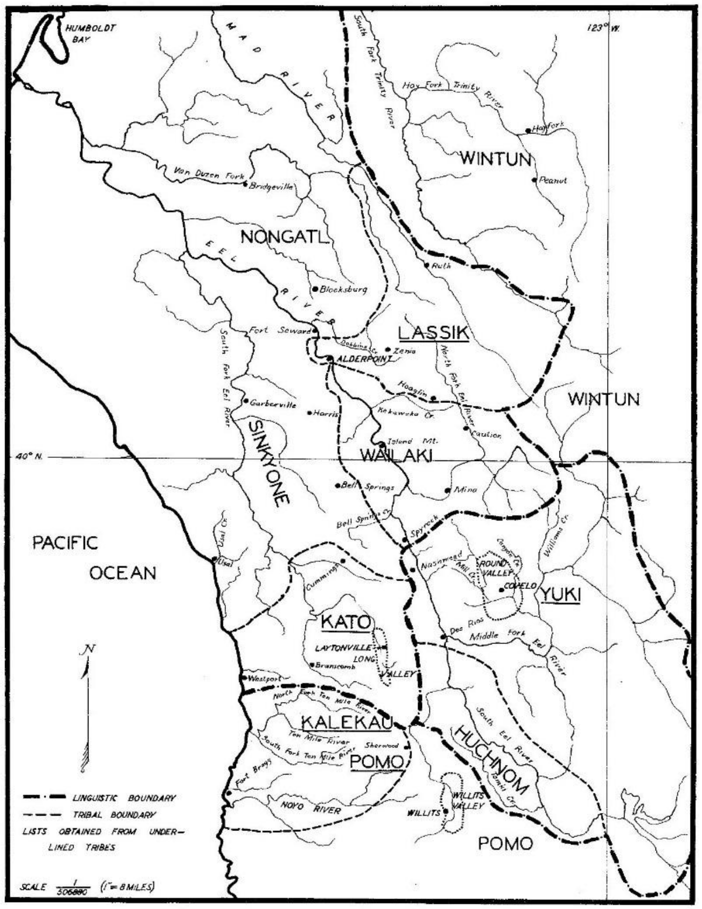
Discussion presented in this chapter is congruent with the framework presented in an article on La Venta, Mexico by Gillespie (2011). In this fashion, the task is to critically analyze the existing maps that represent heritage of the Black Butte River and those who lived there in the past. In the words of Gillespie (2011:5), “maps should be more carefully analyzed in terms of the decisions and conventions that went into their making.” Keep in mind that one of the overarching goals of this thesis is to avoid ideologies that define maps and mapping technologies as benign byproducts of “more fundamental” changes in heritage management (Fairclough 2008:301) and promote an approach that critically addresses the use of maps and mapping technology in heritage research.

I focus on maps as “theory-laden media for conveying information.” (Gillespie 2011:3), rather than considering maps a benign byproduct of the narrative. To understand heritage in a holistic characterization of conceptualizations (Fairclough 2008), we must also understand the data, ideologies, representations, and visual interpretations that have been *previously* established. The purpose being to gain an understanding of the theories that these maps convey, and to understand how they manifest in visual interpretations. I find that, much in line with Gillespie's (2011) analysis of maps that convey interpretations of La Venta, previous maps of the region do not always correlate well with their accompanying narratives.

At the macro level, discussion begins with a look at California in general, and limits the largest scope of discussion to publications of this scale. The meso-level analysis presents the results of the resource density maps. Discussion at the meso-level is focused on inferring settlement patterns from the densities and distributions of resources throughout the water shed based on the three age categories of prehistoric, multicomponent, and historic.

Language Families or Geopolitical Units?

At the macro level, the maps that are currently used to discuss divisions of Native Americans in California are based on Kroeber's language family boundaries. The way the language families are represented however, suggests that these are sociopolitical boundaries. The maps that display the Yukian language area can be very suggestive or even explicit in portraying language family areas as somehow unified socially or politically. Misrepresentation of the meaning of these major divisions can lead to homogenous interpretations of cultures over large geographical areas while simultaneously presenting such discrepancies to the public. In most examples, the problem of misrepresenting language family areas is that they are either mislabeled or aren't labeled well in general.



Map 1. Tribes investigated (underlined).

Figure 11: Map by Essene (1942: Map 1). Note the specific label of Tribes.

Take for example the map published by Essene (1942: map 1, facing page1). In this representation, the geographical regions that are included in the map are divided by Kroeber's language families but are labeled as tribes. The corresponding charts and text are organized into homogenous cultural groups based on language family labels on the map (Essene 1942). The overall effect is that a larger tribal identity is extended onto groups who may not have identified under a larger united tribal structure. The interpretation of an overarching tribal identity is achieved through visual *and* textual representations that remain persistent in heritage literature, including publications meant for public consumption.

Publications geared toward education and public use are an important way of relating heritage information to interested readers and students. For example, Eargle (2000) has compiled a fantastic introductory guide to Native California that discusses the past and present of Native heritage. This publication features 11 maps, one of which is a macro level map of the entire state (Eargle 2000:13). It is accompanied by an explanation of language family groups, but interchangeably uses the term tribe in some cases. For instance, the introduction to the overview of each language family includes the following statement (Eargle 2000:12): "Several of the tribal languages and dialects listed here have merged with others or have been lost. The names used here, are the ones most commonly used in 2000." The designation of tribe or tribal is used interchangeably to reference a specific area that is then described and divided based on language. Thus, language divisions equate to tribal divisions.

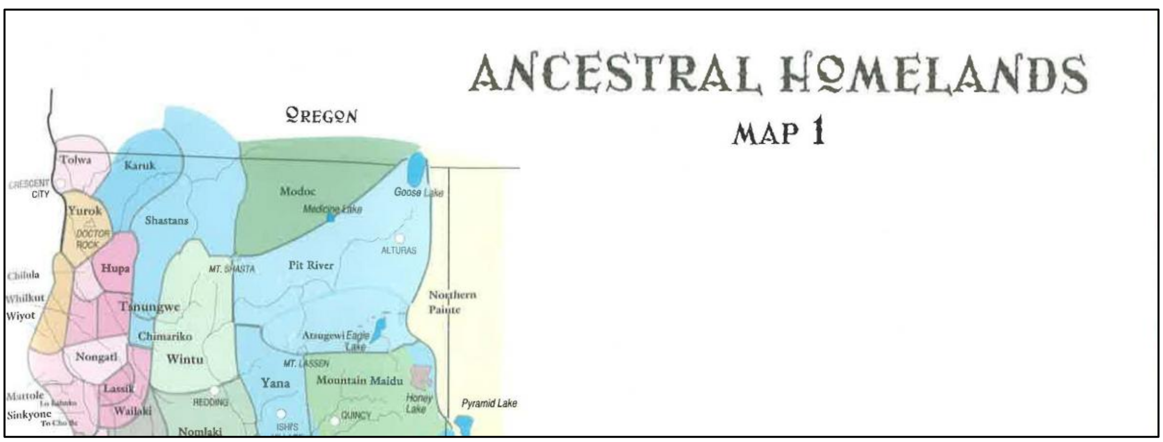


Figure 12: Excerpt from Map 1 (Eargle 2000:13).

To complicate things a bit further, the map is labeled *Ancestral Homelands* (see Figure 12 above) which adds an organizational element and ambiguity to the representation. Language, time, and cultural change are all themes mentioned in the general narrative, and in text explaining the map specifically, but neither the map nor narrative correspond well. While it seems confusing, the overall effect creates a translatable single unit for the reader to interpret each area: the unit of *tribe*.

Meso-Level Analysis

This section presents the results of the resource density maps created by running a kernel density analysis with an output resolution of 10m and a search radius of 2500m. To visually represent the locations of resources and interpret settlement patterns over time, the resources are split into three categories, and each output is displayed on a separate map. The age categories are *prehistoric*, *multicomponent,* and *historic*. The results of the kernel density analysis for prehistoric resources appear to correlate with the settlement pattern suggested by Lightfoot and Parrish (2009) that describe well distributed populations of small polities or tribelets, rather than larger isolated groups that were typically centered within a territory. The multicomponent map shows a decline in prehistoric resources across the landscape and represents a transition from a hunter gather settlement pattern to agricultural. The historic map represents a fully realized agricultural settlement pattern with a fewer number of resource locations that are relatively isolated from one another. Combined these maps display a shift from a well distributed pattern of resources in the prehistoric period, to the more isolated pattern of agricultural use of the landscape in the historic period.

Prehistoric Resource Density and Distribution

In the figure below (see Figure 13), prehistoric resources in the watershed are plotted and their relative densities are displayed. In this representation, resource locations are distributed across the landscape rather than isolated in the center of the watershed along the BBR riparian corridor. Though there are some smaller concentrations of resources toward the center of the watershed, the largest concentrations of resources appear to be positioned along the borders of the watershed.

Larger concentrations in the northern section of the watershed also show a greater density of resources toward the confluence of the BBR and the Middle Fork of the Eel River where the sharp inclines of the greater canyon move into lower elevations culminating at a relatively large riparian area. Densities of resources along the western and southwestern edges of the watershed show large concentrations along the trending ridgeline called Etsel Ridge, congruent with the research by Amy Huberland (1988). Lastly, clusters of prehistoric resources appear to be concentrated on the northeastern and eastern boundaries of the watershed. This correlates with the large trending ridgeline that forms the apex of the North Coast Range in the general region. In summary, the prehistoric resources appear to be well distributed across the watershed with concentrated clusters located throughout. The areas of highest density are in proximity to the outer boundaries of the watershed at the confluence of the Black Butte and Middle Fork Eel River, and the trending ridgelines that form its eastern and western extent. The overall effect of this analysis lends support to the settlement patterns as noted briefly by Huberland (1988) and more in-depth discussion of Native California by Lightfoot and Parrish (2009). Rather than the model of isolated groups centrally located proposed by earlier researchers (Foster 1944; Kroeber 1976[1925]; Treganza et al. 1950), the locations and densities of resources seem more likely to represent a well distributed pattern of small polities or tribelets across the landscape. Though there are some concentrations of resources in the middle of the watershed and in close proximity of the Black Butte River, the major densities of resources are located on the peripheries of the watershed. This distribution more accurately reflects a well populated landscape of hunter gatherers that utilize a multitude of ecological niches located in the watershed.

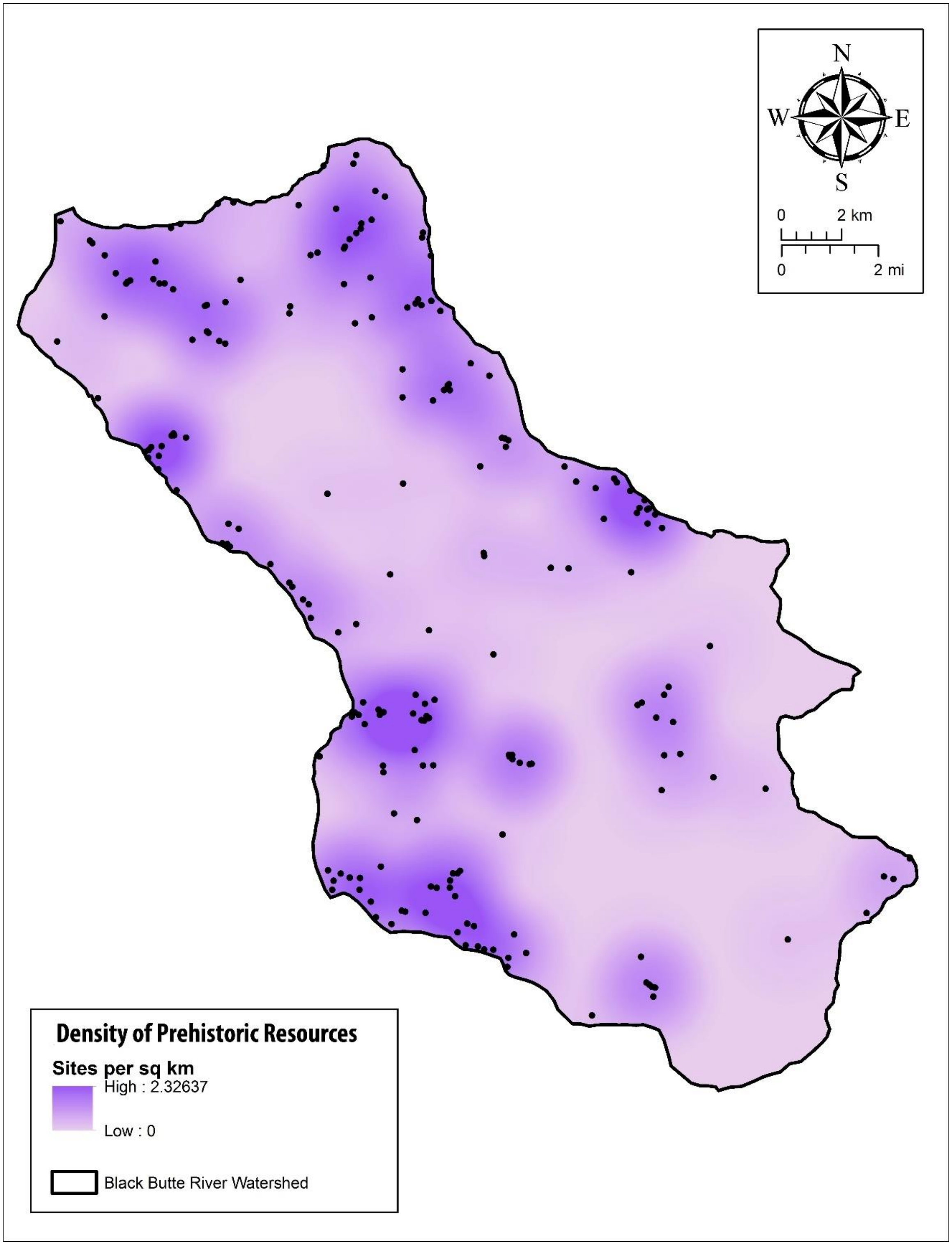


Figure 13: Density of Prehistoric Resources.

Multicomponent Resource Density and Distribution

The multicomponent resource density maps (see Figure 14 below) show a distribution with less density and smaller concentrations overall. In some ways the distribution in this map correlate with those seen in the prehistoric resource density map. For example, there are small clusters of resources toward the confluence of the Black Butte and Middle Fork Eel rivers, some along the western boundary on Etsel Ridge, as well as the ridgeline on the eastern border of the watershed. Some resources also appear to be clustered toward the center of the watershed. The most notable differences are twofold. First, there are a lesser number of resources in this category and though they are similar to distributions seen in the prehistoric map, resources appear to be more isolated from each other. Second, resource densities around the edges are much less robust than in the prehistoric map.

These trends are likely a pattern representative of the initial effects of the introduction of Euroamerican settlers into a hunter gatherer landscape. As the settlers move into the landscape and start to practice agriculture, the Yukian speaking groups are being dislocated, or as previously noted many were outright killed in cold blood. Therefore, what the patterns of distribution are likely to represent is a major shift in settlement pattern and a drastic reduction of hunting and gathering practices across the landscape. Note that in this representation both Yukian speakers and Euroamericans are present in the watershed. Thus, the resource locations are potentially occupied by both groups of people simultaneously, or the material cultures of the groups are intermixed. Glass projectile points found at habitation resources are an example of this (Dugas et al. 2014). This distribution clearly represents the transition into historic settlement.

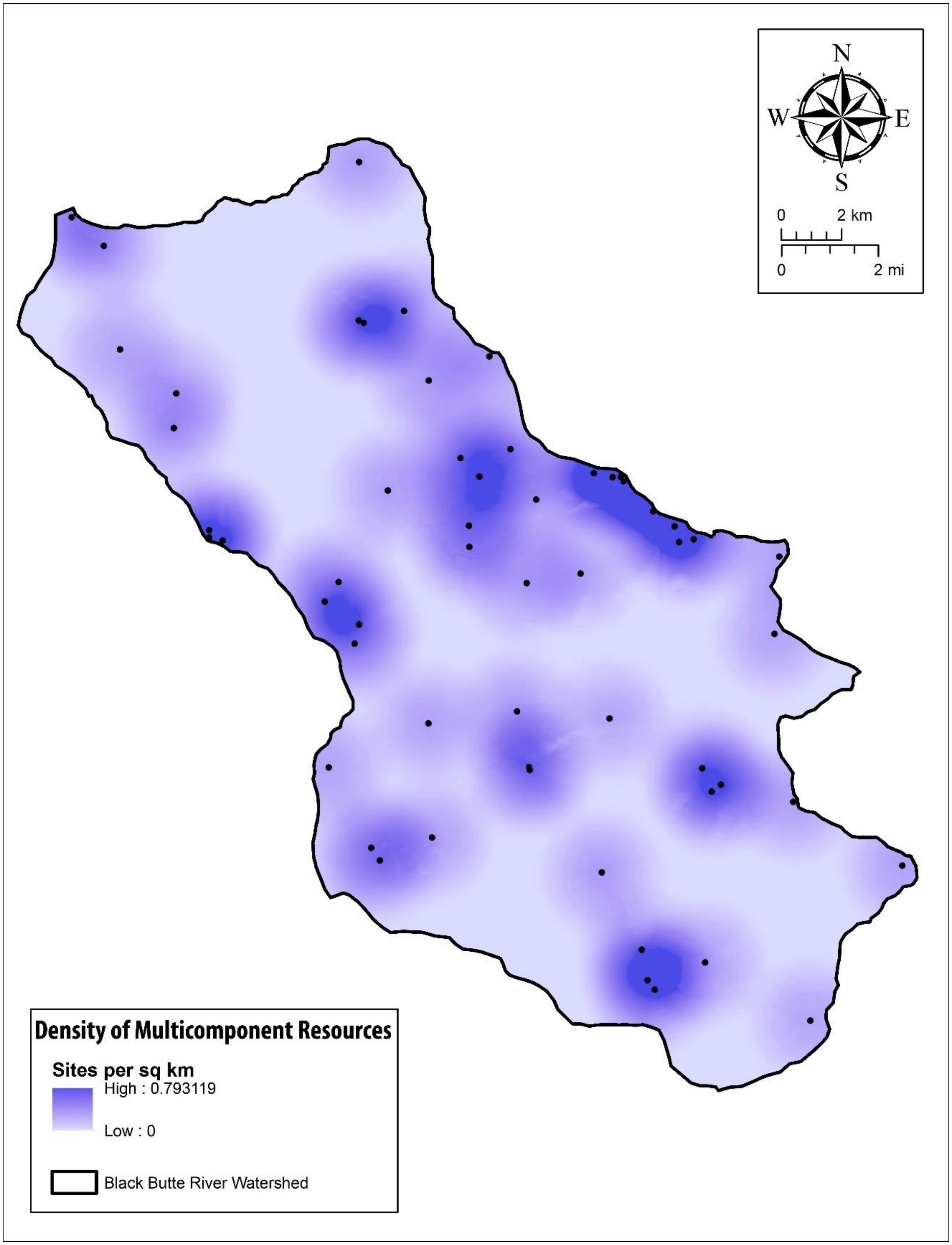


Figure 14: Density of Multicomponent Resources.

Historic Resource Density and Distribution

The historic resource density map is quite different from the prehistoric and represents a full transition into the historic period and agricultural landscape (see Figure 15 below*)*. There are fewer resources as compared to the other maps and the distribution of sites does not appear to match the prehistoric distribution very well. Though some of the locations overlap with resources from the other categories, the overall effect is that the historic resources move away from the edges of the watershed toward the center. The distribution appears to lack major clusters, leaving the impression that these locations are more isolated than in the previous maps. Where there are small clusters, the resources are spaced much further apart, especially as compared to the prehistoric map.

The patterns of resource distribution and density in this map are indicative of the change to a rural, agricultural landscape with the majority of these resources representing homesteading locations. It appears that as the watershed was colonized by Euroamericans and agriculture practices in the region, typified herding livestock including cattle and sheep, the resources are significantly less clustered across the landscape. Raising livestock requires access to relatively large areas of pasture, resulting in a more sparsely distributed rural settlement pattern. This assessment is congruent with the discourse on historic colonization of the area (Adams and Schneider 2011; Bauer 2009; Miller 1974, Tassin 1887). Notably, that these settlers were often competing amongst themselves for access to land and other resources and so spread apart. They did group together when necessary, for instance when illegally occupying reservation lands and engaging the federal government (Adams and Schneider 2011). This map represents a fully realized rural, agricultural settlement pattern.

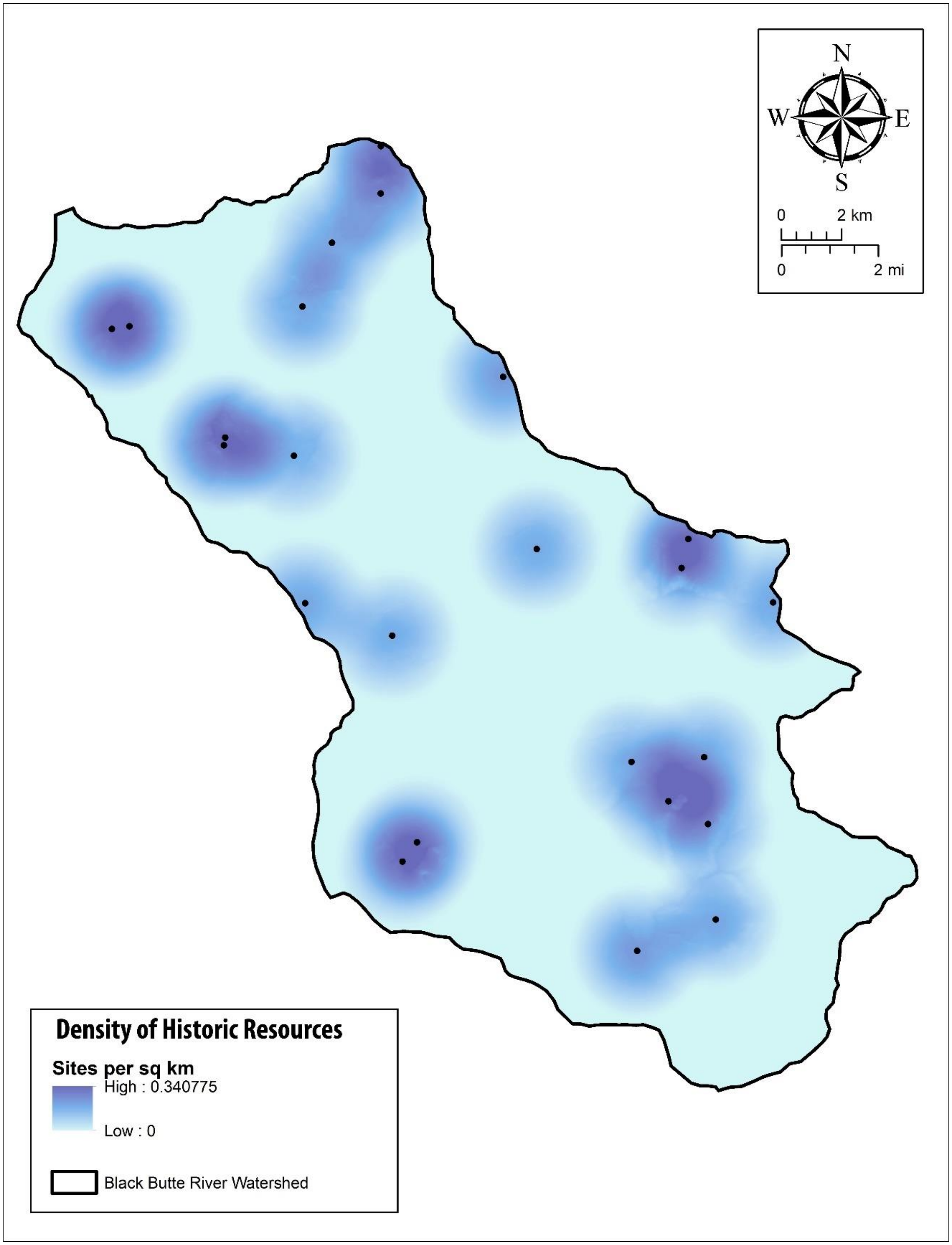


Figure 15: Density of Historic Resources.

Summary

Macro level analysis identifies a bias toward maps that portray CA Native American groups as large tribal units, rather than language families. This is usually achieved through mislabeling of the map and can lead to homogenous interpretations of Native American groups. Research suggests that California did not have large tribal units, sociopolitical units are better described as smaller tribelets. Furthermore, the bias is not limited to anthropological or professional publications but can be identified in maps published for teaching and public consumption. Representing language groups as tribes is misleading to professionals, students, and the public.

Prehistoric resource distributions in the watershed more closely resemble models of active hunter gatherers across the landscape rather than isolated groups, stuck to the inside of a territory. Resources are located throughout the watershed, with higher concentrations along the boundaries rather than along the river. There are resources along the river but the highest concentrations of these appears on the northern boundary, where the Black Butte and Middle Fork Eel River meet.

Multicomponent resources are fewer in number but are distributed throughout the watershed. The pattern is similar to prehistoric resource distributions, but the clusters are more isolated from each other. This is indicative of the decline of Yukian speakers and the colonization of the watershed by Euro-Americans.

The historic resource density map shows less density of resources overall, coupled with an isolating effect. Each resource appears distant from the next, as compared with the prehistoric map. Distributions are suggestive of a rural landscape where homesteads are spaced relatively apart from one another, due to the demand for resources in agricultural practices including pastures for grazing livestock. This map is representative of the transition from hunting and gathering to agricultural practices across the watershed.

Chapter 6: Conclusions and Future Research

Conclusions

Applying a critical technological approach to mapping in the BBR watershed has demonstrated that mapping practices do insert potentially theoretical constructs into their interpretive outcomes. At the macro level of analysis this is apparent in the representation of Native American language families as socioeconomic units. The literature on the area does not support the organization of large tribal groups, but rather postulates relatively small, independent groups or tribelets. When larger groups are represented in maps, they provide a homogeneous interpretation of the social organization suggested by the data. This could lead to homogenous interpretations and representations in future research and publications.

At the meso level of analysis, prehistoric resource densities and distributions support the intensive hunter gatherer model rather than earlier models presented by ethnographers. Resources are located throughout the watershed suggesting wide spread use, rather than constrained to the river corridor. Large concentrations of resources are also located along the boundaries of the watershed so that they appear to overlap them in many places. This pattern is in contradiction to the ethnographic accounts which describe isolated groups who did not associate with neighboring groups or often leave their own boundaries. It would appear that the watershed was used in its entirety, more or less, and that contact between groups was likely more prevalent than previously thought.

Explaining the proliferation of resources along the boundaries of the watershed is one area where this research falls short. The pattern of prehistoric resources in the density maps can be partially explained through intensive use of the watershed. However, this fails to provide any more specific explanations for the abundance of resources along the boundaries. Why are resources so numerous along the borders? Is there a significance to this pattern? To approach these sorts of questions, tools such as edge theory, niche theory, or fuzzy boundaries may be useful.

Critical technological approaches can be valuable to heritage researchers in many contexts and with a variety of technologies other than mapping. For instance, museum professionals often use technology in the creation of exhibits for public presentation. Applying this approach in a museum setting could assist in ensuring that the exhibits visual representations are as accurate as possible and convey the intended message to the audience. Museum staff could use this type of approach to analyze a permanent exhibit and make changes or adjustments as needed based on their findings. Renovations or upgrades to an exhibit space would provide an ideal time for such endeavors. Technologies assessed could include video, lighting, audio, maps, and databases.

The use of technologies, especially digital technologies, is becoming more pervasive in heritage management practices. In some cases, the entire process from data acquisition to product of interpretation and final report, are all achieved digitally. Data and information are stored through digital databases. With the use of this technology on the rise, more critical discourse is needed concerning their effect on the process. This type of discourse can help improve the functioning of new methods, provide words of caution for future researchers, and help to ensure that the intended interpretation is what reaches a given audience. We must have more discourse in this area, as the reliance of digital technologies is growing at an exponential rate. One example being the digitization of the CHRIS base maps.

Future Research

One area for future research is to add more contextual information to the density maps by adding the voice of Native Americans and other stakeholder groups. Using GIS, a researcher could work with stakeholders to identify culturally significant areas and create layers overlapping the resource densities. Hunting areas, gathering areas, homestead boundaries and grazing lands are examples of what could be added that may not be formally recorded as resources. The resource densities could then be compared to the contextual layers to see if patterns emerge to make more sense of spatial distributions. This should be a highly collaborative process between the heritage researcher and local stakeholder groups in order to bring multiple voices to the map and analysis to help explain the existing resource patterns.

Another way to add more contextual dialogue to the study of the watershed would be to analyze the distribution of the prehistoric resources using edge theory, niche theory, or fuzzy boundaries. These theories may lend more insight into the tendency of resources to be located around the borders of the watershed. While the idea of intensive hunter gatherers supports a wide distribution of resources across the watershed, it does little to explain the pattern along the borders. Why is there an abundance of resources along the boundary? Is this pattern connected to a natural resource or a social relationship? Research along this vein could provide insight into the patterns from the distribution maps.

In addition to adding contextual elements to the distribution maps, a micro level analysis of a resource within the watershed would prove useful. Following the basic methods in this thesis, analysis at this level may provide insight into the potential for bias to affect mapping practices at the resource level. Are there similar issues as seen in the macro and meso level maps and narratives? What new relationships can be found with heritage mapping at this scale?

The final suggestion for future research is a comparative study using similar methods in a different region. The sample size of the region and scale of analysis could vary widely. For instance, a researcher could focus on another state and the heritage mapping at a macro scale, then select a smaller sample for density maps at the meso level. If the sample is in California, a sample from a different language family could be chosen and would provide excellent comparative data. The best way to continue this specific research though, would be to analyze another of the Yukian sub groups. Ideally, a group adjacent to the BBR watershed would be chosen to help explain the resource densities along the borders and to add more interpretation to the resource distribution of the region in general. Whatever the sample size and location, a comparative study would gauge the usefulness of the approach used in this research in another region.

Appendix A

Table of Point Data for Resource Density Maps

	Primary Number	AGE
1	P-11-000024	MUL
2	P-11-000118	PRE
3	P-11-000119	MUL
4	P-11-000120	PRE
5	P-11-000121	PRE
6	P-11-000122	PRE
7	P-11-000123	PRE
8	P-11-000124	PRE
9	P-11-000125	PRE
10	P-11-000135	PRE
11	P-11-000136	PRE
12	P-11-000137	PRE
13	P-11-000138	PRE
14	P-11-000139	MUL
15	P-11-000140	PRE
16	P-11-000144	MUL
17	P-11-000147	MUL
18	P-11-000148	PRE
19	P-11-000150	MUL
20	P-11-000152	MUL
21	P-11-000153	PRE
22	P-11-000176	MUL
23	P-11-000178	PRE
24	P-11-000179	PRE
25	P-11-000180	HIS
26	P-11-000181	PRE
27	P-11-000183	MUL
28	P-11-000184	MUL
29	P-11-000185	PRE
30	P-11-000186	MUL
31	P-11-000187	HIS
32	P-11-000196	PRE
33	P-11-000197	HIS
34	P-11-000198	HIS
35	P-11-000199	MUL
36	P-11-000200	PRE
37	P-11-000201	PRE
38	P-11-000202	PRE
39	P-11-000203	PRE
40	P-11-000205	MUL
41	P-11-000222	PRE
42	P-11-000233	MUL
43	P-11-000234	MUL
44	P-11-000236	HIS
45	P-11-000237	PRE

46	P-11-000248	MUL
47	P-11-000250	MUL
48	P-11-000251	PRE
49	P-11-000252	PRE
50	P-11-000266	PRE
51	P-11-000267	MUL
52	P-11-000269	PRE
53	P-11-000281	PRE
54	P-11-000282	PRE
55	P-11-000283	MUL
56	P-11-000284	HIS
57	P-11-000288	PRE
58	P-11-000290	PRE
59	P-11-000291	HIS
60	P-11-000304	PRE
61	P-11-000431	PRE
62	P-11-000432	PRE
63	P-11-000433	HIS
64	P-11-000435	MUL
65	P-11-000436	PRE
66	P-11-000437	PRE
67	P-11-000450	MUL
68	P-11-000451	PRE
69	P-11-000452	PRE
70	P-11-000453	PRE
71	P-11-000454	MUL
72	P-11-000456	PRE
73	P-11-000458	PRE
74	P-11-000459	MUL
75	P-11-000460	MUL
76	P-11-000496	HIS
77	P-11-000497	MUL
78	P-11-000510	MUL
79	P-11-000511	HIS
80	P-11-000512	PRE
81	P-11-000515	PRE
82	P-11-000518	MUL
83	P-11-000552	PRE
84	P-11-000560	PRE
85	P-11-000584	MUL
86	P-11-000627	PRE
87	P-11-000668	PRE
88	P-17-000849	PRE
89	P-17-000850	PRE
90	P-17-000992	HIS
91	P-23-000016	PRE
92	P-23-000057	MUL

93	P-23-000590	MUL
94	P-23-000611	PRE
95	P-23-000612	PRE
96	P-23-000613	MUL
97	P-23-000614	PRE
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126	P-23-000826	PRE
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129	P-23-000829	PRE
130	P-23-000836	PRE
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132	P-23-000842	PRE
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134	P-23-000846	PRE
135	P-23-000847	PRE
136	P-23-000848	PRE
137	P-23-000850	PRE
138	P-23-000852	PRE
139	P-23-000853	PRE

140	P-23-000855	PRE
141	P-23-000856	PRE
142	P-23-000857	PRE
143	P-23-000858	PRE
144	P-23-000859	PRE
145	P-23-000860	PRE
146	P-23-000861	PRE
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153	P-23-000870	PRE
154	P-23-000871	MUL
155	P-23-000872	MUL
156	P-23-000877	PRE
157	P-23-000879	PRE
158	P-23-000880	PRE
159	P-23-000884	PRE
160	P-23-000891	PRE
161	P-23-000899	PRE
162	P-23-000901	PRE
163	P-23-000902	MUL
164	P-23-000912	PRE
165	P-23-000913	PRE
166	P-23-000915	PRE
167	P-23-000916	PRE
168	P-23-000917	PRE
169	P-23-000919	PRE
170	P-23-000920	PRE
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184	P-23-000949	PRE
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228	P-23-002077	HIS
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231	P-23-002081	PRE
232	P-23-002082	PRE
233	P-23-002083	PRE

234	P-23-002084	PRE
235	P-23-002085	PRE
236	P-23-002090	HIS
237	P-23-002125	HIS
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240	P-23-002149	PRE
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253	P-23-002399	PRE
254	P-23-002400	PRE
255	P-23-002401	PRE
256	P-23-002404	MUL
257	P-23-002701	PRE
258	P-23-002702	HIS
259	P-23-002703	HIS
260	P-23-002704	MUL
261	P-23-002705	MUL
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271	P-23-003106	PRE
272	P-23-003107	HIS
273	P-23-003108	HIS
274	P-23-003109	MUL
275	P-23-003110	MUL
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295	P-23-005837	PRE
296	P-23-005839	PRE
297	P-23-005840	PRE
298	P-23-005841	PRE
299	P-23-005863	HIS

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