THESIS

A ROCK AND A HARD PLACE: EXPLORING FREMONT TERRITORIALITY THROUGH THE PINNACLE ARCHITECTURE OF DOUGLAS CREEK, RIO BLANCO COUNTY, COLORADO

Submitted by

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In partial fulfillment of the requirements

For the Degree of Master of Arts

Colorado State University

Fort Collins, Colorado

Summer 2022

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ABSTRACT

A ROCK AND A HARD PLACE: EXPLORING FREMONT TERRITORIALITY THROUGH THE PINNACLE ARCHITECTURE OF DOUGLAS CREEK, RIO BLANCO COUNTY, COLORADO

Fremont occupations in northwestern Colorado's Douglas Creek have long captured the attention of travelers and archaeologists. Spanish explorers in the 18th century dubbed its canyon corridor "El Cañon Pintado", due to the impressive rock art peppered throughout. Researchers in the 20th century were captivated by the masonry architecture perched on pinnacle landforms in the area and some wagered that they may have served defensive purposes. This was a warranted premise, considering the known territorial tendencies of Fremont peoples in the Uinta Basin, and the social and environmental changes that occurred around the time of the pinnacle occupations from 1000–1550 CE.

This thesis represents the first synthetic study of seven pinnacle structures in Douglas Creek and undertakes to determine whether they were indeed defensive in nature through three research themes. Examined first are the physical conditions associated with the pinnacle sites and finds that they are in naturally defensible settings, such as inconspicuous locations on the landscape and areas with steep slopes, dangerous cliffs, and protective blinds. Architectural components of the structures are then assessed to understand how much planning and effort went into their construction. The results show that the masonry construction attests to attention and care on behalf of the architects, although the structures are not always so meticulously built, perhaps signaling a lack of resources on their part. Finally, viewsheds of each pinnacle site are analyzed, and the results reveal that they provide commanding views of the canyon corridor, arable land, and some storage granaries (another form of masonry architecture attributed to the Fremont). These results suggest that the Douglas Creek Fremont were engaged in a mostly passive form of defensibility but retained the option to actively engage in conflicts. This thesis offers these foregoing insights about the territorial postures assumed by Douglas Creek Fremont during a time of socioeconomic stress stemming from drought, demographic shifts, and increased regional conflicts.

ACKNOWLEDGEMENTS

During my time at Colorado State University, I have had the privilege of meeting extraordinary people who have supported me as a made my way through the master's degree program. First and foremost, I would like to thank my advisor, Jason LaBelle. Jason was kind enough to take me under his wing as a graduate student after my initial research intentions were complicated by the pandemic and political tensions in Bolivia. He quickly welcomed me as an advisee and encouraged me to pursue this fascinating project in Canyon Pintado. At numerous critical junctures along the way, he offered me valuable leads on research ideas, helped to orient me with literature relevant to the Fremont, and introduced me to important people who would be of service during this endeavor. Additionally, he offered me an opportunity to work with his Center for Mountain and Plains Archaeology, a position that I have deeply enjoyed. His sustained support and guidance helped me complete this project in a timely and efficient fashion, so important to me as my wife and I welcomed our first child into this world just before I set out to write this thesis. Jason, thank you so much for everything you have done for me. I am honored to have you as an advisor and am immensely grateful for your mentorship.

I would also like to thank Mary Van Buren and Jared Orsi for their willingness to serve on my committee and usher me through this final stage of my graduate school experience. Jared's kindness has been on display from our initial work together on the Eldorado Project with the Public Lands History Center, through to his acceptance to stand as my third committee member. I am indebted to Mary, as it was she who initially suggested that I work with Dr. LaBelle, considering the futility of pursing research in Bolivia amidst multiple crises. Beyond that invaluable counsel, her teaching helped to shape my understanding of archaeology and her comments on my work helped to polish my writing abilities.

Funding for this research came from a travel grant from the Anthropology Graduate Student Research Award, the Center for Mountain and Plains Archaeology, and the Department of Anthropology at CSU. It is thanks to this support that I was able to carry this project through to completion.

I would also like to extend my gratitude to the phenomenal CSU faculty that I had the good fortune to study under during the past two years. Adrienne Cohen and Mica Glanz, I benefited tremendously for our theory course and consider myself a more well-rounded anthropologist today because of it. Kate Browne, I feel so lucky to have taken your course on resilience, well-being, and social justice as you ended your distinguished professorship at CSU. Our work together in Pueblo was also an amazing experience that I will always cherish. Heidi Hausermann, the lessons I gained from your space/place course have become integral to my approach and orientation as a researcher. Diego Pons, I feel as if I became a more critical thinker after your course on coffee, which served to remind me of the limitless entanglements embedded in a single cash crop. Finally, I would like to thank Fernando Valerio-Holguín. Your course on human–animal relationships was instructive for how to understand the implications of this project, which explores human nature from a different perspective. I am indebted to all of you for helping me become a sharper student and — even better — a more informed person.

Bureau of Land Management archaeologist, Lukas Trout, offered me his time and expertise as I worked in the White River District last summer and helped to facilitate the federal permitting process necessary for this project. Thank you, Lukas, for helping to orient me with lay of the land out there and cue me into relevant insights for my research. I also owe a debt of gratitude to Dudley Gardner, who kindly offered me information and guidance stemming from his decades of work in western Colorado. Thank you, as well, to Kallie Sanders with Colorado's Office of Archaeology and Historical Preservation, whose initial record search was instrumental in my research design.

Finally, I would like to thank my wife, Sophia, and our infant son, Roland River. Sophia, it has been quite a journey since we floated the Wacissa River in the Florida Panhandle all those years ago — the moment that you convinced me that I should give this graduate school idea a try. You have been by my side every step of the way and now that the dream has come to fruition, I am reminded of how lucky I am to be with you. Your loving devotion and tireless patience as I obsessively committed myself to my graduate studies and this thesis project have been the greatest gifts I could have received. Roland, I dedicate this work to you, who came into our lives right as I set out to write this manuscript. The arduous task of completing this thesis was made sweeter knowing that I could end each evening in a cozy embrace with you and your mother, as Colorado's winter carried you through your first season of life.

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CHAPTER 1: INTRODUCTION

This research project is designed to explore the concept of territoriality among the Douglas Creek Fremont, an indigenous society that lived in northwestern Colorado between ca. 1–1500 CE (Reed and Metcalf 1999:116–119). Throughout their occupations, they combined horticultural and foraging lifeways and settled along tributary confluences of Douglas Creek. They are best known for their distinctive rock art style (Creasman 1982), which is represented on hundreds of panels along the Canyon Pintado National Historic District. A particular style of masonry architecture is another definitive characteristic of this Fremont group, and it took on two forms. The first, enclosed storage granaries, are scattered across the region in well-hidden areas and were used to store corn and other resources. The second, open masonry structures perched on isolated outcrops and pinnacle landforms (henceforth, these sites are generally referred to as "pinnacles") throughout the region, are in remote and rugged areas with commanding viewsheds (Figure 1). The question of how these people expressed territoriality is explored here through a synthetic analysis these pinnacle sites, structures that other researchers (Wenger 1956, Creasman 1981a) believed were built for defensive purposes. If these pinnacle structures were inherently defensible, it follows that these Fremont had developed conflict resolution strategies to maintain access to their Douglas Creek territory.

Figure 1. Rocky Ford Overlook, one of the Douglas Creek pinnacle sites included in this study. Slab-built masonry coursework is seen atop this pinnacle landform, which is in a well-protected setting with a commanding viewshed. Summer 2021. Photograph by Joshua Bauer.

Substantial archaeological evidence supports the premise that Douglas Creek was a homeland for the Fremont people for at least 1,300 years. Researchers in the area have also concluded that these Fremont began declining in the area between 1000–1300 CE (Reed and Metcalf 1999:118). Their eventual disappearance from Douglas Creek is particularly interesting considering the intensification of conflict, warfare, and violence among indigenous cultures of the Southwest during the transition from the Middle to the Late Periods (ca.1100–1350 CE; LeBlanc 1999; Turner and Turner 1999). Archaeologists have essentially theorized that prolonged dry periods coupled with incursion of Numic and Athapascan peoples into the Colorado Plateau would have precipitated intense social pressures and cultural changes around this time (LeBlanc 1999:277). Taking these broad trends into account, the Douglas Creek pinnacles may well attest to a local Fremont group whose livelihoods were compromised by an intensifying influx of competitors intertwined with resource scarcity. Accordingly, they would have needed to adapt to the inexorable metamorphosis of their milieu or face annihilation.

Considering this local environmental and social context, of principal interest in this investigation is whether these masonry structures are inherently defensive in nature, and particularly, whether their architects designed them for passive or active defensibility. A territorial people would have these two forms of conflict resolution at their disposal; the former would entail avoidance of altercations with competitors, while the latter would involve direct confrontation (McCool and Yaworsky 2019; Schroeder 2018). The research undertaken here is therefore to understand the territorial qualities of these ancient people and deduce their defensive strategies. Embedded into this research are causal factors such as climate change, food insecurity, and cultural resilience — migration, incursion, and warfare. As eclectic as these themes are, they are all explored through the prism of Douglas Creek's slab-built pinnacle structures.

These distinctive structures bestrewn throughout Douglas Creek's desert landscape, in western Colorado's Rio Blanco County (Figure 2) are not irrefutably products of the Fremont culture, nor are they all dated. However, I cite numerous lines of evidence in defense of their Fremont authorship and temporal association with regional droughts and exogeneous migrations through the region between 850–1300 CE. The subsequent interpretation draws upon an

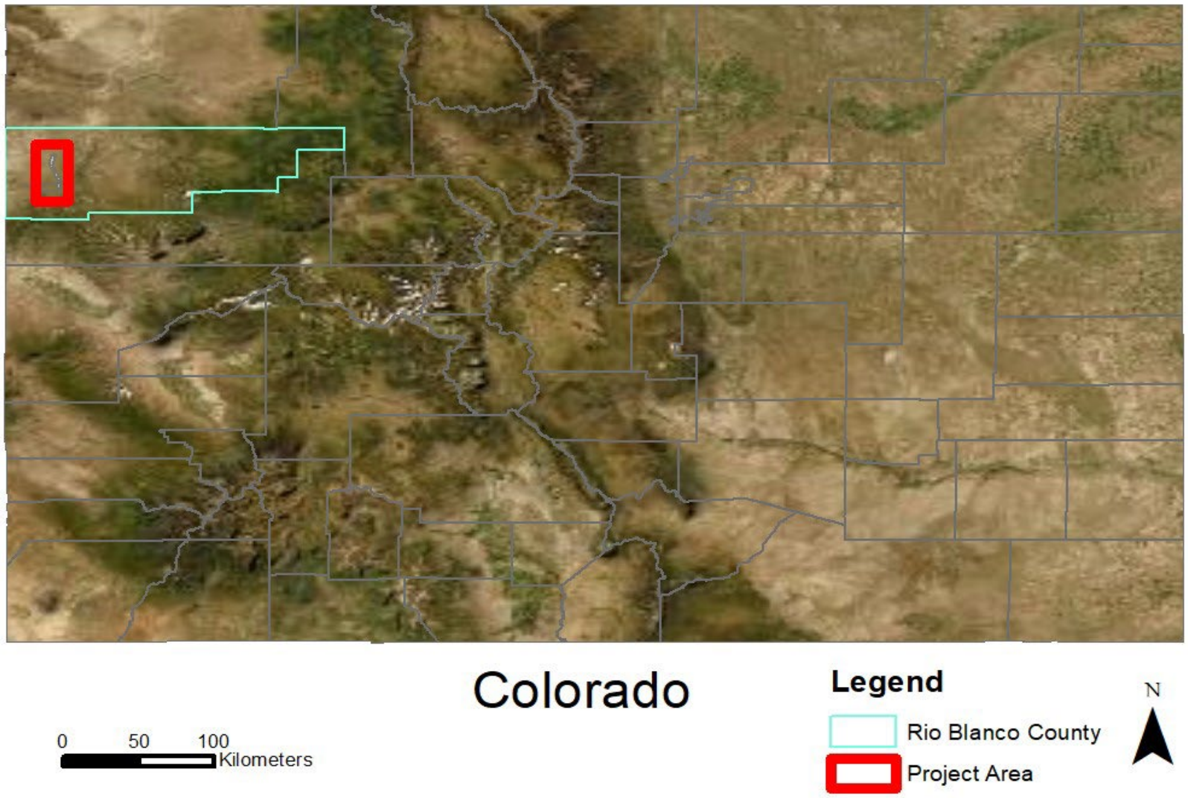

Figure 2. Showing the project area in Rio Blanco County, Colorado.

archaeological understanding of this society, with particular attention to the cascading environmental and demographic stresses these people may have endeavored to overcome.

The pinnacles (i.e., pinnacle sites) constitute the central focus of this investigation. To furnish a robust understanding of their function, three questions are used to address a variety of factors: 1) *What are the physical conditions and access features associated with each pinnacle structure?* 2) *What does the construction of the pinnacle structures suggest about their function?* 3) *What are the viewsheds afforded from the pinnacle structures?* The thrust of these entangled inquiries is to produce a quasi-simulation of the lived experiences of the architects and inhabitants of the pinnacle structures, as well as their proposed antagonists. As such, each question is meant to dovetail into the next. The reader is invited to envision approaching the pinnacles from the canyon below, traversing their access paths, negotiating landscape obstacles near the structures, glean a sense of protection from their masonry walls, and gaze upon their viewsheds from within. To impart fidelity to this imaginary journey and — more importantly — to yield meaningful scholarship, a litany of considerations is woven into each theme. Together, they comprise the scaffolding of variables upon which fundamental elements of Douglas Creek Fremont life are reconstructed. In short, studying how these variables coalesce privileges a reliable discrimination of these pinnacles' functions and an adjudication of their possible role in defensive strategies.

Project Summary

As is discussed in Chapter 3 of this manuscript, anthropology provides the theoretical framework for how environmental change, socioeconomic pressure, and cultural adaptations articulate together. Yet, we do not understand how these dynamics may have unfolded in Douglas Creek. Researchers have postulated that territoriality likely developed among the Douglas Creek Fremont, and have suggested that these pinnacle structures could have served the local population's defensive needs (Wenger 1956:86; Creasman 1981a:282–289). However, no other researcher has studied a sample of these structures with the depth achieved here. Other researchers have significantly advanced our understanding of Fremont territoriality through similar studies in nearby Fremont districts such as Nine Mile Canyon (McCool and Yaworsky 2019) and Range Creek (Boomgarden 2009) in adjacent Utah. In keeping with those efforts, this thesis specifically tests the hypothesis for Douglas Creek Fremont territoriality vis-à-vis the defensibility of their pinnacle architecture.

Environmental and Cultural Context

Uinta Basin

The northeastern Colorado Plateau is comprised in large part by the Uinta Basin (Figure 3), a vast and often dramatic ecosystem of sparse deserts, riparian lowlands, pinyon-juniper communities along foothills, and high elevation forests. This basin is bounded to the north by the towering Uinta Mountains, to the south by the labyrinthine Tavaputs Plateau, to the west by the Wasatch Plateau, and to the east by the Piceance Basin. The variable topography of this basin would have presented local foragers with a wide array of plant and animal resources that occurred in reliable patterns (Spangler 2002:3). However, the imposing physiographic barriers surrounding it would have limited interaction between local people and those of the Great Plains and the southern Colorado Plateau. The eastern and western boundaries are less formidable and

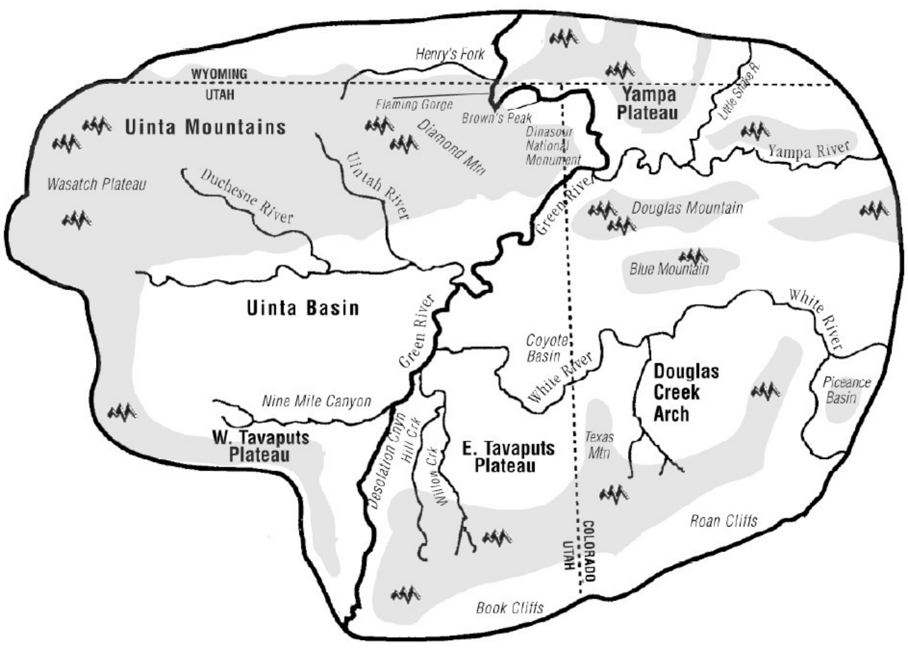

Figure 3. Map of Uinta Basin and its subdivisions. Visible in the southeast quadrant is the Douglas Creek Arch, the physiographic region encompassing this tributary to the White River, which separates the Piceance Basin and the Uinta Basin. Other Fremont districts featuring substantial number of pinnacle sites are located along Nine Mile Canyon and Hill Creek. Shaded areas represent higher elevations. From Spangler (2002:3).

would have been favorable for human travel. Within the Uinta Basin — as is typical for much of the Colorado Plateau — sandstone landscapes are commonly incised with ancient drainages, but water is scarce, which served to aggregate indigenous peoples along the perennial streams of constricted ravines (Spangler 2002:4).

The principal waterway of the Uinta Basin is the Green River, which generally trends southwest from the Yampa Plateau towards the Tavaputs Plateau, which it bisects. Its major tributaries include Yampa River, Uintah River, Duchesne River, Willow Creek, Nine Mile Creek, Willow Creek, and White River. Ancient peoples would have arranged their lifeways according to this hydrography that dictate the occurrence of water, big game, and wild edible plants — critical for sustaining populations in harsh landscapes. Indeed, ethnographic evidence attests to wide use of flora for medicinal, functional, and nutritional purposes by indigenous peoples of the Uinta Basin, such as the Ute, where were present when historic chroniclers reached the area (Conner et al. 2016:52; Goss 2003; Ott 2010:E.1–E.4). Importantly, the flat, broad, and open areas of well-drained alluvium along tributary confluences would have also been suitable settings for cultivation following the introduction of agriculture to the area (Spangler 2002:4–9), despite the challenges of high elevations and inconsistent precipitation (Gardner and Gardner 2016:192).

Douglas Creek

Douglas Creek is a northward flowing ephemeral tributary to the White River located in the southeastern quadrant of the Uinta Basin. This is a rugged canyon landscape of thin alluvial hollows, abrupt slopes, and tablelands (Deats et al. 2021:3). It is a semi-arid region with pronounced variations in climate and topography (Figure 4). Annual precipitation averages 10 to 18 inches (Omernik and Griffith 2008), peaking from May to July (Boyle et al. 1984). Year

Figure 4. View of sandstone geography and Upper-Sonoran vegetation characteristic of Douglas Creek. Facing north-northeast. Summer 2021. Photograph by Joshua Bauer.

round, temperatures can range from 8 to 88 degrees Fahrenheit, and an average of only 90 days per year are frost free (Omernik and Griffith 2008). This figure corresponds to short growing seasons for Fremont farmers (Gardner 2009:36–37; Gardner and Gardner 2016:192), although paleoenvironmental reconstructions derived from deposits at Dripping Brow Cave (5RB699) suggest that between 800–1100 CE, this area was somewhat moister (Creasman 1981b:IV–86). Water is generally scarce, as the White River is the only perennial body of water in the area (Omernik and Griffith 2008).

In keeping with patterns throughout the Colorado Plateau, vegetation communities here are consistent with the Upper Sonoran Life Zone, and vary depending on factors like elevation, drainage, and topography. The canyon lowlands are replete with dense stands of saltbrush and greasewood. High elevations that provide cooler and wetter conditions host woodlands of Gambel oak, pinyon, and juniper. Middle range mesas and benches feature ecological zones of rabbitbrush, sagebrush, prickly pear, mountain mahogany, and scores of wild grasses (Omernik and Griffith 2008). As is seen today, during the Fremont occupations this area would have been home to numerous large mammals like elk and mule deer, small mammals like cottontail and jackrabbit, and a diverse array of avian life from waterfowl to songbirds and raptors (BLM 2018). Other animals integral to Native American culture such as bison, grizzly bear, bighorn sheep, and gray wolf that roamed here during the Fremont era have since been driven out (Deats et al. 2021:5).

Douglas Creek features a complex geographic landscape characterized by sandstone outcroppings that form bluffs, pinnacles, and boulder fields. Dozens of minor tributaries meet Douglas Creek from lateral gullies, and their confluences form relatively flat, broad areas conducive for human settlement. Nestled within this tributary to the White River are traces of ancient Fremont life, including the pinnacle structures foregrounded in this study.

Uinta Basin Fremont

Among the many indigenous peoples who have lived in the Uinta Basin are the Fremont (Figure 5), who occupied the area during from ca. 200–1500 CE, much of which coincided with the Formative Era, which lasted from ca. 400 BCE–1300 CE (Reed and Metcalf 1999:6; Simms 2008; Spangler 2000). This collective culture emerged when Archaic groups occupying the Colorado Plateau adopted agriculture, which likely diffused northward from the American Southwest. While there is contention about which specific criteria distinguish this culture (Madsen and Simms 1998), they are generally defined by their variable use of foraging and horticultural lifeways, one-rod-and-bundle basketry, a particular style of moccasins (Steward 1937), a remarkable rock art tradition of “trapezoidal anthropomorphic figurines” (Madsen 1989:9–11; Simms 2008), and ceramics characterized by distinct paste, temper aggregates, and coil manufacture (Finley and Boyle 2014; Madsen 1979; Watkins 2009). Extensive research supports the idea that they comprised regional communities, including the Uinta and the San Rafael variants (Spangler 2002:323).

The Fremont culture extended well beyond the Uinta Basin, across the Colorado Plateau and into the Great Basin. The Uinta Fremont, a variant centered within the Uinta Basin, are

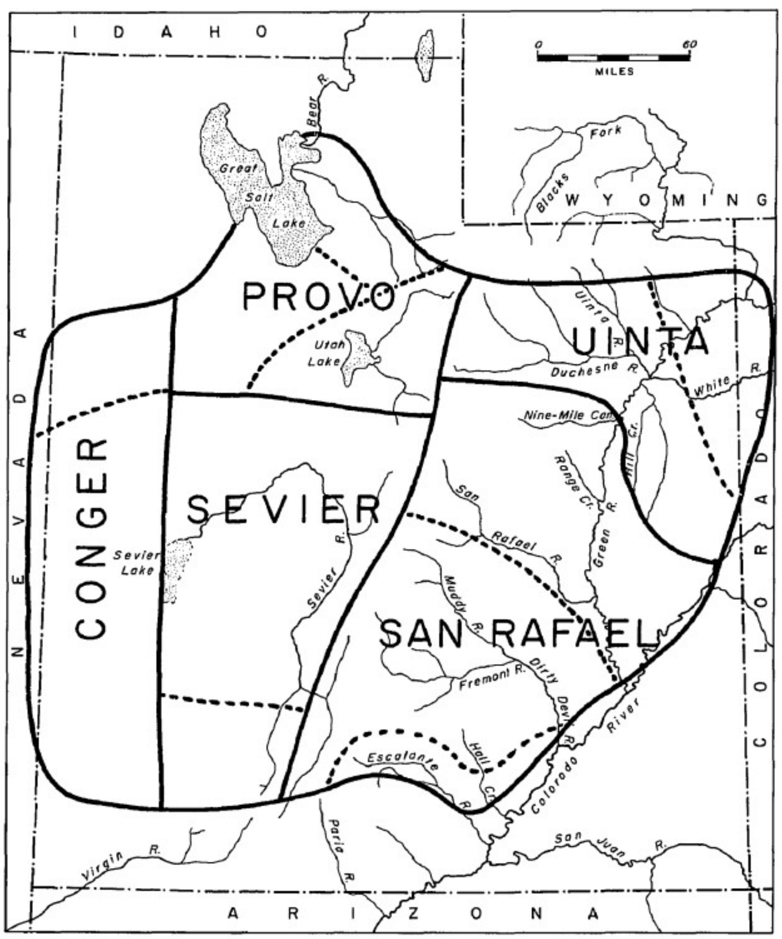

Figure 5. Distribution of Fremont variants in the Colorado Plateau and eastern Great Basin. The easternmost Uinta and San Rafael variants bare the highest cultural resemblance to the Douglas Creek Freemont. From Ambler (1966:232).

thought to have existed from ca. 650–1250 CE (Spangler 2002:324–326) and are principally characterized by shallow pit-house and free-standing masonry habitation structures, the presence of relatively large stone tools common to the Fremont lithic industry, and the absence of "Utah type" metates and clay figurines associated with other Fremont variants (Marwitt 1986). These Fremont seem to have relied more on foraging than farming (O'Rourke et al. 2007:19). This variant is also associated with well-known rock art forms such as distinctive shield figures, an artistic tradition defined as the Classic Vernal style, which features trapezoidal human shapes (Figure 6) and debatably a headhunter motif (Schaafsma 1971; Spangler 2002:137) —

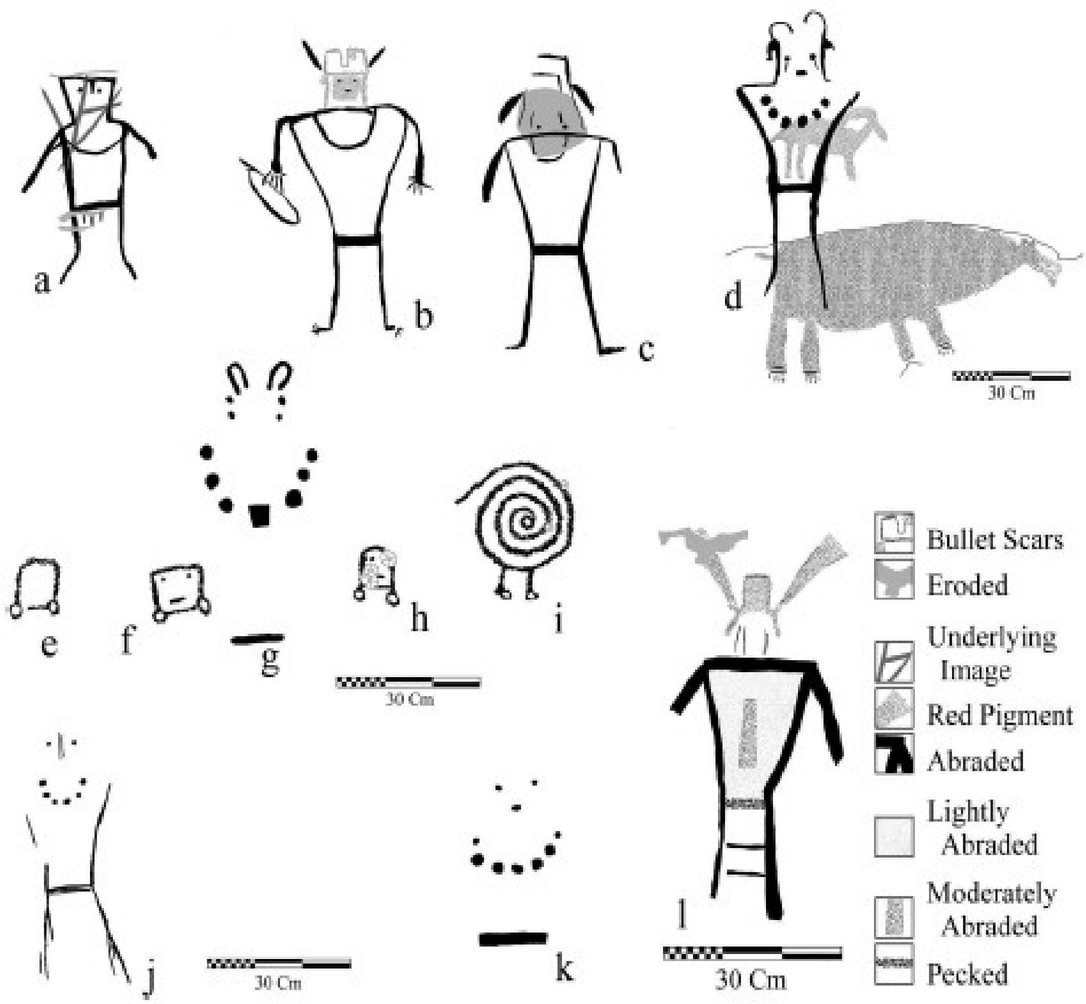

Figure 6. Classic Vernal rock art attributed to the Uinta Fremont. a–d, g, j–l classic anthropomorphs; e, f, h, trophy heads; i, shield bearing warrior. Image and descriptions from Keyser and Poetschat (2017:160).

archaeologists cite this as evidence for warrior traditions among the Fremont (Keyser and Poetschat 2017; Schaafsma 1971).

The San Rafael Fremont, another permutation whose homelands were primarily centered in the Tavaputs Plateau, are believed to have endured later than the Uinta Fremont, from ca. 700–1300 CE. Distinctive cultural traits associated with this variant include slab-built pit dwellings, wet-laid and dry-laid masonry architecture, a preponderance of Emery Gray pottery, the appearance of Ancestral Puebloan tradeware ceramics, and generally smaller projectile point technology (Spangler 2002:326). This variant is also associated with above ground masonry dwellings and granaries, side-notched points, and figurines (Spangler 2002:327). Contrary to their Uinta counterparts, they seem to have developed a greater reliance on agriculture (Black and Metcalf 1986:15).

Douglas Creek Fremont

The Canyon Pintado National Historic District along Douglas Creek, an area widely known for its characteristic Fremont rock art, is another homeland of the Fremont. While Fremont occupations here date as early as 1 CE (pre–Formative Era dates may attest to an Archaic ancestor of the Fremont; see Creasman [1981a:277–278]), distinct cultural manifestations in the area may have endured as late at 1500 CE, which suggests it was the location of a local variant of the Fremont. The archaeology here has long captured the attention of travelers (Baker 2013; Vélez de Escalante 1995 [1776]) and researchers (Anderson 1965; Creasman 1981a, 1981b; Deats et al. 2021; LaPoint et al. 1981; Smith 1941; Wenger 1956) and compelling evidence in support of the distinctive Douglas Creek Fremont variant has been compiled (Reed and Metcalf 1999:110). While these people may have been most closely related to the Uinta and San Rafael groups, Creasman was the first scholar to propose a local definition for the Douglas Creek Fremont (1981a). He argued that there were several qualities that set this Fremont variant apart: distinctive rock art motifs (Figure 7; Creasman 1982), characteristic dry-laid masonry structures on isolated pinnacles, and beehive storage granaries well hidden in rock shelters and alcoves (Creasman 1981b:VI5–6). Later researchers have also identified a sand-

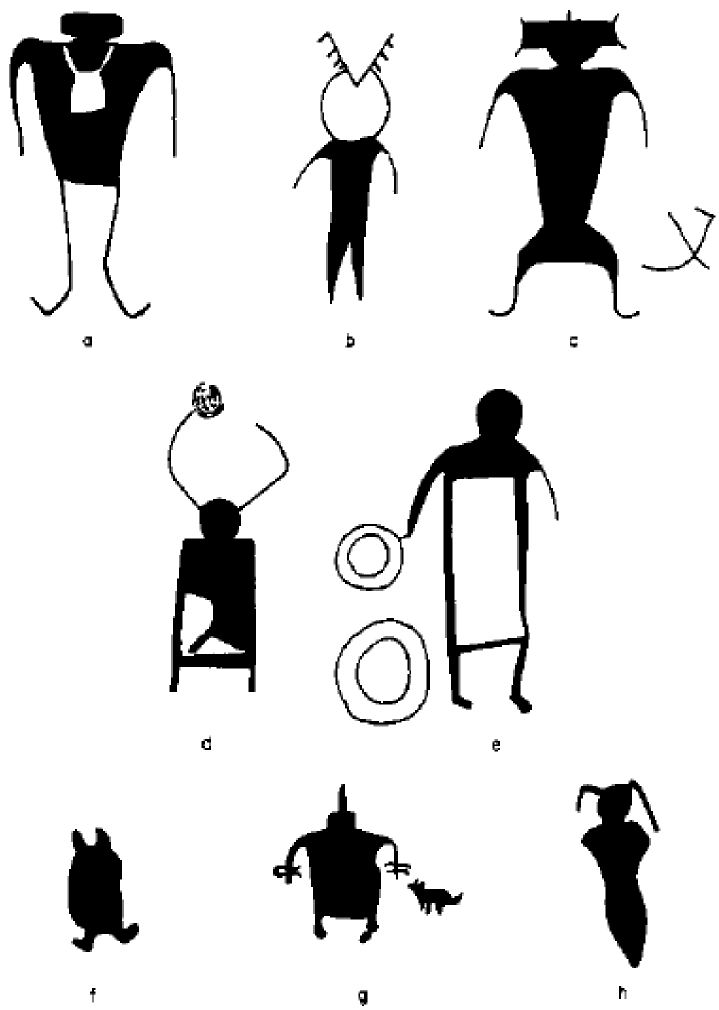

Figure 7. Distinctive anthropomorphic motifs of Douglas Creek Fremont style. From Creasman (1982:3).

tempered variation of Fremont pottery called "Douglas Creek Gray" (Baker 1995, 1998; Hauck 1993, 1997; Reed and Metcalf 1999:127).

These Fremont tended to aggregate near the confluences of tributaries to Douglas Creek. Creasman believed this to be an indication of horticultural use in broad and open areas, which are also connected to travel corridors. Although they clearly practiced maize agriculture, they seem to have also been relatively mobile foragers as well (Creasman 1981b:VI-7-8). Finally, Douglas Creek may have been one of the last homelands for Fremont peoples (Reed and Metcalf 1999:117), as is evidenced by extremely late, 16th century occupation dates at Texas Creek Overlook (Creasman and Scott 1987) — a pinnacle site featured in this study. These people are the protagonists of this manuscript, and their territorial postures reflected through the defensibility of their pinnacle architecture constitute the central interrogation herein.

Regional Demographics

People living throughout the Uinta Basin and the northern Colorado River Basin during the Formative Era would have comprised a mosaic of adaptations. Fremont groups would have been part of a network of settlements separated by significant distances, consisting of numerous ethnolinguistic identities (Reed and Metcalf 1999; Spangler 2002). While the Douglas Creek Fremont would have been regionally isolated, they were close enough to develop a range of relationships with other groups such as Uinta and San Rafael Fremont peoples, nearby Fremont populations around Blue Mountain, and groups belonging to the Aspen and Gateway Traditions.

In the Uinta Basin to the west and northwest of Douglas Creek, most areas were not suitable for dense populations, permanent sedentary living, or intensive agriculture. Therefore, Uinta Fremont people populating that region were attracted to those few areas best suited for cultivation. These groups were probably "living in flats [during] the summer and cultivating corn and [during] the winter sheltering in canyons around the mountains and devoting themselves to hunting" (Morss 1931:76–77). Uinta Fremont settlements were "small, with seldom more than five structures occupied at the same time… [Their habitation sites show thin] cultural deposits [that] suggest short, possibly seasonal occupation" (Marwitt 1970:141–142).

To the west and southwest of Douglas Creek, San Rafael Fremont villages in the San Rafael Swell were "generally small, with no more than a dozen rooms in use at one time" (Marwitt 1970:143–145) and became less densely populated after 1050 (Black and Metcalf 1986). For Formative period Fremont groups living in the Tavaputs Plateau, there was a "cultural homogeneity among…peoples of Book Cliffs, East Tavaputs Plateau, West Tavaputs Plateau, primarily in Nine Mile, Range Creek, Hill Creek, Willow Creek, Chandler Creek, Florence Creek, and Desolation canyons… [where groups] adapted to deeply striated canyon environments…[and] were concentrated…in canyon drainages with permanent water, arable lands, and pinyon-juniper resources" (Spangler 2002:327). People were relatively more mobile in the Tavaputs Plateau that their Fremont neighbors in the Uinta Basin and San Rafael Swell (Spangler 2002:328).

To the south of Douglas Creek, Formative Era sites are often ascribed to the Gateway Tradition. This cultural complex is concentrated in Montrose County and sites exhibit a combination of Fremont and Ancestral Puebloan cultural traits (Reed and Metcalf 1999:131–132). Sites from this tradition cluster around areas of "topographic constriction" that would have funneled peoples through the Western Slope. According to Baker (2008:1), this meant that Gateway peoples were "situated where they might well have regulated access [through west-central Colorado] from the greater Southwest… [which they could have] strategically used to control trade routes". The close resemblance of Gateway Tradition settlement patterns with those of the Douglas Creek Fremont coupled with the appearance of Fremont ceramics in Gateway sites suggests these two groups had economic and cultural exchanges.

The Aspen Tradition is another archaeological construct of northwestern Colorado that has implications for the Fremont of Douglas Creek, because sites from this culture closely parallel Uinta Basin Fremont occupations chronologically and to a lesser extent, spatially. These people were primarily foragers who ranged the higher elevations of the region in pursuit of game. Many Formative sites attributed to the Aspen Tradition co-occur with Fremont sites in Rio Blanco County (Reed and Metcalf 1999:143), suggesting that they had frequent interactions. However, it is possible that Aspen Tradition sites simply represent Fremont manifestations under hunter-gatherer lifeways (Madsen and Simms 1998), making the Aspen designation "redundant and unwarranted" (Spangler 2002:329). Still, it is plausible that some people of the Aspen Tradition represented a distinctive cultural group that had contact and complex relationships with the Douglas Creek Fremont.

Fremont settlement in Douglas Creek would have been diffuse and rural, with local groups forming interconnected quaint hamlets at tributary confluences. Foragers tend to form bands of around twenty-five individuals, with several committed to hunting while the remaining adults gather plant foods within 3 to 6 kilometers of camp (Kelly 2013:166–168). With diets supplemented by horticulture, these Fremont groups may have been slightly larger than those common to foragers, but still small enough to maintain a degree of mobility. According to Creasman (1981b:VI-7–VI-8), "if they became sedentary it was short lived, [as their] masonry structures show no signs of extensive midden buildup that would indicate long-term occupation [and as such] their open sites [i.e., pinnacles] were being used during the summer and possibly the fall". Further, Spangler (1995:476) notes that subsistence strategies and settlement patterns among the Douglas Creek Fremont are indistinguishable from their neighbors in Nine Mile Canyon, 110 km to the west. Therefore, these Fremont likely maintained populations comparable to what has been modeled in Nine Mile Canyon, "where conditions were not ideal for intensive reliance on horticulture and population aggregation" (Reed and Metcalf 1999:117).

This context provides a plausible glimpse of regional relationships for the Douglas Creek Fremont. These semi-sedentary people formed small hamlets of a few dozen individuals, interconnected locally along the creek. They were regionally isolated in their canyon landscape but close enough to numerous distinct cultural groups to develop relationships, likely ranging from peaceful to hostile. Nearby Fremont site concentrations to the north in the Blue Mountains may have been their closest cultural counterparts. While they shared traditions with Fremont groups further west in the Uinta Basin, San Rafael Swell, and Tavaputs Plateau, ethnic and linguistic divisions would have become more defined with greater distance between these groups (Madsen 1989:67). With the Gateway Tradition peoples to the south, they apparently exchanged goods and ideas. Meanwhile, they seem to have coexisted with the Aspen Tradition people, although this inference remains unclear due to the ambiguity of the Aspen complex. Therefore, the Douglas Creek Fremont were ensconced in a complex social world encompassing distinct polities who at times interacted and traded with one another, and at other times avoided each other or fought over land and resources. Regional tensions may have flared up during periods of environmental fluctuation, when some settlement areas were less productive than others. Indeed, the defensive architecture here implies that the not all the Douglas Creek Fremont's relationships with neighbors were amicable.

Manuscript Overview

This manuscript is organized into eight chapters. The schematic is designed to separately cover the theoretical and empirical components integral to this project. Three chapters divulge the theoretical orientations, methods, and results of the research questions; these constitute the bulk of this document. They are bookended by two opening chapters that present the data and theoretical framework foundational to this project, and a final pair of chapters that discuss the archaeological implications of the results and offer commentary about future archaeological investigations in northwestern Colorado.

Chapter 2 presents the data that comprise this research. It begins with a review of the past research in Douglas Creek, from 18th century Spanish explorers to pioneering academics in the 20th century, and finally, recent work completed by cultural resource managers. Importantly, this historical sketch covers the work of former Colorado State University graduate student, Steven D. Creasman, whose early insights about Fremont occupations in Douglas Creek inspired the present investigation. This chapter includes a description of the archaeological sites included in this project and an explanation of how they were selected — a process that involved correspondence with state agencies and an extensive review of archival records. Here, a cursory review of the various archaeological methodologies employed for this work is offered. Provided in this chapter as well is a project timeline — this spans its inception as a graduate course research essay, completion of a drone training school, remote viewshed analysis, two sessions of field work in Rio Blanco County, and manuscript preparation. This work I completed between the November of 2020 and March of 2022. In the conclusion of this chapter, the liberties taken with terms and language throughout the text are addressed, and observations about the disturbances impacting the pinnacle sites are offered.

Chapter 3 delves into the anthropological theories and concepts that form the backbone of this research. A few diverging theories on territoriality are introduced, as the thrust of this thesis is not how or why territoriality emerges, but whether it is manifested through the inherent defensibility of the pinnacles architecture in Douglas Creek. Included here are discussions on terms such as active versus passive defensibility as they pertain the Douglas Creek Fremont. Archaeological and ethnographic literature is cited here to explore the various expressions of territoriality among foraging and farming societies. Finally, the evidence for the development of territoriality among the Fremont generally and in Douglas Creek specifically is offered, as well as evidence for violence and warfare recorded in the American Southwest. This includes compelling discussions on the implications of probable movement of exogenous people through the Douglas Creek travel corridor as well as the spectrum of violence that occurred in the ancient Southwest.

Data for the first of three research questions is presented in Chapter 4. The chapter begins with a discussion of how geography can be exploited for defensive purposes. This notion is supported by the ethos of human–land interdependence that still exists among Native Americans today as well as empirical evidence for defensive landscapes from ancient societies around the world. Methods are then summarized, which primarily entailed pedestrian survey but also the use of aerial photography. In the discussion of the results presented here, it is established that the structures tend to be in areas that foster natural defensibility via inconspicuousness, rugged access, blind opportunities, the presence of cliffs, and long travel times from the canyon floor. These are indices for geographic defensibility, albeit passive.

In Chapter 5, the question of defensive architecture is examined. Again, this chapter includes a review of pertinent literature including the theoretical underpinnings of territoriality in architectural landmarks as well as empirical evidence for defensive architecture elsewhere. Outlined here are the composite methods that I used to answer this question such as photogrammetry to support subjective descriptions of masonry variables and Naroll's formula for size capacity. Artifacts and midden deposits are discussed in this chapter as well, and I draw on excavation reports published by previous researchers at Texas Creek Overlook and Edge Site to corroborate my own findings. The chapter concludes that the construction features of these pinnacles attest to attention and care on behalf of the architects, although they are not always so meticulously built. The structures' general simplicity and small-scale amount to further evidence for passive defensibility.

Chapter 6 closes the three results chapters by revealing the findings for pinnacle viewsheds. Discussed here are the implications for visibility of the landscape, resources, and other pinnacles. These ideas are corroborated with other studies that employ viewshed analysis to explore questions of territoriality among the Fremont, including in Nine Mile Canyon and Range Creek Canyon. This research question involved a range of simple binary viewshed analysis in addition to a more complex weighted overlay viewshed analysis to determine visible arable land. I explain the methods I used to complete these tasks and explain why I constricted viewsheds to account for the limits of human vision. The results in this chapter show that the pinnacles offer optimal visibility of the canyon, some visibility of arable lands and granaries, but achieve no intervisibility of each other. Contrary to the previous research questions, these results indicate that the Douglas Creek Fremont practiced elements of active defensibility as well.

The lines of evidence produced through this study in are tied together in Chapter 7. This begins with a systematic consideration for the following range of possible functions for the pinnacle sites: mortuary site, ceremonial site, lunisolar observatory, stronghold fortification, habitation site, observation point, and refuge fortification. The evidence supports their use as habitation sites and observation points, but their composite elements strongly indicate they were refuge fortifications. This conclusion is followed by an interpretation of the significance of the pinnacle sites. While they ultimately attest to passive defensibility, there is evidence that the occupants retained strategic flexibility and tactical adaptability. The possibility that the pinnacles served multiple functions for an under-resourced people is also discussed here. The chapter continues with the argument that while there is no academic consensus for the pinnacles' Fremont origins, there is ample reason to believe so. Finally, the implication that these pinnacles might have for the Douglas Creek Fremont is that these people were under tremendous socioeconomic stress, and possibly facing extinction. In the end, this data supports the hypothesis that Douglas Creek may have been one of the final havens for the Fremont culture, as was speculated by Reed and Metcalf (1999:117).

Conclusions are succinctly unified in Chapter 8. The key lessons provided through this investigation are summarized here. For instance, while the pinnacle architects had passive defensibility in mind, they ensured the option for active defensibility to suit various scenarios. The argument for a Fremont origin of the pinnacles is again reiterated and their implications for these people's culture history are framed once more. I then address the lingering questions that my research was unable to address. Chief among them is the issue of contemporaneity for these sites, which not truly been established. Beyond chronological sequencing, there remains a need for additional evidence in support of their Fremont association. Finally, despite the many clues for territorial behavior discussed in this study, pinnacle architecture remains the only compelling evidence that violent conflicts ever took place in Douglas Creek. With these gaps in our knowledge recognized, the chapter end with suggestions for future research. One possible project involves remote sensing to locate Fremont villages, which could impart valuable insight into their lifeways over time. Also, there is need for geoarchaeology and paleoenvironmental reconstruction that is lacking in this area. Such an endeavor could shed light on how this region was affected during different drought cycles. A future investigator could conduct a more objective study about pinnacle locations using least-cost pathway analysis. By testing the pinnacle locations against analogous random points on the landscape, another researcher could test the inference about their natural defensibility presented in this manuscript. Also, there more opportunities for synthetic analysis of Canyon Pintado rock art and other pinnacle sites in the area that are not included here. Finally, higher resolution models for arable land could provide a clearer image of farming practices in the area. I end this and the manuscript by discussing upcoming archaeological investigations by researchers at the Center for Mountain and Plains Archaeology at Colorado State University. Their work stands to provide tremendous context about Fremont lifeways in northwestern Coloradan, thus advancing the insights presented here.

CHAPTER 2: PROJECT DATA

The following chapter presents the data involved in this project. It begins with a review of the history of exploration and research in Douglas Creek/Canyon Pintado, including the groundbreaking work by Steve Creasman, whose early insights provided the foundation for the present study. This is proceeded by a discussion of the sites included in this study and how they were selected. Multiple methodologies are employed for this investigation, and each of them are briefly outlined here, as well as the timeline needed to complete this work. Finally, this chapter ends with some remarks about the semantic liberties taken throughout the text as well as the disturbances impacting these sites.

Past Research in Canyon Pintado

Spanish Exploration

The first European travelers known to have visited this area were the Dominguez-Escalante Expedition (Figure 8). These Spanish explorers, led by Native American guides, entered Canyon Pintado in 1776 as part of a scouting mission throughout the Intermountain West. Impressed with the abundance of rock art panels throughout the canyon, they dubbed it "*El Cañon Pintado*", or "painted canyon" in Spanish (Vélez de Escalante 1995 [1776]:49). Despite its early notoriety, the area was not visited by professional archaeologists for nearly two hundred years (Creasman 1981:4). In the intervening centuries, this region was primarily used as grazing land by ranchers, but also by trappers, traders, surveyors (Conner et al. 2016:46), and outlaws evading arrest (Lohr 1948:12).

Early Archaeological Research

Beginning in the 20th century, researchers began studying the archaeological sites in and around Canyon Pintado. University of Utah's Elmer Smith was the first to conduct a formal investigation in the area in 1941. He carried out excavations in nearby Dripping Rocks Cave, just northwest of the town of Rangely, which demonstrated pre-Fremont occupations. He was also the first to formally record the masonry architecture and rock art sites of Canyon Pintado. His excavations at the Edge Site (5RB748) produced evidence for "charred beams and baked adobe", which he surmised to be roofing material (Anderson 1964; Creasman 1981:4–5).

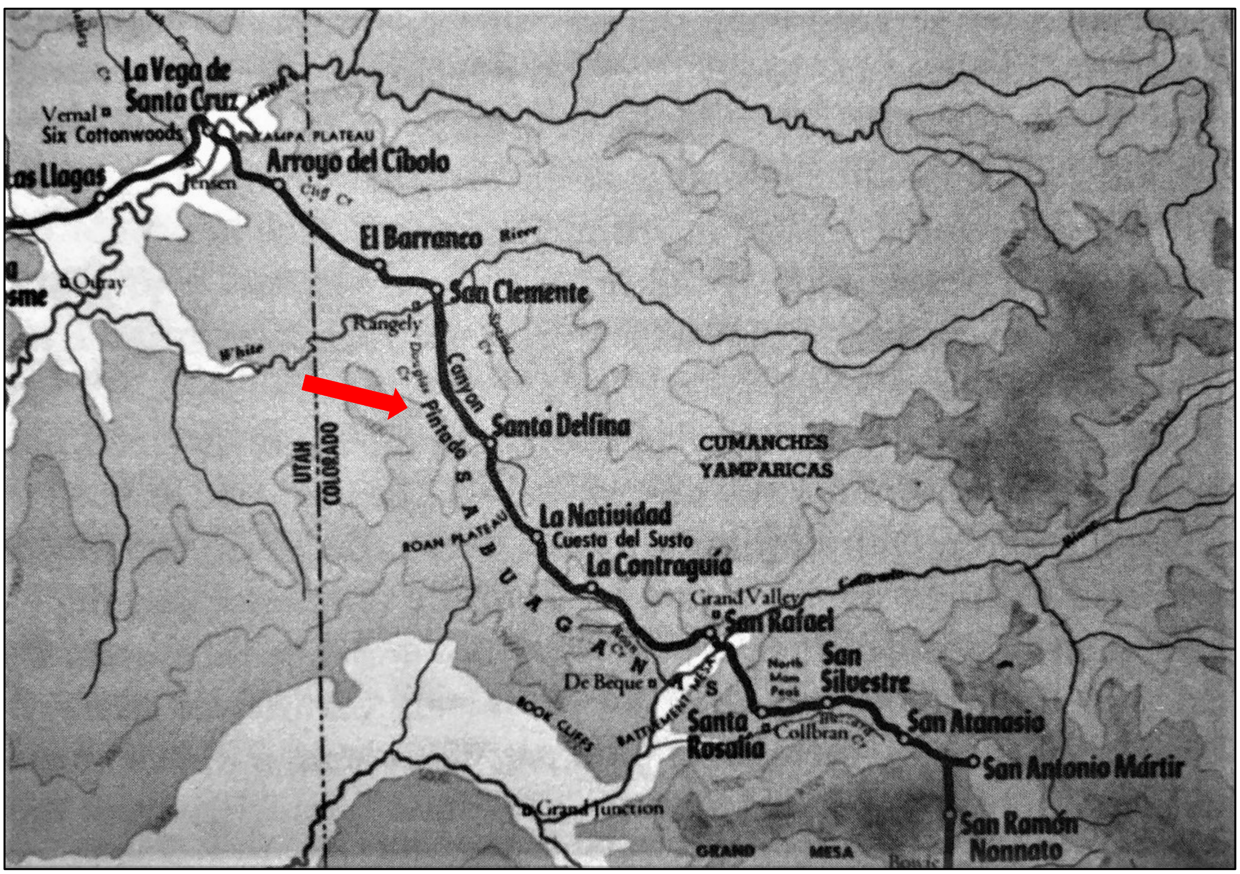

Figure 8. Map of the 1776 Domínguez–Escalante route through Canyon Pintado (red arrow). Shown here is the *San Ramón* to *Las Llagas* segment of their journey, from September 1st to September 16th of that year. The Spanish expedition traversed Douglas Creek between Santa Delfina (near Brush Mountain) and San Clemente (White River). From Vélez de Escalante (1995 [1776]:37).

Gilbert Wenger, an archaeologist from the University of Denver, was the first to pursue a complete and systematic survey of Douglas Creek in 1950. His work led to the discovery of numerous sites, including pinnacle and granary masonry architecture, rock shelter sites, and rock art. Wenger (1956:77) described several of the pinnacle structures in Canyon Pintado, and speculated that these "Indian forts", could have been used as hunting blinds, overlooks, small habitations, or even defensive sites (Wenger 1956:86). He postulated that these sites likely represented Fremont and possibly later Ute peoples. Further, he argued that these Fremont people most closely resembled Basketmaker II cultural expression and that they may predate their counterparts in Fremont River, central Utah (Wenger 1956:i–ii).

Colorado State University Research

Throughout the 1970s, Dr. Cal Jennings of Colorado State University's (CSU) Laboratory of Public Archaeology (LOPA) conducted several surveys throughout Canyon Pintado. LOPA's efforts resulted in significant findings, such as excavating two stratified rock shelters, a stratified open site, and recording nearly 40 other sites along Douglas Creek (Creasman 1981a; Creasman 1981b; LaPoint et al. 1981). Radiocarbon dates from these projects attested to ca. 4000 years of local cultural history. In 1977, The Historical Museum and Institute of Western Colorado (1977) bolstered these findings when they discovered 35 new sites around the northern end of Canyon Pintado. Their work provided further evidence for floor preparation and roof structure at the Edge Site as well as dense site concentrations in upland areas and at mouths of tributaries to Douglas Creek (Creasman 1981a:6-8).

In 1977, LOPA carried out excavations at the Edge Site where two distinct levels of stratigraphy were identified, representing different occupations. The team recovered a range of artifacts including Formative period projectile points, bone awls, lithic tools, bond disk beads, and probable Ancestral Puebloan tradeware ceramics. In addition, numerous faunal and floral remains were recovered such as prairie dog, woodrat, cottontail, white fish, maize, rose, devils shoestring, and prickly pear (LaPoint et al. 1981). LOPA staff interpreted this pinnacle site as a seasonal and semipermanent occupation where a diversity of activities took place. Two samples of wood from roof support beams were dates to ca. 1143 CE and ca. 1416 CE, respectively (LaPoint et al. 1981:V-112). The former date is well aligned with other Fremont occupations in the region. The latter date, however, is late enough to suggest a possible reoccupation during Protohistoric times or an extremely late Fremont occupation, which was speculated by LaPoint and colleagues (1981:V-111–V-112), supported by Creasman and Scott's work at Texas Creek (1987), and endorsed by others (Reed and Metcalf 1999:117; Spangler 2002:425). The implications of late Fremont occupations in Douglas Creek are explored in Chapter 7 of this manuscript

In the late 1970s and early 1980s, LOPA provided the most complete inventory of cultural resources in the canyon (Creasman 1981a; 1981b; 1982). LOPA identified 100 new sites, including open camps, open lithic sites, petroglyphs, and masonry architecture sites. LOPA's Steve Creasman, whose produced a thesis from these surveys, focused great attention on the rock art panels throughout the canyon and through a synthetic and comparative study of their designs, he argued that the rock art attested to a local variant of Fremont culture, possibly related to the San Rafael group (Creasman 1982:12). Creasman also observed high site concentrations at tributary confluences in Douglas Creek, and he believed that these were most likely where Fremont settlements would be located. While he was able to conduct limited excavations at one open air site along Douglas Creek (Brady Site [5RB726]) and one cave site (Dripping Brow Cave [5RB699]), he was unable to sufficiently test his hypothesis about settlements at the confluences, leaving questions about Fremont lifeways unanswered. He also contended that the promontory (i.e., pinnacle) masonry architecture sites were likely defensive in nature, due to their commanding viewsheds overlooking arable land and potential villages (1981:286), as well as their remote and rugged locations (1981:305).

Recent investigations

Other well-known work in the Douglas Creek area includes excavations by Steven J. Baker (Baker 1999) at Sky Aerie Promontory (5RB104). This large residential pinnacle site is attributed to the Fremont culture and, although it was heavily vandalized by the time of Baker's recordation, midden deposits there suggest that one of the more substantial and distinctive masonry structures in the region once stood there (Spangler 2002:382). Baker's excavations produced evidence for several centuries of occupation, artifacts diagnostic of the Fremont cultural tradition, and human remains (Baker 1999:4.8–4.10). Baker recovered the remains of nine disarticulated individuals interred in a clay-capped oven, one of which exhibited a drilled tooth that may represent the earliest evidence for dentistry in the American Southwest (White et al. 1998). Some of human bones Baker recovered exhibited unusual postmortem alterations, which he interpreted as evidence for cannibalism. The claims of cannibalism at this site, however, do not represent academic consensus (Reed and Metcalf 1999:115), have been "dispelled [by] overwhelming evidence against it", and have been contested by Bureau of Land Management (BLM) archaeologists and tribal consultants (Lukas Trout, personal communication 2021). Still, Baker contends that the site was "a special place [used for] ceremonial purposes, playing games, [and could] have been home to a shaman or a witch" (Baker 1999:xi). While Baker's claim for cannibalism at Sky Aerie are disputed, the interments here are distinct from other mortuary sites in the region (letter from Christy Turner in Baker 1999:Appendix V).

Richard Hauck undertook synthetic investigations of some of Rio Blanco's pinnacle architecture in 2004, including at Spook Mountain Sky House (5RB3073, included in this thesis). He focused primarily on the "drill hole" phenomenon on display at Spook Mountain, which is also present at other pinnacle sites discussed in this thesis. He contended that the arrangement of the drill holes constituted an agricultural calendar system used by Fremont horticulturalists (Hauck 2004:i). This possibility is explored in Chapter 7 of this manuscript.

Finally, PaleoWest Archaeology carried out the most recent systematic research in the area with their extensive cultural resources assessment in the southern extent of the Canyon Pintado Historic District (Deats et al. 2021). Their work led to the re-evaluation of 27 previously recorded sites, and the discovery of four new sites. Noteworthy contributions of this project include enhanced imagery of the district's famous rock art panels using D-stretch software, and the recommendation of several sites for the National Register of Historic Places. PaleoWest did not revisit any known pinnacle sites in the area nor discover any previously unknown pinnacle sites (Deats et al. 2021:vi–v, viii). As of 2022, the Bureau of Land Management reports over 300 sites and isolated finds in addition to over 100 rock art sites located along the fifteen mile stretch of Canyon Pintado (BLM 2022).

Pinnacle Research in Eastern Utah

In the Fremont territories of the Tavaputs Plateau and Uinta Basin in eastern Utah, extensive archaeological research has focused on masonry architecture that is comparable to what is found in Douglas Creek. Key thinkers in this realm include Walter J. Fewkes, Noel Morss, James H. Gunnerson, and James D. Spangler. Together, their observations about Fremont masonry architecture span roughly a century of data collection, synthesis, and theorization which help to contextualize the pinnacle sites studied through this project and support their Fremont cultural association.

Fewkes (1917) was among the first to investigate these characteristic architectural sites. Along Hill Creek Canyon in the East Tavaputs Plateau, he documented numerous open masonry structures situated on cliff edges, outcrops, and pinnacles, including Mushroom Rock Ruins located on a distinctive “mushroom-shaped” spire (Fewkes 1917:29). One spectacular site near Taylor Ranch, Ruin A, was a semicircular masonry structure built on the edge of a high cliff measuring roughly 8 meters in diameter and 6 meters high. Access to the site was obstructed by its imposing walls. (Fewkes 1917:25). Another site, Ruin B, was also situated along a high elevation ridge with favorable views of Hill Creek Canyon and a nearby tributary. The masonry structure was oval-shaped and measured 3 by 10 meters and just over 1 meter high. Fewkes suggested that this structure was a fort, based on its rugged location, protective walls, and small entryway (Fewkes 1917:26). He recorded others in Hill Creek Canyon and concluded that their “commanding position[s]” along the rims of canyons and atop pinnacle landforms “suggests that [the] towers were constructed for lookouts and for defense” and that their “massive character of walls suggests a fortification” (Fewkes 1917:33). Interestingly, Fewkes reported that “none of [the] towers show any evidence of past habitation” based on lack of associated ceramics or other artifacts (Fewkes 1917:29). He did not, however, conduct any excavations at these sites (Spangler 2002:23) and based his observations on surface deposits alone. He believed them to be identical to Ancestral Puebloan masonry structures in McElmo Canyon and Yellowjacket areas in Colorado (Fewkes 1917), though their cultural associations would later become clearer.

Noel Morss (1931) provided early definitions for the Fremont culture, through his work along the Fremont River and in Nine Mile Canyon. Though he traveled only ten miles west of

Green River into Nine Mile Canyon, he reported "numerous low walls of rocks without mortar in small shelters and on points on the cliffs", which he attributed to the Ute who had previously had a reservation there (Morss 1931:28). He relayed reports of "small inaccessible cliff-houses" further west, though he did not venture far enough to record them (Morss 1931:28). In his brief foray into Nine Mile Canyon, Morss recorded two open masonry sites. One was on a "small, sheltered ledge in the cliff [below a cave site with] "large, undressed blocks laid without mortar" that formed an enclosed space 6 meters in diameter with a small window overlooking a broad area below. The second was a walled enclosure built into a cliff overhang near a tributary confluence consisting of a "single course of large stones without mortar" (Morss 1931:28–29).

South of the Tavaputs Plateau, near the Fremont River, Morss documented a site consisting of "the masonry foundations of five rooms arranged at the edge of [a] promontory". The structures were "on the southerly high point of [a] high butte…situated on the eastern side of [the] promontory, where it is sheltered from the prevailing west winds… [and offered] an excellent spot for a lookout…[with] unobstructed views of arable lands" as well as other prominent landforms that "might have served as intermediate signal stations" (Morss 1931:3). Morss' observations affirmed those of Fewkes, as they both perceived defensive qualities to these masonry structures.

In his synthesis of the Claflin-Emerson Expedition through the northern Ancestral Puebloan frontier, Gunnerson (1969) documented several pinnacle structures in Nine Mile Canyon and Hill and Willow Creeks like those of Douglas Creek. The best in Nine Mile Canyon was Nordells's Fort, which he described as a fortification or tower located "on the end of a high, steep-sided ridge" built on a bedrock exposure, which it fully covered. He noted that it was mostly rectangular and measured 6.2 by 5.72 meters with walls up to 2.24 meters high, consisting of two rows of coursed, dry laid masonry, and "chinked with smaller stones". The structure featured a "floor-level doorway" 54 centimeters wide…making it "accessible from the ridge upon which it is built" (Gunnerson 1969:90). He noted similar characteristics at Hill Creek's Rock House (Gunnerson 1969:114). Gunnerson also recorded sites initially identified by Fewkes, such as Eight Mile Ruin, which Gunnerson (1969:114) noted had defensive walls as much as 2.25 meters high and 1 meter thick. He argued that although the lack of artifacts associated with the pinnacle structures makes their assignment to Fremont traditions tentative, the absence of "other archaeological complexes in the area where masonry exists strongly supports their Fremont authorship" (Gunnerson 1969:148). Gunnerson noted salient patterns for these structures that closely parallel those of the Douglas Creek pinnacles presented in this study. These include the use of carefully selected but unprepared slabs and predominantly dry-laid masonry with some adobe and chinking with smaller stones. Structure interiors he described with adobe-covered floors sometimes paved with flat stones, adobe-rimmed hearths, the presence of post holes spanning the width of structures as if for roofing, and small doorways (Gunnerson 1969:148–149). Spatially, he noticed that the pinnacle sites were usually on formidable and high elevation landforms, near farmland, and showed a preference for commanding views, possibly to surveil unknown landscapes (Gunnerson 1969:150). Like Fewkes and Morss, he believed that their difficulty in access and locations on remote landforms suggested fortification. Interestingly, he observed less material culture at these high elevation defensive sites compared to low elevation habitation sites and argued that these "forts" may have served as "retreats in time of attack" (Gunnerson 1969:151).

Spangler (1993, 2000, 2002) synthesizes Fremont occupations in the Uinta Basin and Tavaputs Plateau and comments extensively on the pinnacle structures dispersed in canyons throughout the regions. He notes that Fremont "residential structures were characterized by abundant dry-laid masonry construction and settlement patterns featuring clusters of semi-subterranean pithouses on stream terraces and surface masonry architecture on rock outcrops, pinnacles, and cliff ledges, many in arguably defensive postures some 100 to 200 meters above permanent water sources" (Spangler 2000:60). Further, he notes that they are often massive in scale, strategically located in settings that naturally limit access, and tend to overlook arable land (Spangler 1993; 2000:63). Spangler finds that Fremont settlement patterns are generally indicative of resource competition and defensive postures assumed as part of conflict resolution strategies (Spangler 2002:341). The extreme inaccessibility and high elevation of many sites in Tavaputs Plateau, for instance, "could be interpreted as refuge behavior [in response to] ongoing conflicts" (Spangler 2002:373). For Spangler this is a compelling possibility, considering that Fremont people moving into Tavaputs Plateau from Uinta Basin may have faced competition with Numic peoples (Spangler 2002:373). Spangler also notes "the absence of significant midden [development]" associated with the apparently defensive sites of the Tavaputs Plateau (Spangler 1993:28), echoing Gunnerson's prior assessment. Regarding the distinctive nature of these adaptive strategies, he notes that masonry styles characteristic of the Tavaputs Plateau "are virtually absent elsewhere in the Fremont culture area". However, Douglas Creek masonry structures bear a striking similarity to those of the Tavaputs Plateau and likely represent a similar Fremont lifeway (Spangler 2000:58).

Spangler's argues that Nine Mile Canyon masonry sites "may have functioned as defensive retreats", as indicated by their economically inefficient spatial patterning (Spangler 1993; 2002:375). This framework is aligned with ideas advanced by Fewkes, Morss, and Gunnerson, and Spangler (2002:411) points out that it supports other early observations that

Tavaputs Plateau pinnacle sites were “military posts or watch stations”, as was suggested by Montgomery (1894:340), or that they served “primarily as a lookout or a residence in times of invasion”, as was suspected by Gillin (1938:32). The fundamentally defensive nature of these pinnacle sites has therefore been proposed by numerous investigators of Fremont lifeways and continuously supported through generations of scholarship.

Overview of Sites Investigated

The Pinnacles

This thesis project investigates a sample of seven pinnacle masonry architecture sites in the Douglas Creek area (Figure 9). Five are within Canyon Pintado proper, and include Fourmile Overlook (Figure 10; 5RB278), Banty’s Twist Overlook (Figure 11; 5RB270), Mountain Overlook (Figure 12; 5RB752) Rocky Ford Overlook (Figure 13; 5RB722), and Edge Site (Figure 14; 5RB748). Two are located outside of Canyon Pintado proper but are close to Douglas Creek. They include Texas Creek Overlook (Figure 15; 5RB2435) and Spook Mountain Sky House (Figure 16; 5RB3073). Henceforth, these sites are referred to as Fourmile, Banty’s Twist, Rocky Ford, Mountain, Edge, Texas Creek, and Spook Mountain. Three more sites were intended for this project but were either misplotted or mischaracterized in records stored with Colorado’s State Historic Preservation Office (SHPO). These were ultimately omitted from the project and such discrepancies illustrate the need for better coding of these sites in state databases. They include Promontory Structure (5RB741), a rock shelter site near Rocky Ford in Canyon Pintado incorrectly coded as a promontory site, as well as Fremont Lookout Fortification (5RB344) and Ring Rock Hamlet Promontory (5RB2792), both plotted outside of Canyon Pintado but close to Douglas Creek. While Fremont Lookout Fortification fits the definition of a pinnacle site provided here, it was misplotted and was omitted due to project budgetary and time constraints. The last of the three (5RB2792) is incorrectly coded with state data and represents an open camp site with drill holes (see Table 1 for summary of all known and possible pinnacle sites in Rio Blanco County).

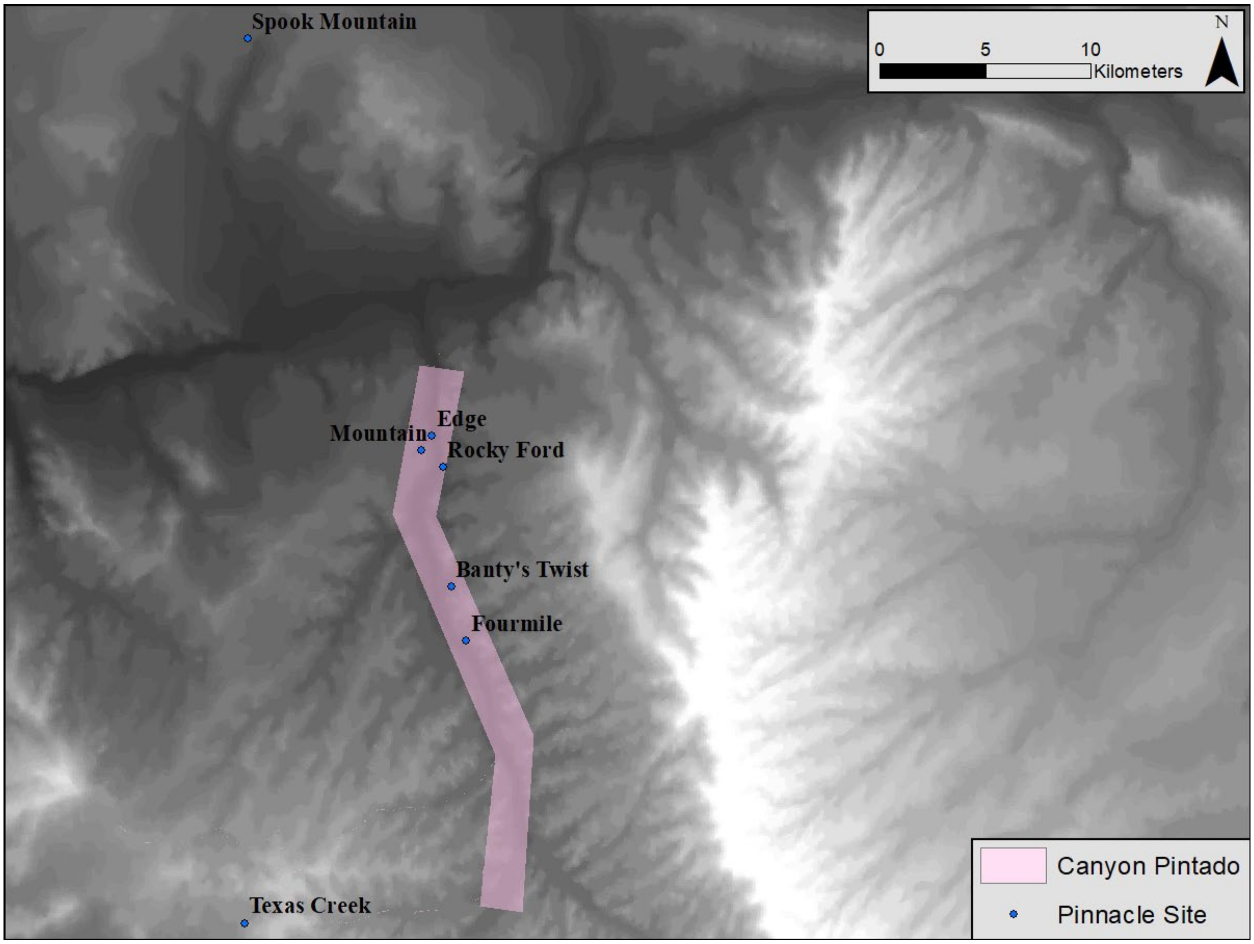

Figure 9. Project area. Five pinnacle sites are located within the Canyon Pintado National Historic District. Two more are located outside of it. Site name abbreviations are used.

Table 1. Summary of the fifteen known and possible pinnacle sites in Rio Blanco County. Sites included in this study are shown in bold italics. Attributes taken from OAHP records as well as other publications (Baker 1999; Creasman and Scott 1987; Hauck 2004; LaPoint et al. 1981; Wenger 1956). Not included are 5RB741 and 5RB2792, sites originally slated for this study, but ultimately omitted due to inaccurate coded in OAHP.

Site Name	Trinomial	Attributes	Reason for Inclusion/Omission
		WITHIN CANYON PINTADO	
Banty's Twist Overlook	5RB270	Masonry overlook with drill holes, lithics, and ceramics	One of six known masonry overlooks in Canyon Pintado
Fourmile Overlook	5RB278	Late prehistoric masonry overlook with drill holes, hearth evidence, lithics, and Fremont rock art	One of six known masonry overlooks in Canyon Pintado; dated with Cottonwood projectile point (1100-1800BP); contains diagnostic rock art
Rocky Ford Overlook	5RB722	Masonry overlook with burned rock	One of six known masonry overlooks in Canyon Pintado
Edge Site	5RB748	Masonry overlook with drill holes and lithics	One of six known masonry overlooks in Canyon Pintado; dated from c.1000-1490 CE
Mountain Overlook	5RB752	Masonry overlook with burned rock	One of six known masonry overlooks in Canyon Pintado
		OUTSIDE OF CANYON PINTADO	
Sky Aerie Promontory Charnel Site	5RB104	Masonry site with buried remains and Fremont material culture	Omitted due to presence of human remains
Unnamed	5RB230	Stone enclosure overlooking White River, west of Rangely, originally recorded as A:13:7 by Wenger (1956)	Omitted due to project time and budget constraints
*Fremont Lookout Fortification	5RB344	Masonry overlook	Proximity to Canyon Pintado. Omitted to due incorrect UTMs in OAHP records.
Little Indian Draw Overlook	5RB359	Possible wall along north face with associated lithic and tool scatter	Omitted due to project time and budget constraints
Red Hill Canyon Overlook	5RB772	Sheltered architectural site with associated rock art, midden deposits, bedrock	Omitted due to project time and budget constraints
Unnamed	5RB774	Open architectural site of dry laid sandstone	Omitted due to project time and budget constraints
Unnamed	5RB1600	Masonry site on pinnacle landform, but possibly a historic hunting blind	Omitted due to project time and budget constraints
White Coyote Draw Vision Quest Site	5RB2215	Dry laid masonry structure on pinnacle landform	Omitted due to project time and budget constraints
Texas Creek Overlook	5RB2435	Possibly late prehistoric enclosed masonry overlook with midden and awl sharpening grooves	Late Formative (ca.1500CE) masonry overlook near Canyon Pintado. Has yielded exceptional Fremont material culture (Creasman and Scott 1987)
Spook Mountain Sky House	5RB3073	Masonry structure with drill hole	Masonry overlook near Canyon Pintado. Proposed agricultural calendar by Hauck (2004)


Figure 10. Overview of Fourmile. Confluence with Douglas Creek is shown in background. Facing northwest. Summer 2021. Photograph by Joshua Bauer.

Figure 11. Overview of Banty's Twist. Background shows small tributary meeting Douglas Creek in the distance. Facing southwest. Summer 2021. Photograph by Joshua Bauer.

Figure 12. Overview of Mountain. Showing fingeridge that overlooks Douglas Creek in the background. Facing east. Summer 2021. Photograph by Joshua Bauer.

Figure 13. Overview of Rocky Ford. Douglas Creek shown in background. Facing west. Summer 2021. Photograph by Joshua Bauer.

Figure 14. Overview of Edge. Nearby Douglas Creek shown in background. Facing northeast. Summer 2021. Photograph by Joshua Bauer.

Figure 15. Overview of Texas Creek. Showing small draw in background. Facing west. Summer 2021. Photograph by Joshua Bauer.

Figure 16. Overview of Spook Mountain. Stinking Water Creek is shown in background. Facing southeast. Summer 2021. Photograph by Joshua Bauer.

The Granaries

The “beehive” storage granaries characteristic for the Douglas Creek Fremont are mentioned numerous times throughout this text. While not central to this thesis, they are a significant consideration for the pinnacle viewsheds, discussed in Chapter 6. There are a total of ten granaries included here, and they are all located within Canyon Pintado itself (Figures 17 and 18). These were all identified through an OAHP record search and are discussed further by Creasman (1981a). These include a recent discovery of a new granary found just north of Edge

Figure 17. Example of the characteristic "beehive" storage granaries of Douglas Creek. This is 5RB705, a reconstructed granary just north of Banty’s Twist. From Gardner (2019).

(Dudley Gardner, personal communication 2022). As of the time writing, there are no other known granaries within Canyon Pintado, and according to BLM archaeologist, Lukas Trout, there are none known within a 2-mile radius of Spook Mountain or Texas Creek (personal communication, 2022).

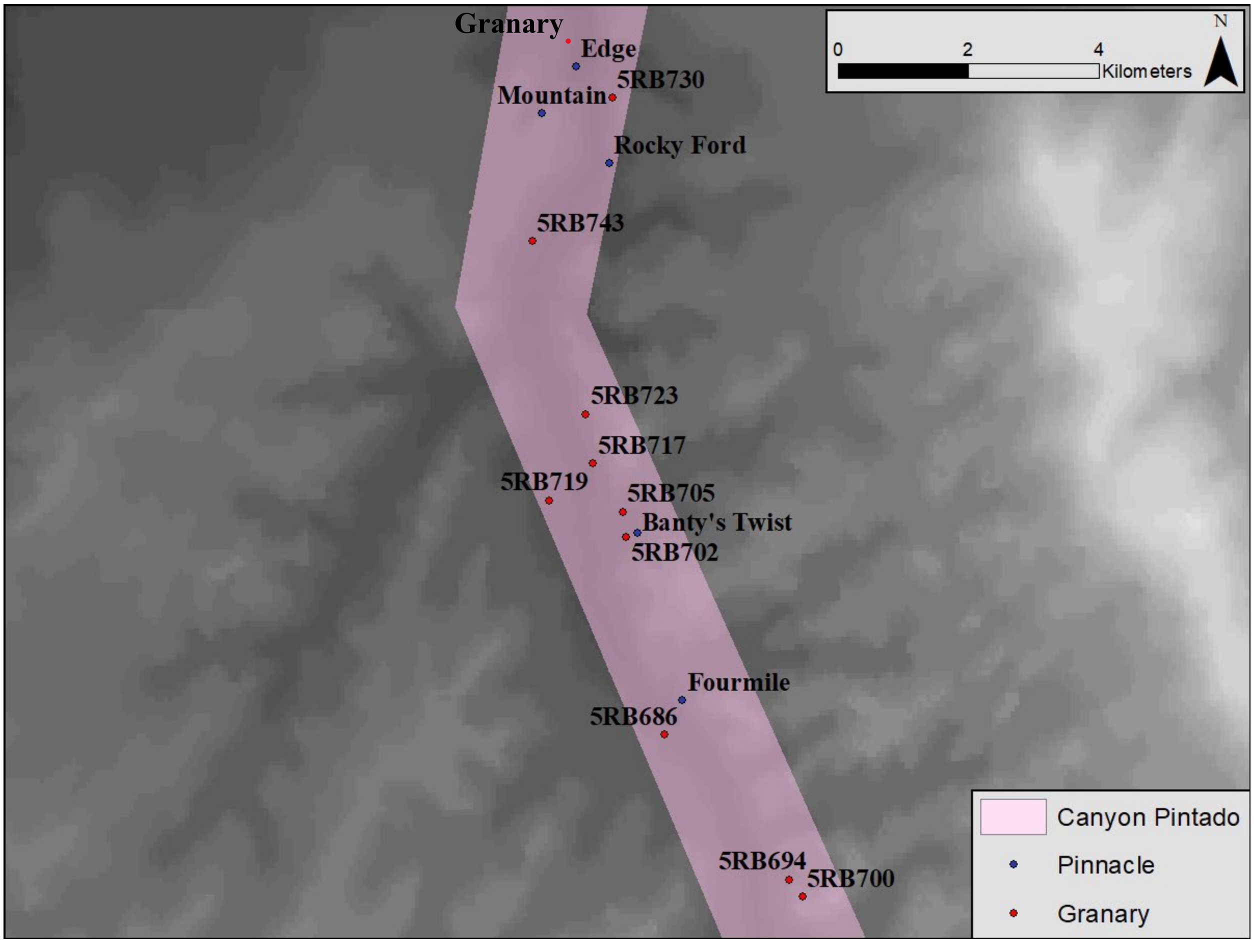

Figure 18. Showing northern extent of Canyon Pintado, which features all known granary sites. Abbreviations are used for five visible pinnacle sites; granaries are shown with SHPO trinomial, with the exception of the new granary discovered north of Edge.

Selecting the Pinnacle Sites

The seven pinnacle sites were selected through a systematic search of Colorado state archaeological records. With assistance from OAHP/SHPO (Office of Archaeology and Historic Preservation; State Historic Preservation Office) staff, all Rio Blanco County prehistoric archaeological sites listed under the labels “promontory”, “pinnacle”, “overlook”, “fortification”, “fort”, “hideout”, “defensive”, “observatory”, and “sky house” were compiled. This produced a litany of sites for the county, of which only those listed with masonry architecture were selected. This process produced five sites within Canyon Pintado and ten others in Rio Blanco County. The five within Canyon Pintado were given preference for this project, as this area contains such well documented Fremont site concentrations. Three more outside of Canyon Pintado were selected: Texas Creek Overlook, due to its proposed late Fremont occupations (Creasman and Scott 1987); Fremont Lookout Fortification, due to its proximity to Canyon Pintado and the impressive scale of its masonry; Spook Mountain Overlook, due to its proposed use as an agricultural calendar (Hauck 2004). Fremont Lookout Fortification was misplotted and therefore omitted. The remaining seven known or possible pinnacle sites near Douglas Creek were not included in this study due to budgetary limitations and other considerations. Among these is the Sky Aerie Promontory Charnel Site (5RB104), which was intentionally avoided due to the human remains that have been encountered there and the controversial reports of cannibalism it has inspired (Baker 1999). The rest include Little Indian Draw Overlook (5RB359), Red Hill Canyon Overlook (5RB772), White Coyote Draw Vision Quest Site (5RB2215), and three unnamed masonry sites (5RB230, 5RB774, and 5RB1600).

Project Methods

I employed a suite of methods for this project. What follows is a cursory overview of those methods, which are all discussed in detail in Chapters 4, 5 and 6. Upon gathering site records from SHPO, I used Esri ArcGIS to conduct the viewshed analysis discussed in Chapter 6. This produced leads about each pinnacle's viewshed of other pinnacles, granaries, potentially arable land, and canyons below. I brought maps of these results into the field as guides to inform my own viewshed observations at each site. In all instances, in-field and remote analyses of viewshed were consistent.

I alone visited all sites and dedicated a full day to each. I collected standardized data (e.g., landform features, measurements, masonry attributes, design elements) for each site, and captured hundreds of ground and sUAV (small unmanned aerial vehicle) images, as well as aerial videos. The environmental considerations for Chapter 4 entailed pedestrian survey of the landscape, access paths, and surrounding area. My observations were corroborated with photographic evidence, which often captured perspectives unavailable to the human eye. Inferences about travel time to sites stemmed from personal experience, geospatial intelligence systems (GIS) calculations, and corrections using Naismith's rule for elevation.

The architectural and material culture considerations for Chapter 5 entailed in-field measurements and observations for each site, which I corroborated with photogrammetric 3D models for each site. I employed Naroll's formula to determine the size capacity for each site, which I articulated with my in-field estimations. My own pedestrian survey in and around sites led to the discovery of artifacts and midden deposits for most sites, and I consulted OAHP site forms and literature on excavations (Creasman and Scott 1987; LaPoint et al. 1981) for material culture recovered by previous researchers at these seven pinnacle sites.

To determine visible arable land for each pinnacle, I developed a weighted overlay model on ArcGIS. This entailed weighing landscape criteria relevant to agricultural suitability such as soils, slopes, and distance to drainages. Together, these were overlaid to create a rasterized representation of arable land, which was then weighed again for visibility from each pinnacle.

Project Timeline and Staff

This thesis project began as a CSU graduate course research assignment (during the Fall of 2020) related to the Canyon Pintado pinnacle viewsheds. It was at that time that the I carried out the initial viewshed modeling for the canyon, which informed my formal thesis field work. It was important to produce these data prior conducting field work, to confirm viewshed inferences in person.

An ancillary goal of this project was to create three-dimensional photogrammetric models of the pinnacle sites, both to aid in data analysis and to satisfy wishes of tribal leadership and BLM officials who sanctioned it. The most efficient way of capturing the necessary photos for these models was through aerial photography. Hence, I undertook formal training to pilot small unmanned aerial vehicles (sUAV, i.e., drones) in a National Historic District. In April of 2021, I attended CSU's Drone School and became a certified drone pilot with Part 107 of the Federal Aviation Administration, thus satisfying the BLM's prerequisite to conduct aerial missions over national heritage sites on public land.

I conducted field work over two sessions during the summer of 2021: the first, a ten-day deployment in June; the second, a two-day return in August. Summer was optimal for field work, as there was no frost on the ground obscuring visibility. One full day was needed to complete recordation of each site. This was enough time to drive to and from the town of Rangely, hike to the pinnacle landforms, record architectural data, survey the landscape, document artifacts, and capture photographs. The Oil Springs forest fire in Rio Blanco county forced me to end my first field session early and return two months later, after the BLM cleared the Douglas Creek area for access.

In early 2022, I created photogrammetric models and completed the additional GIS analysis for arable land and travel distance discussed in Chapters 6 and 4, respectively. Formal work on this manuscript began in February 2022.

All field work and remote GIS analysis for this project was conducted by me alone. The site excavations at Edge and Texas Creek cited throughout this text were carried out by LOPA staff in 1977 (LaPoint et al. 1981) and Western Wyoming College in 1983 (Creasman and Scott 1987). In the Spring of 2022, Kim Biela, staff member with the Center for Mountain and Plains Archaeology, helped collect archival photos, site forms, notes as well as curated artifacts for sites recorded by LOPA staff in the 1970s, which I review here.

Clarification on Terms

Throughout this manuscript, some liberties are taken with language that warrant some clarification here. To begin, the study area is referred to as both Douglas Creek and Canyon Pintado. The reader should be advised that Douglas Creek is a tributary of the White River, and Canyon Pintado is the name of the archaeological district contained within it. In the interest of facilitating discussions, these terms are used somewhat interchangeably. Further, as noted above, two of the pinnacle sites (Spook Mountain and Texas Creek) are not within the designated Canyon Pintado National Historic District, nor immediately adjacent to Douglas Creek. For the sake of simplicity, these terms are maintained to describe the entire project area at times throughout the text. In some instances, however, the geographic context for these two outlier sites is discussed specifically as divergent from the remaining five sites.

Throughout the text, the terms “builders/architects” and “occupants” are repeatedly used when referring to the people involved with the masonry sites. The former refers to matters of architecture, or the act of constructing the sites. The latter is employed when discussing the act of occupying or residing within the pinnacle sites. It is not presumed that the builders and occupants were necessarily distinct cultural groups, but rather the same people whose titles change depending on their involvement with building or using the structures. Ultimately, these terms ought to be understood as two ways of referring to the same people — namely, the Douglas Creek Fremont.

Various terms for these characteristic Fremont masonry structures throughout the Uinta Basin are used in the literature. These include “promontory”, “tower”, “open structure”, “fort”, “overlook”, “observatory”, and “sky house”. Scholars have called attention to their locations on pinnacle landforms (Spangler 1993) that constitute isolated columns of rocks from which the surrounding bedrock has eroded, a geological phenomenon common in the Colorado Plateau. While Texas Creek is the only site in this sample located on the true pinnacle landform, the term “pinnacle” is retained here both to refer to the sites and the landforms they are built upon for the sake of simplifying discussions and to convey the analogous context of isolation and remoteness of the pinnacle sites in Douglas Creek.

In addition, there is variable use of terms such as “pinnacles”, “structures”, and “sites” throughout the following chapters. It should be noted that these almost always denote the masonry architecture sites themselves. In some cases, these terms refer to the pinnacle geographic features (or in some cases, outcrops and cliff ledges) and not the archeological features contained therein, which is made clear in each instance. In other cases, “site” also denotes the material culture remains associated with the pinnacle structures. These distinctions are self-explanatory throughout the text.

Along a similar vein, the terms “masonry”, “coursework”, and “architecture” are used somewhat interchangeably throughout the text. This decision was made in the interest of avoiding excessive repetition when describing the structures. As with previous language choices, there are cases in which these terms denote specific concepts, which ought to be obvious to the reader.

When referring to the land beneath the high elevation pinnacle sites, there is variable use of terms such as “lowlands”, “canyon”, and “travel corridor”. While there are instances in which these terms may have different implications, such as outsiders passing through a “travel corridor”, or villagers living in the “lowlands”, these terms always refer to same geographic bottomlands below the pinnacles. For the five sites within Canyon Pintado, this term denotes Douglas Creek proper. For the two sites outside of Canyon Pintado, they denote their respective primary and secondary tributaries.

Finally, there is frequent reference to the presence of non-local peoples as they relate to the builders/occupants of the pinnacle sites. Depending on the context of the discussion, there is alternating use between terms as benign as “outsiders”, “foreigners”, or “travelers” to more menacing terms such as “attackers”, “enemies”, and “invaders”. While these various characterizations clearly correspond to a range of scenarios, they do invariably refer to peoples theoretically exogenous to the Douglas Creek area, i.e., non-Douglas Creek Fremont people.

The Issue of Site Disturbance

A final matter to address is the question of site disturbance. I encountered disconcerting evidence for modern activities, which have adversely impacted the integrity of these pinnacle sites. First and foremost, Canyon Pintado is a well-travelled tourist destination for hikers, bikers, and history enthusiasts. While its designation as an important national heritage district has elevated Canyon Pintado's protection status and promoted its value, it has also drawn in tremendous volumes of people, who may damage its cultural resources, should they decide to venture off road and access protected sites. At Rocky Ford, there are nearby historic cans strewn

Figure 19. One of several pieces of historic refuge, scattered in the periphery of Rocky Ford. Diagnostic features of this can date from 1935 to 1963 (Merritt 2014:6–8; Reno 2012) and was used for target practice. It is unclear whether this activity is related to obvious damage to the structure's north wall. Summer 2021. Photograph by Joshua Bauer.

Figure 20. Showing condition of Rocky Ford's intact north wall during LOPA's 1977 site recording. Facing south. From Creasman (1981a:41).

with bullet holes (Figure 19), modern beer glass shards, and the remnants of recreational campfire. Worse, in the intervening years since it was visited by LOPA researchers in the 1977 (Figure 20), the masonry architecture there appears to have collapsed or been destroyed (Figure 21). Edge is susceptible to disturbance too, as it is located just above a popular tourist stop along highway 139 through Canyon Pintado and ostensibly receives ample foot traffic. Moreover, recent videos posted on social media channels have advertised Texas Creek as a curiosity for adventure seekers (Jason LaBelle, personal communication 2021). Ring Rock Hamlet Promontory, another site initially slated for this project, is clearly a popular recreational area as is attested by an abundance of spent ammunition cartridges, fire pits, and broken liquor bottles. An outcrop exposure there has even been vandalized with the spray-painted stencil of a scantily clad woman.

Figure 21. Modern glimpse of Rocky Ford's north wall, showing significant damage. Facing south, 1-meter scale bar. Summer 2021. Photograph by Joshua Bauer.

These challenges aside, the sites are still well preserved enough to foster credible data collection. Moreover, a review of the literature germane to this research has shored up any empirical deficiencies that modern disturbances could engender. As such, the reader should rest assured that the data and attendant interpretations presented faithfully characterize these pinnacles and represent a rigorous attempt to capture their significance.

Conclusion

This chapter has outlined the history of exploration and formal research in Canyon Pintado and Douglas Creek, from early Spanish forays into the region through to archaeological investigations by academic institutions and cultural resource management firms. I have also provided a review of scholarship of pinnacle sites in nearby eastern Utah, highlighting the consensus that these Fremont structures are fundamentally defensive. Seven of the known fifteen known pinnacle sites are selected for study in this project, and the justification for their inclusion has been provided here. Attention has been given here to other considerations as well, such as the timeline of work and methods used for this project, the use of terminology in this manuscript, and the issue of site disturbance. The following chapter will delve into the anthropological concepts of territoriality and defensibility, and discuss how they are understood among foragers, farmers, the Fremont, and the ancient peoples of the Southwest.

CHAPTER 3: TERRITORIALITY AND DEFENSIBILITY

This chapter provides definitions for the concepts of territoriality and defensibility that are central to this project. Here, too, is a delineation of the differences between active and passive defensibility, the question that constitutes the thrust of this manuscript. Provided in this section as well is an overview of the theoretical models that anthropologists use to explain territoriality and a discussion of the importance of territoriality for foragers and farmers. The chapter concludes with a review of the evidence for territorial behavior and violence among cultures of the Southwest and a discussion of territoriality as it relates to the Fremont culture at large, and among those of Douglas Creek specifically.

Definitions for Douglas Creek Fremont

The organizing principle guiding this research is that the Douglas Creek Fremont were a territorial people, who maintained defensive strategies to protect themselves and their resources. Simply stated, territoriality refers to the exclusive use of a resource area, maintained through regional competition, defense, and signaling (Bayman and Sullivan 2008; Kelly 2013:138; McCool and Yaworsky 2019:111). While this phenomenon is contingent upon resource density as well as social demographics, size, and dynamics, anthropologists also believe it correlates to resource accessibility and predictability (Kelly 2013:138).

As discussed later in this chapter, it seems apparent that the Douglas Creek Fremont were a territorial people. However, it remains unclear whether these Fremont were engaged in active or a passive defensibility, variations of territorial behavior. McCool and Yaworsky (2019), who studied Fremont pinnacle architecture in Nine Mile Canyon, define these two terms as they relate to Fremont architecture; Schroeder (2018), who wrote about Wyoming's Alcova Redout, provides further discussion on different architectural expressions of defensibility.

If the Douglas Creek Fremont were committed to active defensibility, they would have engaged in conflict, faced down enemies, and endeavored to deter them through direct confrontation. The pinnacles therefore would have functioned as strongholds that the builders would have architecturally imbued with as many strategic advantages as possible that aided in their counterattacks, such as large walls from which to rain down projectiles and shield their own activity from the view of their enemies (McCool and Yaworsky 2019:114; Schroeder 2018:243).

If the Douglas Creek Fremont were instead engaged in a passive form of defensibility, they would have avoided conflict by retreating to the pinnacles, which functionally would have served as refuges that protected them from harm. In this instance, the pinnacles also would have played roles as watchtowers from which people could monitor the canyon below for raiding parties, would offer large viewsheds, enable quick communication, and possibly contain natural barriers inhibiting access. Ultimately, the occupants would have been protected through the pinnacles' inaccessibility, which allowed them to resolve conflicts through non-confrontation (McCool and Yaworsky 2019:114; Schroeder 2018:243).

Territoriality among Hunter-Gatherers and Farmers

Hunter-Gatherer Societies

Territoriality among hunter-gatherers is well documented (Kelly 2013:137–165) and many anthropologists have speculated as to why this phenomenon emerges in these societies. Codding and colleagues (2017:31) show that territoriality among foragers of western North America not only arose when reliable and abundant resources were available in areas populated by competing groups, but also when investing in territorial institutions was mutually beneficial in ecological, social, and economic terms to all parties involved. Their research also demonstrates that growth in cooperative group size only leads to more ownership of resources amongst foragers, whose subsistence was dominated by either gathering or fishing, but not hunting (Codding et al. 2017:36). They draw on Allee's principle to explain why territoriality emerges and why it disintegrates. The authors define this principle as a "positive covariance between utility [i.e., the benefits minus the costs] and the number of cohabitating individuals up to the intermediate population densities" (Codding et al. 2017:31). This model essentially theorizes that as population grows, the benefit-costs of each individual covaries up to the point where the economy reaches capacity, at which point the trend reverses. This runs contrary to the negative

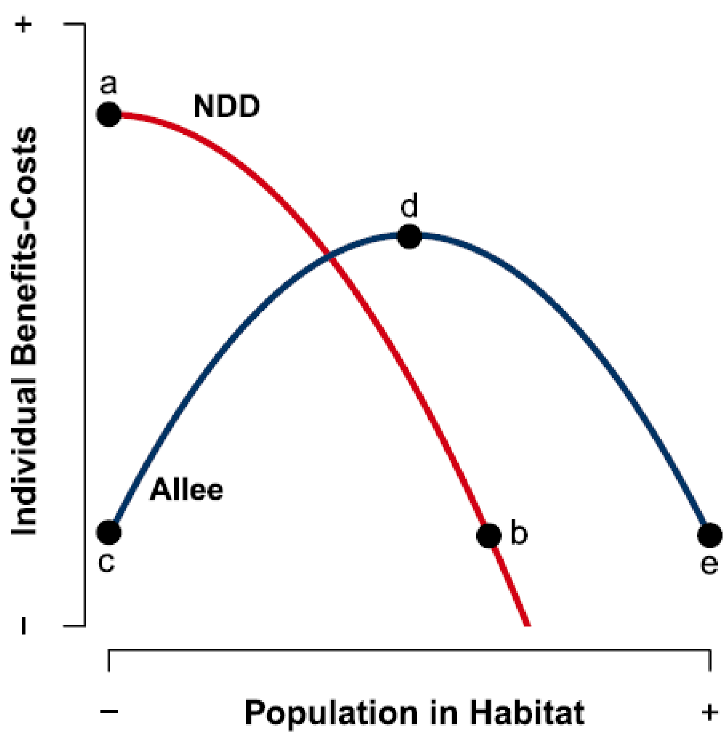

Figure 22. Models for the development of territoriality among hunter-gatherers. Allee's Principal is shown in blue; the Negative Density Model is shown in red. The key difference here is that Allee's Principal accounts for a carrying capacity within groups. From Codding and colleagues (2019:32).

density dependence (NDD) model, which suggests that as population increases, benefit-costs for individuals immediately trend downward. In other words, individuals involved in NDD would "maximize utility working alone, resulting in small cooperative groups [with little shared incentive for] territorial behavior" (Figure 22; Codding et al. 2017:32).

Using ethnographic metadata from around the world, Freeman and Anderies (2015) show that the common pool resource argument, also known as the foraging effort model, best explains why foragers develop territorial ownership. The primary dynamic at play here is that as resource productivity can no longer meet the demands of the population, foragers will work that much harder to maintain a steady supply of food to meet their needs. As part of that increased effort, group members will be drawn to the benefits of increased investment of ownership institutions to offset risk of famine, increase access to demographic information, and prevent theft or hide from enemies (Freeman and Anderies 2015:137–138). This model seems especially appropriate for the Douglas Creek Fremont.

The Human Relations Area Files offer valuable ethnographic information on territoriality among the foraging societies of the Intermountain West (eHRAF 2020), which offer clues for how the Fremont may have expressed territoriality. The Ute society expresses concepts of ownership with limited access to resources such as the Utah Lake fishery. In Navajo culture, families hold rights to their agricultural plots if they are actively used, while forager grounds are public domain. In the Great Basin, the Northern Paiute do not have institutions for individual land ownership but believe that their land is exclusive for their people. Access to their resource areas is restricted between subgroups, but permission can be granted. The Eastern Apache have similar practices.

Farming Societies

Farming peoples are also known to develop territorial behaviors. A polity committed to subsisting on cultivated foods would need to invest in suitable cropland and secure it for exclusive use. This security is achieved through infrastructure and institutions that help promote the growth of crops while protecting them from pilfering outsiders. These may include monumental architecture to signal territorial ownership, land improvement projects, monitoring systems, and the establishment of labor and distribution regimes (Stone et al. 1999). These social creations would constitute common-property assets, which serve to preserve, promote, and allocate the flow of resources to group members invested in them (Cornée et al. 2020). Such assets depend on the continued consent of individuals to commit to collective action and its inherent ethos of shared prosperity (Ostrom 1990:38–40). Hence, an iterative process engendering deeper entrenched territorial postures would unfold as a population grows more dependent on cultigens (Stone et al. 1999:114–119). These are valuable insights for understanding the Douglas Creek Fremont, whose subsistence partially relied on cultigens.

The Human Relations Files also include information on territoriality among agricultural societies of the Intermountain West (eHRAF 2020), which are important considerations for the Fremont, who subsisted on both farming and foraging (Barlow 2002; Finley et al. 2020; Gardner and Gardner 2016:188; Madsen and Simms 1998). The Havasupi consider their farming plots private property if they are actively used, and these plots are passed down through the paternal line. The Zia Pueblo, Tewa Pueblo, and Zuni believe that their tribes have rights to their lands, which is allocated based on family need and can be bequeathed to offspring. The Hopi, who subsist on foraging and farming, own those lands close to their villages or agricultural plots. These instances reveal patterns of behavior and social institutions that possibly parallel those of the Fremont, who were subject to similar environmental constraints and developed comparable strategies to ensure food security

Violence in the Southwest and Territoriality among the Fremont

There is much debate about where the Fremont originated, which artifact traditions characterize their culture, and with whom they interacted (Madsen and Simms 1998:255–256; Spangler 2002:340). However, archaeologists do know that Fremont lifeways occurred on a spectrum from hunter-gatherer to horticultural (Spangler 2002:430), that they maintained a distinct rock art style (Schaafsma 1970), and that they built distinctive coursed masonry architecture and adobe granaries (Spangler 2002:318, 324). In addition to these attributes, archaeologists have also examined evidence for Fremont territoriality, which may have developed as resources became more scarce and less predictable, making their survival more precarious (Boomgarden 2009; McCool and Yaworsky 2019). This makes sense, since we know that there were prolonged droughts in the Fremont domain beginning around 1100 CE (perhaps as early as 850 CE in Douglas Creek [Creasman 1981a:193]), which triggered unpredictable climatic patterns, severe resource scarcity, and dramatic social change (Benson et al. 2007; McCool and Yaworsky 2019:113). Different Fremont groups alternated between foraging and farming (Barlow 2002) — sometimes on a multidecadal basis and differing between communities, a testament to their adaptability (Finley et al. 2020; Simms 1986:204–7; Simms 2008:189; Spangler 2002:322) — but territoriality would have plausibly developed during times of environmental change. Although farming could have feasibly provided for more food security, farming plots in Fremont canyon districts were often small, restricted by topography, and limited due to poor environmental suitability (Creasman 1982:286; Gardner 2009:117; Gardner and Gardner 2016:203; Gunnerson 1969:136–137; McCool and Yaworsky 2019:113; Spangler

2013:162–163), thus making their privatization and protection critically important. Studying Fremont expressions of territoriality is thus important because they offer clues about their sociocultural adaptations to crisis and conflict.

There is evidence to support the hypothesis that regional conflict and territoriality among the Fremont increased throughout the Late Formative period (950–1250 CE), or the Fremont's Late Agricultural period (chronology drawn from Spangler 2002:325). This evidence includes ostensibly defensive masonry granary and pinnacle architecture (Boomgarden 2009; LeBlanc 1999:191-2; Hora-Cook 2018:19; Madsen and Simms 1998:307; McCool and Yaworsky 2019; Spangler 2002:382) rock art images depicting headhunting and men with weapons and shields (Creasman 1982; Keyser and Poetschat 2017; Schaafsma 1971), and possibly even cannibalism (Baker 1999; Madsen and Simms 1998:315; Turner and Turner 1999:170-1); this latter claim has, nevertheless, been widely challenged for the Fremont specifically (Spangler 2002:399) and for the cultures of the American Southwest more broadly (Dongoske et al. 2000). Fremont masonry architecture may indicate a defensive strategy to protect themselves and their resources. Fearsome depictions in their art suggests that warfare took on heightened cultural value during periods of conflict. Cannibalism (if the reader sustains such claims) similarly may indicate behaviors related to warfare, resource scarcity, and intense territoriality.

These patterns are consistent with war and conflict that occurred from the Middle Period (900–1250 CE) to the Late Period (1250-1500 CE) more broadly in the American Southwest, which eventually led to drastic sociocultural transformations (LeBlanc 1999:277). This is critical, as archaeologists believe that most Fremont occupations in the Colorado Plateau and Great Basin ended around 1300 CE (Spangler 2002:426-7). Prehistoric peoples in the Southwest are known to have massacred, raided, ambushed, pillaged, scalped, kidnapped, and possibly even cannibalized during warfare at this time (Baker 1994; Billman et al. 2000; Carlson 1956; Cameron 2011:173; Haas and Creamer 1993, 1997; LeBlanc 1999:1). Practices such as these are known to have triggered dramatic cultural changes wherever they were undertaken (Cameron 2011), and the Southwest was no exception. The Pueblo III system at Chaco Canyon, for instance, collapsed following intense drought during these years (Billman et al. 2000:146). Indeed, agriculture throughout much of the Southwest deteriorated and social systems crumbled. Such dramatic conflicts precipitated major changes in settlement patterns and migrations throughout the Southwest; most people living in the Colorado Plateau during this period aggregated into compact pueblos with variable intercommunity support (LeBlanc 1999:276). While the Fremont were north of Ancestral Puebloan communities, similar environmental conditions in their domain likely would have catalyzed comparable social tumult. However, while some Fremont groups experienced population densities and stratification like their Ancestral Puebloan counterparts, they were likely sparser and egalitarian. For instance, there are no indications that it was stratified to such an extent that power was consolidated by elites (Gunnerson 1969:156–157). Madsen and Simms (1998:2) suggest that this distinction correlates to each Fremont group's relative dependence on agriculture and foraging.

Evidence in Douglas Creek

Researchers studying Fremont occupations in Douglas Creek have long speculated about this group's territorial behavior. Wenger (1956:84–85) wagered that the dry conditions in the area would have only sustained small [and therefore vulnerable] populations and that their pinnacle architecture throughout the canyon likely represented defensive forts, as evidenced by their high elevations, and remote/rugged locations. Creasman (1982:12) also suggested that the archaeological evidence here supports the hypothesis for Fremont territoriality, citing Canyon

Pintado's rich concentrations of rock art and ceramic assemblages, which attest to distinctive regionalized expressions of Fremont culture and land tenure. Furthermore, he argued that the locations of the characteristic Fremont masonry structures in the canyon reveal that conflict resolution strategies were a probable factor in settlement patterns and food caching in this district (Creasman 1981a:282–289). Creasman (1981a:36–38) observed that the pinnacles were often situated above the canyon floor, usually on "benches, small pinnacles, or ridgetops with limited access" and that the granary storage structures were hidden in "small overhangs or rockshelters above the canyon floor". He believed that granary locations were selected based on their seclusion, and not necessarily on their proximity to habitation sites, suggesting an infrastructure of defensibility within the canyon (Creasman 1981:285).

At present, archaeologists do not know precisely when the Douglas Creek pinnacles were built or occupied. However, archaeological deposits at some pinnacles have been dated. Fourmile contained stone tools diagnostic of the Late Formative period (950–1500 CE; Office of Archaeology and Historic Preservation [OAHP], 5RB278 Site Form, completed by the Laboratory of Public Archaeology [LOPA], 1977) and Edge contained wooden beams dating to ca. 1000-1490 CE (LaPoint et al.1981:v111–v112), although Creasman (1981:283) favors the latter years. Excavations at Texas Creek revealed compelling evidence for Fremont occupations in the area dating to 1500 CE, stemming from a 20g piece of charcoal 10 centimeters above the pinnacle surface, associated with cultural deposits such as Formative projectile points, stone tools, Uinta Gray ceramics, groundstone, bone tools and beads (Creasman and Scott 1987:11). This is extremely late compared to Fremont districts in neighboring Tavaputs Plateau, where they would have disappeared centuries prior (Creasman and Scott 1987:11–16). During the Late Formative, the Douglas Creek Fremont would have subsisted on a mixture of hunting and gathering as well as maize agricultural (Creasman 1981a:282–289). Although midden deposits at other Canyon Pintado sites attest to a stronger reliance on hunting than agriculture as there is greater frequency of stone tools and deer and rabbit bones compared to groundstone and maize macro and micro fossils, pollen analysis at Edge suggests a slight increase in corn reliance by the time of its occupation (Creasman 1981a:285-90; LaPoint et al. 1981:v108). These details offer important clues as to how the Douglas Creek Fremont were adapting to a changing environment. The investment in the ten known granaries in Canyon Pintado indicates that the need to store cultivated crops and other resources was high, supporting the hypothesis that territoriality was well underway here at the time of their construction. In terms of the model for foraging effort, the theoretical Canyon Pintado security system could have arisen after intergroup competition over dense and predictable resources prompted the development of increased territoriality, which served to improve the safety of all people invested in its construction and operation (Freeman and Anderies 2015; Ostrom 1990:38–40).

Rock art sites are among most common site type within the Canyon Pintado district — roughly one third of more than 400 known sites contain rock art (BLM 2022). All the petroglyph sites are at or near the mouths of small or large canyons and over half are under 200 meters from the tributary canyon to Douglas Creek. Creasman (1982:2) suggests that these locations may have served the purpose of marking travel and trade routes related to Douglas Creek. Many of the motifs show similarities to broader patterns found in Fremont culture such as the trapezoidal and bottle-shaped anthropomorphs — some exhibiting a menacing posture with broad shoulders, large heads with imposing headdresses, outstretched arms, expressionless eyes, and yielding shields — and rectangular mountain sheep represented in the Classic Vernal or San Rafael styles. However, the Canyon Pintado rock art exhibits less attention to detail than these styles and may therefore represent a local vernacular that emerged here (Creasman 1982:12). Distinctive rock art variations such as anthropomorphic figures wearing breast plates and wielding shields may indicate proclamations of territoriality, such as the striking Classic Vernal motifs represented at Dry Creek (where some figures are seen holding decapitated heads) and Nine Mine Canyon in nearby northeastern Utah (Schaafsma 1970:9–35). This is also the case more broadly in the Southwest among the Trincheras, Patayan, and Hohokam populations (Bayman and Sullivan 2008). While not all these clearly violent images are seen in Canyon Pintado, we may still be able to infer that the appearance of slightly differing rock art traditions among the Douglas Creek Fremont reflects shifting politico-economic relations in which inter-territoriality between the neighboring Fremont groups increased. By placing these symbols at the entrances to the canyon, the Douglas Creek Fremont may have been signaling ownership of their land, which served as their first line of defense against raids.

Douglas Creek as an Intermountain Travel Corridor

Another important consideration for the emergence of territoriality among the Douglas Creek Fremont is that this drainage formed part of a major north–south travel corridor for this region of the Intermountain West (Figure 23). The creek's broad bottomlands offered a welcome route for travelers seeking passage through the rugged topography of the Rocky Mountain's Western Slope. Its establishment as a trail is understandable, as Native American trails often developed according to the direction of topography and patterns of regional waterways (Huscher 1939). Like all indigenous trail systems of North America, Douglas Creek would have received "traders, messengers, emissaries, hunters, and war parties" (Baker 2008:6). This was such a well-known and useful travel way from the south to the lands north of the Colorado River, that the indigenous guides leading the Dominquez–Escalante expedition in the late 18th century relied on it to reach the Green River. Coincidentally, this expedition led to the discovery of the rock art of *El Cañon Pintado*, which inspired its later fame. Writing about his experience on this trail, Spanish chronicler Father Silvestre Vélez de Escalante remarked that his party trekked “through the canyon over a well-beaten path”, which was the only passage “that one can go from the ridge mentioned [Brush Mountain to the south] to the nearest river [White River], for the rest of the terrain in between is very broken and rocky” (Vélez de Escalante 1995 [1776]:49). The well-worn nature of the route in the 18th century, taken with the imposing surrounding landscape clearly illustrate the importance the corridor must have played throughout Native American history, including during the Fremont occupations.

Figure 23. Showing the broad and open landscape of the Douglas Creek bottomlands, which would have been ideal for north-south travel. This aerial image shows the view from the uplands, overlooking this travel corridor. Facing north-northwest. Summer 2021. Photograph by Joshua Bauer.

The Douglas Creek corridor would not only have facilitated intertribal trade between local Fremont populations and those of the Gateway and Aspen traditions but would have also funneled new populations into and through the area. Baker (2008:27) notes that the expansion of Athapascan and Numic-speaking peoples into Western Colorado would have surely followed corridors such as Douglas Creek and he suggests that these may not be the only two transcontinental indigenous migrations that the region hosted.

Ancestral Athabaskans are believed to have made their earliest ventures out of their homelands of the Pacific Northwest into the Four Corners region (Carlson 1965) through an Intermountain corridor, and not the Great Plains. Furthermore, archaeological evidence suggests that the route these travelers took directed them along the Western Slope, and not as far west as the Wasatch Range (Seymour 2012:149). Researchers concerned with this migration have long speculated that the topographic options available in western Colorado would have directed people along only those drainages conducive to human travel (Huscher and Huscher 1949; Seymour 2012; Spangler 2002:4). Based on the earliest known dates of Athabaskans in the Southwest in the 14th century, and the suitability of Douglas Creek as a passageway to the south, it seems probable that Fremont occupants here would have encountered these outsiders at some point.

When Numic speakers spread into the Colorado Plateau, the Rockies, and the western Plains around the 14th century, they would have taken advantage of the Douglas Creek passageway. In fact, this may have been the final sea change likely related to the denouement of the Fremont traditions in Douglas Creek. Research has shown that the Numic people enjoyed certain advantages as they encountered other indigenous groups of the southwest, which ultimately led to their dominance on the landscape. Magargal and colleagues (2017), for instance, propose that the Numic peoples' use of landscape alteration through fire, land privatization, and intense processing of seeds and nuts gave them a subsistence advantage over the people they eventually replaced in the Great Basin and Colorado Plateau regions. A similar process may have unfolded in Douglas Creek, where the Fremont were eventually outcompeted by Numic peoples, whose subsistence strategies rendered them more resilient to environmental changes in the region. Although Ortman and McNeil (2018) argue that the Fremont simply may have migrated into the Great Plains to become the Kiowa peoples encountered by American settlers, the Numic-Fremont replacement theory remains plausible. Upcoming research by CSU's Kim Biela will explore this theme through the distribution of Fremont and non-Fremont ceramics in Rio Blanco County, with attention to the differences in ceramics use between mobile and sedentary groups. Ultimately, her work will produce evidence that will shed further light on the Fremont-Numic replacement theory (Kim Biela, personal communication 2022).

Indeed, as Numic and Athapascan peoples expanded further from their homelands, it was eventually into southwestern lands already populated by other groups and was likely achieved through a series of violent incursions (Carlson 1965; LeBlanc 1999:21), as they competed for optimal resources in Fremont and Puebloan occupied regions. The intention here is not, however, to settle debates on Numic expansion, Athapascan migration, or Fremont disappearance. It is rather to illustrate the probability that Fremont peoples occupying the Douglas Creek area would have interfaced with many outsiders — the two ethnolinguistic groups discussed above as well as foragers to the north and east during the Fremont apogee, ca. 1000 CE (Reed and Metcalf 1999:98–145) — over their centuries of settlement there. These interactions may have led to altercations, particularly if the Fremont were also facing resource unpredictability and social instability stemming from climate change. In such a scenario, the Douglas Creek Fremont's need for defensibility through architecture and other strategies would be all too apparent.

A Spectrum of Regional Violence

In the Southwest, an area marginal for agriculture and subject to floods, droughts and other ecological variability, warfare frequently occurred due to struggles for land and resources (LeBlanc 1999:22). As environmental scarcity created population pressure and tumultuous fluctuations in regional carrying capacity, ancient people were forced to fight for their survival. This was likely the most common cause prehistoric warfare in the Southwest. Enduring rivalries initiated by acts of aggression engendered cycles of revenge, which may have led to endemic warfare in the region (LeBlanc 1999:13). If violence temporarily subsided, even a single violent act of war every several years would have been enough to warrant the development of social institutions organized around war. These include the installment of defensive architecture and the improvement of weapons such as the sinew-backed recurved bow, which appeared in the Southwest during the late period (LeBlanc 1999:39). In time, added cultural value was placed on warrior traditions and this can be seen in rock art depictions of warriors in battle and men yielding shields, donning possible war regalia such as ornate headdresses, and holding severed heads (LeBlanc 1999:108–109; Schaafsma 1970:9–12). Cultural memories of past violence further incentivized defensive postures and fostered preconceptions about traditional enemies. Seventeenth century Spanish explorer, Juan Rivera, accounted his young Tabeguache guide's testimony that the Douglas Creek region was populated by dangerous "privateer Indian nations" and fearsome cannibals (Baker 2013), although this account would have been generations removed from Fremont occupations in the region. Around that same time, a Ute guide informed another Spanish traveler that he had been taken captive in the treacherous region formerly occupied by the Fremont (Baker 2013:18), thus illustrating how past acts of violence between communities can shape ideas and attitudes about entire territories of people.

With warfare institutionalized as it may have become for the Fremont and their Southwestern neighbors, violence could have occurred on a wide spectrum. The most organized expression of warfare would have been in the form of standing armies, committed to the annihilation or total surrender of enemies. In this instance, battles could have been formalized with conditions agreed upon in advance, resulting in moments of acute devastation for involved communities (LeBlanc 1999:15). Standing armies could also conduct less systemized guerilla tactics by ambushing unprepared enemies, thus resulting in long-term social damage due to cumulative losses of male warriors and child-rearing women (LeBlanc 1999:15). Along the middle of this spectrum, warring polities could have dispatched small raiding parties to inflict damage on a smaller scale and carry out surprise attacks meant to shock enemies into surrender by killing as many warriors as possible (LeBlanc 1999:15). Interpersonal violence, or targeted attacks to disrupt enemy political leadership or vindicate past aggressions, would fall at the other end of the spectrum (LeBlanc 1999:15). In the first two scenarios, violent acts can occur a range of scales. Massacres, or the systematic murder of entire communities, were known to occur in the Southwest under these circumstances (LeBlanc 1999:2–5). The razing of villages and resources to dismantle entire communities was also a strategy used by war parties. The Coombs Site in southern Utah's Glen Canyon is one of the few known sites possibly attesting to this practice in Fremont territory (Lister et al. 1959–1961), although it may have been an Ancestral Puebloan outpost in Fremont lands (LeBlanc 1999:192). Finally, captives and slaves were taken by victorious combatants. Women and children were often victimized by this practice, which was a major driving force of cultural change (Cameron 2011, 2016). The bedlam of warfare in the

Southwest, particularly during the Late Period, would have precipitated major demographic shifts consisting of depopulation, migration, and resettlement (LeBlanc 1999:19).

In the archaeological record, warfare appears mostly through defensive architecture (Bamforth 2018:8–11) and the formation of alliances, observable through evidence of trade and intermarriage (LeBlanc 1999:17). For the Fremont of the Uinta Basin, architecture is the most compelling evidence for warfare, as masonry sites seem to reflect a defensive posture after 1150 CE (LeBlanc 1999:192). For the Fremont of Douglas Creek, the ostensibly defensive pinnacle sites may have been built as intergroup conflicts in the region became endemic — stemming from cycles of regional population pressure and environmental scarcity. The violence that occurred here probably fell below the formality of standing armies engaged in frequent battles with enemies but above the relatively inconsequential nature of interpersonal violence — grave enough to warrant defensive architecture, but not the abandonment of the area. What seems likely is that the threat of targeted attacks, razing, and raiding — including the abduction of women — by small bands of enemy warriors traversing the canyon corridor loomed large over the quaint Fremont hamlets of Douglas Creek. These raiding parties may have come from homelands where resources were in short supply and were attracted to the still viable lands of Douglas Creek. While it is possible that the pinnacle sites attest to a gendered response to endemic violence in which women and children sought refuge in high elevation fortifications while men remained in the lowlands to defend land and resources, this would be difficult to perceive in the archaeological record. What is clear is that the fear of attack — however minimal — was enough to incentivize defensive strategizing in the form of hidden storage granaries and masonry fortifications.

Conclusion

Territoriality and its dynamic relationship with resource availability and population demographics is a phenomenon well understood by anthropologists. One of the key mechanisms of maintaining a territory is defense, which can take on both active and passive forms. In some instances, territorial conflicts can lead to violence and warfare, which is best represented in the archaeological record through the presence of defensive architecture. Violence and warfare are known to have taken place during the Formative period in the Southwest, and there is ample evidence to suggest that the Fremont were engaged in them as well. The Fremont of Douglas Creek built well-hidden granaries and what appear to be defensive forts throughout the canyon. They also placed rock art panels along tributary confluences, perhaps to mark their territory. Douglas Creek was an important travel route along the Western Slope and the Fremont population there would have encountered numerous foreign peoples as they made their way through Fremont homelands. In times of environmental scarcity and population pressure, violent conflicts could have flared up in the region, incentivizing the Douglas Creek Fremont to construct defensive architecture. While it is probable that the violence here was less severe that standing armies engaging in formalized battles, the threat of raids and ambushes was strong enough to keep the local population on alert.

The following chapter is the first of three exploring different aspects of the pinnacle sites of Douglas Creek. It will consider the physical context of the pinnacles sites in terms of geographic obstructions and barriers that may have provided safety to the pinnacle occupants. Landscapes can protect people in this way, and I identify patterns across numerous pinnacle sites that suggest the builders selected the most naturally defensible settings for construction.

CHAPTER 4: PHYSICAL CONDITIONS AND ACCESS

This thesis explores the defensibility of Douglas Creek pinnacles through physical, architectural, and visual perspectives. Here, results are presented for the first research question: *What are the physical conditions and access features associated with each pinnacle structure?* To ascertain a robust understanding of the physical settings for each pinnacle, the following variables are systematically analyzed for each of the seven sites: conspicuousness from the canyon floor, natural obstructions along access path, natural blinds on the landform, pinnacle proximity to cliff edges, access path proximity to cliff edges, and elevation gain/distance from canyon/warning times.

Prior to discussing the results from this question, I explore how geography can be a key factor in defensive strategies and review the anthropological perspectives germane to this question. I outline my methodological approach, then summarize what expectations I had for this question and comment on the range of implications various results might have. The results produced through this question support the hypothesis that the Douglas Creek Fremont were engaged in passive defensibility, as they relied on landscapes that could protect them and alleviate them from active defense.

Geographic Defensibility

The complex geography of Douglas Creek is replete with dramatic physical features that at once impede travel and offer secluded niches. The higher elevation and remote settings of the pinnacle structures signal that the builders may have sought locations with naturally defensible elements to act as barriers against intruders. If conflict resolution strategies were inherent in the settlement patterns of the pinnacle site architects, we would expect to find abundant natural obstructions consistently associated with them.

In the instance that residents of the canyon sought such naturally defensible locations to settle, it would follow that they were responding to a need to instill a sense of security in their lives. Threats such as outsider raiding parties may have incentivized Canyon Pintado residents to retreat to higher, more inconspicuous settings. Defensible spaces offer opportunities to avoid conflict by hiding but can also be weaponized to assist in counterattacks (Schroeder 2018:242).

In nearby Nine Mile Canyon, roughly 110 kilometers to the west, analogous Fremont sites offer a glimpse into one form of their conflict resolution strategies. There, masonry structures are located on dangerous, remote, and difficult-to-reach pinnacle landforms (Figure 24). McCool and Yaworsky (2019:119) determined that their limited viewsheds (discussed more in Chapter 6) and extreme inaccessibility attest to the Nine Mile Canyon Fremont avoiding direct confrontations with intruders. Here, the land itself protected a vulnerable Fremont population who either could not or chose not to actively defend themselves.

Figure 24. Nordell's Fort (top) and another pinnacle site in Nine Mile Canyon. This archaeological district was studied by McCool and Yaworsky (2019). Here, the pinnacles' natural defensibility is exhibited through geographic remoteness and inaccessibility. Photo courtesy of drone photographer and photogrammetry specialist, Kevin Wellard (his work and contact information can be found at kevinwellard.com).

The Fremont were known to use geographic isolation as a strategy to protect resources as well. Their characteristic adobe storage granaries were used as part of a caching strategy (Metcalf 1981), as they are often found in remote and difficult-to-reach places like rockshelters and cliff overhangs (Madsen and Simms 1998:298). Madsen and Simms (1998) note that the caching of agricultural surpluses in well-hidden niches in the landscape attests to the variable subsistence practices of the Fremont. By securing their cultigens in covert places, villagers were free to leave to pursue more mobile forager lifeways for part of the year. These granaries were often dispersed in such a way that if one were found, others would not be (Metcalfe 1981). As a flexible and adaptable cultural group, the Fremont knew how to make use of their natural landscapes to protect themselves and their resources.

With this framework, the first question guiding this research in Douglas Creek is presented: *What are the physical conditions and access features associated with each pinnacle structure?* Here, I examine the geographic settings that were present at the locations selected for construction of these masonry structures and assess whether they afforded natural advantages. I determine whether the landforms contained defensive features such as blinds from which to fire weapons or seek protection from incoming projectiles. I examine the ruggedness, difficulty, and dangerousness of access to the pinnacles by measuring elevation gain and distance from the canyon floor, proximity to cliffs, and records natural obstructions such as boulders or outcropping bedrock along the way to structures. Here, too, I ascertain how visible the pinnacles were from the canyon below and determines whether they were conspicuous or hidden from view.

Theoretical Orientation

Landscapes can lend themselves to conflict resolution strategies for a polity engaged in defending themselves or their land. Territorial behaviors and natural environments can constitute a system which impact both the people and the landscapes they live in, thus "shaping social identity and political institutions in the process" (VanValkenburgh and Osborne 2013:2). In this sense, we can wager that as much as people look after their land, their land will look after them. Indeed, this adage evokes the value system oriented towards land stewardship and human/non-human interdependence, which is fiercely maintained by descendent communities and indigenous scholars today (Noel et al. 2014; Simpson 2017; Tallbear 2017; Taschereau Mamers 2020). In terms of defensibility, territorial communities may fight to protect the resources of their ancestral homelands, while the land itself might offer settings that protect the human inhabitants as well. Conditions such as steep slopes, talus ground, jagged outcropping bedrock, high elevations, sheer walls, and precipitous cliffs constitute natural settings that hinder access to certain geographic spaces where people can reside (Arkush and Stanish 2005:7–8; Maschner and Reedy-Maschner 1998:32; Moss and Erlandson 1992:74). Such barriers associated with habitations not only prevent outsiders from entering but provide natural protection to occupants inside. Moreover, environmental obstacles act as an insurance policy that permits occupants to invest fewer resources in fortifying structures themselves (Moss and Erlandson 1992:75). Inaccessibility as a function of landscape, unsurprisingly, is often associated with defensive archaeological sites (Green and Parker 2013:58; Mantha 2013:170; McCool and Yaworsky 2019:114; Parker 2013:131).

Identifying and characterizing the potential natural barriers present on an archaeological landscape can offer insights into the options that a territorial people had at their disposal. By synthesizing where ancient sites are situated within the context of defensible landscapes, we can better understand the choices that inhabitants made and surmise the logic guiding those decisions.

Methods

The dataset variables for this question are the area immediately surrounding the structures themselves, the paths accessing them from the canyon below, and the views of the structures from the canyon below. By examining these landscape elements, I was able to glean some of the considerations that the builders of the pinnacle structures made before building.

I collected this quantitative and qualitative data by visiting each site in the field, but also relied on GIS software to measure elevation gain and employed drone photography to study perspectives unavailable to the human eye. To ascertain the perils of human error in conjunction with the proximity to cliffs, I draw from Murray and colleagues' (1964:341) definition of the average stride length for medium height fighting-aged men from twenty to forty-five years old — roughly 75 centimeters — and measure whether the possibility for human error (i.e., one step) presented a significant danger. For elevation gain from canyon floor to pinnacle, I made in-field measurements and confirmed the findings remotely with GIS software. Likewise, to quantify canyon-to-pinnacle travel distance, I estimated in-field based on the routes I traversed, but also corroborated my findings by tracing the same route with GIS software. While it is impossible to know what paths were used during the Fremont occupation, I chose the path of least resistance for each site, according to the dictates of topography. The "starting point" for each site is always the nearest point within the Douglas Creek canyon itself. There are instances in which a lateral tributary must be traversed from the main canyon to access the sites, and these distances are added together. For Texas Creek and Spook Mountain, located outside of Canyon Pintado, the same method was applied — totaling distance from the main canyon travel corridor with lateral draws. I have designated "ten minutes" as ample warning time to prepare for advancing enemies, which is roughly enough time for defenders to collect weapons, assemble themselves, and organize a response after spotting hostile parties. I use this figure to determine whether sites were sufficiently removed from the canyon floor. Times were calculated using 4 kilometers per hour as the average rate of human walking speed (Murray et al. 1964), which is consistent with the figure I use for viewshed considerations (Chapter 6) and was used for similar studies in Fremont territory (McCool and Yaworsky 2019:117–118). To account for the extra travel time burden of elevation gain, I draw on Naismith's rule — commonly cited in the fields of sports medicine (e.g., Norman 2004, Scarf 2007) and mountaineering (e.g., Carver and Fritz 2000, Mills 1982), which calls for adding one hour for every 600 meters of elevation gain (Naismith 1892). Finally, to ascertain the conspicuousness of pinnacle structures from the canyon below, I hiked the landscape beneath the sites and captured perspectives from multiple vantage points. For this theme, I sought to understand what images might capture the attention of outsiders moving through the Douglas Creek travel corridor. Photographic evidence from these lowland positions supports my interpretations.

Expectations and Implications

Each of the environmental components that are considered here have an implication for the conflict resolution of the people who built and occupied the pinnacles. The composite character of the geographic settings associated with each pinnacle reflects the choices of the builders and comparing these conditions across all seven pinnacles ought to reveal whether there were apparent preferences for their locations. Here, a brief outline is offered of the expectations I had for this research question and a discussion of how different possibilities could yield a range of inferences about Douglas Creek Fremont territoriality. Ultimately, it is how all these variables articulate together that patterns among the pinnacles can be deciphered.

Natural obstacles on and along access paths to pinnacle landforms would be advantageous to structure occupants who are intent on defending themselves from attackers. Geographic obstructions such as sharp rises, outcrops, and large boulders could serve as suitable blinds from which occupants could discharge arms or seek cover from incoming fire. If the same obstacles are situated along the pathways to sites, they could feasibly provide further cover for Fremont defenders and provide them more time to prepare by slowing down raiding parties. Consistent and abundant representation of these landscape features in association with the pinnacle sites may well attest to deliberate actions on behalf of the builders. It could be inferred that they choose settings with as many hindrances and sources of protective cover as possible with the specific intention of weaponizing the landscape in their defense. These patterns would potentially support the active defensibility hypothesis. Still, the same landscape obstacles could equally attest to passive defensibility, as they would serve to hinder or deter would-be assailants, thus liberating occupants from active engagement. The nebulousness of these specific factors illustrates the importance of contextualizing all the subsequent criteria together.

If pinnacle sites are devoid of landmarks that present blind opportunities, we could wager that they did not seek naturally defensive settings to aid in deterring attackers. To choose a location which is relatively open and exposed would leave residents more vulnerable and thus strongly suggest that passive defense was not on their minds. If routes to access lack hindrances like outcrops or talus slopes, any would-be attacker would have little impeding their advance to the pinnacle structures. It would then follow that the architects did not make such considerations when surveying the landscape for ideal niches to build. This outcome would signal that the builders were not preoccupied with using the landscape to curb incursions from potential enemies and therefore were not engaged in active defensibility.

The Douglas Creek region is replete with dramatic sheer walls and cliffs, which present dangers to people traversing the highlands. If the access paths to the structures are within the distance of the average stride (75 centimeters), close enough to demand elevated caution from occupants or outsiders (i.e., human error would present risk of injury or death), then we can presume it was a calculated decision by the builders. By assuming the inherent risks themselves, they would have been investing in a security policy with worthwhile rewards — subjecting their enemies to perilous ascents. The same logic follows for many of the pinnacle sites themselves, which feature similar precipitous drops that could cause serious harm or death if one walked carelessly — children and the elderly at these sites, for instance, would have needed extra supervision to avoid falling. Merely by residing at these locations, occupants were living with the danger of falling, yet with the comfort of knowing it presented risk to outsiders as well. If there are clear and consistent instances in which sites and their access paths are so close to cliffs that human error presents certain doom, it is plausible that the architects privileged such landscape features. As hostile as these intentions are, they would nevertheless indicate passive defensibility. Occupants relying on their land to protect them suggests that they preferred to do less of the safeguarding themselves.

If these pinnacles and their access paths are at a safe distance from treacherous cliffs, then human error would not amount to serious injury or death. Considering the many options available to the builders, this outcome would seem to indicate a clear intention on their part to avoid cliffs. It would then follow that by not privileging dangerous landforms, they did not seek to have such protection for the pinnacle sites. This may be due to the privileging of other landscape attributes like optimal viewshed (see Chapter 6) or proximity to resources. In either instance, this outcome could be construed as evidence that the occupants were engaged in an active form of defensibility, in which they relied on their own force to quell attackers.

Elevation gain and travel distance from the canyon floor below also act as physical barriers to entry for the pinnacles. The further and higher the structure, the greater the physical toll it would inflict upon enemies, and the more difficult it would be to find pinnacle occupants. These factors constitute spatial obstacles and would ideally decelerate the advancement of enemy combatants. If the sites are frequently removed far enough from the Douglas Creek travel corridor to allow for at least ten minutes of preparation time for the occupants, then it is reasonable to conclude that this was a priority for the builders. Likewise, significant elevation gains would compound the effect and slow raiding parties down further. If great elevation gains are represented across most of these sites, it is similarly plausible that this was a preference for the builders. In both instances, it is likely that these were calculated decisions that were meant to lend defensibility to their pinnacle sites. Such a pattern would attest to passive defensibility, as the land itself was meant to deter outsiders, thus aiding residents ill-equipped to do so themselves.

However, if these sites are close to the valley floors where travelers would have passed by, we can infer that the builders were not intent on separating themselves from outsiders with arduous ascents into high country. If these sites could be readily accessed in less than ten minutes of walking, then the occupants would have been equipped and willing to defend themselves actively against enemy parties. To be content with the prospect that your location could be so easily reached is to be predisposed to active defensibility.

Finally, there are the implications of the conspicuousness of the pinnacle sites from the valley below. If the structures are clearly visible from downslope, and appear to pierce the sky, then we can reasonably conclude that the builders did not seek to remain hidden from view. This must be the case, as the complex geography of Douglas Creek offers ample opportunities for secluded sites. By choosing to remain in the open and readily identifiable to potential outsiders traversing the canyon, the builders would have deliberately omitted an added layer of landscape defensibility. This may indicate, rather, that they wanted to be spotted by enemies to signal their territory and use tactical intimidation as a deterrent — clear patterns of active defensibility.

To the contrary, if these sites are inconspicuous, either obscured by larger landforms or camouflaged in the visual landscape, then it is possible that this was the builders' intention. As noted above, the landscape offers such a diversity of settings for these structures, that achieving inconspicuousness would be by design. If this was a motivation guiding the builder's decisions, it could have been because they did not seek to signal their territory to passersby, and as such were content to go unnoticed. This behavior would suggest passive defensibility among the Douglas Creek Fremont.

Results

Conspicuousness from the Canyon Floor

Fourmile is perched upon a landform that is visible from the canyon floor to the west. However, the structure itself is approximately 13 meters east of the outcrop's edge, and while the outcrop is prominently visible from Douglas Creek, it would not be obvious that a structure is tucked so far back. One would need to be standing roughly 75 meters west of the initial rise to

Figure 25. View of Fourmile from the canyon below. The pinnacle outcrop is at center frame, but the masonry architecture is entirely out of view. Facing north. Summer 2021. Photograph by Joshua Bauer.

see where coursed rock begins, which would make it hard for the human eye to perceive (Figure 25).

Banty's Twist is similarly located on a conspicuous and prominent outcrop that appears to pierce the sky from the surrounding landscape. The masonry work presently reaches the north edge of the outcrop and was conceivably stacked along the outcrop perimeter at the time of occupation. However, this site is one kilometer from Douglas Creek and was therefore quite removed from the view of travelers. As such, this structure would have been detectable but only by the well-trained eye.

Rocky Ford is built on an outcrop that is visibly out in the open yet dwarfed by landforms upslope. It, too, is located at such a great distance from Douglas Creek (523 meters) that the landform blends in with the rest of the landscape. In addition, the masonry — like at all pinnacles — is composed of local stone, which further obfuscates the structure. While the well-trained eye could identify this site — especially if people inside were conducting activities — it is effectively camouflaged in plain sight.

Mountain is by far the most inconspicuous of all pinnacle sites. It is located along a finger ridge, at the end furthest from Douglas Creek. While the ridge itself is detectable from below, the masonry site is almost totally obscured from view. Taken with the tremendous distance (800 meters) and elevation gain (138 meters) between this site and the canyon, it would be entirely imperceptible and highly protected visually.

Edge presents a somewhat different scenario. It is on a landform highly conspicuous from Douglas Creek and could be easily spotted from up to roughly one kilometer to the north and 750 meters to the southeast. While the coursework is tucked back on the landform just enough to avoid detection by the unwatchful eye, the site is relatively close to the drainage floor and is hence the most visible of the seven from the perspective of canyon travelers.

At Texas Creek, the pinnacle landform and some of the coursed stone is visible from the valley (unnamed) to the west-southwest. However, this landform itself blends in well in its narrow gully and would not be highly conspicuous to unwatchful passersby. Further, the masonry is tucked back several meters and is thus somewhat obscured from view. Nearby landforms of similar elevation serve to camouflage the site more.

Figure 26. View of Spook Mountain from below the landform. While the outcroppings are clearly visible, the masonry architecture is hidden from view. Facing north-northeast. Summer 2021. Photograph by Joshua Bauer.

Spook Mountain is perched high on a landform that is highly conspicuous from the south, where people may have travelled along this creek — a northern tributary to the White River. The coursework, tucked back 4 to 5 meters on the landform, would be less obviously visible from close to the landform. An observer would need to be several hundred meters away for the masonry to come into view, at which point it is difficult to discern and quite well blended with surrounding rock (Figure 26).

Natural Obstructions along Access Path

There are challenging, if not dangerous, stretches of land associated with all the pinnacle access paths, although some more so than others (Table 2). Apart from Spook Mountain, all the sites require traversing talus slopes that would slow down travelers. Three of the seven sites — Mountain (Figure 27), Fourmile, and Banty's Twist— offer no pathways that avoid steep slopes over thirty degrees. Coupled with the talus sediment, these slopes would be difficult to navigate, particularly at a high pace. Complicating access paths further are large bedrock outcroppings and boulder fields, which generally occur together. Boulders and outcrops are abundant along

Figure 27. Showing unavoidable steep inclines along access to Mountain. Site is in background at frame center right. This steep slope is talus and filled with numerous boulder obstacles. Facing east. Summer 2021. Photograph by Joshua Bauer.

pathways to Fourmile and Banty's Twist (Figure 28) and would be difficult to avoid. Along pathways to Mountain, Rocky Ford, and Edge, these rocky obstructions are moderate and could be avoided with proper route planning. The remaining Texas Creek and Spook Mountain pathways are only minimally populated with boulders and outcrops — these are easily avoided.

Figure 28. View of abundant boulders and outcrops along access to Banty's Twist. These are unavoidable and would slow down incoming parties. Photo taken from pinnacle. Facing east-northeast. Summer 2021. Photograph by Joshua Bauer.

Dense stands of vegetation — either greasewood along the canyon floor or pinyon and juniper in the highlands — present navigation challenges along pathways to Rocky Ford, Fourmile, Texas Creek (Figure 29), and Spook Mountain. While modern plant communities may not reflect conditions at the time of Fremont occupations, there is often great continuity in vegetation zones of the Colorado Plateau (Franklin et al. 2000) and among pinyon–juniper woodlands in particular (Miller et al. 1999). If these conditions were in place during the time of occupation, they would have constituted yet another formidable physical barrier for accessing these pinnacle sites.

Figure 29. View of the dense stands of pinyon and juniper that obstruct the access path to Texas Creek. Facing south-southwest. Summer 2021. Photograph by Joshua Bauer.

These composite landscape barriers often limit the possible pinnacle access pathways to one. Rocky Ford, Fourmile, Texas Creek, and Spook Mountain can only be reached via a single route; attempting by any other means would be impractical, dangerous, or imprudent. Notably, the best pathway to access Rocky Ford from the canyon floor would require negotiating a 6-meter-high sheer cut bank along Rocky Ford Draw (Figure 30). Mountain and Edge are situated in more open settings and can be accessed two different ways. Banty's Twist is the only site that can be reached three different ways from the lowlands, albeit with varying levels of difficulty.

Figure 30. View of the sheer cut bank inhibiting access to Rocky Ford (the red arrow marks the pinnacle). Careful planning is required to negotiate this obstacle. Facing east. Summer 2021. Photograph by Joshua Bauer.

Table 2. Access path obstructions for all pinnacles. Entries marked "yes" indicate that obstacle is unavoidable.

Site	**30+ Degree Slope**	**Talus Slope**	**Boulders**	**Outcrops**	**Sheer Walls**	**Thick Vegetation**	**No. Probable Pathways from Lowlands**	**No. Possible Entries to Structure**	**Notes**
Mountain	yes	yes	moderate	moderate	no	no	2	1	
Rocky Ford	no	yes	moderate	moderate	yes	yes	1	1	Rocky Ford cut bank with 6m drops
Fourmile	yes	yes	abundant	abundant	no	yes	1	1	ascent from west impeded by cliff face
Texas Creek	no	yes	light	light	no	yes	1	1	labyrinthine access close to pinnacle
Edge	no	yes	moderate	moderate	no	no	2	1	
Banty's Twist	yes	yes	abundant	abundant	no	no	3	1	
Spook Mountain	no	no	light	light	no	yes	1	1	

Natural Blinds on Landform

Most of these sites occur in geographic settings that render potential blind opportunities (Table 3). Fourmile, Edge, Texas Creek, and Spook Mountain feature either large outcrops or boulders suitable to provide total coverage for multiple people close to the structure. Massive boulders surround the perimeter of Fourmile (Figure 31). Meanwhile, Edge, Texas Creek, and Spook Mountain (Figure 32) benefit from expansive and complex outcrop structure in the immediate vicinity of the site. Beyond that, all except Spook Mountain offer additional blind options along access pathways. The blinds available at these four sites would provide excellent overall strategic effectiveness for fending off assailants.

Figure 31. Large boulders close to Fourmile provide numerous blind opportunities for defenders. Facing north. Summer 2021. Photograph by Joshua Bauer.

Table 3. Summary of natural blinds on landforms.

Site	Boulders	Outcrops	Near Site <20m	Far from Site >20m	Degree of Coverage	Hidden Persons	Net Strategic Effectiveness	Notes
Fourmile	abundant	abundant	yes	yes	total	several	excellent	several large boulders strewn around pinnacle; more along pathway; very ideal
Texas Creek	moderate	moderate	yes	yes	total	several	excellent	site itself in bowl-shaped outcrop, which doubles as blind; boulders far from site and small
Edge	moderate	moderate	no	yes	total	several	excellent	at least 75 m from site; another even further, but smaller; both along access
Spook Mountain	abundant	moderate	yes	no	total	several	excellent	complex and large outcropping structure atop landform; ideal
Mountain	no	moderate	no	yes	very minimal	minimal	minimal	nothing of consequence to speak of
Banty's Twist	minimal	minimal	no	yes	minimal; smaller, would need to crouch	minimal	minimal	only moderate coverage along access paths, but along steep hill and hard to make use of
Rocky Ford	no	moderate	no	yes	minimal; short, would need to crouch	minimal	moderate	a short outcrop 40m from site; not ideal

Figure 32. Large and complex outcropping structures like these at Spook Mountain provide blind opportunities for defenders. Facing east-northeast. Summer 2021. Photograph by Joshua Bauer.

Rocky Ford features a broad but short outcropping just 40 meters downslope from the pinnacle sites. This would provide only minimal coverage to a person, who would need to crouch rather low to attain full concealment. There are other outcroppings upslope from site, which are also sparse and unideal as blinds. Therefore, this site's blinds provide only moderate strategic effectiveness for active defensibility.

Blind opportunities at Banty's Twist and Mountain are much scarcer. At Banty's Twist, there are boulders strewn along the hillside to access the pinnacle, but these are short and would be unideal along such a steep angle. Meanwhile, the pinnacle itself is totally exposed and only protected by its favorable prominence above the landscape. Mountain is the poorest of the seven, with only small outcroppings nearby, scarcely suitable for coverage. As such, the blind opportunities at these two sites provide poor strategic effectiveness for active defensibility.

Pinnacle Proximity to Cliff Edges

Apart from Mountain, all the sites are close to dangerous cliffs (Table 4). Cliffs at Edge (Figure 33), Texas Creek, and Spook Mountain (Figure 34) present the most danger and falls from these 12 to 35-meter-high cliffs would mean probable death. However, only Edge and Texas Creek are within 75 centimeters, or one misstep, from their respective cliffs. Spook Mountain, on the other hand, is removed several meters from its dangerous precipice.

Figure 33. Dangerous cliffs adjacent to Edge present considerable risks to would-be attackers. Facing north. Summer 2021. Photograph by Joshua Bauer.

Figure 34. Spook Mountain is dangerously close to extremely high cliffs. While not within one step of the structure, a fall would mean death. Facing north. Summer 2021. Photograph by Joshua Bauer.

Fourmile and Banty's Twist (Figure 35) are close to 3 to 10-meter-high cliffs, from which falls would probably cause significant injury. At both sites, there is only one point at which a fall would only be mild — typically, an entryway — while all other points along their perimeters are perilously close to high cliff faces. The cliffs in these cases are both products of the pinnacle landforms themselves, atop which the masonry structures sit. There are numerous instances at both sites in which the coursed stone is within the 75-centimeter average step, constituting a significant danger.

Rocky Ford's pinnacle landform is much smaller and therefore difficult to designate as a dangerous existential threat. A fall from this short outcrop would only present a slight possibility

Figure 35. Banty's Twist is perched on a pinnacle with dangerous cliffs. A fall would likely cause injury. Facing east. Summer 2021. Photograph by Joshua Bauer.

of minor injury. Mountain is situated along a gradual finger ridge and built upon the flat ground. It is not associated with any nearby cliffs.

Access Path Proximity to Cliff Edges

Five of the seven sites feature cliffs along access paths, yet none that cannot be bypassed. At Mountain and Fourmile, outcropping bedrock forms sheer walls up to ten meters high. Falls from these heights would probably cause injury. While these cliffs are close to the paths people would likely use to access the sites, they could be avoided with careful planning.

Table 4. Summary of cliffs near site (left side) and along access (right side).

Site	Near Site	Height (m)	Danger	Within 75cm	Notes	Along Access	Height (m)	Danger	Within 75cm	Notes
Mountain	no	n/a	n/a	no	site on gradual finger ridge	yes	8	definite injury	no	avoidable
Rocky Ford	yes	3–6	possible injury if careless	no	45 m to south, 65 m to north; both avoidable	yes	6–10	possible minor injury if careless	no	avoidable
Fourmile	yes	3–10	probable injury	yes	at all points except single entryway	yes	5–10	definite injury	no	avoidable
Texas Creek	yes	15–23	probable death	yes	perched on dangerous precipice	yes	3–10	possible minor injury if careless	no	avoidable
Edge	yes	12–18	probable death	yes	perched on dangerous precipice	yes	6–10	possible minor injury if careless	no	avoidable
Banty's Twist	yes	5–10	probable injury	yes	at all points except one corner	no	n/a	n/a	no	avoidable
Spook Mountain	yes	20–35	probable death	no	perched on dangerous precipice	no	n/a	n/a	no	n/a

At Rocky Ford (Figure 36), Texas Creek, and Edge, pathways are variously scattered with outcroppings, which at times create sheer walls up to ten meters high. Outsiders attempting to access these sites would need to travel along routes that feature such obstacles, from which falls could present the possibility for minor injury. Nevertheless, with the benefit of careful planning, the dangerous cliffs along these three access paths can be entirely avoided.

Figure 36. Showing outcrop structure along access path to Rocky Ford, which amount to moderate cliffs. These present dangers but are mostly avoidable. Facing east. Summer 2021. Photograph by Joshua Bauer.

Accessing Spook Mountain, the pinnacle site with the highest associated cliffs, involves no need to come close to cliffs. One can traverse a gradual slope to the north of the site and remain at a safe distance from drop-offs the entire distance. At Banty’s Twist, slopes leading to the site are steep and burdensome, but do not constitute cliffs. No real risk of dangerous plummets exists at these two sites.

Elevation Gain, Distance from Canyon, and Warning Times

Reaching most of these sites from the lowlands requires a significant amount of time and energy (Table 5). Pathways to Mountain, Banty's Twist, Rocky Ford, and Spook Mountain involve over half a kilometer of hiking from the canyon corridor. Routes to the remaining three are shorter, ranging from 300 to 465 meters. Elevation gain from the canyon floor is another significant access barrier. Accessing Mountain involves 138 meters of elevation gain, the most by a wide margin. Rocky Ford, Texas Creek, and Fourmile range from 61 to 86 meters above the valley below. Meanwhile, reaching Banty's Twist, Spook Mountain, and Edge involve 33 to 38-meter climbs, which are somewhat less taxing.

Table 5. Elevation gain, distance from canyon, and warning times for all sites. The total times in the right-hand column reflect that time added from Naismith's rule.

Site	Elevation Gain (m)	Naismith's Added Time (min)	Distance from Canyon (m)	Time from Canyon at 4km/hr (min)
Mountain	138	14	800	26
Banty's Twist	36	4	1000	19
Rocky Ford	86	9	523	16
Spook Mountain	33	3	700	14
Texas Creek	61	6	465	13
Fourmile	65	7	370	12
Edge	38	4	300	8

Together, the distances and ascents necessary to access these pinnacle sites amount to significant travel times; these in turn correlate to warning times for occupants. Pathway conditions for Mountain, Banty's Twist, and Rocky Ford amount to 16 to 26 minutes of forewarning. At Spook Mountain, Texas Creek, and Fourmile, residents would benefit from 12 to 14 minutes of advanced warning. Edge, involving only an 8-minute trek, was the only site that did not meet the ten-minute window deemed ample for preparation time (Figure 37).

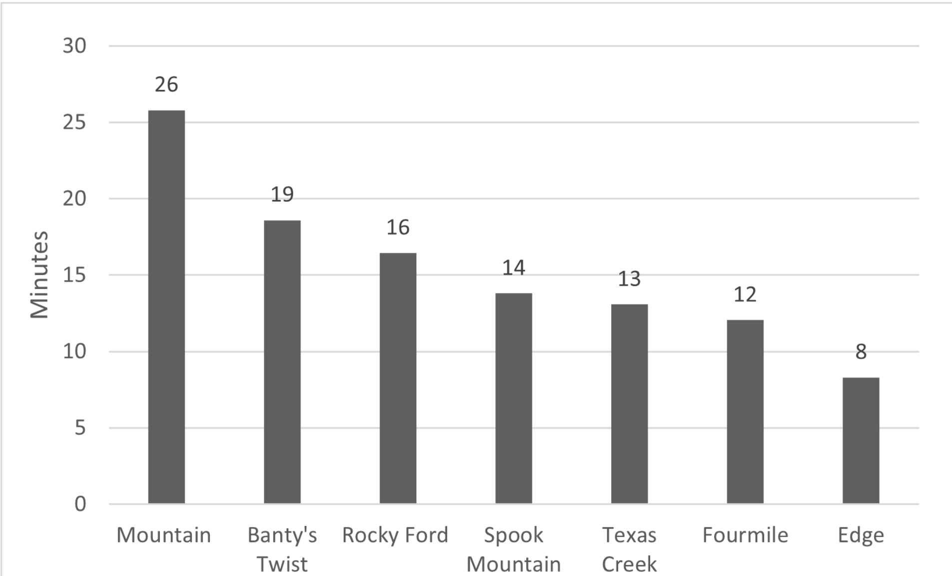

Figure 37. Warning times for each of the seven pinnacles. Mountain is the most remote, but most offer at least ten minutes of preparation time. Times reflect an average pace of 4 kilometers per hour and account for Naismith's rule.

Discussion

The structures tend to be in areas that foster natural defensibility via inconspicuousness, rugged access, blind opportunities, the presence of cliffs, and longer travel times from the canyon floor. To begin, most of these structures achieve inconspicuousness — either through hiding behind landforms or hiding in plain sight. Although some of the pinnacle landforms are prominent and even appear to "pierce the sky" from below, the masonry at these sites is usually tucked back far enough to obscure the structure from view. At other sites the pinnacle landform and the coursed stonework blend into the environment so well that they are scarcely discernable from valley below. Likewise, some of the pinnacle sites are at such a great distance from the canyon floor that the human eye could scarcely distinguish natural from cultural (i.e., outcrops versus masonry) patterns. While the pinnacles would become more conspicuous with roofing or with the movement of human activity, these patterns suggest that the builders deliberately selected locations where their structures would not be easily spotted. Taken by itself, the fact that the builders did not want to be seen would seem to indicate that they were engaged in a passive form defensibility through conflict avoidance.

Accessing these sites from the lowlands would mean negotiating challenging obstructions such as talus slopes, steep inclines, and frequent boulders and outcropping bedrock. The occupants benefited from landscapes with high concentrations of natural barriers separating them from potential travelers below. These obstacles amount to a security policy for the pinnacle occupants, who could enjoy peace of mind knowing that the land itself would slow down intruders. It is possible that the builders intended for these natural deterrents to serve as protection and lessen their own eventual burden of self-defense, a behavior that tilts toward passive defensibility.

The pinnacle sites and their surrounding landscapes tend to offer numerous blind opportunities. The occupants would have benefited from landforms riddled with natural blinds to offer cover in the event of an ambush. Some sites feature blinds that are large enough to hide several warriors at once, a distinct strategic advantage for would-be defenders. The presence of blinds may be a simple benefit afforded by the complex sandstone geography of the Douglas Creek area, but their cooccurrence with other ideal settings at these pinnacles suggests some intentionality by the architects, who may well have invested great care in site selection. In terms of territoriality, the ubiquity of blinds associated with these sites — inherently strategic for a defense system — points to elements of more active defensibility.

Most of the sites are close to dangerous cliffs, and those that are not still feature dangerous drop offs. By choosing to build on landforms that threatened perilous falls, the occupants enjoyed further natural defensibility through inherent danger of pinnacle locations. While the occupants were at risk of injury at these sites as well, they benefited from a setting that could intimidate possible attackers, if not be weaponized in the event of a skirmish. As aggressive as this sounds, the dependence on the landscape as a means of security and the intention to deter outsiders lean towards passive defensibility.

Accessing most of these sites could involve contending with foreboding and dangerous cliffs. However, in almost all cases, the most treacherous points can be avoided if the route is carefully planned. As such, it seems that the proximity to cliff edges was somewhat prioritized by builders, who knew that these avoidable risks still forced outsiders to travel along predictable pathways, which could be more carefully monitored from the pinnacles. These paths of least resistance would therefore feed potential attackers into known positions which could be better defended. Still, the prevailing idea here seems to be to deter outsiders from accessing the highlands, thus avoiding conflicts altogether. These perceived strategic considerations would tilt the occupants towards a passive defensibility.

Most of the sites are at a considerable distance and elevation grain from the canyon floor, which amount to lengthy travel times and in turn, temporal barriers to impede outsiders. Occupants at these sites would have benefited from these challenging climbs and distant treks separating them from foreigners traveling in the valley below. Such a spatio-temporal distance between the pinnacles and the lowlands afforded the occupants ample time to prepare for any hostile conflict. However, in this scenario, attackers would have to ascend to the sites to assault the occupants, who were otherwise seeking conflict avoidance by stationing themselves so far from the travel corridor. If they were stationed in the valley below, they would be much better poised for a direct defense of their lands and as such, this trend categorically marks passive defensibility.

Conclusion

There is enough geographic variability in the Douglas Creek region to support the inference that the pinnacle architects sought out spaces with the most natural defensibility. Given that the structures could have been built in conspicuous, easy-to-reach, and non-treacherous places, their actual locations must reflect careful planning and intention. This synthesis of the environmental conditions associated with the Douglas Creek pinnacle sites supports this claim. What seems apparent is that there were instances in which the builders had to make concessions to optimize the natural defensibility of their site locations. For example, they may have sacrificed rugged access conditions for site remoteness and increased travel time. Likewise, they may have opted for dangerous cliffs and steep slopes, although it meant they would be more conspicuous to travelers. This pattern ultimately leads to the sites' thorough natural protection from attackers traveling through the canyon below.

By seeking naturally defensible spaces to construct the sites, the builders were also choosing to position themselves at a remove from canyon travelers, where they could less actively signal their land tenure. While this behavior is still linked to territoriality, it reflects a posture of passive defensibility. In a scenario where pinnacle occupants were to confront aggressive outsiders, such a confrontation would apparently only take place if the aggressors ascended to the sites themselves and carried out an assault. The numerous natural barriers separating the parties indicates that the pinnacle occupants preferred to avoid such a face-off and were therefore likely predisposed to a passive form of defensibility. The next chapter provides further corroboration for these results by exploring how the architectural components of the pinnacles may have factored into defensive strategies.

CHAPTER 5: PINNACLE STRUCTURE CONSTRUCTION

The builders seem to have selected naturally defensible settings to construct the pinnacle sites. They were protected through rugged and remote landscapes, but how much added safety did they gain through their architecture itself? This chapter presents the second question of this research project: *What does the construction of the pinnacle structures suggest about their function?* Here, I seek to understand the degree of effort and planning involved in building these structures and ascertain what purpose they may have served. To furnish a robust understanding of the architectural components of the pinnacles, the following variables are assessed for each site: rock size consistency, rock shaping, rock type, masonry style, consistency in course numbers, curvature of walls, roof elements, design elements, remodeling, person capacity, variation, artifact assemblages, and midden deposits.

Below, I provide a discussion of how architecture can be used for defensive purposes and a review of anthropological perspectives about defensive architecture. I then outline the methodology I employ for this aspect of my research and discuss expectations I had for this question as well as the implications for various results. Ultimately, I argue that these structures involved the planning, organization, and collective effort of a group responding to a need for conflict resolution. I determine that the evidence here suggests that these structures are refuge fortifications used for passive defensibility.

Defensive Architecture

In this thesis, I seek to understand the function of the Douglas Creek pinnacle architecture by exploring how each site's physical and visual landscape might relate to the theme of territoriality. Tremendous insight is thus afforded through assessing these components that are ancillary to the structures themselves. Still, there remains a need to assess the design and composition of the masonry itself and that is the purpose of this chapter. Intact elements of these structures can reveal the intentions and decisions of the builders, and by synthesizing the configurations and patterns of all seven pinnacle sites, it is possible to glean the motivations guiding the architects' logic.

In his early survey of Douglas Creek, Wenger noted the presence of four pinnacle sites that he dubbed "stone enclosures" (Wenger 1956:76). He offered cursory descriptions of their locations on the landscape along with their general shapes and compositions. Additionally, he noted that some had "dirt mixed with large rocks" as insulation and were at times more like rock shelters aided by one large wall. Wenger cited the possibility that these were "Indian forts", as was believed by local ranchers at the time. Although he wagered a guess that they may have been "observation points, hunting blinds, or even shelter[s]" (Wenger 1956:77), he ultimately did not firmly argue for any specific function they may have had.

Creasman (1981a:303) conceded that Canyon Pintado's "promontory sites [were] of unknown function", and ultimately relied on other indices such as their remoteness and viewsheds to wager that they were possibly dwellings that also served as observatories or defensive forts (Creasman 1981a:286, 305). Regarding their construction, he commented on some patterns worthy of remark. First, he noted the consistent use of slab-lined, dry-laid stone masonry across all pinnacle sites, apart from interior "wall plastering", or the application of mortar, at Edge; this latter trait parallels patterns observed among the San Rafael Fremont (Creasman 1981a:303). Second, Creasman (1981a:304) observed that the structures were not segmented into rooms, unlike in nearby Fremont districts. Finally, he noted that many of the pinnacle sites are "curvilinear in form" (Creasman 1981a:284), as they tended to follow the dictates of the landforms on which they were built and that some of them may have been roofed, as evidenced by presence of post holes in the bedrock at most sites. LOPA (LaPoint et al. 1981:v108–v112) recovered the same post holes as well as timber posts in the excavation at Edge, which supports this hypothesis. LaPoint and colleagues (1981:v109) posit that the numerous post holes strewn around the structure may attest the builders' attempt at a full-scale ventilated wall and the installation of other amenities like drying racks. Further, they believe that Edge was likely used as a semipermanent Fremont habitation site, which involved the significant effort of transporting large slabs for masonry and the preparation of level floors (LaPoint et al. 1981:v109).

In the nearby Nine Mile Canyon Fremont district, McCool and Yaworsky (2019:114) describe the analogous pinnacles, or "tower structures", as "large conical constructions of dry-laid, locally available sandstone slab masonry". The authors correctly observe that building these towers would have amounted to a large expenditure of energy. Still, they offered sparse commentary about other design features of the pinnacle sites, which they ultimately argue are refuges (see additional discussion of this theme in Chapter 6).

This introduction contextualizes the motivation for the second research question guiding this project: *What does the construction of the pinnacle structures suggest about their function?* Here, I address the many features of the masonry architecture at the pinnacle sites. This includes an examination of the type and size of the rocks involved in construction, the occurrence of wet versus dry laid masonry, the meticulousness of their arrangement and stacking (i.e., the number and thickness of courses, wall curvature), and whether they have been shaped. Also addressed in this chapter are the dimensions of each structure to determine how many people could have occupied each at one time. This is an important detail that McCool and Yaworsky do not consider, although they suggest that risk-averse Fremont peoples took refuge in promontories. This may be true, but they do not account for the space of each structure and whether they could fit whole families, including children and the elderly. Finally, the presence of roof and design elements as well as remodeling is ascertained, and I consider the general variation between the structures. A final set of site components considered in this chapter are artifact assemblages and midden deposits associated with the structures.

The aim with this research theme is to infer the degree to which the builders invested time and energy into these structures, how much planning and care went into their construction, and to draw from material culture deposits to ascertain how and how long these sites were used. Another intention here is to determine how much consistency there is between the structures. Consistency could mean the structures were built at the same time by members of same cultural group and/or that they served the same purpose. If they lack consistency, they were possibly not contemporaneous, were built by a different cultural group, or served different functions. This information will offer yet another line of evidence related to territoriality in Canyon Pintado.

Theoretical Orientation

A territorial polity will often signal ownership of their land through markers on the landscape such as rock art (e.g., Creasman 1982; Bayman and Sullivan 2008) or monumental architecture (Kelly 2013:148). Indeed, a territory is often spatially bound by "defensive structures such as walls and fortresses" (Holl 2013:40). Such architectural works are thus at once buildings that protect inhabitants and symbolic markers of territory on the landscape (Greene and Lindsay 2013:55). Specific traits like thick, high walls constitute architecture that is inherently defensive (Mantha 2013:179).

Defensive architecture, or fortifications, can be understood as either refuges or strongholds (Schroeder 2018:243). Refuges are expediently built, characterized by simple walls, and benefit from landscape elements such as commanding viewsheds and geographic remoteness (Sakaguchi et al. 2010:1172). To the contrary, strongholds are more carefully and elaborately constructed, usually with "a curtain" suitable to "shield defenders from attackers" and obstruct outsiders' vision. They also offer an elevated position from which defenders can fire weapons and surveil the area. Finally, they are significantly larger than those fortifications that merely provide refuge from attack (Keeley et al. 2007:57).

Hence, studying the various architectural features of the Canyon Pintado pinnacles and comparing them to these archetypes furnishes an understanding of their purpose and function. Combined with geographic defensibility discussed in Chapter 4 and the viewshed considerations of Chapter 6, these structures' role in defensibility becomes clearer.

Methods

A suite of methods was necessary for collecting detailed information on the pinnacle structures. Chief among them were in-field measurements, descriptions, and observations, as well as reviewing archival collections from LOPA and site recordings by various academic and contract archaeologists. Some aspects of this research theme entail precise measurements, such as structure dimensions, range of stone size, and counting course numbers. As the structures consist of hundreds of stones, it was unfeasible to measure every single stone. I measured representative stones, from which I derived estimations for average sizes. The question of stone shaping was determined based on the observable presence or absence of cut marks, unnaturally squared edges, and evidence of differential patina and lichen development in multiple facets of the same stone. Similar considerations of stone characteristics were made for the question of remodeling. While open to interpretation, these traits stem from objective qualities of the stone. There are other sub-questions that require a more subjective and qualitative description, such as wall "flushness" or "unevenness". Here, these architectural characteristics are best understood in relation to each other, rather than through set definitions of subjective terms (e.g., flush, uniform, billowing, etcetera).

Photogrammetry Methods

To help substantiate the subjective and qualitative analysis carried out here, and to provide perspectives unavailable to the human eye, aerial photography with an sUAV was captured. These and ground-based photos were used to create Structure from Motion (SfM), or photogrammetry models for each of these sites. Photogrammetry is "the science and art of measuring and interpreting imagery in order to reconstruct metrically objects either in 3D or in 2D" (Lerma et al. 2010:500). This relatively recent development in digital photography allows archaeologists to generate accurate representations of reality and document cultural materials with less human error. Further, it leads to the creation of cost-effective archival imagery suitable for curation, all while helping to reduce damage to archaeological sites and sacred places by reducing the need for site revisits by other researchers (McCarthy 2014). Importantly, the models are interactive and can be georeferenced for post-field feature measurement analysis (Yilmaz et al. 2007) and are baselines for long-term preservation and cultural resource monitoring (McCarthy 2014).

Building the models for the Canyon Pintado pinnacle sites began with systematically collecting hundreds of photos from multiple angles under consistent lighting, carefully ensuring that 60 to 80 percent overlapped. Using the sUAV, this is easily achieved with the point of interest function, which locks in a visual target and automatically performs methodical sweeps around it. The photos were then processed through Agisoft Metashape photogrammetry software. This software first created point clouds — some models were tens of thousands of points — from the composite photos. These clouds were then "trimmed" to remove excess non-architectural imagery. With clean point clouds, geometric "mesh" or "wire frames" triangulated and connected the points. Finally, a textured surface created from the highest quality elements of the combined photos was "draped" over the wire frame. Once complete, the models were scaled by automatic georeferencing, a feature available through the software's professional addition. These models and the measurements available through them ultimately serve as corroboration for in-field data collection and support my subjective observations.

Naroll's Formula

To determine the size capacity for each of these structures, I draw on Naroll's formula for floor area and settlement population (Naroll 1962). With his simple formula, Naroll contends that "the population of a prehistoric settlement can be very roughly estimated by archaeologists as of the order of one-tenth of the floor area in square meters occupied by its dwellings" (Naroll 1962:588). In essence, Naroll's formula produces relative figures that help to easily differentiate small, medium, and large occupation sizes. Other researchers (e.g., Duwe et al. 2016) have tested this model against different formulas and found that Naroll's formula falls on the conservative end of the spectrum (Duwe et al. 2016:28), which is appropriate for this research. Hence, each structure was measured for interior area in meters and then divided by ten. Results were rounded to the nearest whole number.

Artifact Assemblages and Midden Deposits

Pedestrian survey was conducted at each site and its surrounding vicinity to identify artifacts and midden deposits. All findings were recorded in field, as no specimens were collected. Two sites, Edge and Texas Creek, were excavated in 1977 by LOPA staff (LaPoint et al. 1981) and Western Wyoming College in 1983 (Creasman and Scott 1987), respectively. I consulted reporting from these excavations and integrate their results into this chapter. Surface deposits were also recorded by previous researchers at Fourmile, Banty's Twist, Rocky Ford, and Edge and I consulted OAHP records for artifacts found there.

Expectations and Implications

Each of the architectural components considered here has an implication for the possible function of these structures intended by the builders. The variable design features ought to reflect the decisions made by the builders and a synthesis of the patterns and attributes across all seven pinnacles reveals whether there were apparent preferences for their construction. What follows is a brief review of my expectations for this research question and a discussion of how different possibilities could yield a range of inferences about these structures and, in turn, Douglas Creek Fremont territoriality.

The size, type, and shape of the rocks used for masonry can offer clues about how much effort was expended in construction. The consistent use of the same size rock would suggest that the builders went to great lengths to procure ideal materials to suit specific designs for long lasting and semi-permanent structures. If stones were intentionally shaped to produce more flush coursework, a greater effort on behalf of the architects can be inferred. Likewise, if the masonry slabs come from non-local sources, i.e., not within a few hundred meters of pinnacle vicinities, then the builders would have exerted significantly more effort in their procurement.

If only locally available stones — found within a few hundred meters of the pinnacles — were used in construction and were left in their natural shape, it follows that the builders spent less energy in collecting and preparing their raw materials. Further, if there is inconsistency in stone size, then it is possible that the structures were built relatively hastily or that this concern did not matter to them.

The degree of planning can be inferred through indices such as consistency in masonry course numbers, the use of mortar, and in the curvature of walls. Those structures that exhibit uniform coursework, wet-laid masonry, flush walls, or otherwise attain architectural balance and precision, were likely built with great care, planning, and intention. Those that fail to meet such criteria would exhibit variable course numbers and billowing/bulging walls, and were most likely built haphazardly. A caveat is warranted here, though, as the Douglas Creek Fremont likely did not possess the architectural expertise of building structures like their Ancestral Puebloan neighbors, as this was not their culture.

The presence of roof elements and design elements would also offer important clues about the degree of planning and effort involved in erecting these structures. Roof elements, for instance, would have involved much more procurement and preparation of raw materials such as hewn timber or tanned hides and could signal an elaborate depth of design for the architecture. The inclusion of roof elements would also imply that the pinnacles served as habitation sites. Design elements such as entryways or windows would similarly attest to an elaborate construction blueprint.

The absence of roof and design elements would again suggest that these structures were not built with specific plans and were haphazard in nature. These qualities all insinuate a hurried design and construction, possibly signaling that the builders were under duress of some kind.

Evidence of remodeling, such as repairing damage, enhancements upon previous designs, or the expansion of interior area, would offer further clues as to the degree of prolonged group investment in these structures. Extensive improvements that took place over time would indicate that the pinnacle sites served a vital role in the lives of the occupants and were therefore committed to prolonging their lifespan with continual upkeep and maintenance. The absence of any remolding could indicate that these sites were occupied in single episodes and abandoned after short use or after they fell into disrepair.

Each structure's estimated size capacity offers clues as to their intended function and social importance. Those structures with large person capacities may have held whole families or bands, who possibly sought refuge or temporary habitation therein. Smaller pinnacle sites that could only fit a few people may have more likely served as observation sites where designated individuals surveilled the landscape on behalf of villagers below.

Low variability in design exhibited across all seven pinnacle sites might suggest that the same group or culture was responsible for their construction and could support the possibility of their contemporaneity. It could also attest to the builders having the same intention and plan for each structure. High variability in the masonry structures might provide further evidence that they were built expediently with little coordinated effort among families or bands across the Douglas Creek region. Such variability could also indicate that the structures served specific purposes in different settings.

The presence and composition of artifact assemblages and middens would provide vital insights into the activities conducted at these sites. An abundance of lithic debitage and chipped stone tools could attest to occupants using the sites to manufacture and/repair sharp implemenets and indicate they were possibly armed in preparation for defense while inhabiting the sites. Other material culture such as ceramic sherds or groundstone could indicate that a more prolonged domestic habitation took place at pinnacles, where occupant activities included food preparation and storage.

Finally, midden deposits on site such as hearth features and faunal deposits would suggest that the structures were used for longer term occupation and were possibly domestic habitations. On the other hand, the lack of midden deposits could indicate that the structures were only occupied episodically and briefly, which in turn may suggest that they were defensive sites only occupied during times of conflict and stress. Sparse midden deposits could also point to an upland settlement system, where Douglas Creek residents made seasonal rounds through different resource areas. In this case, they would have used higher elevation habitation sites in addition to these pinnacles, and therefore their refuse would be distributed across multiple areas.

Results

Rock Size Consistency

At Texas Creek, Edge (Figure 38), Banty's Twist, and Mountain (Figure 39), rock sizes are mostly consistent, meaning that over fifty percent of the rocks fall within a tight "average size" range, relative to each structure. Some of the variability among these sites is attributed to tapering in stone size from bottom to top on masonry coursework. Stone size at Rocky Ford is somewhat variable, with an estimated fifty percent of stones meeting an "average size" range. Meanwhile, rocks at Fourmile and Spook Mountain (Figure 40) are highly variable, as well below fifty percent of stones fall within a relative "average size" ranges at each site. At Spook Mountain, tapering of stone size is poorly ordered and appears rushed.

Figure 38. Rocks at Edge are generally consistent. Some variation can be seen in this photo, but over fifty percent of the rocks fall within a tight range. Facing north. Summer 2021. Photograph by Joshua Bauer.

Figure 39. Showing rock size consistency at Mountain. The rocks here are just above 50 percent consistent. Facing northwest. Summer 2021. Photograph by Joshua Bauer.

Figure 40. Showing highly variable rock size at Spook Mountain. This detail and poor course tapering attest to a possibly rushed construction. Facing northwest. Summer 2021. Photograph by Joshua Bauer.

Rock Shaping

There does not appear to be any intentional shaping of the rocks used in masonry coursework across the seven pinnacle sites. While the shapes of stones range from sub-rounded to angular among the structures, they were all left unmodified. Balanced rock stacking was thus achieved through fitting stones logically according to their natural shape, which were already suitable for masonry work and architectural integrity (Figure 41).

Figure 41. Detail of south wall at Edge, showing sandstone slabs in their natural state. No rocks appear to have been shaped at any of the sites. Instead, stacking was carefully arranged according to dictates of natural forms. Summer 2021. Photograph by Joshua Bauer.

Rock Type

According to the United States Geological Survey, all the pinnacles included in this sample are located within the Upper Mesa Verde formation, which consists of "sandstone, shale, and coal beds above Sego Sandstone" (USGS 2022). Fittingly, masonry work at all sites is composed entirely of locally available sandstone slabs, which erode ubiquitously in the region. At some sites, such as Mountain, flatter slabs were selected, although these are common along the finger ridge upon which the site sits. At most sites, these sandstone slabs were readily available within 100 meters of the structures. In other areas, such as Texas Creek and Edge, builders appear to have selected stones ideal for their designs but still would not have needed to

Figure 42. Showing especially large stones used at Spook Mountain. These would have required numerous people to move and arrange. Summer 2021. Photograph by Joshua Bauer.

travel far. Meanwhile, at Spook Mountain, either the builders used all locally available sandstone slabs or, more likely, they had to travel further to procure raw materials. At Edge and Spook Mountain (Figure 42), many stones are large enough to have required more than one person to lift and transport to the structure.

Masonry Style

Wet-laid masonry was used at Texas Creek, Rocky Ford, and Edge (Figure 43). The mortar at each of these sites consists of a mud (light brown silt loam) and crushed sandstone grit paste, while at Texas Creek, vegetal (e.g., sticks, roots, and grass) temper was also added (Figure 44). The mortar is delicate and can be swept away with a gentle touch. Mortar was applied mostly above and beneath rocks, and somewhat less consistently along lateral margins of

Figure 43. Detail of mortar used at Edge, composed of a light brown silt loam and a crushed sandstone grit aggregate. The same paste was used at Rocky Ford. Summer 2021. Photograph by Joshua Bauer.

Figure 44. Showing fibrous temper of sticks, roots, and grass added to the mortar in Texas Creek's north wall. Summer 2021. Photograph by Joshua Bauer.

coursework. Each of these sites is characterized by a single wall that dominates the structure and these portions of the structures received most if not all the mortar insulation. This may be a function of decomposition of the less well-preserved walls at each site, or a design feature chosen by the builders.

At the remaining four sites, all masonry is dry-laid (Figure 45). Coursework at these sites is held together by friction and gravity alone, which involved hundreds of logical decisions by the builders to achieve order and balance. At some sites, such as Spook Mountain, small hand-sized stones are wedged between larger slabs as chinking, possibly to mimic the added insulation achieved by a formal mortar.

Figure 45. Detail of dry-laid masonry work at Mountain, characteristic of most of the pinnacles. Careful attention was needed to achieve balance and uniformity. The thinner slabs used at this site are also on display here. Summer 2021. Photograph by Joshua Bauer.

Consistency in Course Numbers

Most of these structures exhibit course numbers that are either generally consistent or vary as a necessity to maintain structural integrity. The builders conformed many of these structures to the undulating foundation of the pinnacle landforms themselves, and therefore had to alter the number of vertical courses to attain walls of level height (Figure 46**.**). There is even greater consistency in horizontal coursework, which rarely exceeds two to three courses thick (Figure 47). Many of these sites are heavily deteriorated through disturbance or erosion, which may account for some walls exhibiting inconsistent coursework. However, at Texas Creek, the

Figure 46. Exhibiting the consistency of course numbers at Mountain. Like other sites, some variation here stems from tailoring structure to natural undulations of the foundation. Facing southeast. Summer 2021. Photograph by Joshua Bauer.

north wall is clearly the result of more investment relative to the three other sides, a probable function of this side facing more exposure and therefore left more vulnerable compared to the remainder of the well-protected perimeter. The highest wall remnants at the sites range from 0.4 at Banty's Twist to 2.1 meters at Texas Creek.

Curvature of Walls

At Edge, Mountain, and Rocky Ford (Figure 48), the exemplary and best-preserved walls are relatively flush, considering the way variable rock shapes must be stacked to achieve structural integrity atop the complex contours of pinnacle foundations. At Edge, the more

Figure 47. Horizontal coursework across all sites rarely exceeds two to three courses. This image at Rocky Ford attests to that pattern. Facing southwest. Summer 2021. Photograph by Joshua Bauer.

deteriorated wall still exhibits traces of the original flushness, attesting to the site's initial architecturally sound and aesthetically pleasing design. At Mountain, there is some tapering of the walls from the base, but this is an intentional design feature necessary for structural integrity (Figure 49).

At Texas Creek, the elaborate north wall billows frequently from the interior and exterior, often protruding up to 10 centimeters. However, this was likely intentional and necessary for achieving balance for such high walls, up to thirty courses tall. The wall is still well constructed and ostensibly not built in haste (Figure 50).

Figure 48. Image of exemplary flush walls at Rocky Ford. Any billowing seen here is a probable necessity for balance. Facing southwest. Summer 2021. Photograph by Joshua Bauer.

Figure 49. Showing flush walls at Mountain, where tapering appears to be a design feature that the builders used for balance. Facing east. Summer 2021. Photograph by Joshua Bauer.

Wall remnants at heavily decomposed Spook Mountain offer a glimpse of original flushness, but most areas bulge out considerably on the interior and exterior. Some efforts were apparently made for flush walls sporadically but overall, the appearance of the walls suggests that the structure was built haphazardly (Figure 51).

What remains of the walls are Banty's Twist and Fourmile is so minimal that it is difficult to discern any curvature they originally exhibited. All that can be said of the sparse remnants at Banty's Twist is that the circular floor plan of the original masonry is consistent. Walls at Fourmile are never uniform or flush. However, there is a curious discrete and rectangular concentration of coursed stones atop the center of the outcrop that appears to have served a function ancillary to the original structure — it may have been neatly arranged reserve material kept for repairing damaged walls. Coursework at this anomaly is relatively flush, especially considering the range in rock size.

Roof Elements

At Texas Creek, there are four vertical hewn juniper posts embedded along the north wall that constituted wall reinforcement or possibly roof elements. Two extend 40 to 75 centimeters above the structure, of which, the most visible is 140 centimeters long and 18 centimeters in

Figure 50. Showing north wall at Texas Creek, where frequent billowing is a function of building such high walls. This photo also shows the juniper posts embedded in wall as reinforcement or as roof elements. Facing north. Summer 2021. Photograph by Joshua Bauer.

diameter at the base. A third post is lying across the wall, and a fourth is lodged in the corner of the wall, which is 190 centimeters long by 27 centimeters in diameter at the base.

LaPoint and colleagues (1981:v111–v112) report that numerous roof beams were recovered by during excavations at Edge. Taken with what they identifie as post holes (called “drill holes” by Hauck [2004]) scattered around the pinnacle site, they conclude that “a massive roof support system [was] laid out [over the structure] in rectangular fashion with a single central support post” (LaPoint 1981:v108–v109. At the time of this my site visit, no evidence of wooden roof beams was present.

None of the remaining five pinnacle sites exhibit roof elements.

Figure 51. Showing a relatively intact portion of Spook Mountain, where extensive billowing attests to rushed work more so than necessity for structural integrity. Facing south. Summer 2021. Photograph by Joshua Bauer.

Design Elements

Two salient design elements are represented in all seven of the pinnacle sites. First, masonry coursework follows the semi-circular shape of the pinnacle landforms or, in the case of Mountain, the horseshoe-shape of exposed bedrock that constitutes the foundation (Figure 52). Second, each site has a single entrance, almost always influenced by logical openings or access points produced by pinnacle geography. The most noteworthy among these is at Texas Creek, where a natural opening — only large enough for a single individual — sloping upwards towards the pinnacle forms the lone entrance to the structure (Figure 53).

Figure 52. Aerial image of Mountain, showing the distinctive horseshoe-shape the builders attained, possibly due to following dictates of bedrock pattern. Coursework at most pinnacles follows topography as well. Facing northeast. Summer 2021. Photograph by Joshua Bauer.

Other particular design elements can be found at Rocky Ford, where the pinnacle outcrop features a natural gap (20 to 25 centimeters wide), over which several large slabs have been laid as a bridge (Figure 54). Texas Creek includes three horizontal hewn juniper posts (15 to 20

Figure 53. Aerial image showing the natural opening at Texas Creek (red arrow). Natural barriers such as these constrict entryways to all sites. This natural opening limits access to a single person and makes Texas Creek the most difficult site to reach. Summer 2021. Photograph by Joshua Bauer.

Figure 54. Showing slabs placed across a natural gap in the pinnacle landform at Rocky Ford to form a bridge. Facing southwest. Summer 2021. Photograph by Joshua Bauer.

centimeters in diameter) embedded within the north wall. These may have served to fortify the large wall or were possibly related to the roof elements.

Remodeling

There was no evidence for remodeling at any of the sites. Edge is the only site known to exhibit remodeling, where LaPoint and colleagues noted (1981:v112) that excavations revealed two episodes of prepared floors, but no change in cultural material over time, suggesting that the "uppermost floor represents a remodeling episode at the site, rather than a later reoccupation".

Person Capacity

The spacious Fourmile would have been equipped to house up to ten individuals, the most of any of the seven sites. Edge, Spook Mountain, and Texas Creek could have fit up to six individuals each. In fact, Creasman and Scott (1987:6) identified three “rooms” inside Texas Creek, based on natural differences of elevation on the pinnacle landform. The somewhat smaller Banty’s Twist and Rocky Ford would have been suitable for five and four individuals, respectively. Finally, the diminutive Mountain was so small that it would fit less than one person, according to Naroll’s formula. However, it is plausible that one or two people could temporarily cohabit this roughly 3-square-meter space, albeit rather uncomfortably (Table 6; Figure 55).

Table 6. Summary of results for pinnacle size capacity. Heights are given for tallest wall remnant. Capacity results reflect Naroll’s formula, rounded to whole numbers. An estimated 2.5 adults could likely fit in Mountain.

Site	**Length (m)**	**Width (m)**	**Height (m)**	**Area (m^2)**	**Capacity**	**Notes**
Fourmile	12.5	8	1	100	10	Livable space atop pinnacle
Edge	8	8	1.5	64	6	Half of area on slope
Spook Mountain	8	7.6	1.6	60.8	6	Whole area is flat
Texas Creek	7.6	7.6	2.1	57.76	6	
Rocky Ford	10.78	3.59	1.4	38.7002	4	From inferred interior space
Banty’s Twist	8.4	5.4	0.4	45.36	5	From inferred interior space
Mountain	1.9	1.5	1.4	2.85	0	2 adults and 1 child could likely fit

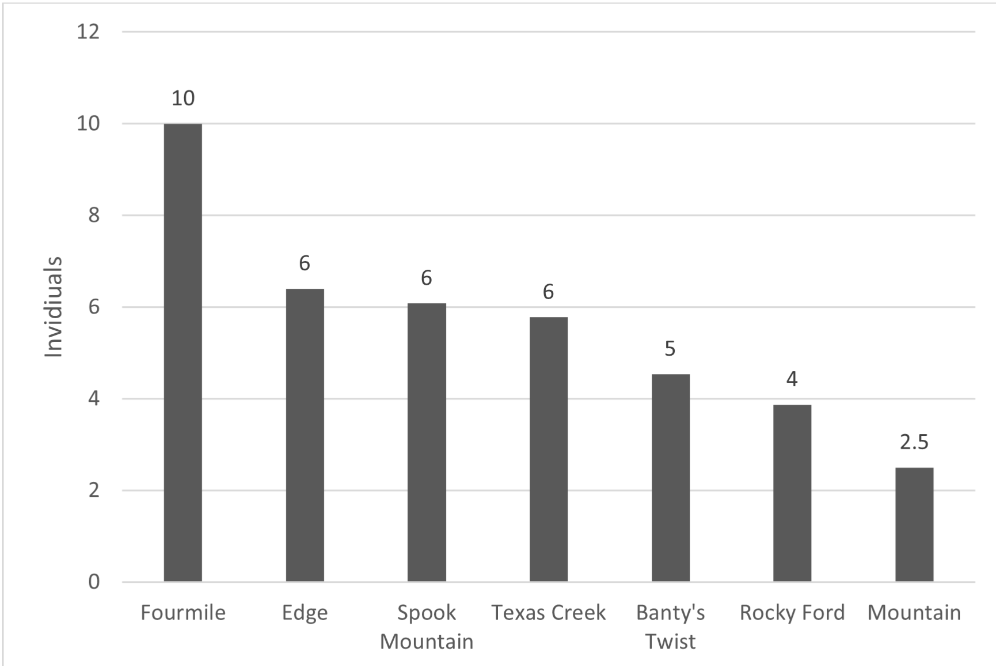

Figure 55. Graph summarizing size capacity for each of the pinnacle sites. Naroll's formula is followed for all results except for Mountain, where an estimated two adults and one child could fit.

General Variation among Structures

Some of the structures exhibit varied attributes worthy of remark. For instance, Mountain is built on a finger ridge and not a pinnacle. Texas Creek features the most constricted access, as well as 360 degrees of highly dangerous cliffs (Figure 56). It also features the most courses and the only hewn juniper posts observed. Edge is distinctive in its conspicuousness and its association with the most dangerous cliffs within Canyon Pintado proper. Banty's Twist contains the highest concentration of fire-affected sandstone gravels. Finally, Spook Mountain features the highest percentage of relatively large (75 centimeters long) stones, which would have required multiple people to lift.

Figure 56. Aerial image of the high cliffs surrounding Texas Creek, a distinct geographic feature of this pinnacle. Facing northwest. Summer 2021. Photograph by Joshua Bauer.

Artifact Assemblages

Five of the seven sites contain artifacts of probable Native American provenance (Tables 7–9). At Fourmile, I recovered an edge-modified flake, twelve pieces of lithic debitage, and one metate rim piece, each located atop the pinnacle. Previous researchers at Fourmile have also recovered a Cottonwood arrow point (ca. 1100–1800 CE), a biface, debitage, ceramic sherds, and an abrading stone (OAHP, 5RB278 Site Form, Historical Museum and Institute of Western Colorado, 1977; OAHP, 5RB278 Site Form, LOPA, 1977). At Texas Creek, I identified two pieces of lithic debitage. Previous excavations here by Western Wyoming College recovered: several formal chipped stone tools, including Rose Springs, Uinta Side-Notched, and Cottonwood series; groundstone; dolomite-tempered Uinta Gray Fremont ceramic sherds; clay pieces possibly from characteristic Fremont figurines or gaming pieces; bone tools; beads (Table

7; Creasman and Scott 1987:9). Notably, the previous researchers argue that these projectile points and ceramics support Fremont cultural affiliation for the site (Creasman and Scott 1987:11–13).

I found no artifacts at Edge, but excavations by LOPA staff in 1977 produced: five Rose Springs points (Formative Era; Justice 2002); a large side-notched point with a convex base; an array of formal lithic and bone tools; a possible Ancestral Puebloan ceramic tradeware sherd; bone discs/beads; numerous fish and small mammal faunal remains; mixed wild and domesticate floral remains (LaPoint et al. 1981). At Banty's Twist, I identified five pieces of lithic debitage and two metate fragments (Figure 57) — all but one flake was found atop the pinnacle outcrop. Previous researchers here have found projectile points, various chipped stone tools, debitage,

Figure 57. Detail of sandstone metate fragment recovered atop Banty's Twist. The specimen exhibits multi-directional striations and thermal alteration. Dorsal and ventral surfaces are polished and pecked. Summer 2021. Photograph by Joshua Bauer.

groundstone, a ceramic sherd, bone awls, bones, polishing stones, beads, and possible clay gaming pieces (OAHP, 5RB270 Site Form, Unknown Organization, 1975; OAHP, 5RB270 Site Form, LOPA, 1977). At Rocky Ford, where I found no artifacts, previous researchers have recovered a projectile point, a biface, and debitage (OAHP, 5RB722 Site Form, LOPA, 1977). Finally, at Spook Mountain, I found a single piece of lithic debitage in association with the structure. Hauck (2004) reports no material cultural findings from his recording of the site.

Table 7. Summary of artifacts recovered from excavations at Texas Creek, including "rooms" they identified within the structure. From Creasman and Scott (1987:9).

Artifact	Room 1	Room 2	Room 3	Trash Area	Total
Projectile Point	2				2
Bifaces	9	1	1	2	13
Retouched/Utilized	14	2			16
Drill/Punch	2				2
Cores			1	1	2
Debitage	2657	154	90	281	3182
Groundstone	10			3	13
Pottery Sherds	11	1		3	15
Bone Awl	1				1
Bone Tube	1				1
Gilsonite Beads	2			1	3
Shell Bead	1				1
Clay Pieces	3				3
TOTAL	2713	158	92	291	3254

Four of the sites contain two or more of what Hauck (2004) and the BLM (informative placard posted at Edge) refer to as "drill holes". These are circular bore holes drilled directly into the pinnacle bedrock, usually around 15 centimeters in diameter and from 3 to 17 centimeters deep. Fourmile contains ten such holes, Edge has fifteen (Figure 58), Banty's Twist features three, and Spook Mountain exhibits two. These holes may have supported roofing beams (Creasman 1982:284), other installations such as drying racks (LaPoint et al. 1981:V109) or were tied to an agricultural calendar system (Hauck 2004:i–ii). The shallower drill holes may simply represent bedrock mortars, as evidenced by their smooth, dished bottoms (Figure 59), a notion also posited by Creasman (1981b:v7). This possibility has been explored for similar features at Uinta Basin Fremont sites in Cliff Creek, Cub Creek and Dead Horse Spring (DeVed and DeVed 1996; Johnson 1997; Spangler 2002:119).

Figure 58. Showing four of the "drill holes" present at Edge. While some are possibly for support posts, others may have been used as bedrock mortars. Summer 2021. Photograph by Joshua Bauer.

At Rocky Ford, there are four historic cans found several meters removed from the pinnacle. These include one hole-in-top, one 7-tab bimetal, and two sanitary cans. Diagnostic attributes of the cans place them within a date range from roughly 1935 to 1963 (Merritt 2014:6–8; Reno 2012). These cans all exhibit small caliber bullet holes, indicating they were used as target practice. Nearby, there are also several pieces of charred hewn juniper, likely used as a campfire fuel source. It is unclear whether these historic activities are related to the significant damage to the masonry observed here.

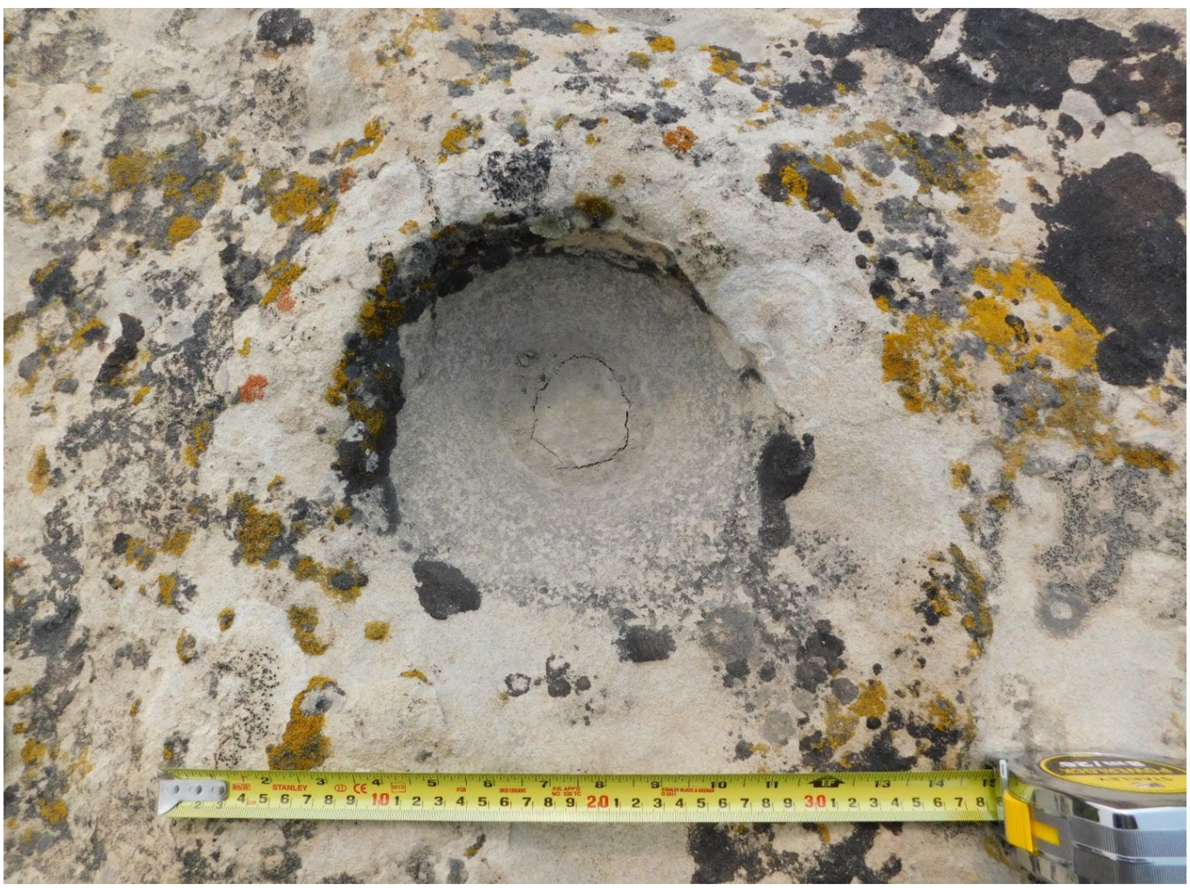

Figure 59. Detail of a "drill hole" at Fourmile. As seen here, some are shallow, dished, and smooth — possible evidence that they served as bedrock mortars. Summer 2021. Photograph by Joshua Bauer.

Midden Deposits

Three of the sites contain midden deposits. At Fourmile, there is a dark hearth feature atop the pinnacle, several pieces of fire-affected rock, and fifteen avian and rodent long bones (Figure 60). At Texas Creek, I encountered light gray staining with charcoal flecks, probably associated with a hearth feature. Finally, at Banty's Twist, there are two dark hearth features filled with charcoal flecks and an abundance of fire-affected rock (Figure 61).

Figure 60. Overview of midden deposits found at Fourmile. Dark staining, charcoal, and fire-affected rock attest to fire here. Faunal artifacts further attest to food consumption at this site. Summer 2021. Photograph by Joshua Bauer.

Table 8. Artifact assemblages (left) and midden deposits (right) recovered during current investigation. Table does not include artifacts recovered by previous researchers. Thermal alteration is abbreviated as “TA”; bifacial thinning is abbreviated as “BT”. Flake sizes adhere to standard graduated sieves from 1, ½, ¼, and 1/8-inches.

Site	Artifact Assemblage	Chipped Stone Tools	Debitage	Ceramic	Metate	Drill Holes	Midden Deposits	Fire-Affected Rock	Charcoal	Hearth Feature	Faunal
Mountain	no	no	no	no	no	no	no	no	no	no	no
Rocky Ford	yes; historic refuse	no	no	no	no	no	no	no	no	no	no
Fourmile	yes	1 edge-modified flake	12 BT flakes; chert and chalcedony, non-TA	no	1; rim piece;	10; most roughly 13-14 cm (diam/depth)	yes	10; 1-4cm (diam)	yes	1; 350 cm (diam); dark gray loose silt loam	15; avian and rodent long bones
Texas Creek	yes	no	2 BT flakes; 1/2", non-TA, light gray chert	no	no	no	yes	no	yes	some light gray staining (diffuse) at south end of pinnacle with single piece of charcoal (2 cm diam)	no
Edge	no, but disturbed, likely looted, and previously excavated	no	no	no	no	15	no	no	no	no	no
Banty's Twist	yes	no	5 BT flakes; chert; non-TA	no	2 frags; see notes	3; a: 15 x 17 cm; b: 13 x 3 cm, ground smooth at base, pecked, edge less worn; c: 8 x 3	yes	scores of sandstone FAR	yes	2 natural depressions on outcrops filled with dark staining and charcoal flecks	possible deer metacarpal; incomplete; no cut marks; not fossilized
Spook Mountain	yes	no	1 BT flake; 1/2", semi-trans. speckled lt. brn. chert; repatinated on dorsal surface	no	no	2	no	no	no	no	no

Table 9. Summary of artifacts recorded by previous researchers. Artifact totals shown here combine the assemblages described in all known previous site recordings. The plus sign indicates that the site form did not list artifact quantities or that author(s) used vague language (e.g., “several”, “numerous”). For complete descriptions of all LOPA artifacts curated at CSU’s Archaeological Repository (AR-CSU), see Appendix B.

Sources cited here include the following:
A: Inventory of Curated Materials from LOPA investigations in Rio Blanco County. On file at AR-CSU.
B: OAHP, 5RB278 Site Form, Historical Museum and Institute of Western Colorado, 1977
C: OAHP, 5RB278 Site Form, LOPA, 1977
D: OAHP, 5RB270 Site Form, LOPA, 1977
E: OAHP, 5RB270 Site Form, Unknown Organization, 1975
F: OAHP, 5RB722 Site Form, LOPA, 1977
G: LaPoint and colleagues 1981.

Artifact	**Fourmile**	**Banty's Twist**	**Rocky Ford**	**Edge**
Projectile Point	1	5	1	6
Biface	1	2	1	5
Scraper		1		1
Graver		1		
Edge-Modified Flake		2		
Drill		2		
Core	1			
Debitage	22+	27+	5+	74
Hammerstone				1
Groundstone		1+		4
Ceramic Sherd	2	1		1
Bone Awl		3		1
Bone		1+		140
Abrading Stone	1			
Polishing Stone		2		2
Bead/Disc		1		7
Clay Piece		1		
Game Piece		1		
Burnt Wood				2
Sources	*A, B, C*	*A, D, E*	*A, F*	*A, G*

Figure 61. Dark staining and concentration of fire-affected rock atop Banty's Twist. This evidence suggests that hearths were maintained here for cooking and other needs. Summer 2021. Photograph by Joshua Bauer.

Discussion

The construction features of these pinnacle features attest to attention and care on behalf of the architects, although the structures are not always so meticulously built. From the raw materials used in construction and the layout and design elements the builders achieved, it is possible to infer the depth of planning and effort involved with these pinnacles (see Tables 10 and 11 for summaries). Associated material culture remains further attest to the activities carried out at each site and offer clues as to their functions.

To begin, the rocks are generally of a similar size, which suggests that builders endeavored to quarry materials suitable for their needs. However, some of the rock size variability seen among the structures may indicate that the builders had to make do with the local materials. These rocks were universally left in their natural forms and were never shaped to fit the needs of the builders. This fact illustrates that a tremendously laborious task was omitted by the builders, but this may simply be a testament to the tabular slabs already suiting the architectural requirements of the builders. Indeed, masonry at all sites is composed entirely of locally available sandstone, which erodes generously in Douglas Creek, particularly in the rocky and rugged uplands that play host to these sites. Hence, the builders did not have to travel too far for their construction materials. It should still be noted that significant effort and organization was needed to transport and stack hundreds of stones by hand.

Masonry is mostly dry-laid across these sites, although wet-laid masonry is sporadically used at more elaborate walls. The use of mortar at some sites reflects added investment in structural integrity and insulation, which in turn suggests a high value placed upon them and reflects the importance these structures had as dwellings. While the dry-laid masonry is less labor intensive, a degree of careful planning is still shown, as the structures frequently exhibit balance and uniformity. It is also possible that mortar was used at all the pinnacles but has since eroded away. Course numbers are often consistent, and any deviation from this norm was apparently necessary to accommodate masonry to the landform shape (i.e., fewer courses were needed at high points on the pinnacle and vice versa). Additionally, the walls tend to be reasonably flush, and any unevenness is apparently the function of natural rock shapes and related to the need to fit them together in a balanced way. These patterns again indicate the careful planning needed to erect reliable structures, which could support occupants.

Apart from “drill holes”, which may have been used to support shade structures or other installations, evidence for roof elements is generally absent, which may indicate that most of the structures were indeed roofless. This in turn could signal that the occupants did not stay for a long duration, or that they occupied the sites during warmer months. Roofed sites Edge and (possibly) Texas Creek, on the other hand, may have been inhabited for longer durations or could have been more suitable for colder months.

Common design elements at these sites include single entryways and curvilinear shapes due to conformity to natural landforms, both of which seem to signal some care and planning on behalf of the builders. Small doorways — usually the only means of entry to each site — further attest to the defensibility inherent in these structures. Conforming to natural landforms suggests that builders sought to maximize interior spaces and perhaps proximity to landform edges for optimal viewsheds or increased danger (i.e., drop-offs to deter enemies). There is no clear evidence for remodeling at these sites (except for those at Edge discussed by LaPoint and colleagues [1981]), a possible indication that the sites were only used for one episode or period. It could also mean that the structures were not in need of remodeling or repair, as they were ideally suited to the occupants’ needs for the entirety of their use.

While there is some variability in the pinnacles, they are mostly similar enough to suggest that they all served similar functions. Their shared attributes could also be a sign that they were built by the same cultural group to serve similar purposes. The one clear is Mountain, which is different in size, location, and horseshoe-shape. This site could have served similar roles as the others, but on a different scale (e.g., serving fewer people at once). It is also plausible that it served a different purpose altogether, such as a small hunting camp, was exclusively symbolic/ceremonial, or was a mortuary site, although there is minimal evidence to sustain these latter possibilities. Other possibilities for Mountain are discussed further in Chapter 7.

The material culture remains found on and around sites attest to their use as semi-permanent camps, likely used by small groups of people who perhaps took up residence at these structures as part of their seasonal rounds (Binford 1980). The evidence suggests that the occupants were carrying out a variety of activities at the sites, such as stone tool manufacture and repair, plant processing, cooking, and creating fires. The presence of ceramics and groundstone at some sites suggest semi-permanent occupation, as these heavier items do not lend themselves to mobility. The gaming piece found at Banty's Twist, along with a diversity of bone and stone tools further suggest the complex activities of a semi-permanent occupation. The presence of "drill holes" at some pinnacles is compelling. Although it is unclear what these represent, it is plausible that they were part of installations such as roofs, verandas, shade structures, or drying racks; some may also be bedrock mortars. Any of these possibilities would further indicate semi-permanent occupations, as the added investment to drill into bedrock must have served group needs.

Table 10. Summarizing the characteristics of rocks used in pinnacle masonry.

Site	Rock Size Consistency	Average Size Range (l x t) (cm)	Percent "Average Size"	Max Size (l x t) (cm)	Min Size (l x t) (cm)	Rock Shaping	Changes in Patina, Lichen	Rock Type
Mountain	mostly consistent; uniformity with large at bottom and small at top	52 x 4	over 50	81 x 22	21 x 1.5	natural; longer and flatter stones selected, although these are common nearby; stacked according to shape	no	local sandstone cobbles and boulders; likely from same outcrop
Rocky Ford	quite variable	45 x 7	under 50	97 x 14	22 x 1.5	natural; angular to sub-angular	yes, but likely due to new facet exposure through site deterioration and erosion	local sandstone cobbles and boulders
Fourmile	highly variable	45 x 5	under 50	85 x 10	15 x 2	natural; angular to rounded	no	local sandstone cobbles and boulders
Texas Creek	mostly consistent; S, E, and W wall rocks are generally smaller, but within this range	47 x 8	60	60 x 16	12 x 1	natural; angular to sub-rounded; balanced stacking arranged logically according to natural shapes	no	local sandstone; see notes on travel and availability
Edge	wide range, but bulk are consistent; seems like rocks of a certain size preferred for selection; aberrations were architectural necessities to adjust to contours of outcrop and achieve balance	50 x 6	over 50	105 x 28	23 x 2	natural; mostly flat and angular, some sub-angular; already fit for masonry; builders made due to achieve balance and integrity	no	local sandstone cobbles and boulders; see notes
Banty's Twist	mostly consistent	45 x 6	over 50	67 x 7	25 x 6	natural; angular to sub-rounded	no	local sandstone cobbles and boulders
Spook Mountain	highly variable; less ordered tapering towards top courses; appears rushed	58 x 8	under 50	100 x 21	18 x 3	natural; mostly angular to sub-angular; some sub-rounded; stacked according to logic of natural shapes	no	local sandstone cobbles and boulders; although this is common material in area, no such rocks are nearby on landform; either builders used all, or had to travel downslope for materials

Table 11. Summarizing the design features of the masonry architecture.

Site	Masonry Style	Consistency in Course Numbers	Curvature of Walls	Roof Elements	Design Elements	Entrances	Remodeling	General Variation
Mountain	dry; just carefully stacked	consistent; 2/3 is 12-14 courses high, while remainder is up to 20 courses high; apparently result of conforming to slope and ground; most is one course thick; uses exposed bedrock as base, which influenced the U-shape of the structure	considering variable shapes of rocks, as flush as possible without compromising structural integrity; thickness tapers towards the top (likely for balance) and reaches same height all around	no	horseshoe-shaped with 50cm opening at the SW corner; possibly due to natural location/orientation of the bedrock exposures that form foundation, which inspired design of structure; following nature	1	no; some damage on structure, not repaired	not a pinnacle, but a finger ridge
Rocky Ford	wet at north end only	intact north wall is consistently 7-8 courses high and 2-3 thick; western and eastern wall is decomposed but what remains is intact; these walls appear badly damaged and difficult to decipher	intact north wall has flush walls; accommodates variable stone shapes and contours of pinnacle; remaining walls appear flush, but difficult to ascertain	no	gap at west end for entrance; several slabs across gap in pinnacle, 20-25cm across	1	no	
Fourmile	dry	consistent; 2-3 high and 2-4 thick	perimeter wall either eroded or never uniform or flush; discrete portion is flush and uniform, especially considering range in rock size	no	follows landform curvature	1	none; possibly discrete coursework used as backup for repairs	
Texas Creek	wet at north end only	most (85%) of more elaborate north wall ranges from 13-30 courses high (one shallow segment of 6 courses); range attributed to conforming to pinnacle contours; great attention involved to achieve excellent wall; much less effort involved in other 3 walls, possibly as there is more natural protection at S, W, E	from interior, the north wall billows frequently and protrudes up to 10cm; likely intentional to achieve balance for such high walls, not hasty construction; exterior is similar, but well-constructed	4 vertical juniper posts embedded along north wall; see notes	3 horizontal posts (15 to 20 cm in diam) within coursework of north wall; single entrance is a natural opening sloping upwards towards the pinnacle platform; like other sites, structure conforms to natural pinnacle shape	1	no abrupt changes: however, builders clearly had different ideas about north wall compared to other three, which are more expedient and benefit from inaccessibility and cliffs	most constricted access; 360 degrees of highly dangerous cliffs; most courses; hewn juniper posts

Site	Masonry Style	Consistency in Course Numbers	Curvature of Walls	Roof Elements	Design Elements	Entrances	Remodeling	General Variation
Edge	wet	together, it would have constituted uniform coursework; there is range (south wall 12-15 high and 2 thick; west wall 6-8 courses and 2 thick; intact portion of collapsed north wall is 4-6 high and 2 thick) that seems due to wall fall and original design accommodating for outcrop contours	builders seem to have sought flushness of walls, both ext. and int; some rocks sticking out, only slightly; south wall exemplary flushness; remainder is deteriorated but exhibits traces of original flushness; design is both architecturally sound and visually pleasing	none found; other researchers have reported this though	structure shape apparently influenced by shape of outcrop; bedrock exposures make up part of foundation; perceived entrance at west 40 cm wide	1	no; apparently build in a single episode; other researchers have comments about this; I found that rocks are of similar composition and patina/lichen development; damage was post- occupation and no repairs	conspicuous; most dangerous cliffs in CP
Banty's Twist	dry	highly decomposed; remains mostly 1-2 courses high and wide; much just single course	not enough remaining to say; circular shape of structure is consistent, however	no	mostly follows landform curvature	1	none; apparently most of northern portion has fallen below	scores of FCR sandstone gravels within structure
Spook Mountain	dry; held together by friction and gravity alone; many logical decisions taken to achieve order and balance	highest intact portion is 13-15 courses high and 1-2 thick; remainder is apparently collapsed, but ranges from 7-8 high and 1-2 courses thick; max height is 145ags and 110cm thick; intact portion of collapsed area range from 45 to 90 cm high and 60-80 cm thick	remnants offer glimpse of original flushness; some areas flush but most is bulging out on the interior and exterior; efforts were made to create flush walls sporadically, but overall, the structure appears to have been built in haste and haphazardly	no	south end is left opened, which gives way to ledge areas and commanding views; structure is circular; opening in structure follows landform, like 752	1	no; damage was post occupation and never repaired	more use of larger (75cm long) stones here, requiring multiple people to lift; interesting that little effort was made for more flush walls; little rocks (10-20cm long) wedged into coursework after assembly, as if to fill gaps; suggests hurried construction

The charcoal stains atop pinnacles might attest to use of sites as beacons with smoke signals, in addition to cooking. Yet, the shallow deposits of those pinnacles with middens suggests that these were used by small groups with sparse refuse accumulation. The spatial separation of midden deposits at Fourmile suggests activity areas for people occupying a residential camp (Binford 1980). The limited size capacity determined for these sites — ranging from two to ten individuals — lend further credence to the notion that they were indeed occupied by small groups, perhaps individual families. This could mean that individuals were designated to serve as monitors atop the pinnacles, or that small groups living precarious lives needed defensive dwellings. Certainly, both could be true — the occupants sought refuge in the structures and required the services of a monitor while band members conducted activities in the canyon below.

Previous researchers at Texas Creek (Creasman and Scott 1987) and Edge (LaPoint et al. 1981) have offered similar interpretations for occupation length and group size at those pinnacle sites. Creasman and Scott (1987:12) assert that "although [the material cultural remains at Texas Creek]… suggest that a variety of activities took place there, the site functioned primarily as a faunal procurement camp which is not typical of Fremont sites". They report recovering only sparse corn remains, suggesting that gardening activities were not undertaken there. Their excavations did produce evidence for the intensive processing of animal remains, such as marrow extraction and rendering of bone fat. At Edge, LaPoint and colleagues argue that the site was used as a semipermanent residence, possibly as a base camp where both cultigens and wild plants were processed. Hunting was an important activity there as well, although the abundance of smaller animals suggests that these were for daily consumption only (LaPoint et al. 1981: V-108–V-112). The sites both show diagnostic Fremont material culture such as "Uinta Gray ceramics, gilsonite disc beads, and Uinta side-notched projectile points" (Creasman and Scott 1987:13), and no difference in artifacts over time. This suggests that both sites were occupied by Fremont, rather than reoccupied by other groups such as the Ute of Shoshone (Creasman and Scott 1987:13).

Conclusion

There are salient patterns apparent in these structures that ultimately signal the value placed upon them by their builders and possibly the role they may have served. Clearly, significant energy was expended to construct the pinnacle sites. Although the stones are local and kept in their natural shapes, their procurement and transportation would have required substantial effort. While the walls at times exhibit some curvature and the courses are sometimes inconsistent, these were likely consequences of achieving structural integrity. Hence, it is apparent that the structures served a purpose important enough to merit the investment. Also, the size of some stones and the architectural scale of some sites illustrate that collective effort was needed, which in turn signals a shared need on behalf of the builders.

Still, it is plausible that more effort could have been expended to erect structures superior to these. Many have only one large wall, while other walls are diminutive. Mortar was uncommon, as were roof elements. In general, they certainly could have been built on a larger scale, as may be expected for true strongholds. It therefore seems that the builders simply made do with their labor capacity and resource availability, investing the effort to erect structures that at least minimally suited their defensive needs. The lack of remodeling, minimal size capacity, and sparse material cultural remains here suggest that small groups stayed at the structures on a semi-permanent basis as part of seasonal rounds, carried out common domestic activities, and made no major improvements to the structures during their stay.

The architectural features and artifact assemblages of these sites therefore suggest that they are best understood as refuges. It is plausible that small groups of people with limited resources — possibly living precarious lives — erected these structures. While they may have lacked energy or the need to erect truly imposing strongholds, they succeeded in completing structures that provided shelter and protection. These architectural patterns suggest that the builders were likely engaged in a passive form of defensibility. In the next chapter, I discuss the viewsheds of these pinnacles and find evidence that suggests that the occupants may have retained the option for active defensibly as well.

CHAPTER 6: PINNACLE VIEWSHEDS

The physical settings and architectural components of the pinnacles suggest that the occupants were engaged in a passive form of defensibility. This chapter tests those inferences by answering the third research question of this project: *What are the viewsheds afforded from the pinnacle structures?* Through understanding what the occupants could see from the pinnacles, we obtain a broader sense for what concerns and priorities were guiding their defensive postures. To produce a systematic representation of each of the pinnacle viewsheds, the following variables are analyzed: pinnacle intervisibility, granary visibility, visible arable land, and maximum canyon visibility. I assess each of these factors to determine how the power of sight might have aided pinnacle occupants.

Here I begin by discussing how viewshed is a key component of defensibility and support this concept with anthropological perspectives. I then discuss how I used spatial analysis software to produce visual representations for each of the pinnacle viewsheds and explain my methodological approach for determining arable land. As I have done in previous chapters, I outline the expectations I had for this research question and explore how various results might have different implications. I conclude that pinnacle occupants would have had favorable views of the canyon corridor, arable land, and some nearby granaries. These results suggest that they may have retained strategic flexibility that allowed for active defensibility.

Viewshed and Defensibility

The prominent positions of these pinnacle structures above the canyon floor suggest that their intended use may have been for observation. In this scenario, occupants could have used these structures as lookout points to surveil the landscape below. This would have served as a strategy to monitor resources such as storage granaries and cultivated fields from pilfering, as allies in the lowland could be signaled to deter thieves, or, pinnacle occupants could descend to actively confront outsiders absconding with their resources. Occupants could also monitor vast stretches of land up and down the canyon for incoming parties and prepare for potential conflicts. Finally, the high elevation placement of the pinnacles could have facilitated long-distance communication to villagers below, or even between different pinnacle structures.

If the builders were motivated to develop such a security system throughout their homelands, it follows that they were possibly responding to a pressure. That pressure could have been conflicts related to competition for resources or migrations of people through the Douglas Creek corridor, both possibly stemming from broad environmental and social changes. In this scenario, the builders of these structures would have been assuming a decidedly active form of defensibility. Constructing advantageous lookout points throughout the Douglas Creek area for the purposes of carefully watching for nefarious activity would suggest that the architects were implementing a strategy to confront and deter would-be assailants.

Comparable viewshed analyses have been carried out by archaeologists investigating nearby Fremont homelands. McCool and Yaworsky (2019) argue that the locations of pinnacle towers in Nine Mile Canyon are indicative of conflict avoidance behavior among the Fremont, as they neither offered superior viewsheds into the canyons nor provided consistently advantageous warning times for advancing enemies. What their analysis shows, rather, is that the towers tended to be in extremely difficult-to-reach places, suggesting that the Fremont strategy to conflict was avoidance and hiding. Therefore, these structures were probably refuges, rather than watchtowers. Hence, they believe that the Fremont would have engaged in a passive defensibility characterized by naturally defensible habitation sites and remote, hidden storage facilities.

Boomgarden's viewshed analysis of over seventy Fremont granaries in Range Creek Canyon concludes that they were in plain sight, and nearly all visible from within habitation sites (2009:21). She hypothesizes that this system was designed to prevent theft in that the granaries were built in difficult-to-access locations that were visible from at least one — and often multiple — domestic areas. She suggests that this system would require fewer individuals to guard the food stores at any given time, which would permit for more community investment in a broader range of foraging activities (Boomgarden 2009:28). Thus, viewshed analysis reveals another variation within the spectrum of Fremont defensibility, in which caches were meant to be monitored at every opportunity, tilting this group slightly more towards active defense.

This framework provides the reasoning behind the third research question: *What are the viewsheds afforded from the pinnacle structures?* Quantifying the scale and scope of these viewsheds through remote sensing software is well suited to assess the logic behind their location. Here, I undertake to discover whether the pinnacles were in view of one another, to facilitate communication within the canyon. Given the great distance between some of these pinnacles, the possibility of smoke signal communication is explored here, a practice that is well documented ethnographically and supported archaeologically across North America (Beers 2014). By determining the degree of intervisibility between the structures, I also ascertain if these elevated sites formed a type of integrated surveillance system. Protection of resources is another important consideration for this analysis. Hence, I examine whether the pinnacles offer visibility of nearby storage granaries and arable land, the latter a possibility proposed by Creasman (1982:286) in his survey of the area. A final component of viewshed considered here is maximum distance into the canyon, reflecting how much time pinnacle occupants may have had to prepare for intruders.

Theoretical Orientation

The arrangement of archaeological settlements on the landscape can offer a plethora of clues about a society's settlement logic. Proximity to natural resources and travel ways, for instance, have obvious implications for ancient lifeways. A site's location in relation to another may provide insight into regional political or economic dynamics, while a site's association with other landforms might reveal details about ancient religious practices. A site's viewshed, or the total area that is visible from it, holds the potential to provide critical information about all these sociocultural characteristics.

While an understanding of viewshed can be sensed through direct experience, it is best quantified through the application of GIS technology. Platforms such as ESRI ArcGIS are now widely available for the benefit of archaeologists, and we may now employ this technology to generate reliable digitized viewshed models. As this methodology continues to evolve, archaeologists endeavor to address a myriad of assumptions that have been maintained for generations. It is only through GIS-based systematic viewshed analysis that archeologists may now confidently infer meaning from the visual landscapes pertaining to archaeological sites.

Methods

A viewshed analysis will typically begin with a basic hypothesis related to site location and visibility. Such a hypothesis may be "sites are distributed irrespective of the elements [other sites, landforms, travel ways, resource areas, etc.] which are visible" (Wheatley 1995:3). While this may be an assumption stemming from seemingly obvious observations in the field, with viewshed analysis archaeologists are equipped to accurately quantify and test this subjective phenomenological experience. It many instances, these assumptions have long existed among specialists and are being tested for the first time.

The next step is to generate Universal Transverse Mercator (UTM) coordinates with a Global Positioning System (GPS) unit for each of the archaeological sites in question. Some researchers have the means to collect this data in the field (Jones 2006; Jones 2010; Earley-Spadoni 2015; Wheatley 1995). Others rely solely on legacy data housed in academic or private research institutions (Dungan et al. 2018; Kay and Sly 2001; Murphy et al. 2018; Williams 2006). Regardless of how this site data is compiled, it is indispensable to complete a viewshed analysis and it is imperative that the data be accurate.

With site data assembled, the following procedure is followed to generate an elevation model for the landscape surrounding the archaeological sites. These are rasterized representations of the landscape in which each cell represents an area and an elevation (Figure 62). The most common is the Digital Elevation Model (DEM), which most scholars use. In some cases, the DEM is not the best model available, and researchers will rely on others such as the National Elevation Dataset (NED) (Kanter and Hobgood 2016) or NASA's interferometry models (O'Driscoll 2017). Factors such as the complexity of the terrain and the models' creation

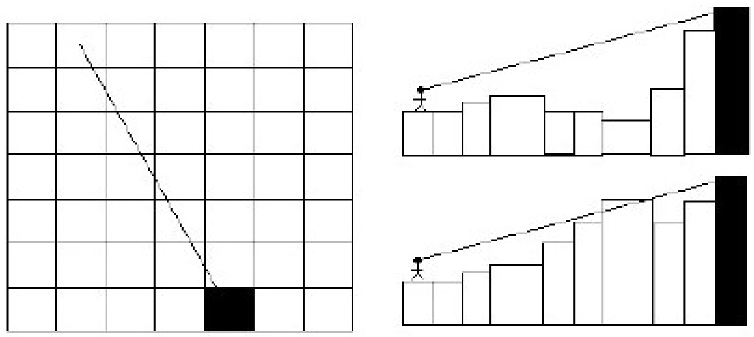

Figure 62. A visual schematic for line-of-sight calculation used in viewshed analysis. Each square column represents a cell in the digital elevation model, either visible or not visible from the observer point. From Wheatley (1995:12).

dates can impact resolution scale. Recent studies employ DEMs with 5-meter resolution (Murphy et al. 2018) while foundational studies could only rely on 80-meter resolution (Wheatley 1995). These differences in resolution amount to significant differences in precision, as the complex surface texture of topography is best captured with small interval DEM representation of the landscape.

With these key geospatial data prepared, the researcher must then account for viewer height. This step is important, since it follows that different elevations afford different viewsheds. When the height of archeological structures is known, those are often used with human height added. In the instance of unknown structure heights, estimations are used — often a range of estimates to account for a diversity of possibilities (e.g., Kanter and Hobgood 2016). Other cases account solely for the height of a human standing on the landscape or paddling on the water (Supernant 2014). This critical piece of information can dramatically impact viewshed results and, as such, careful consideration of likely viewer height must be employed.

Once these steps are completed, all this information is processed through the ESRI ArcGIS viewshed spatial analysis tool. When the calculations are finished, the software produces a rasterized image of the visible landscape from the perspective of the point in question. As viewshed analysis is a complex computational process often requiring hours of processing time (Gillings 2015), a buffer can be set to restrict the viewshed analysis within parameters relevant to the research question (e.g., 5, 30, or 60 km).

Using UTM locations for the seven pinnacle sites collected in-field recorded following the North American Datum (NAD) 83 system, along with the 1-degree (equivalent to 3 arc seconds or roughly 75 square meter cells) DEM on file for western Colorado, I created individual viewsheds for each of the seven pinnacle sites. This required adjusting the Z-factor appropriately for latitude (Z=0.00001171) and setting an average viewer height of 1.75 meters. With these raster files generated, I was afforded reliable approximations of the visible landscape from each site. However, to confirm the results generated from this low-resolution DEM with compromised cell size, I corroborated all my remote sensing results with in-field observations.

The pinnacle sites are all located prominently above Douglas Creek. The structures' commanding views of the canyon seem to suggest that monitoring the broad areas below was a priority for the builders. By quantifying these distances, I was able to determine how far potential outsiders could be spotted and how much time occupants might have had to prepare for an altercation. Here, I simply measured the distance of the furthest viewshed raster cell located within the canyon floor. Since human vision can only detect another person as a distinct figure in the landscape at a maximum distance of roughly 2.5 kilometers (Fábrega-Álvarez and Parcero-Oubiña 2019:63), I cut viewsheds off at this point — even those which extended well beyond this distance. Warning time was calculated based on the average walking rate of 4 kilometers per hour, a standardized figure (Murray et al. 1964) used in analogous Fremont studies (McCool and Yaworsky 2019:117–118).

Methods for Visible Arable Land

While broad and flat areas suitable for agriculture are within view of many of these pinnacles — often, estimably dozens of acres — remote sensing helps to produce quantifiable data to characterize potential farmland more accurately within pinnacle viewsheds. To reliably determine lands suitable for agriculture, I developed an approach based on the geospatial approach applied by Dorshow (2012) for Chaco Canyon, whose approach entailed reclassifying and then performing a weighted overlay of various landscape criteria such as soil depth, soil texture, slope, aspect, distance to water, and flow length. Modifying this methodology, I applied a combination of ESRI's spatial analysis tools for Euclidean distance, reclassification, slope, and weighted overlay to account for land that was both flat and close to drainages. With these lands represented on the landscape, another weighted overlay with viewshed was performed for each site to determine how much arable land was indeed visible from the pinnacles.

Here, distance to water and slope are key considerations for optimal agricultural suitability. Using the 1-degree DEM on file for western Colorado, I produced raster files for slope and Euclidian distance to drainages. I then reclassified each variable based on suitable conditions for agriculture, following work by Akıncı and colleagues (2013) and Dorshow (2012). Land on 0 to 2-degree slopes and 1 to 25 meters from water are considered optimal agricultural suitability. Given the marginal conditions of the Douglas Creek area, I adhered to this conservative definition of arable land to avoid overestimating the agricultural potential of the lands visible beneath the pinnacle sites. The weighted overlay tool was employed to show those lands that had both optimal slope and distance to drainage; weighted overlay was repeated to find which of these ideal parcels are within each structure's viewshed. To compensate for the limits of human vision to detect individuals in the landscape (Fábrega-Álvarez and Parcero-Oubiña 2019:63), I buffered those arable lands to a conservative 750 meters and generated total acreage using the zonal histogram tool.

The Natural Resources Conservation Service (NRCS) soil data on file for the greater American Southwest only show two soil types for this project area. These two soil series are listed as Rentsac-Moterson-Mikim-Atchee, which covers three of the pinnacle viewsheds, while the Wallson-Wallnolls-Turley-Potts-Penistaja-Abra series covers viewshed areas for the remaining four pinnacles. Both soil series groups are listed as well-drained with depths up to 38 centimeters. These are conditions suitable for limited agriculture and therefore, I did not include soil series as a factor in weighted overlay analyses.

While this remote sensing approach suited the basic needed of the present research, more sophisticated methods could produce a better representation of the Fremont farming practices in Douglas Creek a possibly detect signatures for irrigation canals, which the Fremont were known to create in central Utah (Metcalfe and Larrabee 1985). Gardner (2009), for instance, created the Probability of Agricultural Land-use Model (P.A.L.M) in Northwestern Colorado using indices such as the Normalized Vegetation Difference Index (NDVI). His results demonstrated that land in and around Canyon Pintado was suitable for agriculture. Boomgarden (2015) experimented with maize farming in both dry and irrigated regimes in Range Creek Canyon to test which lands are best suited for agriculture. These approaches could be employed to obtain the most accurate representation of arable lands specifically in Douglas Creek.

Expectations and Implications

Each of the viewshed criteria considered here has an implication for the defensive strategies of the people who occupied the pinnacles. The composition of each pinnacle's viewshed reflects the priorities of the builders and the synthesis of all seven pinnacle viewsheds ought to reveal whether there were clear patterns underlying their locations. Below is an outline of the expectations I had regarding this research question and what possible inferences could be drawn from various potential results.

Pinnacle intervisibility would be a strong asset for communication across the canyon. For those pinnacles that are in view of one another, their locations could be regarded as conducive for long-distance message relay. The longer the distance between mutually visible pinnacles, the greater time would be afforded to prepare for incoming conflict. Should mutual visibility be shared between more than two structures (e.g., A to B, B to C, etc.), this could represent a security system comprised of multiple signal beacons, implemented to secure the lands and resources throughout the Canyon Pintado area. Through such an integrated security system, advance warning times could be achieved, large response forces could be marshaled to prepare for confrontations, and the safety of canyon residents could be ensured. Again, the broader the reach of such an integrated system, the more time canyon residents would have to anticipate the arrival of outsiders.

The absence of intervisibility between the pinnacle structures would indicate that the builders were not intent on facilitating communication between these elevated sites, and much less on constructing an in-canyon security system. However, this outcome could also mean that direct intervisibility between pinnacle sites was not readily attainable in the complex geography of Canyon Pintado. In the instance that these sites lack intervisibility, occupants could still communicate with others close by, such as villagers below, or further away using smoke signals. The limited size sample of this study could also prevent the detection of a canyon-wide communication system, as only seven of the fifteen known or possible pinnacles in the area are given attention here.

Pinnacle sites overlooking cultivated fields or storage granaries would be ideally located to protect precious resources from potential theft. Should the viewsheds from the structures include one or more granaries, it would imply that the pinnacles were strategically located to afford surveillance opportunities to occupants. The distance between visible granaries and the pinnacle sites would correlate to the amount of time occupants would have to respond to any threat to their stores. The question of visible arable land is another important consideration that the builders may have had in mind when selecting locations for the pinnacle sites. If the builders were motivated to surveil the landscape from on high, the ability to monitor crops below ought to figure into their plans as well. Viewsheds that include arable lands in the terraces and canyon tributaries below would suggest that monitoring crops was an intended function of the pinnacle locations. As with pinnacle intervisibility, the greater the distance of visible granaries, the more time occupants would have to prepare a response. In turn, the greater number of acres visible from each pinnacle, the more important a monitor stationed there would have been. Ultimately, any such strategic position of pinnacle sites would ostensibly attest to an expression of active defensibility, as detection of enemies could precipitate attempts to dispatch them.

In the instance that pinnacle viewsheds do not include glimpses of granaries and arable land, it would reasonably follow that their architects did not have such considerations in mind. However, they may have had such intentions with their designs but had to make certain concessions given the dynamic and varied landscape of Douglas Creek. For instance, builders may have opted to prioritize visibility of other pinnacles rather than monitoring agricultural resources, as communication was the more important asset to these high elevation sites. Still, a lack of visibility of any such precious resources would diminish the possibility that these people were committed to forcibly deterring theft and actively defending their property. It may also simply mean that the pinnacles and granaries were built at different times.

Commanding views into the canyonlands below would offer a distinct strategic advantage for occupants of the pinnacle sites. They could spot enemies long before their own presence was detected in the landscape and therefore mobilize an effective response. By positioning these structures with favorable vistas of the landscape below, the builders could have had defensive strategies in mind. As with the other viewshed components, the greater the distance, the more time parties would have had to organize themselves appropriately to meet incoming danger. All this evidence would support the notion that the occupants were engaged in an active defensibility of their lands.

However, if the pinnacle sites have limited or no visibility of the canyon, such evidence would suggest that builders were unconcerned with surveilling these travel corridors. Rather, it may suggest that being out-of-view was more important. This outcome could signal that these people were concerned with hiding and were instead practicing passive defensibility.

Results

Pinnacle Intervisibility

The viewshed analysis demonstrated that there was no intervisibility shared between the pinnacle structures. The complex geography of this meandering canyon landscape prevents mutual visibility between these sites, and they are all tucked behind other landforms and obscured from view. However, a group of three — Mountain, Rocky Ford, and Edge — comprise viewsheds that are close enough that occupants conceivably could have communicated through smoke signals (see Figures 63–69).

My observations made in-field confirmed this finding. From atop each of these pinnacle sites, I was unable to identify neighboring structures, despite knowing their locations. Still, the three relatively nearby sites listed above could have relayed messages with smoke signals strong enough to climb above the obstructing landforms.

Granary Visibility

The results for granary visibility are somewhat more compelling. Four of the pinnacle sites have nearby granaries within their viewsheds. Banty's Twist offers visibility of two granaries, from 0.5 to 1.4 kilometers away. A third is just outside of its viewshed. Meanwhile, viewsheds at Fourmile and Rocky Ford include one granary each, 0.6 and 1.7 kilometers away, respectively. Finally, Gardner (Dudley Gardner, personal communication 2022,) recently reported discovery of a previously unknown granary just below Edge, making it the fourth pinnacle in this sample with visibility of a granary. The three remaining pinnacle sites do not offer views of any granaries.

This finding I vetted with ground-truthing and identified that the landforms where granaries are hidden — but not the granaries themselves — are visible from these four pinnacle sites. While there are granaries associated with Banty's Twist and Fourmile close enough that "basic recognition of [an] individual" would be possible, the remainder fall within the range of "first detection" by the human eye (Fábrega-Álvarez and Parcero-Oubiña 2019:63–64). This means that from distances between 1.4 and 1.7 kilometers, a sentry perched at one of these pinnacles could only identify a human-like figure in the distance moving in the landscape. Still, the possibility remains that raiding parties attempting access to these stores would consist of several individuals, making detection at such a great distance much easier.

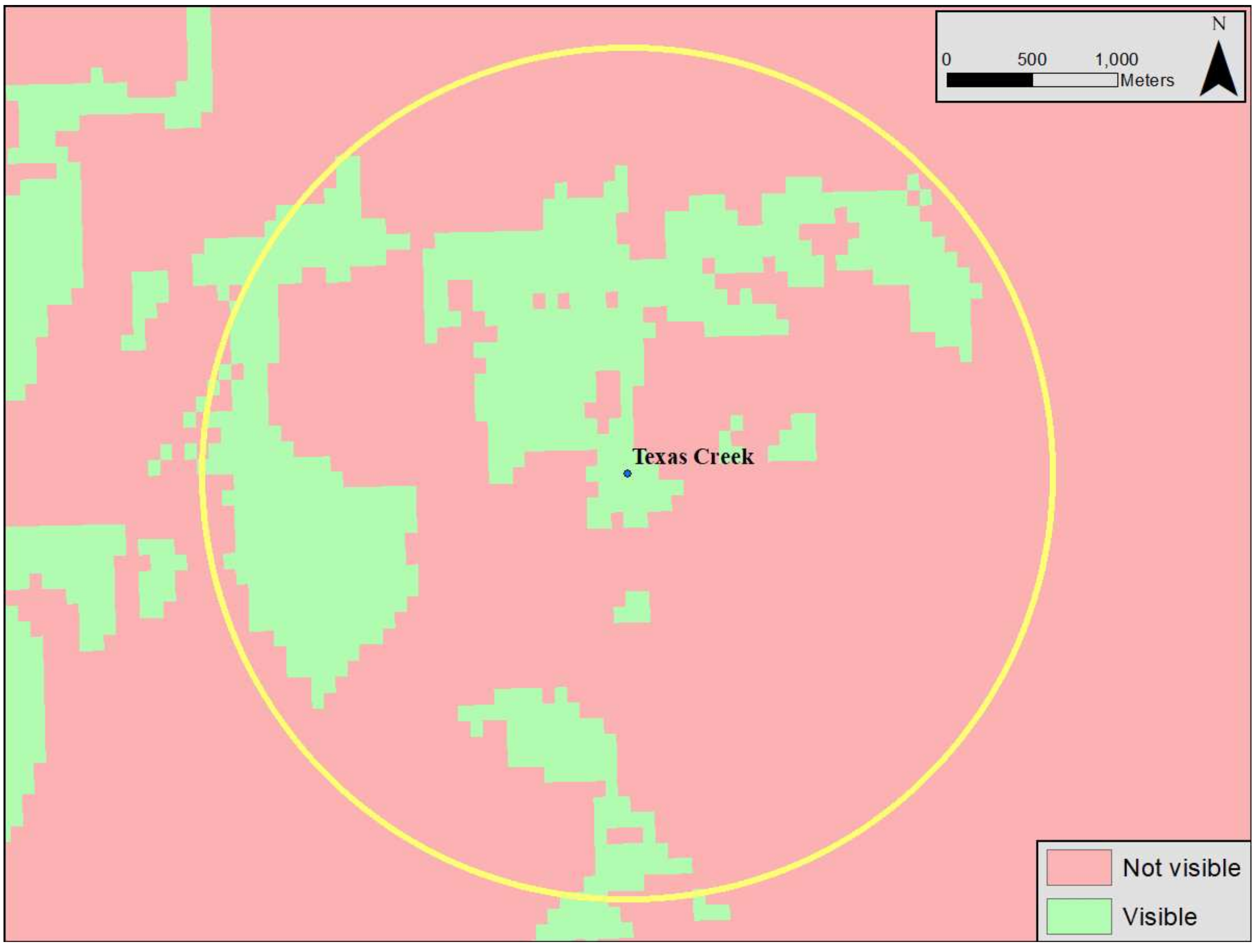

Figure 63. Viewshed results for Texas Creek, with a 2.5km buffer. There are no known nearby granaries.

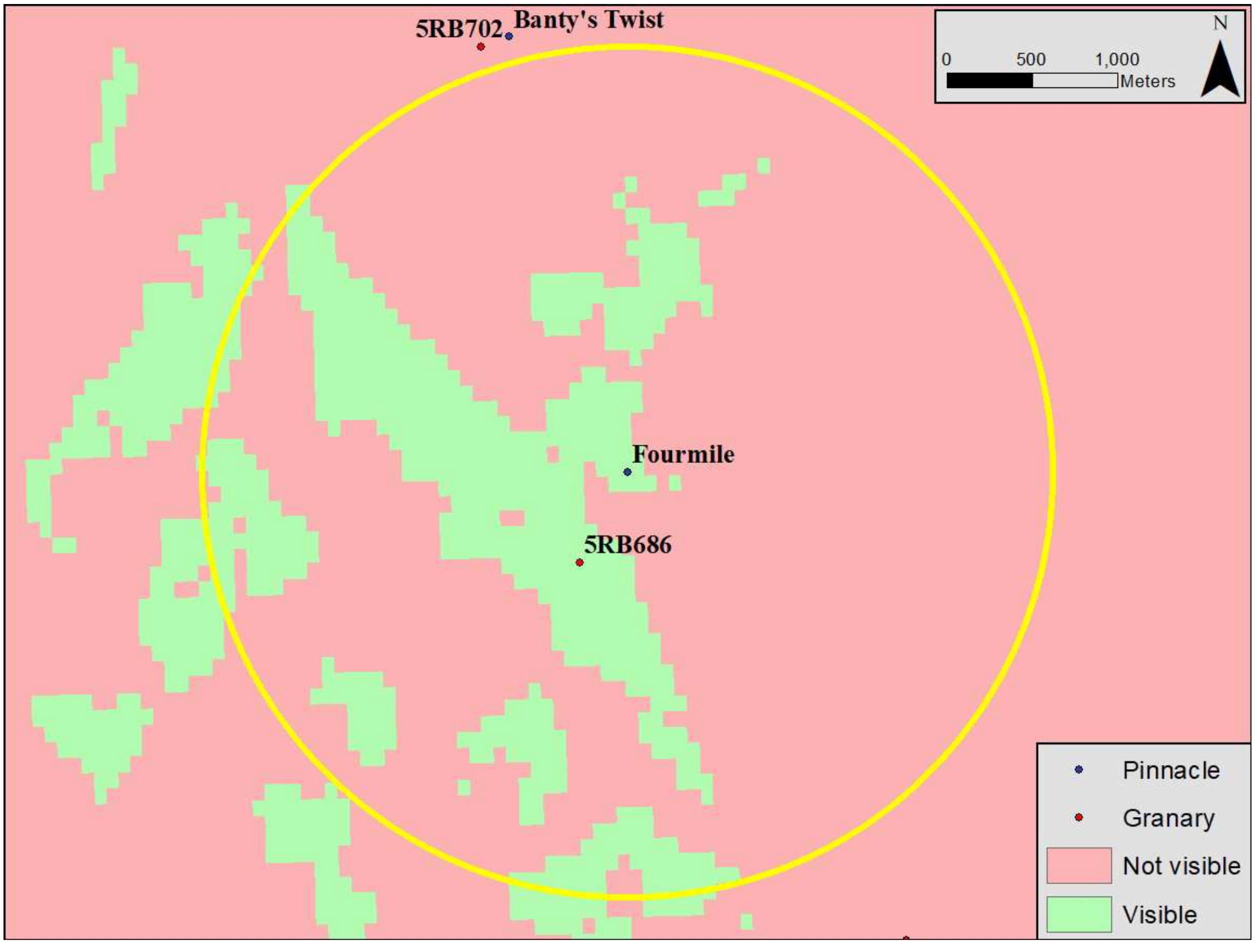

Figure 64. Viewshed results for Fourmile, with a 2.5 km buffer. Granary 5RB686 is visible to the south.

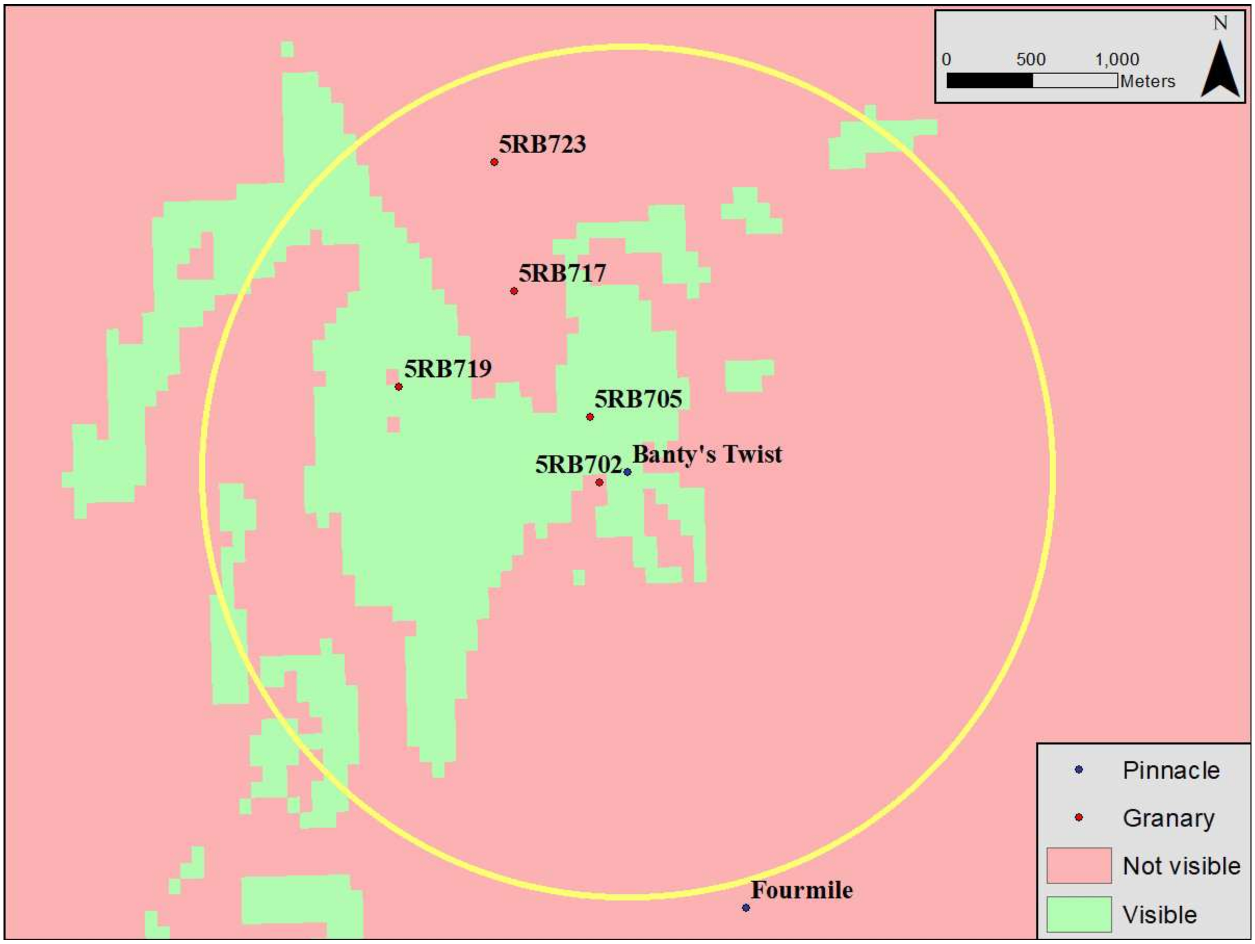

Figure 65. Viewshed results for Banty's Twist, with a 2.5 km buffer. Granaries 5RB705 and 5RB719 are visible from the north to the northwest; two others are just out of sight. Fourmile is shown to the south, where smoke signals may have facilitated long-distance communication.

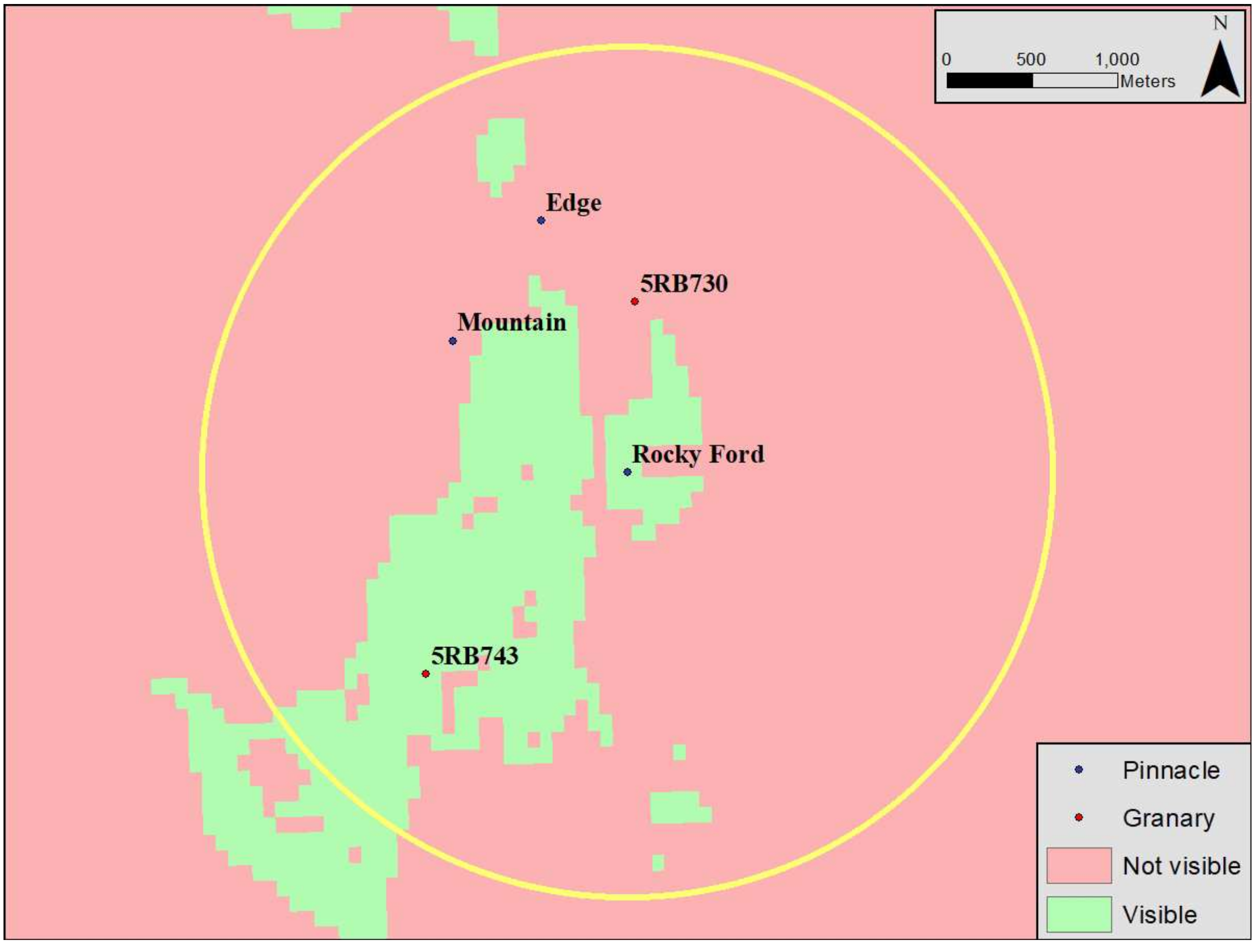

Figure 66. Viewshed results for Rocky Ford, with a 2.5 km buffer. Granary 5RB743 is visible to the southwest. Nearby Mountain and Edge are just out of reach, although possibly still close enough for smoke signal communication.

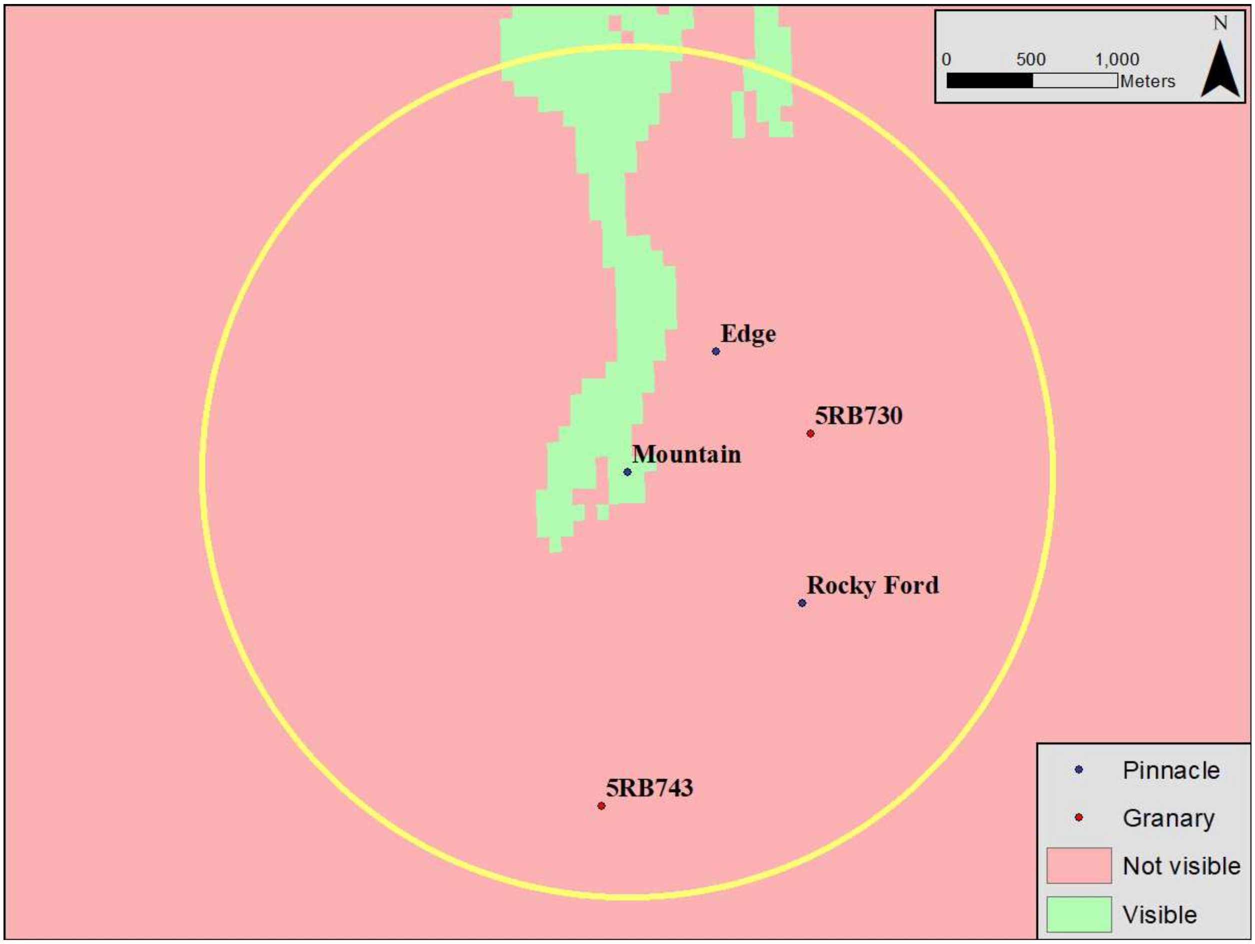

Figure 67. Viewshed results for Mountain, with a 2.5 km buffer. No known pinnacles or granaries are visible.

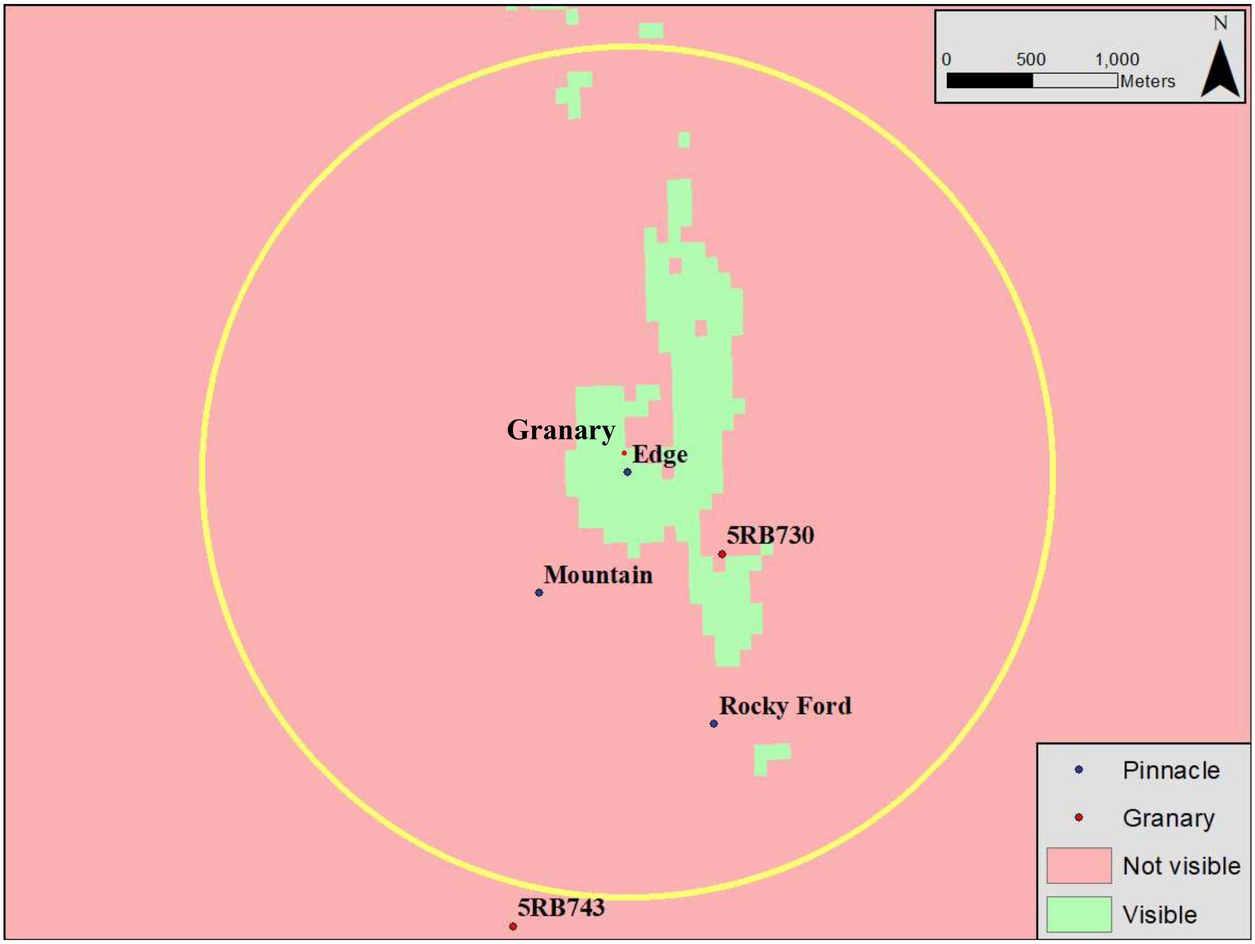

Figure 68. Viewshed results for Edge, with a 2.5 km buffer. No pinnacles are visible, although the proximity of Mountain and Rocky Ford is on display here. Shown without a SHPO trinomial is a recently discovered granary just north of Edge, within the pinnacle's viewshed.

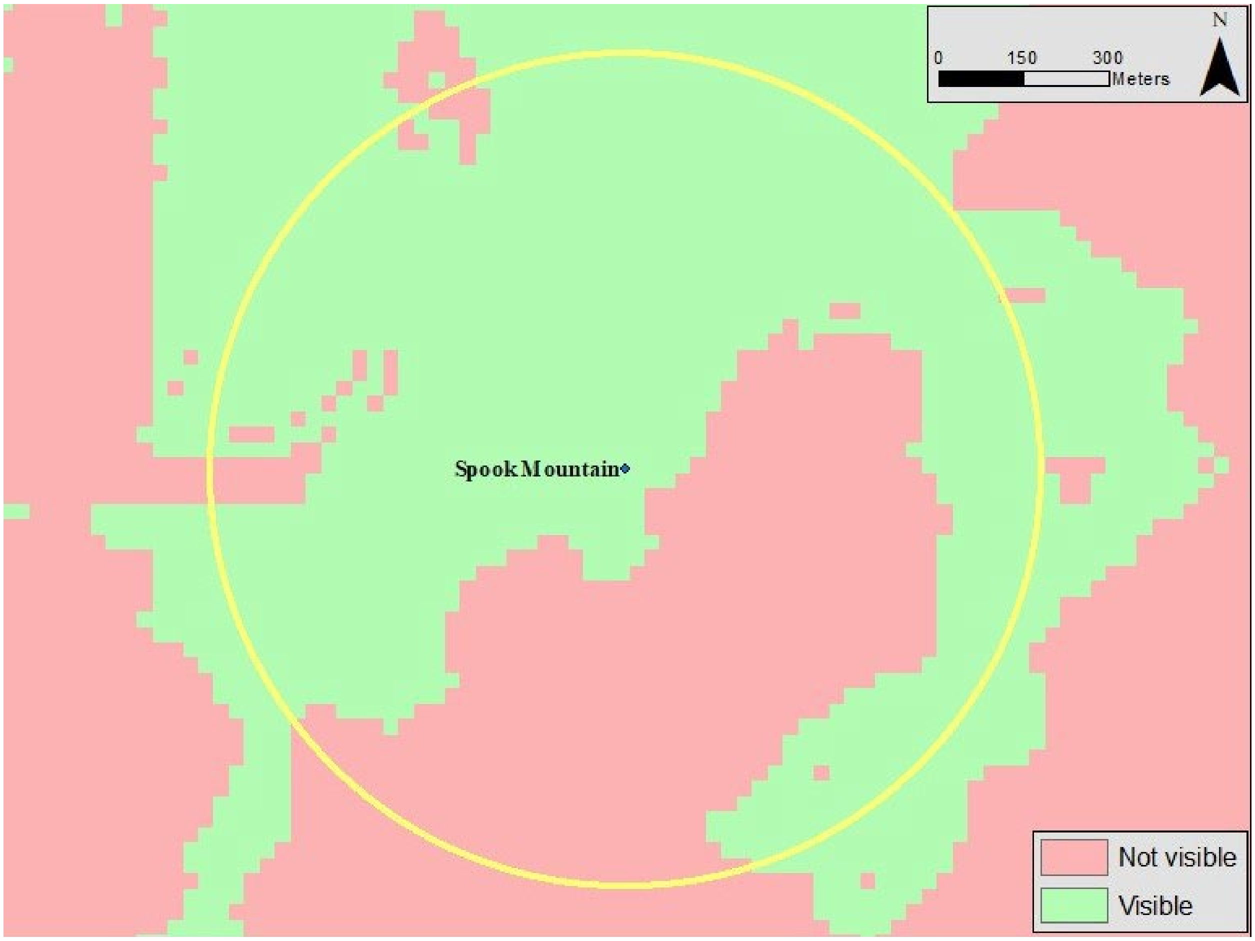

Figure 69. Viewshed results for Spook Mountain, with a 2.5 km buffer. There are no known granaries nearby.

Visible Arable Land

All seven sites have arable land within their viewshed, yet there is a significant range of acreage between them (Figure 70). Five of the seven have large plots of arable land within their view. Spook Mountain overlooks 72 acres of land suitable for agriculture, the highest among the sites. Edge and Banty's Twist have just over half of that within their viewsheds, 44 and 42 acres, respectively. Texas Creek and Fourmile offer views of 26 and 24 acres, respectively. Viewsheds at Rocky Ford and Mountain are limited to only two acres of arable land each.

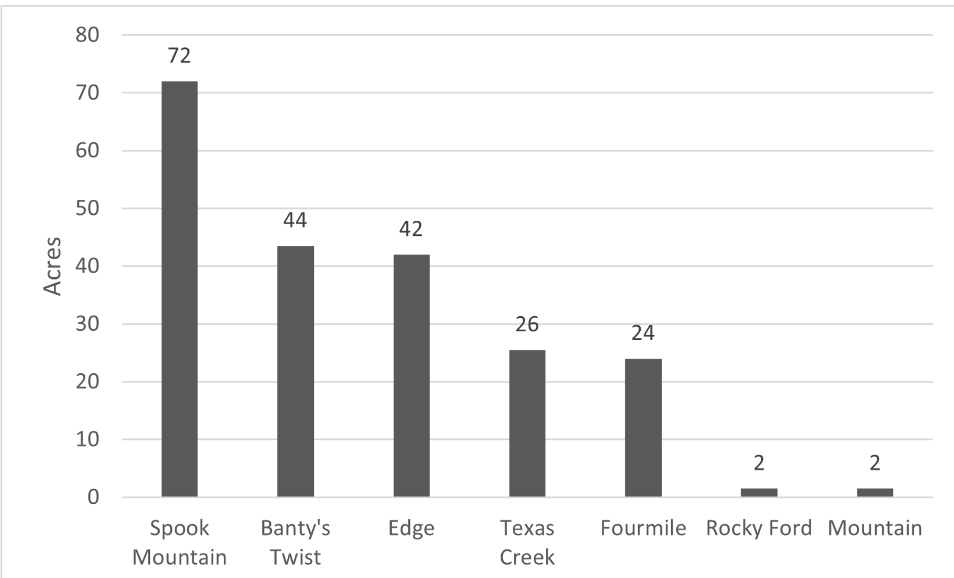

Figure 70. Summary of results for visible arable land.

These results are consistent with my findings upon visiting these structures. From atop each of the pinnacle sites, one can observe broad areas of flat land close to drainages. These are either large terraces above Douglas Creek and its tributaries or wide confluences where the two meet. Landscape settings like these lend themselves well to agriculture, as they would be high enough above the drainages to avoid flooding, yet close enough to facilitate irrigation systems, a possibility supported by recent research and experimentation in Fremont territory elsewhere in the Uinta Basin (Boomgarden et al. 2019; Simms et al. 2020). The broad and flat settings make for analogous soil depth and drainage mechanics, which are suitable for farming small plots (see Figures 71–77 for complete visible arable land results).

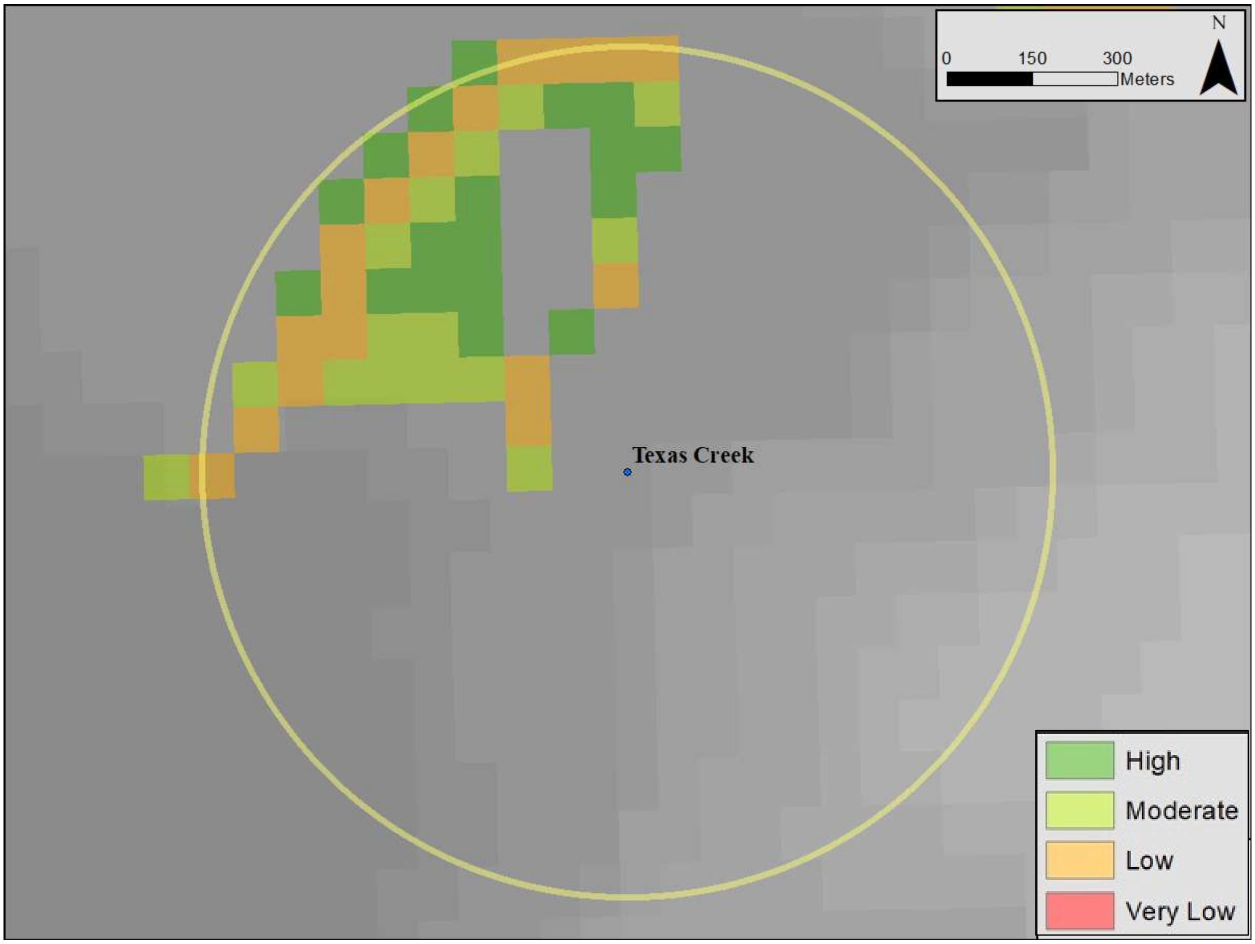

Figure 71. Visible arable land results for Texas Creek, with a 750-meter buffer. Twenty-six acres of suitable land are visible from the north to the northwest.

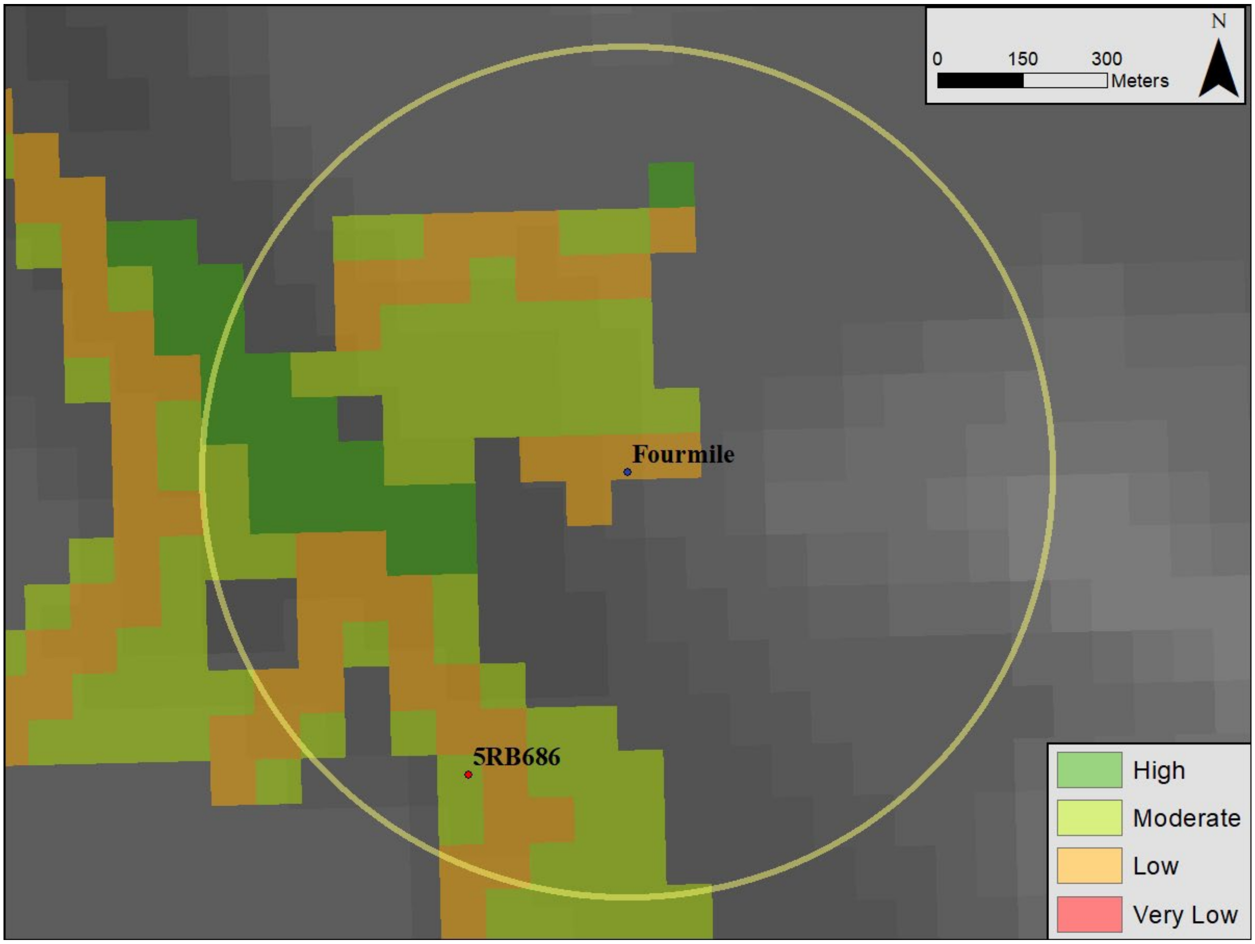

Figure 72. Visible arable land results for Fourmile, with a 750-meter buffer. Twenty-four acres of suitable land are visible from the west to the northwest.

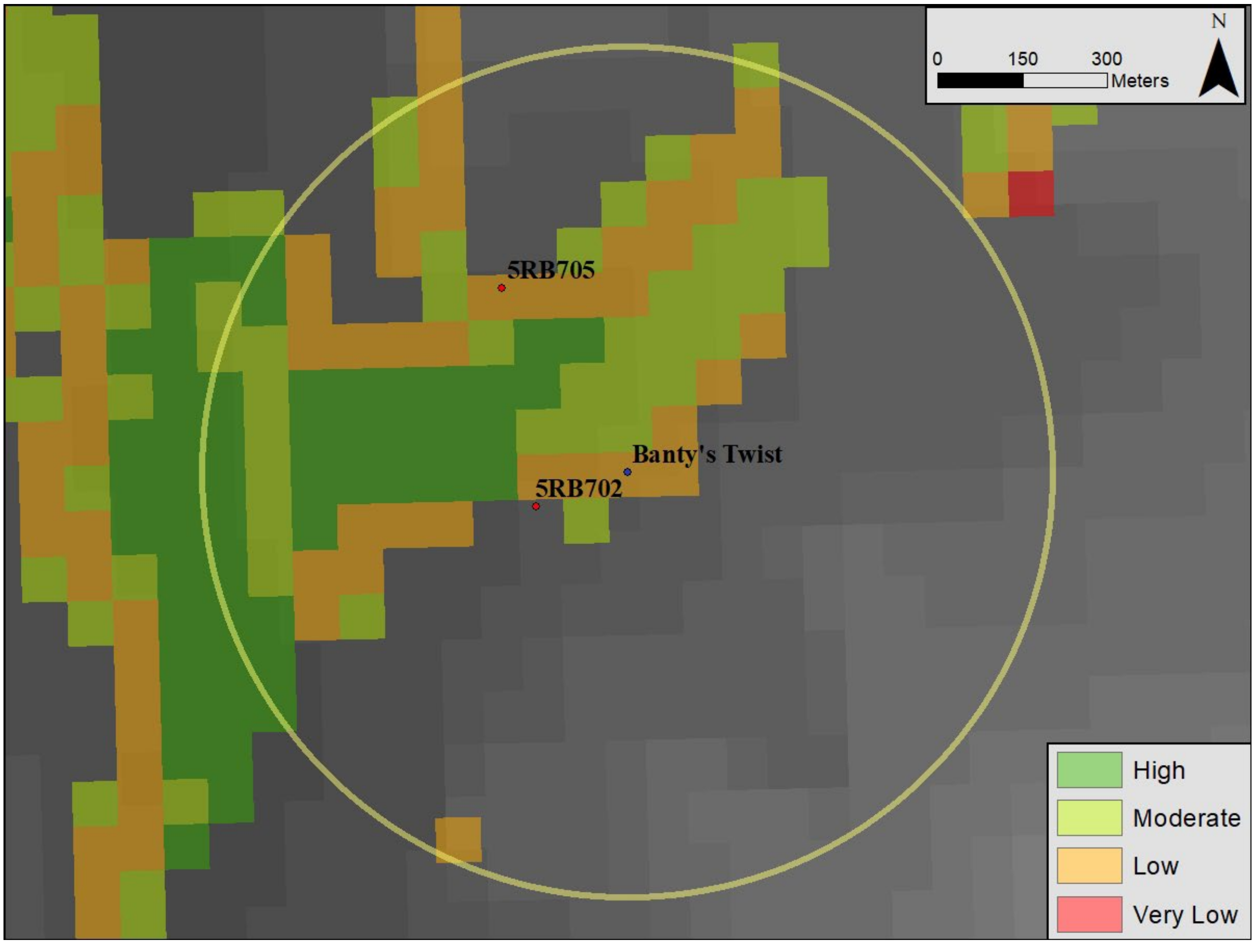

Figure 73. Visible arable land results for Banty's Twist, with a 750-meter buffer. Forty-four acres of suitable land are visible from the west to the north.

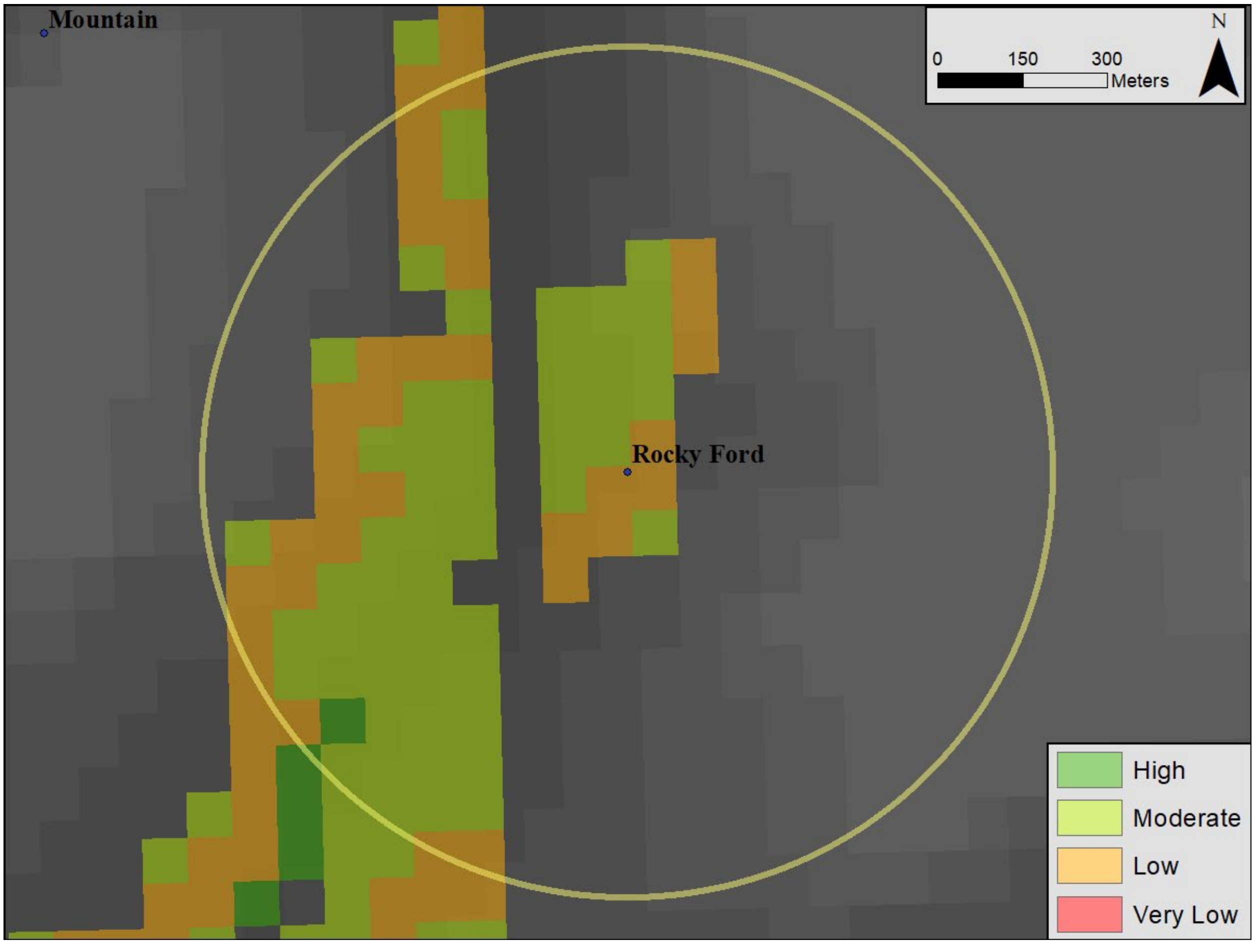

Figure 74. Visible arable land results for Rocky Ford, with a 750-meter buffer. Only two acres of suitable land are visible to the southwest.

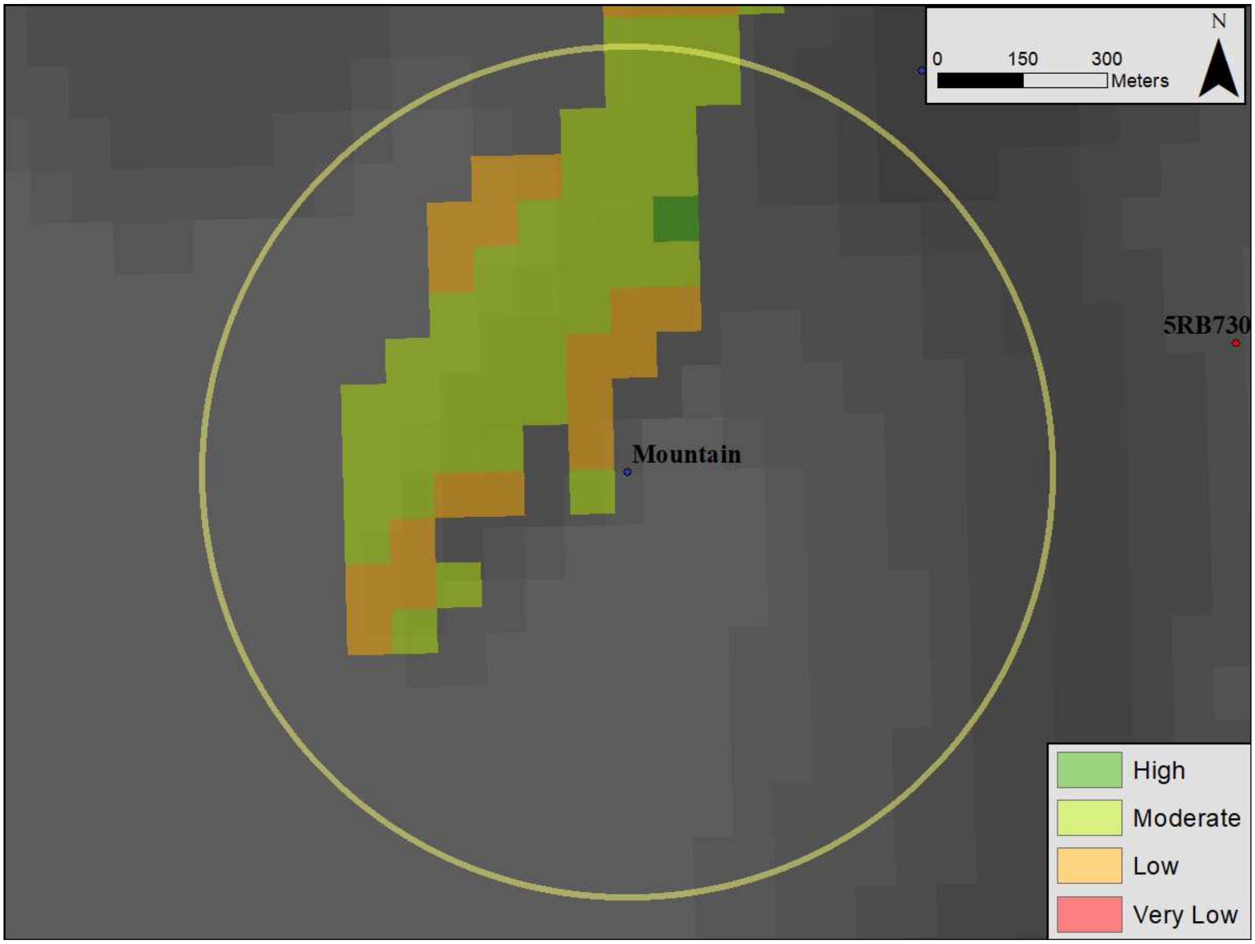

Figure 75. Visible arable land results for Mountain, with a 750-meter buffer. Only two acres of suitable land are visible to the north.

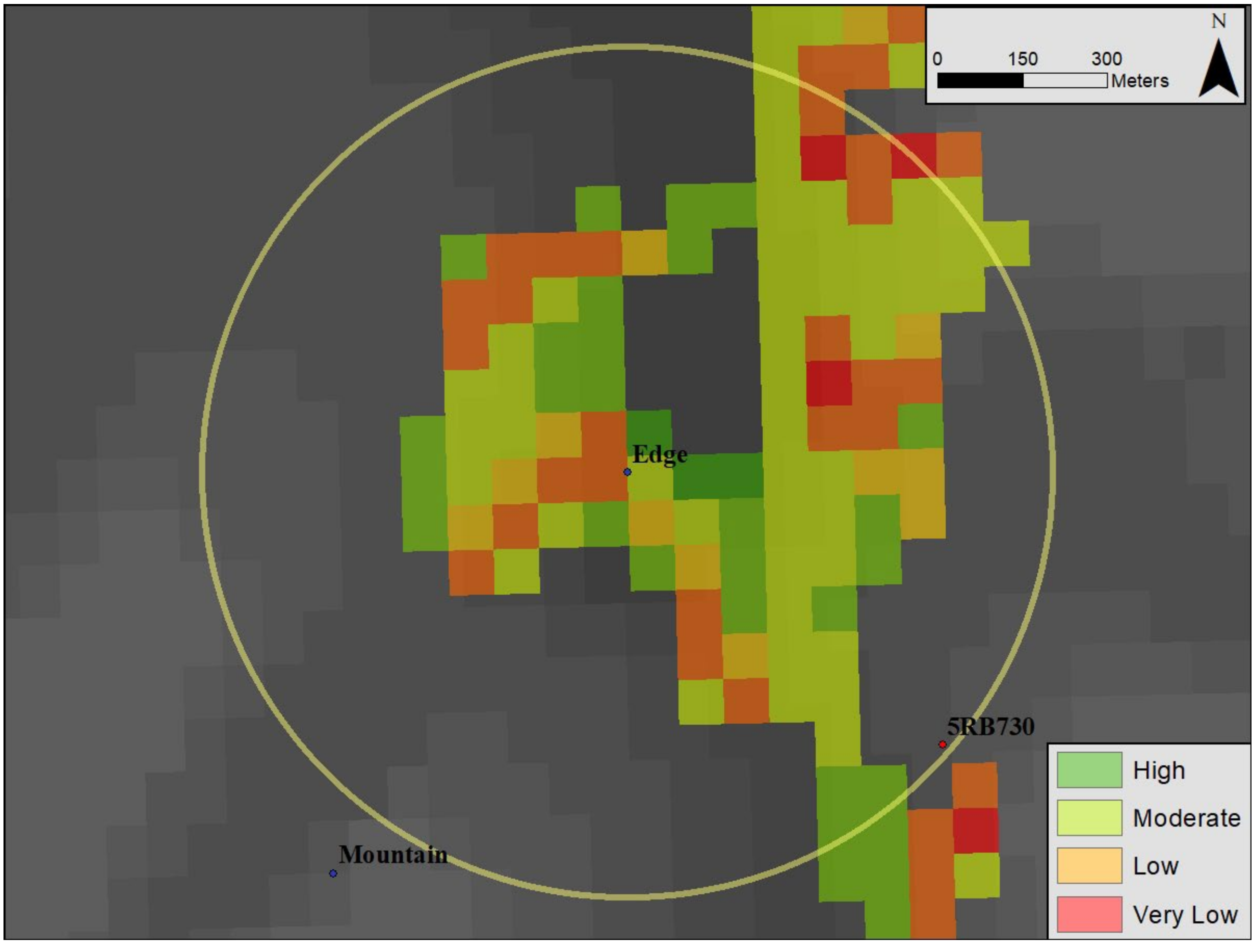

Figure 76. Visible arable land results for Edge, with a 750-meter buffer. Forty-two acres of suitable land are visible in all directions.

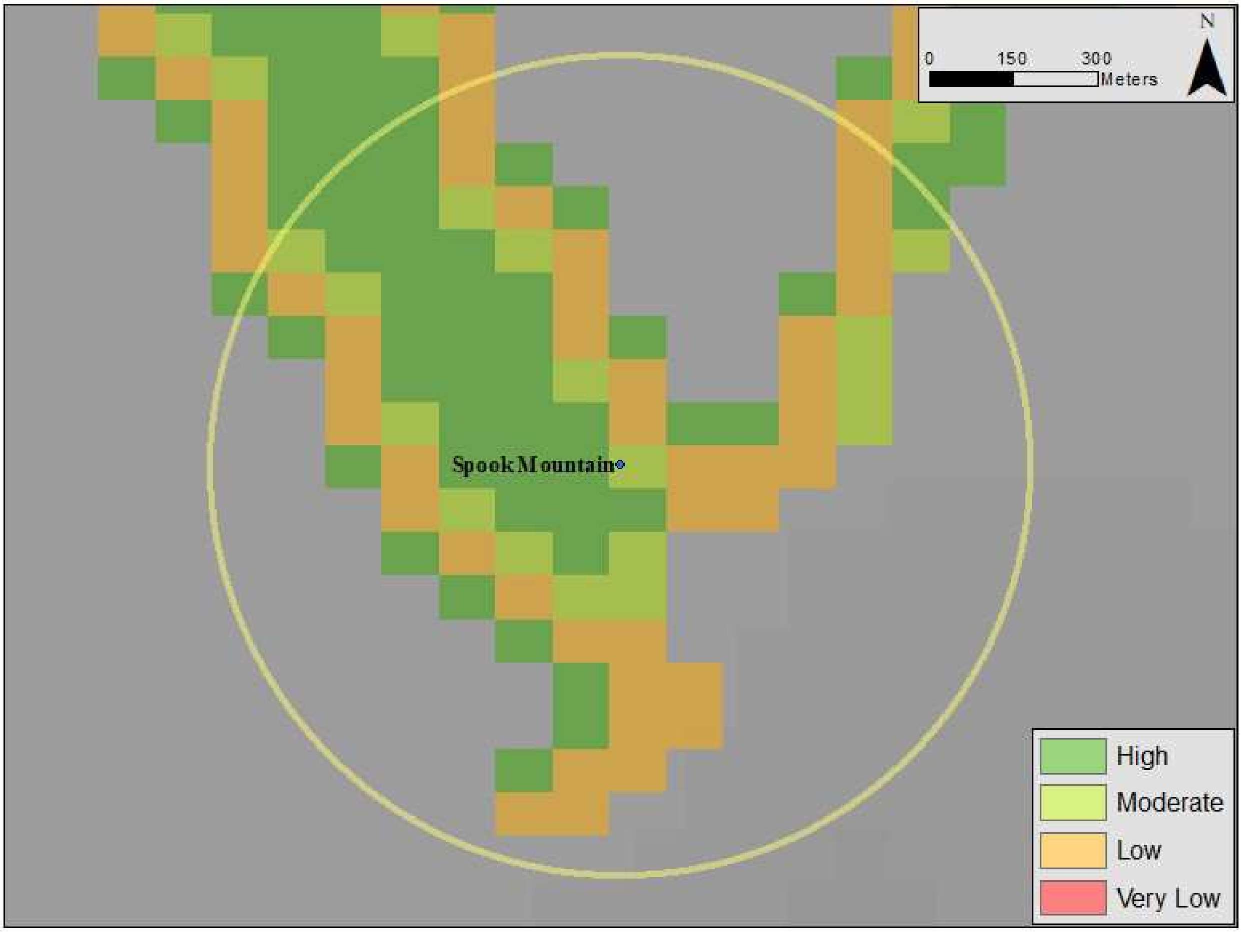

Figure 77. Visible arable land results for Spook Mountain, with a 750-meter buffer. Seventy-two acres of suitable land are visible in all directions, but mostly to the west.

Maximum Canyon Visibility

Four of the sites — Edge, Spook Mountain, Rocky Ford, and Mountain — achieve the maximum of 2.5 kilometers of canyon visibility. Occupants at each of these sites would have had at most 38 minutes to prepare for incoming travelers through the canyon. Texas Creek offers views 2.3 kilometers into the nearby canyon, amounting to 35 minutes of preparation time. Viewsheds at Banty's Twist and Fourmile reach 1.8 and 1.5 kilometers into the canyon, respectively, amounting to roughly 25 minutes of advanced warning time each (Figure 78). It should be noted that these warning times are different from the times described in Chapter 4. The figures here reflect total time based on the full extent of canyon visibility, while the previous times reflect times based on people approaching the pinnacles from the nearest low point in the canyon.

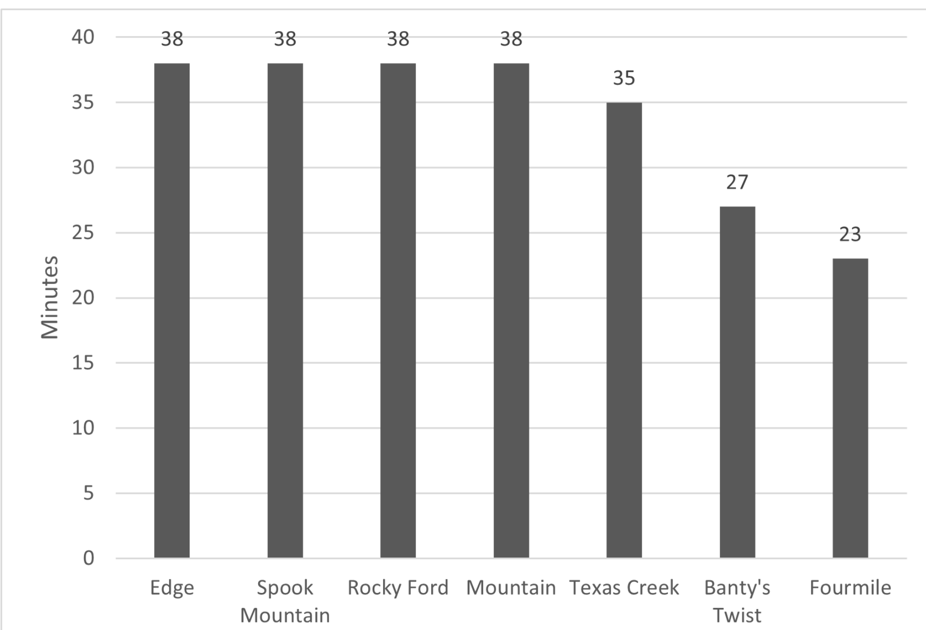

Figure 78. Total warning times based on maximum canyon visibility. Note that these are distinct from the warning times provided in Chapter 4, which account for people approaching from nearest point in the canyon.

These remotely sensed results are consistent with what I observed in the field. These pinnacle locations afford favorable vistas of the lowlands. This often includes perspectives in multiple directions into the canyons, which would prove advantageous for monitoring activity in these travel corridors. Sparse vegetation throughout much of the canyonlands create the open space that aids detection of faint human figures at such great distances (Fábrega-Álvarez and Parcero-Oubiña 2019:58–59). As with raiding parties threatening distant granaries, the larger the group of travelers advancing from the maximum of 2.5 kilometers away, the easier they could be perceived by pinnacle occupants on lookout (see Table 12 for summary of all viewshed results).

Table 12. Summary of viewshed results. Granaries are visible from four pinnacles and there is no pinnacle intervisibility. Maximum canyon visibility and warning times have been adjusted for the limits of human vision.

Site	Visible Granaries	Maximum Granary Visibility (km)	Visible Pinnacles	Maximum Canyon Visibility (km)	Warning Time (min)
Edge	1	0.2	0	2.5	38
Spook Mountain	0	n/a	0	2.5	38
Rocky Ford	1	1.7	0	2.5	38
Mountain	0	n/a	0	2.5	38
Texas Creek	0	n/a	0	2.3	35
Banty's Twist	2	1.4	0	1.8	27
Fourmile	1	0.6	0	1.5	23

Discussion

The pinnacles offer optimal visibility of the canyon, some visibility of arable lands and granaries, but achieve no intervisibility of each other. Prominent viewsheds of canyonlands available at most sites suggest that builders prioritized locations with commanding perspectives of vast tracts of land below. These patterns seem to support the hypothesis for active defensibility, as occupants could detect unwanted outsiders with advanced warning, organize a response, and then potentially deter them from the area.

All the sites offer viewsheds of lands suitable for agriculture, confirming Creasman's (1981a:286) earlier inference about pinnacle sites in Douglas Creek. While two of the sites oversee just a few acres of arable land, the remaining five have between 24 and 72 acres of flat lands close to drainages, suitable for cultivation. Occupants of these pinnacle sites could have easily monitored crops below and protected them from pilfering, should they have elected to leave the safety of their high elevation sites to actively deter thieves. It follows that positioning structures in view of arable lands was a significant consideration for the architects. This may attest to a pressure for defensibility that they were responding to, ultimately incentivizing the juxtaposition of these masonry structures with precious farm plots.

Such consistent representation of arable land across these sites appears to lend credence to notion that pinnacle structures stem from the Fremont tradition. The Fremont were the only known indigenous horticulturalists in the Douglas Creek region (Reed and Metcalf 1999:116–117; Spangler 2002:83–84) and were prolific farmers throughout their traditional homelands (Gunnerson 1969:136–137). The spatial and visual connection to arable lands and the pinnacle sites suggests their cultural affiliation. Considering the number of known granaries in Douglas Creek, it is reasonable to suspect that these Fremont's investment in horticulture was akin to their San Rafael neighbors, therefore supporting these estimations of arable land. Still, further evidence — such as remnants of irrigation systems along these tributary confluence — is still needed to support the notion that horticulture was practiced in these specific arable lands featured in pinnacle viewsheds. As such, the results presented here are speculative.

Four of the sites have one or more granaries within their viewsheds, suggesting that monitoring these food stores was a preference whenever possible. Considering that the granaries are close enough that the human eye could discern troubling activity such as theft, this scenario is even more plausible. These components of viewshed seem to support the hypothesis for an active defensibility, yet their inconsistent representation across all seven sites renders the evidence tenuous. Still, the possible remains that pinnacle occupants would have had the ability to spot pilfering of the granaries and would have had the option to descend and confront thieves.

This aspect of viewshed also tenuously supports a cultural affiliation between the pinnacles and the granaries. Since we have strong evidence that the distinctive granaries such as those found in this area are of Fremont origin (Boomgarden 2009:25; Gunnerson et al. 1969:138–139; Madsen and Simms 1998:261; Morss; Spangler 2002:378), we can reasonably assign cultural association between these two forms of masonry architecture in Canyon Pintado. If the builders knew the locations of the granaries and endeavored to situate themselves within view of them, both may well have been architectural projects of the same people.

These components of the composite viewsheds each provide varying support for the active defensibility hypothesis. However, that supposition is troubled by the total lack of intervisibility between the pinnacle structures. Clearly, achieving an in-canyon security system via inter-connected relay points was not a critical priority for the builders. This presents a few possibilities. For instance, it may suggest that the sites operated as individual hubs to monitor local traffic and resources. Also, this could indicate that the sites were not occupied contemporaneously — at least not at the time of construction. Or perhaps the occupants were still capable of communication, but with smoke signals reaching high above the landforms obstructing direct view between the sites. But it may also hint at the hierarchy of preoccupations concerning the builders. For instance, it could be the case that the builders placed more value on monitoring traffic across large swaths of the canyon floor and nearby resources than on the ability to communicate long distances. Thus, while evidence for an integrated security system would lend strong credibility to the active defensibility hypothesis, the aggregated components of these viewsheds still support this hypothesis. The occupants may have been engaged in active defensibility, just a less intense form than pinnacle intervisibility would imply. Certainly, this framework could change with a complete sample of all known pinnacles in the Douglas Creek area.

Conclusion

The impressive views offered from the elevated positions of the pinnacle structures signal an intentional strategy by the architects. Previous researchers have speculated that these locations were meant to overlook arable land and villages along the tributary confluences (e.g., Creasman 1981a:286), but until now, no archaeologist has quantified and synthesized these pinnacle viewsheds. What this viewshed analysis has shown is that the builders made calculated decisions with the placement of these masonry structures. They sought commanding views of the canyon floor below, conceivably to monitor vast swaths of activity, and they preferred locations with favorable views of arable lands and storage granaries. The builders did not, however, achieve an interconnected security system via mutual visibility of the structures.

Together, all these viewshed components point to some degree of active defensibility expressed here in Canyon Pintado, a curious inference considering the indices for passive defensibility detailed in Chapters 4 and 5. The structure occupants would have been well-positioned to surveil traffic and resources below and could have identified troublesome activity from outsiders with sufficient time to repel them. The absence of an integrated communication system — assuming the pinnacles are contemporaneous — indicates that these security efforts were localized. While smoke signals could have relayed messages between locales invisible to one another, this assumption is difficult to sustain. While the results from this research question seem to contradict the results from the two questions, in the next chapter I reconcile these apparently conflicting inferences and interpret what they reveal about the conflict resolution strategies of the Douglas Creek Fremont.

CHAPTER 7: DISCUSSION OF RESULTS

This chapter synthesizes the insights from the three research questions and makes sense of what appear to be contradicting results. I begin by systematically exploring the possible functions of the pinnacles, based in part by ideas suggested by other researchers. Here, I conclude that they are best understood as refuge fortifications. This is followed by a proposal for a framework for the Douglas Creek pinnacles in which they were used by occupants primarily engaged in passive defensibility, but who retained the option for strategic flexibility and tactical adaptability. While the pinnacles most likely represent refuge fortifications, I discuss how they could have served multiple functions such as habitation sites and observation points. It remains unclear who built these structures, but a case is made here for their Fremont authorship. Given what is known about Fremont culture history and the social and environmental changes in the region, I offer an interpretation for what these pinnacles suggest about the lives of their builders with consideration for the conflicts they were facing and how they strategized to resolve them.

Exploring the Possible Functions for the Pinnacles

The results presented here support the notion that these structures were inherently defensive in nature. However, to sustain this position, it is imperative to entertain other possibilities. What follows is a discussion of the various functions the pinnacles could have served. I examine the extant evidence and determine the degree to which it supports each case. This is not an exhaustive litany of potentialities, and future researchers could propose frameworks about these structures that go unexplored here. Nevertheless, this discussion includes those that are commonly referred to in the literature relevant to this study.

Mortuary Site

Archaeological investigators in the Douglas Creek area have discovered few human burials (Reed and Metcalf 1999:127). Of the human remains found in the area, only one instance involved a pinnacle site. Baker (1999) discovered the remains of nine disarticulated human individuals at Sky Aerie Promontory (5RB104; henceforth, Sky Aerie), a pinnacle site located roughly 14.5 kilometers west of Fourmile. He noted no evidence suggesting intentional interment of any of the individuals, although there was substantial modern disturbance at the site. Some of the bones were placed in curious places, such as "three skulls found atop a [clay-capped] hearth"; other bones were burned, and one tooth had been drilled antemortem (Baker 1999:6.21–6.36). Baker made the argument that the human bone assemblage exhibited evidence for cannibalism, citing "cut marks, perimortem fracture, loss of spongy bone, anatomically patterned burning, and pot polish" (Baker 1999).

While mortuary aberrations and indices for anthropophagy have been recorded in Mesa Verde pit structures dating to around this time (Stodder 2020), at Sky Aerie they are more tenuous. Baker's claims were not supported by cannibalism experts (Reed and Metcalf 1999:127), but he still believes Sky Aerie represents a site where ritualistic cannibalism took place. While the function and meaning of this site remains unclear, it stands alone as the only pinnacle site known to have human remains.

The seven pinnacles featured in this study do not exhibit any clear evidence indicative of human burial. Mortuary practices in the Southwest commonly incorporate the following elements: extramural pits (Watson 2020), which are antithetical to these pinnacles; grave goods as well as deep deposits of charcoal, ash, and midden fill (Atkins 2020), which have not been recovered among with these structures; spatial separation from living spaces (Atkins 2020; Watson 2020), which is contradicted by the domestic assemblages of these sites.

The one possible exception is the anomalous Mountain. Its great distance from and elevation above the canyon, tight horseshoe-shape, diminutive size, and ostensibly thoughtful and aesthetically pleasing masonry coursework seem to suggest that the builders may have had different ideas about this site. Design elements such as carefully following the dictates of exposed bedrock and opening to the west may have some cosmological significance as well. These considerations make Mountain the only pinnacle that is plausibly mortuary in function. However, no human remains have been discovered here, which makes this a tenuous hypothesis.

Ceremonial Site

The pinnacle sites are distinctive architectural manifestations on the Douglas Creek landscape. Their semi-circular shapes and design elements attest to intentionality while their sizes clearly indicate group effort. These factors, coupled with their isolation on the landscape and distance from the (theoretical) hamlet sites along tributary confluences below, are all characteristics commonly associated with ceremonial sites in the Southwest (Coffey et al. 2017:3). Distinctive architectural scale and layout, along with their scarce representation amidst built social environments, make ceremonial structures special and "formalized spaces to conduct civic and ceremonial affairs to promote social cohesion, and reduce tensions" (Coffey et al. 2017:3). These descriptions seem to align with my observations of the pinnacles. However, ceremonial structures ought to host a range of extradomestic activities, which would produce material remains distinctive from assemblages characterizing mundane domestic settings (Coffey et al. 2017:4). The material culture at these pinnacles recorded by me, as well as by previous researchers at Fourmile, Banty's Twist, Edge (LaPoint et al. 1981), and Texas Creek (Creasman and Scott 1987) all indicate evidence of food preparation, food storage, and other common domestic activities. While Creasman and Scott also recovered shell beads and clay pieces possibily related to figurines, they are more likely related to personal adornment and/or gaming than exclusive ceremonial use, due to their association with such an abundance of quotidian items.

Baker's interpretations at Sky Aerie are once again relevant for this discussion. His claims for cannibalism aside, Baker believed that the site may have been home to a special person in the community such as a shaman or witch or was otherwise a special place where people would routinely visit to carry out ceremonial "feasting on corn and human flesh and [engage in] playing games and/or gambling" (Baker 1999:xi). Baker cites the presence of charred corn, gaming pieces, and unusually treated human bones in support of this proposition. Spangler (2002:182) endorses the possibility, highlighting the distinctive construction elements — it is larger in overall scale, has an abundance of architectural bedrock postholes, and incorporates large non-local foundational slabs — of Sky Aerie compared to other pinnacle sites in the area.

None of the pinnacle sites presently studied exhibit material culture remains comparable to what Baker recovered at Sky Aerie, nor do any seem to exhibit the architectural qualities described by Spangler. The shallow deposits of quotidian artifacts and lack of evidence for extradomestic activities at these pinnacles suggest that they were likely not spaces exclusively used for ceremonial purposes. While there is a possibility that de facto ritualistic practices were carried out at these sites, there is no convincing material evidence to suggest as much. Indeed, there is little evidence for "specialized ceremonial structures at Fremont sites" that meets our understanding for ceremonial practices in the Southwest (Gunnerson 1969:157), and most of these pinnacles are no exception.

The one outlier is Mountain, where peculiar details suggest the possibility that it was vision quest site. Indigenous peoples across North America are known to have visited these sites to “fast for visions of good fortune and spirit power” (Benedict 1985:1), for healing and for success in battle (Benedict 1985:32), or to acquire knowledge about life and the universe (Conner 1982; Dormaar and Reeves 1993:162). Vision quest sites are usually detected archaeologically through distinctive architecture, ritual artifact deposits, and special settings in the landscape. They are often represented through small stone structures that fit a single person and can be horseshoe shaped (Conner 1982; Dormaar and Reeves 1993:163). Frequently, they are found in areas considered sacred, secluded, and isolated such as mountain ridges, hill tops, and buttes (Conner 1982; Dormaar and Reeves 1993:162). High elevation settings are most common, where individuals were removed from the secular world and afforded a commanding view of all directions. This imbued vision quest sites with a “wild beauty and spiritual character” (Benedict 1985:32). These unusual places were not suitable for habitation and were meant to remove participants from mundane life (Dormaar and Reeves 1993:162) but remain close to home (Benedict 1985:32). These elements seem to align perfectly with Mountain, a small structure in an impractical place, isolated from nearby lowland hamlets. Tellingly, it is facing west, away from secular life in Douglas Creek and toward the setting sun.

However, other critical pieces of evidence are lacking to support Mountain as a vision quest site. To begin, there is no accumulation of distinctive ritual artifacts such as river cobbles carried to the site to demonstrate personal commitment, burned bone, painting implements, sharp tools for self-mutilation, or offerings of pottery (Benedict 1985:132). Further, there is no evidence for fasting beds — usually an assortment of narrow timber poles — that participants would have rested on during the ritual (Conner 1982:89). Finally, there is no support from ethnographic literature, which furnishes rich context for vision quest sites elsewhere in the Rocky Mountains and Great Plains (Benedict 1985; Conner 1982; Dormaar and Reeves 1993). The lack of artifacts here is telling, as this site is less likely to be subject to looting as it is so difficult to find and reach. For these reasons it is plausible that Mountain was a vision quest site, but it is at present impossible to confirm such a possibility.

Lunisolar Observatory

The pinnacle sites are situated prominently above the canyon floor on landforms that afford superior viewsheds of the sky. It is plausible that the occupants used these spaces as observatories to gaze towards the heavens and that such practices were charged with both sacred and worldly significance. Believable, too, is the prospect that Fremont farmers in Douglas Creek observed the patterns of the sun and moon to inform their agricultural calendar. Indeed, archaeoastronomers interested in these traditions have proposed that ancient cultures around the world built observatories specifically used for tracking movement of celestial bodies to situate themselves within time and space. These observatories had implications for the material and spiritual lives of ancient peoples, as they at once supported calendar systems as well as connected humans to the cosmos (Belmonte 2014:144). However, it is difficult to ascertain whether archaeological structures were true celestial observatories, i.e., built with the specific intention of fostering sky-gazing (Belmonte 2014:134–138), or whether firmament viewsheds were mere secondary functions of buildings that served other purposes.

Hauck (2004) has made the argument that Spook Mountain (and Mud Ball Ridge Sky House [5RB4333], another site in the region with drill holes and masonry) represented a formal observatory or “sky house”, with the purpose of informing a lunisolar calendar, which guided agricultural cycles of Fremont farmers. He states that the primary purpose of this calendar system “was to predict and anticipate the arrival of…the Spring Equinox, …[the date] apparently marked [as] the initiation of the planting season” (Hauck 2004:i). In support of this hypothesis, Hauck (2004:14) cites the “generally linear pattern from the northwest to the southeast” of Spook Mountain’s nine drill holes, and their orientation with respect to the Metonic cycles from 495 to 533 C.E. (Hauck 2004:i). If this hypothesis were true, it would be extremely early in the Fremont occupation of the area and roughly 500 years prior to their most intense cultivation of corn (Madsen and Simms 1998:290; Spangler 2002:358).

The intention here is not to refute Hauk’s work, which is supported by extensive astronomical research, complex arithmetic, and sound deduction. Indeed, it is reasonable to suspect that ancient agricultural peoples would have monitored celestial patterns and devised measurement systems to temporally order their planting and harvesting decisions. However, if these pinnacles were in fact celestial observatories, this would only be an added benefit of their elevated locations on the landscape. It seems that astronomically aligned drill holes and vertical posts alone could serve the calendrical purpose that Hauck proposes, without the need for extensive architectural accompaniment. The additional energetic expenditure necessary to assemble masonry structures ought to have been incentivized and justified by other causes. The masonry components of these sites must have provided an immediate economic benefit for individuals to consent to and invest in their construction (Ostrom 1990; Schroeder 2018:224). As such, these pinnacles likely satisfied a need beyond lunisolar observation.

Stronghold Fortification

The masonry architecture at these pinnacles invites the interpretation that they were fortifications. In the archaeological literature on defensive structures, fortifications are understood as occurring on a continuum between two categories: strongholds and refuges

(Keeley et al. 2007:57). While all fortifications are functionally defensive and comprise major architectural undertakings, strongholds exhibit large walls and defensive "curtains", which effectively shield inhabitants from projectiles and obscure their positions from view (Schroeder 2018:243–244). They can be understood as "castle-like" structures, which not only provide safety but also a strategic vantage point from which to launch an active defense. Strongholds achieve the requisite scale from which combatants can stage themselves in advance of a substantial counterattack (Keegan 1994:149). Another key distinction for strongholds is that they are built to "provide a raised position to both fire and view attackers from and slow down the advancement of attackers into the defended position" (Carlson 1965; Keeley et al. 2007:57). Among strongholds there is also a tendency to limit access to single entry points and integrate weapons systems into the architecture as strategies to concentrate enemies and expose them to attack (Schroeder 2018:243).

Individual components of strongholds seem to be represented among the Douglas Creek pinnacles. To begin, they all are restricted to a single entry point, often dictated by the pinnacle geography. Most of these are narrow enough to limit entrance to one person at a time. Conceivably, these could be strategic advantages for pinnacle occupants seeking to aggregate and target assailants. Moreover, most of these sites achieve an elevated position, although not as a function of architecture but rather topography. In some cases, such as Fourmile, Banty's Twist, and Texas Creek, the pinnacles provide positions above their immediate surroundings and could thus foster vantage points conducive to targeting nearby enemies. Others, however, are merely elevated above their canyon floors, and not above the vicinity from which enemies might approach.

The remaining definitive features of strongholds are not exhibited at these pinnacle sites. None of the sites feature the integration of weapon systems into the architecture. In fact, the only design features other than entryways were conformity to pinnacle contours, the occasional placement of slabs to cover gaps in the ground, and the wooden posts embedded into the walls at Texas Creek. Just as important, all but one of the pinnacles failed to meet the criteria established for "curtains", which might provide total coverage and concealment to occupants. The north wall at Texas Creek is the lone exception, as its substantial scale could conceivably shield those inside from view and block projectiles. However, the absence of equal protection to the east, west, and south at this site seem to trouble this proposition. Finally, all seven of these sites are far from "castle-like" in scale and are limited in their capacity to stage great numbers of warriors for strategic counterattacks. For these reasons, it seems unlikely that these pinnacles represent true strongholds.

Habitation Site

As noted above, the assemblages associated with some of these sites (Fourmile, Banty's Twist, Edge, Texas Creek) reflect limited domestic activities. Previous researchers and I have recovered clear evidence for food processing, chipped stone tool manufacture, cooking, and fire building at the pinnacle sites. Excavations by previous researchers at Edge (LaPoint et al. 1981) and Texas Creek (Creasman and Scott 1987) produced even more compelling evidence for domesticity, including bone tools, Ancestral Puebloan tradeware ceramics, Formative era projectile points, faunal remains, and beads. There can be no doubt that people were inhabiting these pinnacle sites and conducting quotidian activities there.

The Fremont peoples of northwestern Colorado were known to settle at lower elevations, as would make sense for a horticultural people committed to crop tending (Reed and Metcalf

1999:120). In fact, of the more than 300 recorded Fremont sites in northwestern Colorado, fifty-six percent are clustered between 1,524 and 1,828 meters above mean sea level (amsl). Another thirty-four percent cluster in a higher elevation zone of 1,829 to 2,133 meters amsl. Six of the pinnacle sites featured in this study are found in the lower and most common zone (their mean elevation is 1,725 meters amsl), while Texas Creek is the lone site reaching the upper bound limits of the higher zone at 2,030 meters amsl. Another key insight is that Fremont habitation sites are known to occur "along major drainages, such as Douglas Creek, and their tributary canyons" (see Creasman and Scott 1987; Reed and Metcalf 1999:122). Equally important, previous researchers in the area have noted that masonry habitation sites contain shallow middens, sparse ceramics, and generally reflect small, mobile groups (Creasman 1981b; Jennings 1978; Reed and Metcalf 1999:122; Spangler 1995:571). Also, Fremont domestic architecture of the Uinta Basin often consisted of "semisubterranean pithouses of dry-laid masonry…situated above stream terraces…[occurring] singly and in clusters of five noncontiguous dwellings…[with] easy access to permanent water and arable lands" (Spangler 2002:375). In short, these are strikingly aligned with the patterns exhibited through the locations and the material remains left behind at these pinnacles.

Reed and Metcalf have posited that the pinnacle masonry sites of Douglas Creek may represent "field houses in support of horticulture and for hunting and gathering", noting that these Fremont would have been "tethered to [their] cultivated fields", which limited their mobility (1999:125). This framework is supported here, particularly considering the arable lands visible from each pinnacle. However, factors other than habitation seem to be at play here, as evidenced by the natural defensibility of the pinnacle settings, their commanding viewsheds, their inconspicuousness on the landscape, and their inaccessibility. Also, it seems that field houses would best serve their purpose immediately adject to arable land, and not high above them. Hence, further discussion of the pinnacles' functions is warranted.

Observation Point

The advantageous elevated positions that the builders selected for these pinnacles supports the prospect that they were observation points. Individuals stationed at any given pinnacle would have a favorable panorama of the surrounding lowlands, including arable lands, possible hamlets, and canyon corridors. Some would also have views of nearby storage granaries. These viewshed assets would be attractive to the builders, who were clearly discerning in their location choices.

The pinnacle viewsheds present some possibilities. First is to monitor traffic through Douglas Creek and its surrounding areas, as these were probable trade routes in addition to likely migratory paths for various ethnolinguistic groups (Baker 2008:6; Huscher 1939; Huscher and Huscher 1949; Seymour 2012:149; Vélez de Escalante 1995 [1776]:49). Douglas Creek Fremont may have used these pinnacles to oversee the flow of people through their homelands and possibly as a security measure, since the arrival of exogenous peoples eventually escalated into violence (LeBlanc 1999:21). This ties into granaries and arable lands visible from the pinnacles possibly threatened by petty theft, which the Fremont would have protected.

Scholars interested in trade routes, monumental architecture, and viewshed have found that in some stratified societies, architectural landmarks were placed strategically to signal power to merchants and traders in their domain (e.g., Murphy et al. 2018; O'Driscoll 2017). Nonetheless, this model is incongruent with the Douglas Creek pinnacles, simply because they are frequently obscured from view. Admittedly, sparse evidence limits faithful modeling of

Fremont social organization (Reed and Metcalf 1999:130), but there are no indications that it was stratified to such an extent that power was consolidated by elites (Gunnerson 1969:156–157).

Rather than expressions of elite power, what is ostensibly reflected with these pinnacle viewsheds is defensibility. The evidence suggests that individuals stationed at these sites could effectively maintain incognito surveillance of their landscape — in other words, see without being seen. Their ability to monitor crops and food stores suggests that the occupants retained the option to act in the instance of pilfering, but otherwise could avoid conflicts of a more severe nature. Clearly, observation ability was important to the pinnacle architects, yet their defensive locations still suggest other purposes factored into the builders' plans.

Refuge Fortification

As outlined above, fortifications occur on a spectrum from refuges to strongholds. Unlike strongholds, refuges are relatively small in scale, expediently built, commonly only feature a single rudimentary wall, and are situated in "naturally defensive or strategic locations" (Keeley at el. 2007:56), such as places that "restrict access…thereby serving to protect [them] from attack" (Schaepe 2006:674). Already, these descriptions are perfectly aligned with the qualities of the Douglas Creek pinnacles — and yet, the literature offers even more compelling criteria for refuges. Refuge fortifications are frequently defined by at least one of the following attributes: "location at high elevations and on steep landforms characterized by elevation differences in altitude, such as hilltops or mountains; concealment of site interiors from outsiders; presence of large viewsheds, prominent lookout points, and/or settlement surveillance" (Sakaguchi et al. 2010:1172, punctuation changed). The Douglas Creek pinnacles manifestly meet not just one, but all these criteria. Therefore, their primary functions are best understood as refuge fortifications.

A word about the question of construction “expediency” is in order. While these pinnacles do not exhibit carelessness or hastiness in their assembly per se, they are relatively unsophisticated compared to stronghold fortifications that feature imposing walls, integrated weapons systems, and a scale to stage dozens of warriors. Sites that fit this description include the Alcova Redoubt in Wyoming (Schroeder 2018), or others in the Great Plains such as Huff (Bamforth 1994), Crow Creek (Zimmerman and Bradley 1993), and Jiggs Thompson (Jones 2004) — each of these reach a higher level of architectural sophistication and scale that the Douglas Creek pinnacles. The builders presumably went to great lengths to fabricate these refuges, a testament to the importance they would have held for people possibly facing limited resources. Finally, refuges represent one end of the fortification continuum, meaning that they could share some qualities more closely resembling strongholds. The lack of expediency exhibited in these structures, therefore, should not preclude their designation as true refuge fortifications.

Framework for the Douglas Creek Pinnacles

An Argument for Passive Defensibility

The evidence presented here firmly supports the notion that the Douglas Creek pinnacles were refuge sites. Indeed, we know that “mobility as a conflict mediation [for hunter-gatherers] seem[s] to preclude fortification” (Schroeder 2018:238). Therefore, these structures must have served some purpose that leaving the area could not. The construction of the pinnacles would have involved a large energy expenditure, which would only be justifiable if it provided an "immediate economic benefit" (Schroeder 2018:240). As refuges are intrinsically defensive places, it follows that the builders were responding to a need for conflict resolution strategies, which consequently would have achieved such an economic benefit.

The composite attributes of the pinnacles revealed through this study suggest that these strategies primarily comprised passive defensibility. They all enjoy inconspicuousness on the landscape — some are even hidden in plain view. In addition, they are elevated above the canyon and removed from travel corridors considerable distances. Moreover, the paths separating the refuges from the lowlands are often challenging enough to slow down aggressors and at times dangerous enough to dissuade their attempts altogether. These factors provide multiple levels of safety to pinnacle occupants, whose security was ensured by defensive location alone and who could avoid confrontation of hostile parties.

The outstanding canyon viewsheds afforded at the pinnacles would grant occupants up to 38 minutes to identify incoming foreigners, attempt to discern their intentions, and prepare accordingly. In a passive defense scenario, this would mean hastening to their refuge fortifications and waiting for foes to pass through. This sequence would likely have been desirable for the occupants and conceivably could have played out more than any other outcome.

Strategic Flexibility and Tactical Adaptability

These pinnacles are unmistakably situated to permit a strategically passive defensibility. However, there were elements at the disposal of the occupants that would have allowed for strategic flexibility, should the need have arisen. The powers of observation furnished the ability for occupants to oversee resources below and monitor traffic through the canyon. Refuges fostered the privilege of retreat when danger was too great to engage, yet their positions would have afforded occupants the option to descend and actively engage, depending on the perceived threat level.

The pinnacles' immediate surroundings provide additional coverage that would aid the occupants should they need to face down a determined enemy who ascended to strike against them. The pinnacle landforms and their local environs featured blinds to offer protection and treacherous cliffs that could be weaponized in the event of an unavoidable skirmish. These nearby landscape elements would be indispensable tactical assets in such dire circumstances.

Architecturally and topographically, the pinnacles would have provided the final line of tactical defense in the event of inescapable direct confrontation. Some pinnacle landforms are high enough above their periphery to potentially shield occupants from projectiles. Likewise, those pinnacles that are not so elevated feature at least one wall, behind which occupants could take cover as they engage in combat. Finally, the ubiquity of single entryways at the pinnacles would at a minimum serve to funnel foes into predictable locations, enabling tactical targeting.

Possibility of Multiple Functions

The discussion opening this chapter concluded that while these pinnacles are more likely refuges than any other possibility, they do exhibit qualities that suggest their multi-functionality. The preponderance of domestic artifacts testifies to these spaces' use as habitations. Such a possibility is reasonable considering that, as occupants spent more time retreating to these refuges, they would have needed to attend to their daily material needs. The drill holes at some sites, which Hauck (2004) has identified, in at least some sites, as elements of an agricultural calendar, may well reflect the pinnacles use as celestial observatories. Again, this is plausible for a farming people who would need to anticipate seasonal change from the safety of their refuges.

Finally, the impressive viewsheds at the pinnacles surely meant they served as observatories. There may have been instances in which friendly bands made their way into these homelands of the Fremont, who would have conceivably descended from the refuges to meet them under peaceful terms. While visual dominion is a critical asset for high elevation fortifications (Jones 2006:526), viewshed alone is not always their only purpose (Jones 2010:10–11; Smith and Cochrane 2011:79-80). The versatility of these refuges bears out such a syllogism.

A Case for Fremont Association

It is hereby submitted that the masonry architecture found on the pinnacles of Douglas Creek are refuge fortifications. The framework hitherto provided relies on a reading of Fremont traditions to draw out an archaeological interpretation with connotations to a known cultural complex. As a point of concession, the assignment of a Fremont association maintained thus far has been postulation, albeit one informed by substantial evidence.

To be sure, the identification of Fremont traditions initially befuddled archaeologists (Gillin 1938:34–35; Spangler 2002:25–29; Spangler and Aton 2018; Steward 1937:121–123). Despite early confusion, the distinctive archaeological traces they left behind in regions like central Utah eventually came into focus (Gillin 1971[1941]:42–44; Morss 1931; Spangler 2002:319–320). Granted, as early researchers first studied the pinnacle sites of Douglas Creek, they were unsure who may have built them; Wenger (1956:85) even posited a possible Athapascan origin, though he cited no supporting evidence to that end. An understanding of Fremont lifeways soon grew clearer as more evidence was compiled, and slab-built granary and pinnacle architecture came to be understood as definitively Fremont (Gunnerson 1969:138, 148; Reed and Metcalf 1999:113), and has proven to be generally uncommon elsewhere in Colorado.

Indeed, outside of Rio Blanco County, indigenous fortifications are rare in Colorado. In the Four Corners Region, three areas feature masonry architecture like the refuges of Douglas Creek. At Hovenweep, there are six towers located in defensible locations such as boulders and along cliff edges. These are attributed to Ancestral Puebloans and date from 1116 to 1277 C.E. (Ferris 2015), a period of surging violence in the Southwest. Castle Rock Pueblo in McElmo Canyon is another defensive site attributed to late 13th century Ancestral Puebloans. This fortification was built on and around a naturally defensible high butte of slickrock. Forty-one people were killed at this site, attesting to the regional violence of that period (Kuckelman et al. 2002). A third concentration of defensive sites in this region (although just across the border in New Mexico) are the Navajo fortresses of the Gobernador District (Carlson 1965). These were built in the 18th century and, like Hovenweep and Castle Rock Pueblo, are larger in scale than those of Douglas Creek and are attributed to non-Fremont cultures. The scarcity of such masonry fortifications in this region is revelatory, considering the intensity of survey coverage in this part of the Southwest.

Beyond the Four Corners region, three defensive fortifications are well known in Colorado. Granby Ute Fort in Grand County was built by 18th century Utes for protection against raiding bands of Arapaho and Cheyenne (Harmon 1945). It is located on the "south side of a [hogback] promontory…[with] low stone walls [that represent] the remains of [a] fort" (OAHP, 5GA49 Site Form, BLM, 1973). Wall remnants measure 40 meters east to west and 15 meters north to south and naturally defensible elements such as a 10-meter-high hogback cliff are incorporated into the architecture (OAHP, 5GA49 Site Form, BLM, 1973). Apache Fort, located in Larimer County, marks the site where the Apache are believed to have made their final stand against the Arapaho after a series of battles in the 19th century (Toll 1962:17). It was built on a defensible hill that is steep on all but the north side, and in addition to its defensive function, the fortification represents a monument to the first man killed in the previous battle (Toll 1962:18). Old Agency Fortified Site, found in Saguache County, comprises a series of stone circles measuring roughly 3 meters in diameter and was apparently defensive in function. An associated Elko corner-notched point could date the site to the Archaic period, although other evidence such as wooden reinforcement used in construction and nearby tree scars suggest a more recent origin, possibly related to the historic Los Pinos Indian Agency period (OAHP, 5SH49 Site Form, Grand Mesa Uncompahgre Gunnison National Forest, 2004). These three masonry fortifications were built by hunter-gatherers, and two in recent centuries. They are far removed from Fremont territories and attest to how uncommon such sites are in Colorado. Considering how rare such sites are in Colorado and the Four Corners region, the concentration of pinnacle fortifications in Douglas Creek attests to their Fremont authorship, as their occupations in this area are now well understood.

Pioneering work in the 1970s and 1980s provided illumination about Fremont lifeways in Douglas Creek. Specialists in the area have recovered distinctive Fremont artifacts such as Uintah gray ceramics and Formative era projectile points in association with the pinnacles, as well as maize cobs in association with the granaries (Baker 1995, 1998; Creasman 1981a, 1981b; Creasman and Scott 1987; Hauck 1993, 1997; LaPoint et al. 1981), which offer potent corroboration for their Fremont origins. In support of this notion, too, is their spatial association with iconic Fremont rock art (Creasman 1982) and visual association with nearby granaries and arable land (Chapter 6, this manuscript). So, too, is the compelling frequency of Fremont ceramics found at other sites in Douglas Creek. In fact, Douglas Creek and nearby Blue Mountain and Castle Park are now believed to contain the best representations of Fremont traditions in all northwestern Colorado (Reed and Metcalf 1999:110, 115). Consequently, this framework is resolutely asserted as it pertains to Fremont culture history. Should future researchers conclude the pinnacles to be of a different cultural extraction, this framework should necessarily change — but they would still categorically stand as refuge fortifications.

Implications for Douglas Creek Fremont Cultural History

Assuming that the pinnacles are indeed products of the Fremont people, what can be made of their significance? This research presents an opportunity to derive their implications for local Fremont cultural history, accounting for what is known about the chronology of these sites and the archaeological record of the region.

Scholars have explored the possibility that severe droughts (Benson et al. 2007; Billman et al. 2000; Onken et al. 2017) coupled with seismic demographic shifts in the Southwest (Magargal et al. 2017) precipitated the decline of the Fremont, beginning around 1000 CE (Gunnerson 1969:181–182; Madsen and Simms 1998:264). Fremont farmers would have sundered into increasingly small groups, transitioned to a primarily foraging lifeway, and become more vulnerable as environmental conditions deteriorated, which engendered increased competition for optimal lands (Schiele 2021; Wenger 1956:85). Numic expansion into Fremont lands (Madsen and Simms 1998:266) in addition to Athapascan migration through them (Carlson 1965; Huscher and Huscher 1942; Madsen and Simms 1998:324; Seymour 2012) would have further compounded regional conflicts. In the coming centuries, precarious groups in nearby Tavaputs Plateau came to depend on security strategies such as masonry storage cisterns and “defensively situated” structures (Gunnerson 1969:181–182; Madsen and Simms 1998:306–307). Likewise, there is an unequivocal insinuation of violence in the head-hunter rock art imagery depicted in nearby Uinta Basin (Madsen and Simms 1998:308; Schaafsma 1971).

Critical, too, significant changes in Fremont material cultural — the introduction of exotic basalt-tempered ceramics, the increased appearance of Ancestral Puebloan ceramics typologies, and a decline in ceramics use overall — known for this period reflect shifts in demography and lifeway (Madsen and Simms 1998:306–307).

Refuges are "places of short-term safety, of value only against an enemy who lacks the means to linger in the vicinity or who operates a crude strategy of raiding" (Keegan 1994:139). By extension, the occupants of the Douglas Creek pinnacles must have been under a comparable threat. If their groups sizes were declining, they would have lacked the energy to construct more substantial fortifications and therefore made do by engineering refuges with as many defensive qualities as possible.

Issues of chronology have the potential to problematize this framework, as so few of the pinnacles have been dated. However, if we are to believe dates generated for Edge and Texas Creek, supported by other scholars (Reed and Metcalf 1999:117; Spangler 2002:425), then these pinnacles were used by Fremont people past the 11^{th} century and perhaps even into the 16^{th} century. This places their occupations well into the period of environmental deterioration and social upheaval that preceded the disappearance of Fremont traditions (see Figure 79 for a chronology of events relevant to this research).

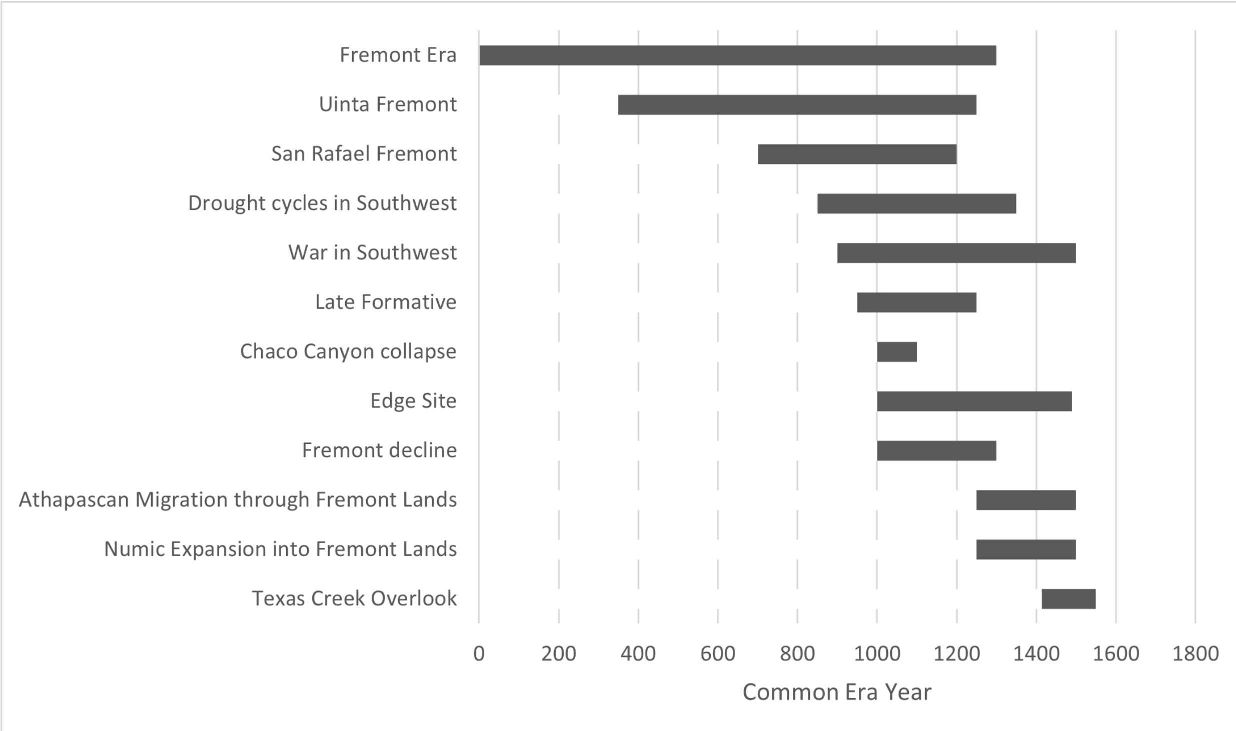

Figure 79. Summary of dates relevant to this research. Douglas Creek pinnacle sites clearly correlate temporally with regional drought cycles, increased warfare in the Southwest, social upheaval, and incursion of outsiders into Colorado Plateau.

With this archaeological sketch in mind, a conceivable narrative for the Douglas Creek Fremont begins to materialize. This Fremont homeland harbored small groups living precarious lives as they adapted to a transforming social and natural world. Facing dwindling populations, vanishingly spare resources, and the mounting stress of incursion from formidable competitors, they were forced to negotiate their survival. These diminished Fremont maintained minimal farm plots along the tributaries and confluences of Douglas Creek, which they could not afford to abandon during the growing season. Having invested in local patches, they devised refuge fortification sites overlooking their arable lands — this was the best they could manage with a limited labor force. Teetering on the brink, they wisely elected to avoid most altercations; ever bound to their warrior heritage (e.g., Warrior Ridge rock art panel in Nine Mile Canyon [Spangler 2013:84–88]) they retained the option to fight. After a protracted struggle for survival, they may have altered their strategies. Extremely late occupations at Texas Creek could reflect Douglas Creek Fremont moving further from the canyon travel corridor and installing even more sophisticated fortification infrastructure as their stability became more fleeting.

As stirring as this framework sounds, it is not necessarily novel. In their concluding remarks on Fremont traditions in northwestern Colorado, Reed and Metcalf (1999:117) incisively mused that Douglas Creek may represent the final haven for "peoples attempting to maintain the Fremont lifeway". Their interpretation is supported here, and this research contributes further perspective on how the final generations of the Fremont era may have unfolded.

Conclusion

This chapter explored the possible functions of the pinnacles and determined that they are best understood as pinnacle refuges. Their occupants were engaged in a form of passive defensibility, but they retained the option for some strategic flexibility depending on the how they assessed the threat level of outsiders entering their territory. If their strategy for passive defensibility failed and they were forced to fight, they were furnished with tactical advantages that would have aided them in active defense. I believe that these pinnacles were built by the Fremont of Douglas Creek, and that they were responding to endemic conflicts in their region stemming from resource scarcity and population pressure. The defensive posture that they adopted reveals that they were committed to maintaining their homelands but had limited means in vanquishing enemies. If the extremely late dates at Edge and Texas Creek are accurate, Reed and Metcalf's (1999) assertion that Douglas Creek may have been the final sanctuary for the Fremont would be retained. While that framework would change if more precise dating provides different occupational sequences for those sites, the insights provided here would still hold true.

In the final chapter, I summarize those key insights, address lingering questions I was unable to address, and highlight future research opportunities as well as upcoming projects in northwestern Colorado by CMPA researchers.

CHAPTER 8: CONCLUSIONS

This chapter provides a summary of the key insights of this research. While the data and interpretations presented here are valuable for our understanding of the Fremont people of Douglas Creek, some issues remain unresolved. I outline a few of the questions that I was unable to answer. Following this discussion of the implications of my work, I offer some ideas for future research in Douglas Creek that could answer more questions about the Fremont. I conclude by reviewing upcoming archaeological investigations in northwestern Colorado that is being undertaken by researchers at the CMPA.

Summary of Key Insights

Through a synthetic analysis of Douglas Creek's pinnacle structures, patterns regarding their locations, architecture, and viewsheds have crystallized. The landscapes and landforms associated with them have abundant defensive features, and the pinnacles are hidden from view. The masonry construction reflects some degree planning and organization. However, the builders did not shape stones or travel far for raw materials, likely as rocks in rugged, high elevation locations were already suitable in their natural state. In erecting these sites, they exhausted their limited resources; the architecture reflects a substantial effort, albeit by a stressed people. Pinnacle vantage points offer commanding views of the canyon, arable land, and some nearby granaries. These insights constitute ample evidence in support of the hypothesis that these structures were built as refuge fortifications. These sanctuaries satisfied the occupants' strategy for passive defensibility, while still permitting tactical active defensibility.

It is wagered here that these refuges are Fremont in origin, considering their similarity to other Fremont masonry sites, the rareness of such sites in Colorado, and the ubiquity of nearby

Fremont rock art. Additional support for this claim is attested by the pinnacles' viewsheds of granaries as well as many tributary canyons, where Fremont hamlets and farm plots are commonly found in other districts. Finally, the Fremont material cultural produced through excavations and surface collections at Edge, Texas Creek, Banty's Twist, and Fourmile provide corroborating evidence for this assertion.

Compelling dates have been generated for Fremont sites in Douglas Creek, which place their occupations firmly past the 11th century and possibly into the 16th century CE. Considering what is known about warfare and resource competition triggered by environmental and demographic changes that began in the American Southwest around the 1000 CE, the residents of Douglas Creek would have understandably been under serious pressure. Groups would have assumed more territorial postures, investing in local patches. For those who could bear the socioeconomic burden, strategies of active defensibility would have been at their disposal. Those who were more vulnerable — perhaps like the Douglas Creek Fremont — would have instead relied on passive defensibility. The compelling evidence for defensibility presented here supports the speculation that this area may have been among the final sanctuaries for the Fremont of northwestern Colorado.

Lingering Questions

While this project advances our understanding of the pinnacle architecture in Douglas Creek, critical questions are left unanswered. For instance, it remains unproven whether these structures were all built for the same exact reason, in response to the same pressure. In addition, the extent to which some of the refuges served additional functions such as habitations or observatories remains unclear.

Strong evidence attests to these sites having served similar needs, which suggests a mutual cultural origin and possibly contemporaneity. Despite the case made above for these refuges' temporal and cultural provenance, it remains unclear whether they were clearly built by the Fremont, let alone during the same centuries.

Finally, although it is apparent that the pinnacle architects had conflict resolution strategies in mind, there is no clear evidence of violent confrontations at any of the pinnacles in this study sample. Sky Aerie, with the nine disarticulated remains of nine individuals and unusual treatment of human bones remains the only known pinnacle in Rio Blanco County with evidence for possible violence. Although archaeological evidence for warfare is most often represented through defensive architecture (Bamforth 2018:8–11), further evidence in Douglas Creek would strengthen this framework. The knowledge gaps thus presented offer some interesting opportunities for future research.

Opportunities for Future Research

Remote Sensing for Population Centers

Throughout this manuscript, repeated references to theoretical settlements of people living in the Douglas Creek lowlands have been made. It would be interesting to test for evidence of these communities, assess the nature of their occupations, get a sense for local population density, and determine if pinnacle sites served as overlooks above them. Future researchers could employ geophysical remote sensing to locate hamlet sites, homesteads, and other features that are poorly understood here.

Indeed, Creasman (1981b:V-7–V-8) noted that archaeological sites were most concentrated at tributary confluences along Douglas Creek and speculated that these areas were most likely where Fremont villages and farmsteads were located. The approach outlined below closely follows those inferences. It also presents another opportunity for academic researchers to ask questions of cumulative cultural resource management datasets, as I have done here.

An investigator could conduct systematic aerial surveys of target areas using sUAV thermal imagery. One could consider any of the tributary confluences along Douglas Creek that are likely to contain settlements suitable for excavation (Figure 80). These confluences encompass the densest site concentrations in the district, and include hearth features, fire-affected rock features, lithic and stone tool scatters, and rock art panels (Creasman 1981a). Importantly, the some of these areas are just downslope from pinnacle sites.

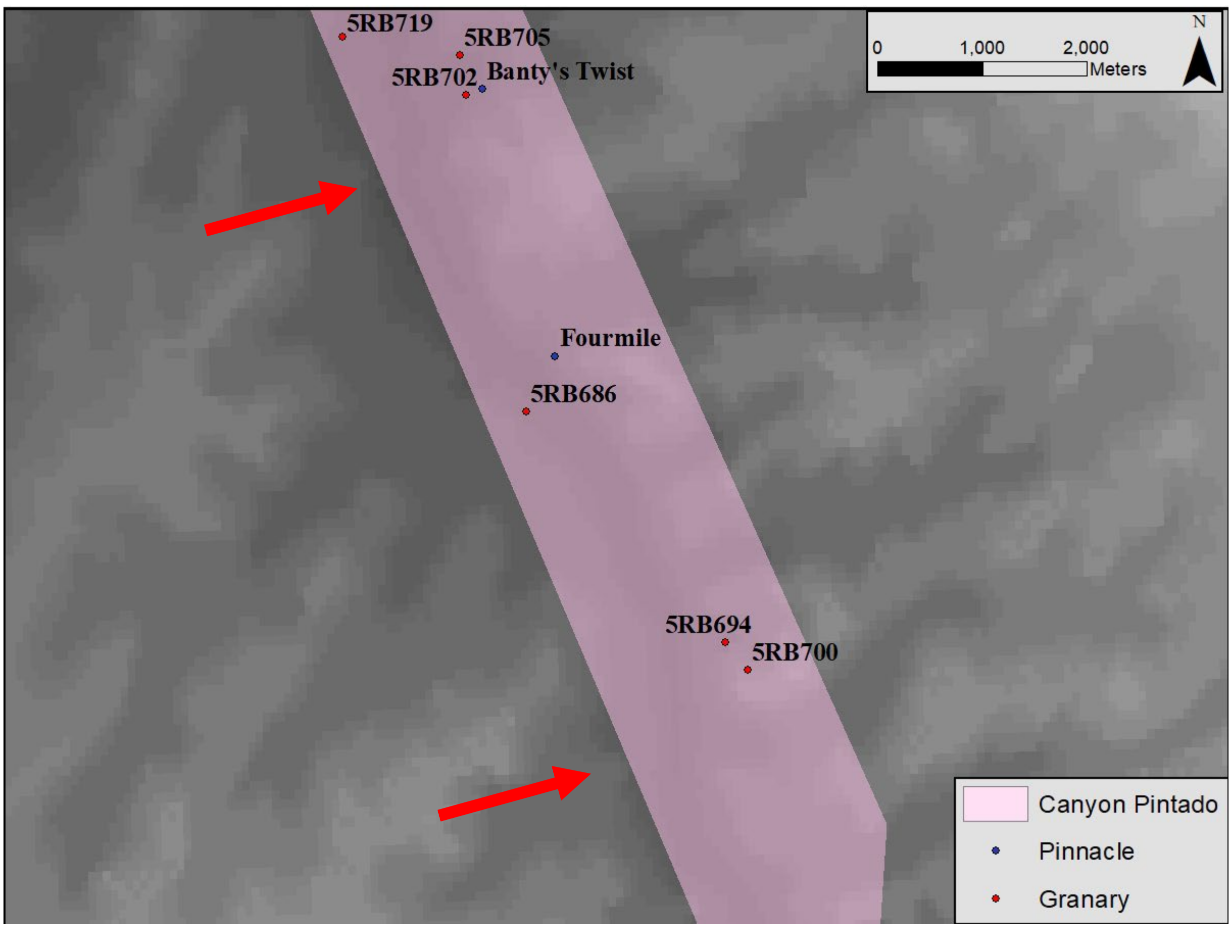

Figure 80. Showing potential study areas for future research. The red arrows show dense site concentrations at confluences within the National Historic District boundary.

Following survey coverage, one could create composite orthoimages using photogrammetry software and use them to identify cool depressions (possible signatures for pithouses, pits, ditches, and agricultural furrows) and warm mounds (possible signatures for village fill and middens). Areas that show both signatures are likely to represent the complex activities at villages and farmsteads (see Casana et al. 2014).

These broad, flat spaces would have been suitable for settlement and agriculture. Their locations at major confluences along Douglas Creek would have afforded the inhabitants access to water, optimal visibility of surrounding tributaries, and travel corridors. If hamlets and farmsteads are buried in Canyon Pintado, they are probably near these confluences. This remote sensing approach would furnish coverage of such broad areas and facilitate the identification of features that have never been recovered in Canyon Pintado. With informed decisions for placement of excavation units, a future researcher would be well positioned to recover a rich assemblage attesting to the lifeways of the local Fremont (and possibly non-Fremont) groups over time.

Geoarchaeology and Paleoenvironmental Reconstruction

Geoarchaeology and paleoenvironmental reconstruction have long been needed in this district to help provide a better understanding of the local conditions the Fremont adapted to. Creasman's (1981a:193) initial paleoenvironmental reconstruction at the Brady Site (5RB726) showed that there were centuries-long stretches of stable moisture in the area. However, pollen records suggest a drying period in the area beginning around 850 CE. These are valuable insights that other researchers could expand upon.

The deeply incised Douglas Creek features many exposed arroyo banks, which lend themselves well to such a study. A geoarchaeologist could select some of these exposures — perhaps near the confluence areas recommended above — and characterize profile features such as sediment texture, color, pedogenic alteration, and stratigraphic boundaries. The specialist could collect samples and undertake laboratory analysis of sediment, plant macrofossils, mollusks, charcoal, and eroding artifacts. Sediment composition, the presence of wetland taxa, variable charcoal deposits, and other indices could offer clues about how the environment changed over time (see Onken et al. 2017). This endeavor could shed light on the dynamics of hydroclimatic change in the Douglas Creek area and would be critical for reconstructing the natural environment in which the local Fremont lived and adapted.

Least-cost Pathway Analysis for Pinnacle Sites

According to the argument presented in this manuscript, the pinnacle refuges enjoyed natural defensibility through their remote and rugged settings. However, this conclusion was reached through a myriad of indices that were at times subjective. Other archaeologists interested in this question could test the hypothesis through GIS software using least-cost pathway analysis. Such a project would entail testing the pinnacle locations against topographically analogous random points in Douglas Creek to determine whether structure locations were especially difficult to reach from the canyon floor. McCool and Yaworsky (2019) employed a similar methodology in their assessment of warning times provided from Nine Mile Canyon pinnacles. These same random points could also be tested to see if the pinnacles had especially good views of arable land. This undertaking would likely also require the development of more accurate — and much needed — digital elevation models for the area, as the ones currently available offer sub-optimal resolution. An exploration of this nature could further illuminate the logic guiding the architects as they negotiated for the most suitable settings, and ultimately, test the proposition that these pinnacle structures were built in especially naturally defensible locations.

Arable Land, Pinnacle Synthesis, Drill Holes, and Rock Art

Although low-resolution models for arable land are presented here, a future researcher could create superior models incorporating a richer set of variables such as soil moisture, soil texture, temperature, precipitation. Also, the predictive modeling for arable land in northwestern Colorado undertaken by Gardner (2009) or the maize and irrigation experimentation conducted by Boomgarden (2015) could be attempted in Douglas Creek for a high-resolution representation of arable land.

More work on the pinnacles is in order as well. Only seven of the known fifteen pinnacle sites in the area are recorded here. The opportunity exists for another researcher to record the remaining eight and ask the same questions explored in this thesis. There is also a chance that more pinnacle sites remain to be discovered, and systematic aerial survey through the Douglas Creek and its tributaries with airplane coverage (the area is too large for sUAV survey) could be used to find more. Further, not all these pinnacles have been extensively tested for sub-surface deposits. Future researchers could conduct systematic excavations at these pinnacles, like those carried out at Texas Creek and Edge, to provide much more data on past lifeways as well as better chronological sequencing for Fremont occupations. New dates could also be ascertained at Texas Creek and Edge with organic specimens stored at AR-CSU and Western Wyoming College, thus testing a thirty-year-old hypothesis about extremely late Fremont occupations in Douglas Creek. In addition, the “drill holes” found at many of these sites have been suggested as support beams for roofs, verandas, drying racks (LaPoint et al. 1981), as bedrock mortars (DeVed and DeVed 1996; Johnson 1997; Spangler 2002:119), and even as part of an agricultural calendar (Hauck 2004). Breternitz (1970) encountered the same phenomenon at Fremont open masonry sites in nearby Cub Creek and offered similar speculations. A future researcher could undertake a synthesis of all the drilled holes at the pinnacle sites in Rio Blanco County and examine their manufacture and variability within and between sites. Such a study would offer tremendous insight about the nature of these pinnacles structures.

The defensive qualities of these pinnacles suggests that the builders were responding to conflict, and possibly endemic violence and warfare. While refuge fortifications strongly support this inference, further corroboration could be found through a study of the rock art in Canyon Pintado. A researcher could systemically examine the known rock art panels in the canyon — as well as look for more — and look for depictions of violence or warfare. The Classic Vernal motifs that depict warriors with shields and severed heads may not be in Canyon Pintado, but other suggestions of violence could be represented.

Upcoming Work by CMPA Researchers

Researchers with CSU's Center for Mountain and Plains Archaeology are currently undertaking archaeological investigations in northwest Colorado. Each of their projects stand to produce valuable information about ancient indigenous peoples from the Archaic, Formative, and historic periods. The reader is advised that these investigations are underway and thesis manuscripts sharing their results ought to be completed in the coming year or two.

Spencer Little will be working on a temporal sequencing of Hells Midden along the Yampa River to understand the transition towards sedentary and horticultural lifeways in the region. As part of his research, he will seek radiocarbon dates from the site's faunal assemblage to furnish the sequencing of cultural horizons. Little will also compare the density of artifacts and features at different strata to better understand changing subsistence strategies during the Formative Era. Finally, he seeks to understand what makes a site appealing to different groups over time, and thus answer questions about Archaic occupations preceding the Fremont ones in the region (Spencer Little, personal communication 2022).

Kim Biela's work focuses on the use of ceramics by indigenous peoples in Rio Blanco County spanning the prehistoric and historic periods. In her synthesis of all known ceramic sherds collected in the county over the past eighty years, she will examine their patterns of distribution between the Fremont and Numic-speaking peoples who came after them. Her research will consider the presence of tradewares in the archaeological record as well as the differential use of ceramics by semi-sedentary and mobile groups. Biela will also identify methodological problems that may have engendered misconceptions about the use of ceramics in western Colorado. Her research has the potential to answer critical questions about exchange networks and subsistence strategies for the various native peoples who have lived in Rio Blanco County, as well as provide further evidence pertaining to the Numic-Fremont replacement theory (Kim Biela, personal communication 2022).

Erika Powell's upcoming thesis project is designed to better understand past occupations at Mantle's Cave (5MF1) in Yampa Canyon, which was used by the Fremont. She will draw from archival collections and site reporting produced from past excavations at the cave to ascertain the range of human activities that took place there in the past. Powell intends to determine whether this cave site served functions beyond habitation and storage such as ritual or ceremonial purposes, thus expanding upon original interpretations from excavator Charles Scoggin. She will also work to better connect the material remains with the spatial layout of the cave to identify activity areas or artifact clusters as well as understand any changes in cave use over time. Powell hopes that this project will reveal the nuances of cave use by the Fremont and other groups in the region and in turn offer critical insights about the richness of ancient lives in the region (Erika Powell, personal communication 2022).

Conclusion

The organizing principle directing this investigation was that the Douglas Creek Fremont were a territorial people. Through a systematic analysis of the physical settings, architectural components, and viewsheds of seven of their characteristic pinnacle structures, this notion has been supported. The numerous variables assessed here point to a strategy of passive defensibility for the occupants, although it may not have always been so simple. The nuanced nature of the Douglas Creek Fremont's conflict resolution strategy reflects the complexity of the problems they were facing, and their collective will to overcome them.

The insights furnished here provide context for future research among the Fremont, Douglas Creek, and northwestern Colorado as a whole. Several opportunities for related explorations are identified here, and each of them — along with upcoming work from CMPA researchers — stand to advance our understanding of ancient lives in this culturally rich region.

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APPENDIX A: PHOTOGRAMMETRY MODELS

Screen capture image of the 3D photogrammetry model for Fourmile Overlook (5RB278). Complete model is accessible at https://sketchfab.com/3d-models/rio-blanco-county-pinnacle-2-2e0b2e7fcd3c4f3484f0d21ed47b28bc.

Screen capture image of the 3D photogrammetry model for Banty's Twist Overlook (5RB270). Complete model is accessible at https://sketchfab.com/3d-models/rio-blanco-county-pinnacle-1-f896d82393d64496abc4fdd6b7872c76.

Screen capture image of the 3D photogrammetry model for Rocky Ford Overlook (5RB722). Complete model is accessible at https://sketchfab.com/3d-models/rio-blanco-county-pinnacle-3-16bdb57cbfcf4099a6db2f3594106398.

Screen capture image of the 3D photogrammetry model for Mountain Overlook (5RB752). Complete model is accessible at https://sketchfab.com/3d-models/rio-blanco-county-pinnacle-5-8a61bf3ea20a48ab9168122897827977.

Screen capture image of the 3D photogrammetry model for Edge Site (5RB748). Complete model is accessible at https://sketchfab.com/3d-models/rio-blanco-county-pinnacle-4-43e5a0cce5a144c2a5da6823aaab7d8f.

Screen capture image of the 3D photogrammetry model for Texas Creek Overlook (5RB2435). Complete model is accessible at https://sketchfab.com/3d-models/rio-blanco-county-pinnacle-6-c3789bc3f2234cc080224ffc0f82244d..

Screen capture image of the 3D photogrammetry model for Spook Mountain Sky House (5RB3073). Complete model is accessible at https://sketchfab.com/3d-models/rio-blanco-county-pinnacle-7-3afaebe4d53b4621973ab55461e1b5d2

APPENDIX B: LEGACY DATA

Inventory of Artifacts Curated at AR-CSU

Table showing all artifacts recovered at pinnacle sites located within The Canyon Pintado National Historic District by LOPA staff in 1977. This includes Banty's Twist Overlook (5RB270), Fourmile Overlook (5RB278), Rocky Ford Overlook (5RB722), and Edge Site (5RB748). All these artifacts are stored at Colorado State University's Archaeological Repository.

Site Number	Catalog Number	Description	Artifact Class	Artifact Element	Raw Material	Count	Artifact Description	Horizontal Provenience	Vertical Provenience	Additional Provenience Details
5RB270	5RB270.1	Chert, quartzite	Chipped stone	Flake	Other	7	5 chert; 2 Quartzite	General Surface	Surface	general surface from datum, surface collection
5RB270	5RB270.2	Red chert; complete	Chipped stone	Biface	Chert/Chalcedony	1	Incomplete; flaking on both sides, heated	General Surface	Surface	
5RB270	5RB270.3	Tan chert	Chipped stone	Edge modified flake	Chert/Chalcedony	1	Complete; indications of use on lateral edges	General Surface	Surface	
5RB270	5RB270.4	Various colors of chert	Chipped stone	Flake	Chert/Chalcedony	20	flakes/tools	General Surface	Surface	Horizontal: "Surf. Core. Bottom"
5RB270	5RB270.5	sandstone	Ground stone and other lithic	Netherstone/metate frag	Sandstone	1	Thin metate fragment smooth on one surface	N7W/1.23 m	Surface	Horizontal: N7W/1.23 m from datum
5RB270	5RB270.6	Scratches along rock; brown/tan rock	Chipped stone	Misc. Chipped stone tool/chopper/polishing stone	Quartzite	1	"polishing stone"; Flakes removed from cutting surface; polished on both faces, polishing present on lateral side, battering present on tool.	General Surface	Surface	Horizontal: "Surf. Core. Bottom"
5RB270	5RB270.7	Red chert	Chipped stone	Drill	Chert/Chalcedony	1	Complete; formerly part of flake collection 5RB270.4	General Surface	Surface	

Site Number	Catalog Number	Description	Artifact Class	Artifact Element	Raw Material	Count	Artifact Description	Horizontal Provenience	Vertical Provenience	Additional Provenience Details
5RB270	5RB270.ASS 1	Large frags; appear to have a femur	Unmodified animal bone	Unidentified animal	Bone	6	Fragmentary - long bone, scapula, etc.	General Surface	Surface	
5RB278	5RB278.1	Tan, orange, brown chert	Chipped stone	Flake	Other	5	4 Chert, 1 Quartzite	N70E/22 m	Surface	Horizontal: N70E/22 m from datum, surface transect leg; last flake on transect at 21.65 m
5RB278	5RB278.10	Chert w/ cortex	Chipped stone	Flake	Chert/Chalced ony	2		S60W/17.5 m	Surface	Horizontal: S60W/17.5 m from Datum C, surface transect leg, last flake at 5.5 m
5RB278	5RB278.11	Tan chert, small, complete	Chipped stone	Projectile Point	Chert/Chalced ony	1	Complete; triangular shape, retouching on lateral margin, corner notched, expanding base	N45W/9.18 m	Surface	Horizontal: N45W/9.18 m from Datum C
5RB278	5RB278.2	Orange, red, dark brown chert, chalcedony	Chipped stone	Flake	Chert/Chalced ony	Bag	14 count	N78W/16 m	Surface	Shelter 1; Horizontal: N78W/16 m from Datum B, surface transect leg, last flake on transect at 6.95 m, associated with shelter 1

Site Number	Catalog Number	Description	Artifact Class	Artifact Element	Raw Material	Count	Artifact Description	Horizontal Provenience	Vertical Provenience	Additional Provenience Details
5RB278	5RB278.3	grey sherd	Ceramic	Misc. ceramic piece	Ceramic	1	Emery Gray, one piece that has been smoothed on both surfaces, may have been burned; clay and temper; coiled	S78W/3.3 m	Surface	Horizontal: S78W/3.3 m fr.1.5lt. From Datum B
5RB278	5RB278.4	Tan, red, dark chert	Chipped stone	Flake	Chert/Chalced ony	Bag	11 count	N2W/12 m	Surface	Horizontal: N2W/12 m from Datum B, surface transect leg, lask flake on transect at 6.95 m
5RB278	5RB278.5	Chert, all kinds of colors, some cortex	Chipped stone	Flake	Other	Bag	38 count; chert, chalcedony, quartzite; some cortex present	S65E/25.65 m	Surface	Horizontal: S65E/25.65 m from Datum B, surface transect leg, last flake at 21.9 m
5RB278	5RB278.6	grey sherd	Ceramic	Misc. ceramic piece	Ceramic	1	Emery Gray, one piece that has been smoothed on both surfaces, clay and fine grain temper; no apparent slip	S65E/9.7 m	Surface	Horizontal: S65E/9.7 m from Datum B
5RB278	5RB278.7	Chert	Chipped stone	Flake	Chert/Chalced ony	4		S30E/15.3 m	Surface	Shelter 2; Horizontal: S30E/15.3 m from Datum C, surface transect leg

Site Number	Catalog Number	Description	Artifact Class	Artifact Element	Raw Material	Count	Artifact Description	Horizontal Provenience	Vertical Provenience	Additional Provenience Details
5RB278	5RB278.8	Tan, grey, pink chert, chalcedony	Chipped stone	Flake	Chert/Chalcedony	Bag	17 count	N30W/11 m	Surface	Horizontal: N30W/11 m from Datum C, surface transect leg, last flake on transect 9.85 m
5RB278	5RB278.9	Tan chert	Chipped stone	Biface	Chert/Chalcedony	1	cortex and patination present; listed as projectile point; thinned and retouched extensively on laeral margins, hinge fracture on one face	N30W/6 m	Surface	Horizontal: N30W/6 m from Datum C
5RB722	5RB722.1	Biface tip, gray/brown	Chipped stone	Biface	Quartzite	1	triangular shape, thinned and retouched	N77W/2.38 m	Surface	FEA. 1
5RB748	5RB748.1	Tan/brown, smooth, very small black spotting, length last flake 28.5	Chipped stone	Flake	Other	2	cortex on one flake	North leg 1	Surface	Horizontal: North leg #1, 50 m
5RB748	5RB748.10	Fragment	Ground stone and other lithic	Misc. ground stone	Other material	1		N53E	Surface	Horizontal: N53E 65 cm from datum
5RB748	5RB748.11	Red, flat, smooth	Chipped stone	Flake	Other	1		S20.3E/11 m	Surface	Horizontal: S20.3E/11 m from datum
5RB748	5RB748.12	Dark Gray, Tan, Orange Hammerstone, with slight stratification	Ground stone and other lithic	Hammerstone	Petrified Wood	1	incomplete; previously listed as not found in inventory	S5W/15.8 m	Surface	Horizontal: S5W/15.8 m from datum
5RB748	5RB748.13	Tan, bubble-like texture	Chipped stone	Flake	Other	1	Oolitic	S9W/14.3 m	Surface	Horizontal: S9W/14.3 m from datum
5RB748	5RB748.14	Tan/grey/black/brown, mostly smooth, one end thinner than the other	Chipped stone	Flake	Other	1		N77W/12.1 m	Surface	Horizontal: N77W/12.1 m from datum

Site Number	Catalog Number	Description	Artifact Class	Artifact Element	Raw Material	Count	Artifact Description	Horizontal Provenience	Vertical Provenience	Additional Provenience Details
5RB748	5RB748.15	Red/tan, black spotting, rough, smooth	Ground stone and other lithic	Handstone/mono frag	Sandstone	1	Mano fragment	S38W/30.5 m	Surface	Horizontal: S38W/30.5 m from datum
5RB748	5RB748.16	Tan/brown, shaped like a projectile point, glassy-like sound	Chipped stone	Projectile Point	Other	1	Possible pojectile point	Trench 1	Level 3-6	Horizontal: 3-4 m
5RB748	5RB748.17	Brown, thin, sharp/pointy, somewhat see through	Chipped stone	Flake	Other	1		Trench 1	Levels 3-6	Horizontal: 3-4 m
5RB748	5RB748.18	Black, ribbed/wavy pattern, small brown spots	Chipped stone	Projectile point	Other	1		Trench 1	Levels 3-6	Horizontal: 3-4 m
5RB748	5RB748.19	Brown/red, smooth, scratches/cracks	Ground stone and other lithic	Edge ground cobble/polishing stone	Other material	1	Polishing stone	Trench 1	Levels 1-5	Horizontal: 4-5 m
5RB748	5RB748.2	Black/brown, small red dot on one side	Chipped stone	Flake	Other	1		0-1 m	Level 1	
5RB748	5RB748.20	Multiple colors/sizes/shapes /textures	Chipped stone	Flake	Other	14	cortex on three Flake	Trench 1	Levels 1-5	Horizontal: 4-5 m
5RB748	5RB748.21	Bag filled with grey powder/sediment	Ceramic	Misc. ceramic piece	Ceramic	bag	gray powder, documented incomplete/broken; clay with mica temper; "1805" written on tag	Trench 1	Levels 1-5	Horizontal: 4-5 m
5RB748	5RB748.22	Black, broken into 3 pieces	Ground stone and other lithic	Misc. ground stone	Other material	3	Bead, broken in 3 pieces; catalog sheet lists 5 pieces	Trench 1	Levels 1-5	Horizontal: 4-5 m
5RB748	5RB748.23	Tan, brown smear on one side/corner, one side is smoother than the other	Chipped stone	Projectile point	Other	1		Trench 1	Levels 1-5	Horizontal: 4-5 m
5RB748	5RB748.24	Brown, rounded triangle shaped, grey/tan veins	Chipped stone	Biface	Other	1	broken/incomplete	Trench 1	Levels 1-5	Horizontal: 4-5 m

Site Number	Catalog Number	Description	Artifact Class	Artifact Element	Raw Material	Count	Artifact Description	Horizontal Provenience	Vertical Provenience	Additional Provenience Details
5RB748	5RB748.25	2 red/brown, 1 black, 1 light brown, small, different shapes	Chipped stone	Flake	Other	4		Trench 1	Level 4	Horizontal: 1-2 m
5RB748	5RB748.26	Black/brown, sharp, white scratches	Chipped stone	Projectile point	Other	1		Trench 1	Level 4	Horizontal: 1-2 m
5RB748	5RB748.27	1 half white, half grey, 1 brown, smooth, pointy, white spots	Chipped stone	Flake	Other	2	cortex on one flake	Trench 2	Levels 1-10	Horizontal: 6-7 m
5RB748	5RB748.28	Black, small chip broken off	Modified animal bone and shell	Bone bead/perforated disc	Bone	1		Trench 1	Level 6	Horizontal: 4-5 m
5RB748	5RB748.29	Tan/brown, starting to break down	Modified animal bone and shell	Bone bead/perforated disc	Bone	1	Chipped bead	Trench 1	Level 6	Horizontal: 4-5 m
5RB748	5RB748.3	Red, tan/grey markings, thin, mostly flat	Chipped stone	Flake	Other	1		Strat Unit 1	Level 1	
5RB748	5RB748.30	Brown, very sharp, black spotting	Chipped stone	Projectile point	Other	1		Trench 1	Level 6	Horizontal: 4-5 m
5RB748	5RB748.31	Multiple colors/shapes, small to medium sizes	Chipped stone	Flake	Other	12	cortex on one flake	Trench 1	Level 6	Horizontal: 4-5 m
5RB748	5RB748.32	Orange/purple/grey/brown, most are smooth, orange ones have black spotting on them	Chipped stone	Flake	Other	14	Some flakes with cortex	Trench 1	Level 7	Horizontal: 3-4 m
5RB748	5RB748.33	Tan/white, one has brown veins on it	Modified animal bone and shell	Bone bead/perforated disc	Bone	2		Trench 1	Level 7	Horizontal: 3-4 m
5RB748	5RB748.34	Grey/tan/black, flat, one side smooth, other side rough	Chipped stone	Flake	Other	1		Trench 2	Level 3-10	Horizontal: 5-6 m
5RB748	5RB748.35	Tan/brown/red/clear, smooth, most are curved	Chipped stone	Flake	Other	6	cortex on one flake	Trench 2	Level 1-10	Horizontal: 6-7 m
5RB748	5RB748.36	Brown/purple/red, narrow/thin	Chipped stone	Projectile point	Other	1		Trench 1	Level 6	Horizontal: 2-3 m

Site Number	Catalog Number	Description	Artifact Class	Artifact Element	Raw Material	Count	Artifact Description	Horizontal Provenience	Vertical Provenience	Additional Provenience Details
5RB748	5RB748.37	small, tan, perfect circle	Modified animal bone and shell	Bone bead/perforated disc	Bone	1	Tag indicates two artifacts, but only one is present (pink); catalog sheet also indicates missing piece	Trench 1	Level 6	Horizontal: 2-3 m
5RB748	5RB748.38	2 smaller, 1 larger than the rest, tan/brown, flat, smooth	Chipped stone	Flake	Other	3		Trench 1	Level 6	Horizontal: 2-3 m
5RB748	5RB748.39	Black, brown markings, rounded triangle shaped, dark brown chert	Chipped stone	Biface	Other	1		Trench 1	Level 7	Horizontal: 5-4 m; 90 cm S from stake #4; vertical: -43 cm from datum
5RB748	5RB748.4	Tan, some edges are sharp, 2 points that look like cat ears/horns	Chipped stone	Misc. scraper	Other	1		Trench 1	Level 3	Horizontal: 2-3 m
5RB748	5RB748.40	White, small, round with a hole in middle	Modified animal bone and shell	Bone bead	Bone	1		Trench 1	-44.5 cm from datum	Horizontal: 4-5 m; 48 cm W from stake #4
5RB748	5RB748.41	1 grey, 1 half white, half brown, long, slightly curved	Chipped stone	Flake	Other	2	cortex on one flake	Trench 1	Level 7	Horizontal: 4-5 m
5RB748	5RB748.42	Black/brown, wavy/ribbed texture, rounded triangle shape	Chipped stone	Biface	Other	1	broken/incom plete	Trench 1	Level 7	Horizontal: 4-5 m; 37 cm W, 93 cm S from stake #4; Vertical: -55.5 cm from datum
5RB748	5RB748.43	Fragmented	Ground stone and other lithic	Misc. ground stone	Other material	2		Trench 1	Surface	Horizontal: 1.1 m W, 1.1 m N
5RB748	5RB748.44	Long, thin, sharp point, brown/tan	Modified animal bone and shell	Bone awl	Bone	1		Trench 1	Level 6	Horiztonal: 4-5 m
5RB748	5RB748.45	Brown, small, trangle shaped	Chipped stone	Flake	Other	3	flotation sample	Trench 1	Level 7	Horiztonal: 4-5 m
5RB748	5RB748.46	Small, brown/tan	Chipped stone	Flake	Other	1	waterscreen sample	Trench 2	Level 11	Horiztonal: 5-6 m

Site Number	Catalog Number	Description	Artifact Class	Artifact Element	Raw Material	Count	Artifact Description	Horizontal Provenience	Vertical Provenience	Additional Provenience Details
5RB748	5RB748.47	Animal bone, 3 holes in it, one at the tip, the others at the other end/middle	Modified animal bone and shell	Misc. modified bone	Bone	1	polished distal end	Trench 1	Level 4	Horizontal: 2-3 m
5RB748	5RB748.48	Tan with grey/brown on it, small fracture on one edge, curved in	Modified animal bone and shell	Misc. modified bone	Bone	1	polished proximal end	Trench 1	Levels 3-6	Horizontal: 3-4 m
5RB748	5RB748.5	1 brown, smooth, slightly curved in, 1 grey, thin, slightly rough, larger than brown, cruved	Chipped stone	Flake	Other	2		Trench 1	Level 5	Horizontal: 2-3 m
5RB748	5RB748.6	Black/grey, triangle shaped, one side smooth, one side rough	Chipped stone	Biface	Other	1		Trench 1	Level 5	Horizontal: 2-3 m
5RB748	5RB748.7	White/clear, long round triangle shaped	Chipped stone	Biface	Other	1		Trench 1	Level 5	Horizontal: 2-3 m
5RB748	5RB748.8	Bullet casing, silver, small, "HI SPEED" written on end with a U in the middle	Historic	Ammunition	Metal	1		Trench 1	Level 1	Horizontal 3-4 m
5RB748	5RB748.9	White/yellow/red, one is jagged	Chipped stone	Flake	Other	2	cortex on one flake	N40W/30.2 m	Surface	
5RB748	5RB748.ASS 1	Tan/brown, flat/thin, hollow	Unmodified animal bone	Long bone	Bone	1		Trench 1	Level 3	Horizontal: 1-2 m
5RB748	5RB748.ASS 10	Tan, holes on multiple sides, partly triangular shaped	Unmodified animal bone	Mandible	Bone	1		Trench 2	Levels 1-10	Horizontal: 6-7 m
5RB748	5RB748.ASS 11	Tan/grey, a little more weighted, highly textured	Unmodified animal bone	Mandible	Bone	bag	7 pieces	Trench 1	Level 6	Horizontal: 2-3 m
5RB748	5RB748.ASS 12	Red, smooth, darkening around edges on one side	Unmodified stone or mineral	Ochre	Other	1		Trench 1	Level 3	Horizontal: 1-2 m
5RB748	5RB748.ASS 13	Red/grey, small, multiple sides	Unmodified stone or mineral	Ochre	Other	1		Trench 1	Level 4	Horizontal: 2-3 m

Site Number	Catalog Number	Description	Artifact Class	Artifact Element	Raw Material	Count	Artifact Description	Horizontal Provenience	Vertical Provenience	Additional Provenience Details
5RB748	5RB748.ASS 14	White/red, soft	Unmodified stone or mineral	Ochre	Other	vial		Trench 1	Levels 3-6	Horizontal: 3-4 m
5RB748	5RB748.ASS 15	Soil	Sample	Sediment	Other	bag		Trench 1	Level 4	Horizontal: 4-5 m
5RB748	5RB748.ASS 18	Black/brown, black is shiny, brown is rough/textured	Sample	Misc. Sample	Other	vial	appears to be wood	Trench 1	Level 5	Horizontal: 4-5 m
5RB748	5RB748.ASS 19	One red, one grey, one brown, one tan/yellow	Unmodified stone or mineral	Ochre	Other	4		Trench 1	Levels 1-5	Horizontal: 4-5 m
5RB748	5RB748.ASS 2	Tan, long/thin, some sharp	Unmodified animal bone	Unidentified animal	Bone	bag	24 pieces, lots of long bone, some highly fragmented	Trench 1	Level 3	Horizontal: 2-3 m
5RB748	5RB748.ASS 20	Soil	Sample	Sediment	Other	bag		Trench 1	Level 4	Horizontal: 1-2 m
5RB748	5RB748.ASS 21	4 are white/red, 1 is white/yellow	Unmodified stone or mineral	Ochre	Other	vial		Trench 2	Levels 1-10	Horizontal: 6-7 m
5RB748	5RB748.ASS 22	Black, somewhat shiny, multiple sizes/shapes	Sample	Misc. Sample	Other	bag	C-14 sample, 11.1 g	Trench 2	-0.05 m below datum	Horizontal: 6-7 m
5RB748	5RB748.ASS 23	Brown/black, multiple sizes/shapes	Sample	Misc. Sample	Other	bag	organic matierial/spec ies ID	Trench 2	-5 cm from datum	Horizontal: 6-7 m
5RB748	5RB748.ASS 25	Soil	Sample	Sediment	Other	bag		Trench 2	Levels 1-10	Horizontal: 6-7 m
5RB748	5RB748.ASS 26A		Sample	Misc. Sample	Other	vial	wood/charcoa l	Trench 2	Levels 1-10	Horizontal: 6-7 m
5RB748	5RB748.ASS 26B	Black, burnt wood chunks, somewhat shiny	Sample	Misc. Sample	Other	vial	wood/charcoa l	Trench 2	Levels 1-10	Horizontal: 6-7 m
5RB748	5RB748.ASS 27	Red, small/medium chunks	Unmodified stone or mineral	Ochre	Other	vial	document list 8 pieces	Trench 1	Level 6	Horizontal: 4-5 m
5RB748	5RB748.ASS 28	Soil	Sample	Sediment	Other	bag		Trench 2	Levels 1-10	Horizontal: 6-7 m
5RB748	5RB748.ASS 29	Some black/shiny, some brown/textured	Sample	Misc. Sample	Other	vial	wood/charcoa l	Trench 1	Level 6	Horizontal: 4-5 m

Site Number	Catalog Number	Description	Artifact Class	Artifact Element	Raw Material	Count	Artifact Description	Horizontal Provenience	Vertical Provenience	Additional Provenience Details
5RB748	5RB748.ASS 3	Tan, multiple shapes, some tube-shaped	Unmodified animal bone	Unidentified animal	Bone	bag	6 pieces; 3 long bone, 3 highly fragmented pieces	Trench 1	Level 4	Horizontal: 2-3 m
5RB748	5RB748.ASS 30	Multiple sizes/shapes/textur es/colors	Sample	Misc. Sample	Other	bag	organic material/speci es ID	Trench 2	Level 8	Horizontal: 6-7 m
5RB748	5RB748.ASS 31	Tree bark	Sample	Tree-Ring sample	Wood	bag		Trench 2	Level 8	Horizontal: 6-7 m
5RB748	5RB748.ASS 33	Tree bark	Sample	Tree-Ring sample	Wood	bag		Trench 2	-28 cm from datum	Horizontal: 6-7 m
5RB748	5RB748.ASS 34	Light/dark red, small/medium chunks	Unmodified stone or mineral	Ochre	Other	3		Trench 1	Level 7	Horizontal: 3-4 m
5RB748	5RB748.ASS 35	Soil	Sample	Sediment	Other	bag		Trench 1	Level 7	Horizontal: 3-4 m
5RB748	5RB748.ASS 37	Red, medium size	Unmodified stone or mineral	Ochre	Other	vial		Trench 2	Levels 3-10	Horizontal: 5-6 m
5RB748	5RB748.ASS 38	Red/tan, small/medium chunks	Unmodified stone or mineral	Ochre	Other	vial		Trench 2	Levels 3-10	Horizontal: 6-7 m
5RB748	5RB748.ASS 39	soil	Sample	Sediment	Other	bag		Trench 2	Levels 6-8	Horizontal: 5-6 m
5RB748	5RB748.ASS 4	Tan/brown, 3 large, 3 small, rough-like texture	Unmodified animal bone	Unidentified animal	Bone	bag	6 pieces; at least one long bone	Trench 1	Level 5	Horizontal: 2-3 m
5RB748	5RB748.ASS 40	Dark brown/black, somewhat shiny, bark falling off	Sample	Misc. Sample	Wood	2	burnt wood	Trench 1	Level 6	Horizontal: 2-3 m
5RB748	5RB748.ASS 41	Soil	Sample	Sediment	Other	bag	Archival soil sample taken from ASS68	Trench 2	Level 11	Horizontal: 6-7 m; floor fill
5RB748	5RB748.ASS 42	Pollen	Sample	Pollen	Other	bag	Floor pollen sample	Trench 2	Level 11	Horizontal: 6-7 m
5RB748	5RB748.ASS 43	Soil	Sample	Sediment	Other	bag	Archival soil sample taken from ASS69	Trench 1	Level 6	Horizontal: 2-3 m
5RB748	5RB748.ASS 44	Soil	Sample	Sediment	Other	bag	post-impressed soil sample	Trench 2	Level 11	Horizontal: 6-7 m
5RB748	5RB748.ASS 45	Black, log-shaped, dusty	Sample	Misc. Sample	Other	vial	wood/charcoa l	Trench 2	Level 11	Horizontal: 6-7 m

Site Number	Catalog Number	Description	Artifact Class	Artifact Element	Raw Material	Count	Artifact Description	Horizontal Provenience	Vertical Provenience	Additional Provenience Details
5RB748	5RB748.ASS 49	Soil	Sample	Sediment	Other	bag	Archival soil sample taken ASS70	Trench 2	Level 11	Horizontal: 5-6 m
5RB748	5RB748.ASS 5	Tan, multiple shapes/sizes/textur es/marbling	Unmodified animal bone	Unidentified animal	Bone	bag	4 mandibles, teeth, cranial fragments, long bone fragments, and other unidentified bone	Trench 1	Levels 3-6	Horizontal: 3-4 m
5RB748	5RB748.ASS 52	Black, multiple shapes, somewhat shiny	Sample	Misc. Sample	Other	vial	wood/charcoa l	Trench 2	Level 11	Horizontal: 5-6 m
5RB748	5RB748.ASS 53	soil	Sample	Sediment	Other	bag		Trench 2	Level 1	Horizontal: 6-7 m
5RB748	5RB748.ASS 54	Soil	Sample	Sediment	Other	bag	Archival soil sample taken from ASS72	Trench 1	Level A	Horizontal: 1-5 m
5RB748	5RB748.ASS 55	Soil	Sample	Sediment	Other	bag		Trench 1	Level B	Horizontal: 1-5 m
5RB748	5RB748.ASS 57	Soil	Sample	Sediment	Other	bag	Archival soil sample taken from ASS74	Trench 2	Level 8	Horizontal: 5-6 m
5RB748	5RB748.ASS 58	Soil	Sample	Sediment	Other	bag	Mortar soil sample; archival soil sample taken from ASS75	Trench 2	Level 5	Horizontal: 6-7 m
5RB748	5RB748.ASS 59	soil	Sample	Sediment	Other	bag	Archival soil sample taken from ASS76	Trench 2	Level sub-floor	Horizontal: 5-6 m
5RB748	5RB748.ASS 6	Tan, grey spots, multiple shapes/sizes/textur es	Unmodified animal bone	Unidentified animal	Bone	bag	31 pieces, some highly fragemnted	Trench 1	Levels 1-5	Horizontal: 4-5 m
5RB748	5RB748.ASS 61	soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS16	Trench 1	Level 5	Horizontal: 4-5 m
5RB748	5RB748.ASS 62	soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS17	Trench 1	Level 4	Horizontal: 4-5 m

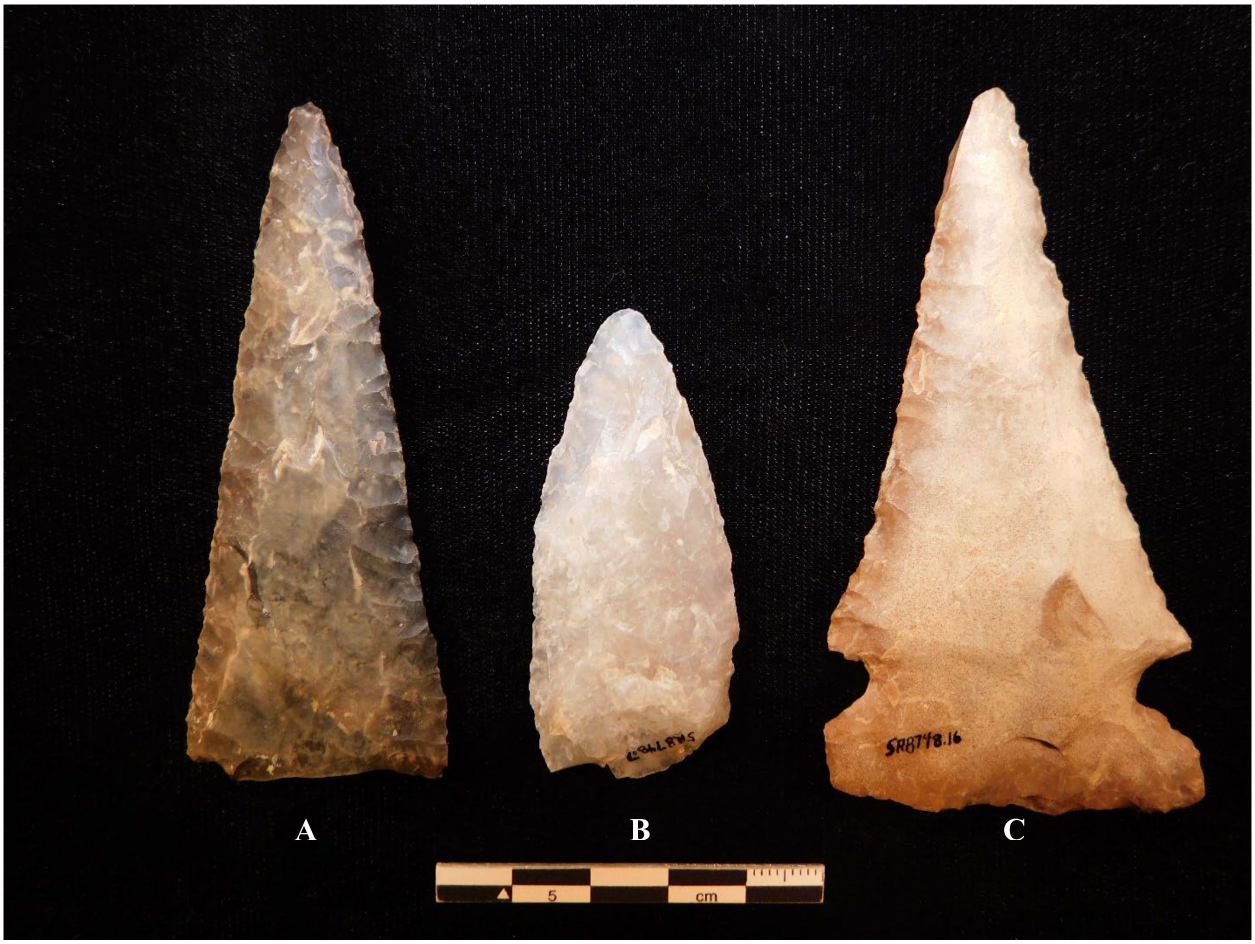
Site Number	Catalog Number	Description	Artifact Class	Artifact Element	Raw Material	Count	Artifact Description	Horizontal Provenience	Vertical Provenience	Additional Provenience Details
5RB748	5RB748.ASS 63	Soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS20	Trench 1	Level 4	Horizontal: 1-2 m
5RB748	5RB748.ASS 64	Soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS25	Trench 2	Levels 1-10	Horizontal: 6-7 m
5RB748	5RB748.ASS 65	Soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS28	Trench 2	Levels 1-10	Horizontal: 6-7 m
5RB748	5RB748.ASS 66	soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS35	Trench 1	Level 7	Horizontal: 3-4 m
5RB748	5RB748.ASS 67	soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS39	Trench 2	Levels 6-8	Horizontal: 5-6 m
5RB748	5RB748.ASS 68	soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS41	Trench 2	Level 11	Horizontal: 6-7 m
5RB748	5RB748.ASS 69	Soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS43	Trench 1	Level 6	Horizontal: 2-3 m
5RB748	5RB748.ASS 7	Brown/grey, pointed at both ends, textured veins	Unmodified animal bone	Unidentified animal	Bone	1		Trench 1	Level 4	Horizontal: 1-2 m
5RB748	5RB748.ASS 70	soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS49	Trench 2	Level 2	Horizontal: 5-6 m

Site Number	Catalog Number	Description	Artifact Class	Artifact Element	Raw Material	Count	Artifact Description	Horizontal Provenience	Vertical Provenience	Additional Provenience Details
5RB748	5RB748.ASS 71	Soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS53	Trench 2	Level 1	Horizontal: 6-7 m
5RB748	5RB748.ASS 72	soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS54	Trench 1	Level A	Horizontal: 1-5 m
5RB748	5RB748.ASS 73	soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS56	Trench 2	Levels 2-10	Horizontal: 6-7 m
5RB748	5RB748.ASS 74	Soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS57	Trench 2	Level 8	Horizontal: 5-6 m
5RB748	5RB748.ASS 75	soil	Sample	Sediment	Other	vial	Archival soil sample (mortar); taken from soil sample ASS58	Trench 2	Level 5	Horizontal: 6-7 m
5RB748	5RB748.ASS 76	soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS59	Trench 2	Sub-floor	Horizontal: 5-6 m
5RB748	5RB748.ASS 77	soil	Sample	Sediment	Other	vial	Archival soil sample; taken from soil sample ASS60	Trench 2	Level sub-floor	Horizontal: 6-7 m
5RB748	5RB748.ASS 78	Small fragments, tan/brown/grey, one square shaped, other rectangular/long	Unmodified animal bone	Unidentified animal	Bone	2		Trench 2	Level 2	Horizontal: 5-6 m
5RB748	5RB748.ASS 79	Small, mostly round, black, smooth	Unmodified flora	Seed	Other	3		Trench 2	Level 2	Horizontal: 5-6 m

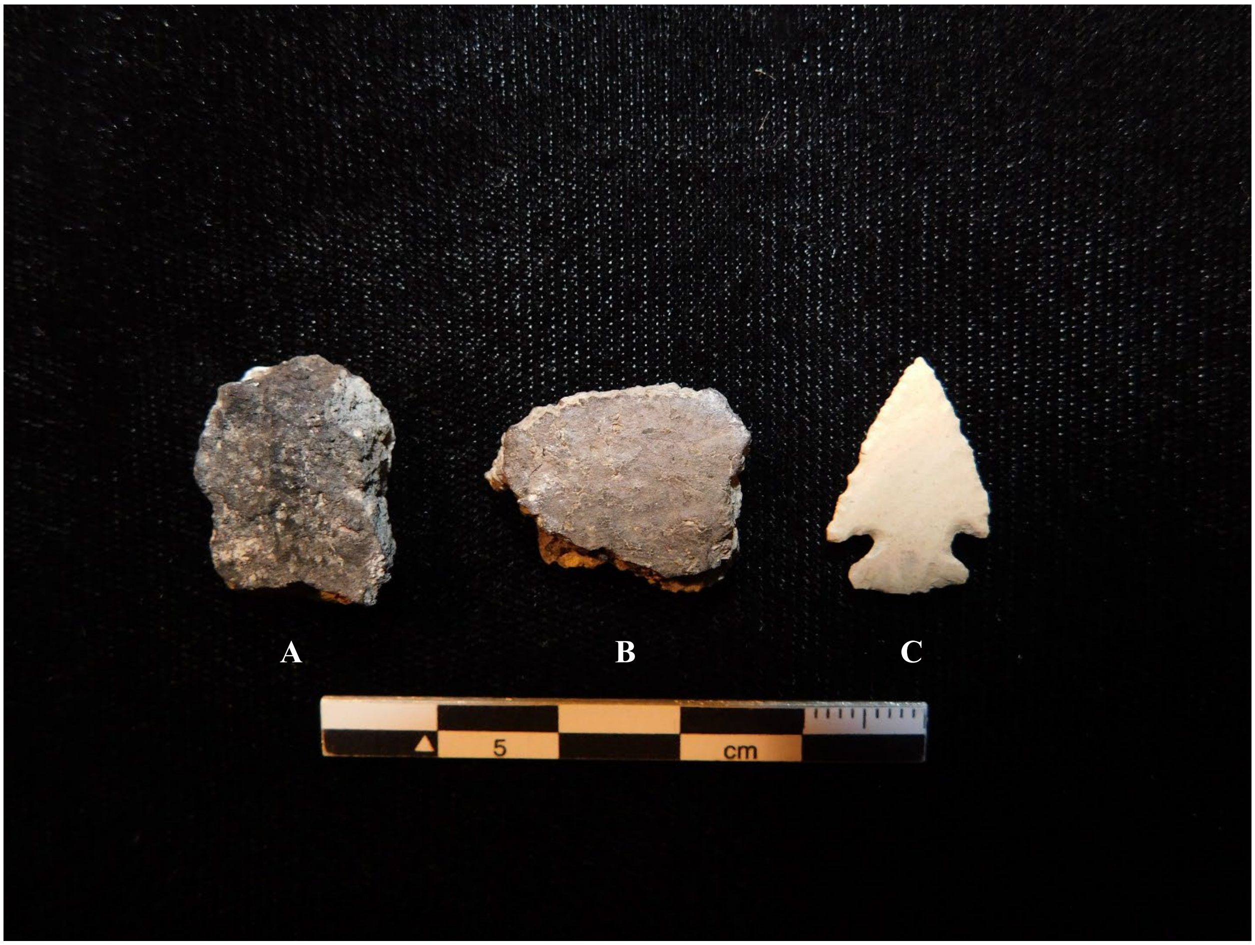
Site Number	Catalog Number	Description	Artifact Class	Artifact Element	Raw Material	Count	Artifact Description	Horizontal Provenience	Vertical Provenience	Additional Provenience Details
5RB748	5RB748.ASS 8	Tan/brown, one large, some curved, cracking on some	Unmodified animal bone	Unidentified animal	Bone	bag	6 pieces	Trench 1	Level 6	Horizontal: 4-5 m
5RB748	5RB748.ASS 80	Red, one larger chunk is greyer	Unmodified stone or mineral	Misc. rock or mineral	Sandstone	vial	Hematite	Trench 2	Level 2	Horizontal: 5-6 m
5RB748	5RB748.ASS 81	Small fragments, tan, one thin/long, other rectangular	Unmodified animal bone	Unidentified animal	Bone	2		Trench 1	level 7	Horizontal: 4-5 m
5RB748	5RB748.ASS 82	Small, brown/red, angular	Unmodified flora	Seed	Other	vial		Trench 1	Level 7	Horizontal: 4-5 m
5RB748	5RB748.ASS 83	soil	Sample	Sediment	Other	vial	Archival sample; taken from ASS46 soil sample	Trench 1	Level 6	Horizontal: 4-5 m
5RB748	5RB748.ASS 9	Tan/grey, multiple shapes/sizes	Unmodified animal bone	Unidentified animal	Bone	bag	7 pieces; three long bone fragments and others	Trench 1	Level 7	Horizontal: 3-4 m

Photographs of Artifacts Curated at AR-CSU

Projectile points recovered from excavations at Edge Site (5RB748). A: 5RB748.18; B: 5RB748.23; C: 5RB748.26; D: 5RB748.30; E: 5RB748.36. Each identified as Rose Springs series (LaPoint 1981: v97–v98), dating from ca. 500–1300 C.E. (Justice 2002). Photograph by Joshua Bauer.



Bifaces and one large side-notched projectile point recovered from excavations at Edge Site (5RB748). A: 5RB748.6; B: 5RB748.7; C: 5RB748.16. Photograph by Joshua Bauer.



Ceramic sherds and a projectile point recovered from surface collections at Fourmile Overlook (5RB278). A: 5RB278.3; B: 5RB278.6; C: 5RB278.11. Ceramics are probable Uinta Gray series and projectile point is Rose Springs series, diagnostic of the Fremont culture and the Formative era, respectively. Photograph by Joshua Bauer.

Chipped stone tools recovered from surface collections at Banty's Twist (5RB270). A: 5RB270.2, biface; B: 5RB270.3, edge-modified flake; C: 5RB270.7, drill. Photograph by Joshua Bauer.

Inventory of Archival Site Documentation

Table summarizing the various documents contained within LOPA file folders for pinnacle sites recorded in 1977. All five pinnacles listed are located within the Canyon Pintado National Historic District. These site file folders are stored at Colorado State University's Archaeological Repository. Forms that are present within each site folder are indicated with an "X".

Site Number	Printed Black and White Photo(s)	Excavation Unit Data Form(s)	Artifact Catalog Form(s)	Site Inventory Record	Site Sketch Map	Topographic Site Location Map	Research Potential Ranking Form	Other Documents
5RB270	X	X	X	X	X	X	X	
5RB278	X	X	X	X	X	X	X	
5RB722	X		X	X	X	X	X	
5RB748	X	X	X	X	X	X	X	Elmer Smith (1941) site notes, including brief commentary about roof beams and his cursory testing of the site; Spectrometry analysis form for ceramic artifact 5RB748.21
5RB752	X			X	X	X	X	LOPA Site Summary Form

Photographs from Wenger, LOPA, and WWC Site Recordings

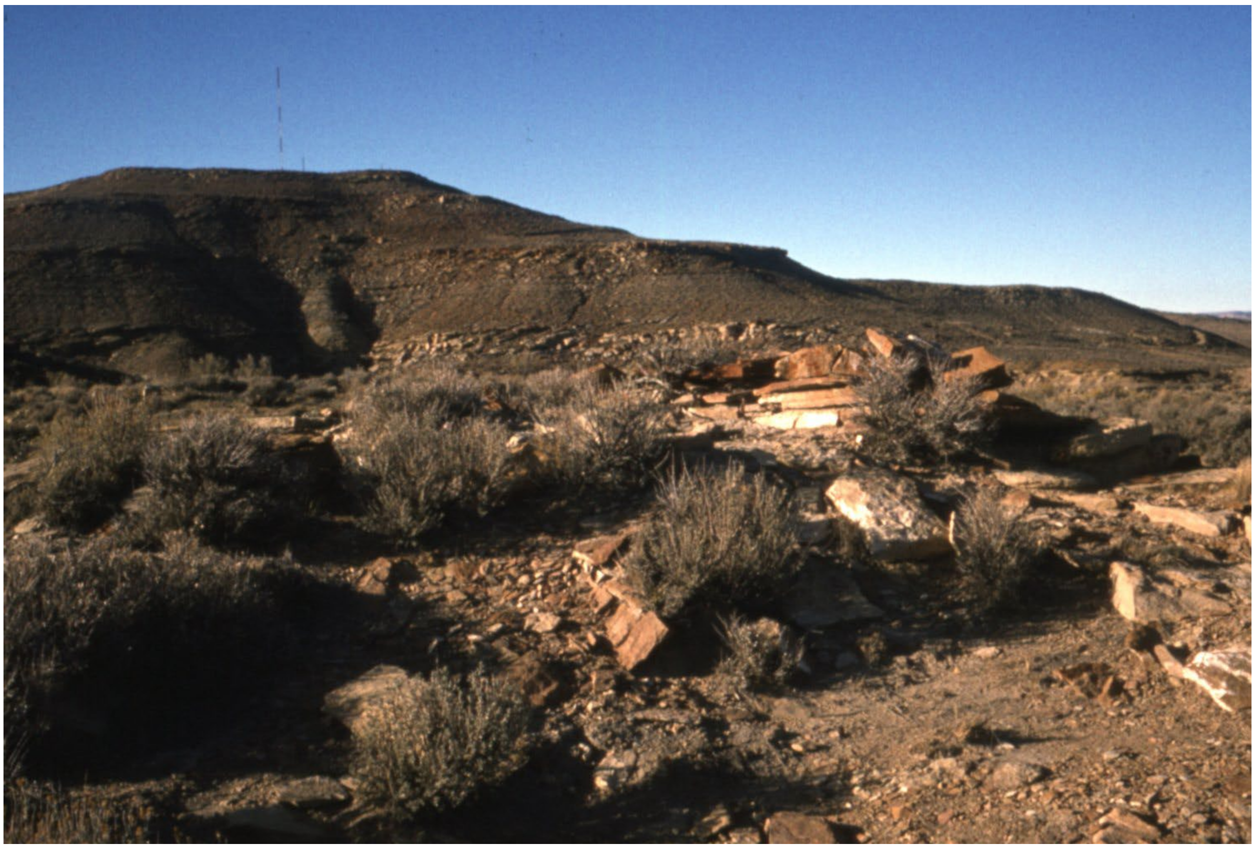
Showing Rocky Ford Overlook at the time of Wenger's 1951 site recording. Wenger tested for subsurface deposits here but recovered no artifacts. Facing west. Photo courtesy of The Center for Mountain and Plains Archaeology (CMPA).

Showing view from interior of Rocky Ford Overlook at the time of Wenger's 1951 site recording. Facing north. Photo courtesy of CMPA.

Showing Edge Site at the time of Wenger's 1951 site recording. Wenger tested for subsurface deposits here but recovered no artifacts. Facing east. Photo courtesy of CMPA.


Showing the floor at Edge Site prior to field excavations by LOPA staff in 1977. Facing south. Photo courtesy of CMPA. Original LOPA photo number: 5RB748C GV-29.

Showing the south wall at Edge Site at the time of LOPA's 1977 recording. Facing north. Photo courtesy of CMPA. Original LOPA photo number: 5RB748C FE-1.5.


Overview of the Edge Site at the time of LOPA's 1977 recording. Facing east. Photo courtesy of CMPA. Original LOPA photo number: 5RB748C FE-1.3.

Showing the south wall at Edge Site at the time of LOPA's 1977 recording. Facing northeast. Photo courtesy of CMPA. Original LOPA photo number: 5RB748C AR-1.2

LOPA staff conducting excavations at Edge Site in 1977. Facing southwest. Photo courtesy of CMPA. Original LOPA photo number: 5RB748C GV-18.

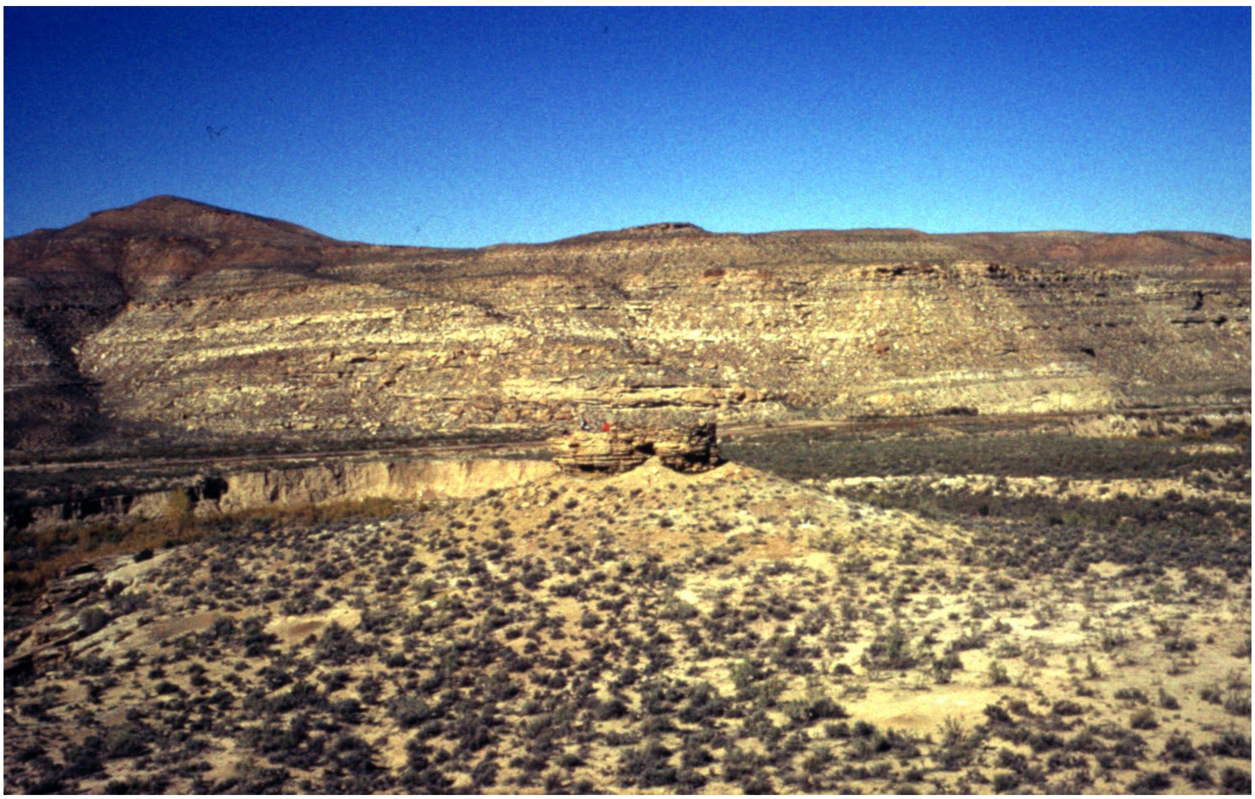
Overview of Fourmile Overlook at the time of LOPA's 1977 site recording. Facing northwest. Photo courtesy of CMPA. Original LOPA photo number 5RB278C GV-3.

Showing masonry along the northwest wall remnant of Fourmile Overlook at the time of LOPA's 1977 site recording. Facing northwest. Photo courtesy of CMPA. Original LOPA photo number: 5RB278C FE-1.1.

Showing wall fall along the northern wall of Fourmile Overlook at the time of LOPA’s 1977 site recording. Facing south. Photo courtesy of CMPA. Original LOPA site number: 5278C GV-2.

Overview of Banty's Twist at time of LOPA's 1977 recording, showing field staff. Facing west. Photo courtesy of CMPA. Original LOPA photo number: 5RB270C GV-1.

Interior of Banty's Twist at time of LOPA's 1977 recording, showing cleaned living surface and charcoal stain feature near north wall. Facing north. Photo courtesy of CMPA. Original LOPA photo number: 5RB270C FE-2.



Overview of Rocky Ford at the time of LOPA's 1977 site recording. Facing west. Photo courtesy of CMPA. Original LOPA photo number 5RB722C GV-1.

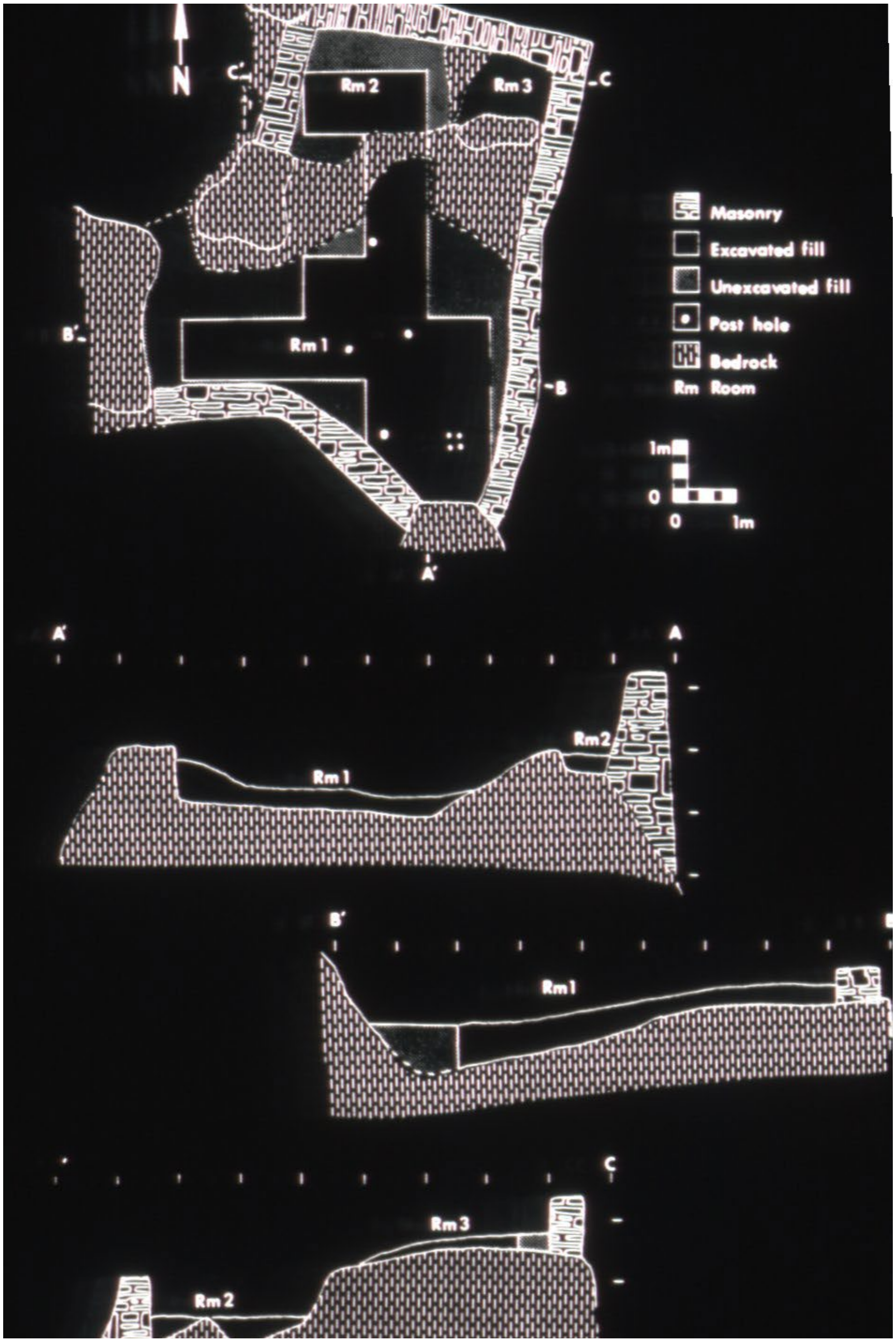

Overview of Mountain Overlook at the time of LOPA's 1977 site recording. Facing northeast. Photo courtesy of CMPA. Original LOPA photo number 5RB752C FE-1.

Overview of Texas Creek Overlook at the time of WWC's 1983 site excavation. Facing south. Photo courtesy of Steve Creasman, as donated to the CMPA.

Overview of Texas Creek Overlook at the time of WWC's 1983 site excavation. Facing south. Photo courtesy of Steve Creasman, as donated to the CMPA.

Showing WWC field crew during 1983 excavation of Texas Creek Overlook. Facing east. Photo courtesy of Steve Creasman, as donated to the CMPA.

Showing “drill hole” at Texas Creek Overlook, exposed during WWC’s 1983 site excavation. Photo courtesy of Steve Creasman, as donated to the CMPA.



Plan map of Texas Creek Overlook produced by WWC from 1983 site excavation. WWC identified three "rooms" inside this site that are distinguished through natural differences in elevation on the pinnacle landform, although there was little difference in material culture between rooms. Photo courtesy of Steve Creasman, as donated to the CMPA.

APPENDIX C: OAHP SITE FORMS (FOR OFFICIAL USE ONLY)

Confidentiality Disclaimer: Disclosure of site locations prohibited (43 CFR 7.18)