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NEGOTIATING COLONIAL REALITITES:
A LITHIC ANALYSIS OF TECHNOLOGICAL CHANGE AND PERSISTENCE AT THE SCOTT COUNTY PUEBLO (14SC1) IN WESTERN KANSAS

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NEGOTIATING COLONIAL REALITITES:
A LITHIC ANALYSIS OF TECHNOLOGICAL CHANGE AND PERSISTENCE AT THE SCOTT COUNTY PUEBLO (14SC1) IN WESTERN KANSAS

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF ANTHROPOLOGY

BY THE COMMITTEE CONSISTING OF

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Abstract

The arrival of the Spanish in the American Southwest produced significant and enduring consequences that transformed the lives of Indigenous communities. As colonial actions intensified in the seventeenth century, many Puebloan communities relied on long-established practices of mobility, migration, and alliance-building to navigate these changing conditions. In one case, a group of migrants from the Northern Rio Grande moved into the Ladder Creek Valley of western Kansas where they built a seven-room masonry pueblo within the territory of local Ndee (ancestral Apache) communities. Archaeological evidence suggests that these groups formed a creolized community in which people negotiated new forms of daily practice, social relationships, and identity.

This dissertation examines how Puebloan migrants and local Ndee communities negotiated technological practice through an analysis of the lithics from the Scott County Pueblo and three nearby Ndee-affiliated sites. Drawing on theories of daily practice and chaîne opératoire, this research evaluates whether interaction between these groups resulted in technological continuity, exchange, or blending through time. To do so, I conducted a detailed attribute and raw material analysis of lithic assemblages associated with occupations before, during, and after the pueblo occupation.

The results indicate that lithic technology at the Scott County Pueblo remained broadly consistent across proveniences and throughout the occupation of the pueblo. The data suggest that interaction between Puebloan migrants and Ndee communities involved selective and uneven sociotechnical exchange rather than complete technological convergence or separation.

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Chapter 1: Introduction

The arrival of the Spanish to the American Southwest marked a pivotal moment in history, unleashing significant and enduring consequences that reshaped the cultural, social, and economic lives of communities living both within and beyond direct colonial control. In the seventeenth century, one community who faced the indirect effects of Spanish colonialism, and the topic of this dissertation, is Ndee, non-Navajo Athapaskans or ancestral Apache, living in western Kansas. Known archaeologically as the Dismal River aspect, Ndee occupied a significant portion of the Central Plains; a position that proved to be strategically beneficial as they established close social and exchange relationships with Indigenous communities in the American Southwest (Figure 1). This relationship only intensified as Spanish colonial pressures contributed to Puebloan mobility and diaspora (Kulischeck 2003, 2010; Trabert et al. 2023). Within this movement, a small group of Northern Rio Grande Puebloan migrants moved into the Ladder Creek Valley of western Kansas and built a seven-room masonry pueblo, exactly on top of a former Ndee occupation, at the heart of Ndee territory. Drawing on contemporary approaches to colonialism and culture contact—and the rich potential for lithic methodologies to inform these conversations, this dissertation examines the extent to which the migrants interacted with the local occupants to better understand how colonial activities altered the technological decisions, everyday practice, social networks, and identities of the local Ndee living miles away from colonial powers.

The effects of colonialism on Indigenous communities were vast and complex. For many, the arrival of colonial powers produced sweeping demographic, cultural, and material changes that communities navigated in varied, strategic, and often creative ways. While most archaeological scholarship has focused on Indigenous communities living in close proximity to colonial settlements and institutions, a growing body of literature demonstrates that communities beyond these colonial centers also experienced diverse and often profound consequences through shifting trade networks, altered political landscapes, and new constraints on mobility and access to resources. Archaeologists examining colonial contexts on a global scale have noted this, focusing on settlement strategies, community construction, daily practice (*habitus*), and technology (i.e., procurement, production, use, discard) as proxies for understanding the nature and extent of these changes, particularly as they relate to the maintenance of cultural identity and creation of hybrid communities (Dietler 2007, 2010; Dominguez 2002; Gosden 2004; Rogers 1993; Wells 1998). Mobility and migration responses are of particular interest in this research as fleeing individuals and families would often settle with neighboring populations, bringing with them their cultural practices and technology. Examples of hybridity, ethnogenesis, and creolization are more modern approaches to understanding Indigenous responses to these multicultural colonial contexts, revealing that the maintenance, addition, replacement, rejection, and transformation of material culture can provide nuanced insights into the negotiation of shifting social, political, and economic landscapes (Silliman 2015, 2020).

The premise guiding this dissertation is that the Ndee community in the Ladder Creek Valley experienced meaningful shifts in everyday practice, social relationships, and identity as Puebloan migrants established a home in their territory, though scholars are still exploring the full scope and nature of those changes. Previous research has already shown that Puebloan potters likely integrated into the local community after the closing of the pueblo, passing on their techniques to either their children or Ndee potters (Beck et al. 2016; McGrath et al. 2017). However, creolization is often selective and uneven across daily practices, a pattern reflected in the variable adoption, persistence, and blending of material culture. As a result, interpretations of social negotiation remain incomplete without a more detailed examination of additional material categories, including chipped stone technology(Cobb 2003; Rogers 1990, 1993). Though case studies are sparse, scholars have shown that lithics not only reflect but embody social identities and relationships “and were crucial to the reproduction of everyday practices and belief systems” (Cobb 2003:2; Barfield 2016; Bolus 2016; Rodríguez-Alegría 2008). Drawing on contemporary approaches to colonialism and culture contact, this study examines lithic technology from 14SC1 and other sites that post-date the pueblo to evaluate how Puebloan migration and local Ndee histories intersected in technological decision-making, social networks, and the negotiation of continuity and change in a multicultural colonial landscape.

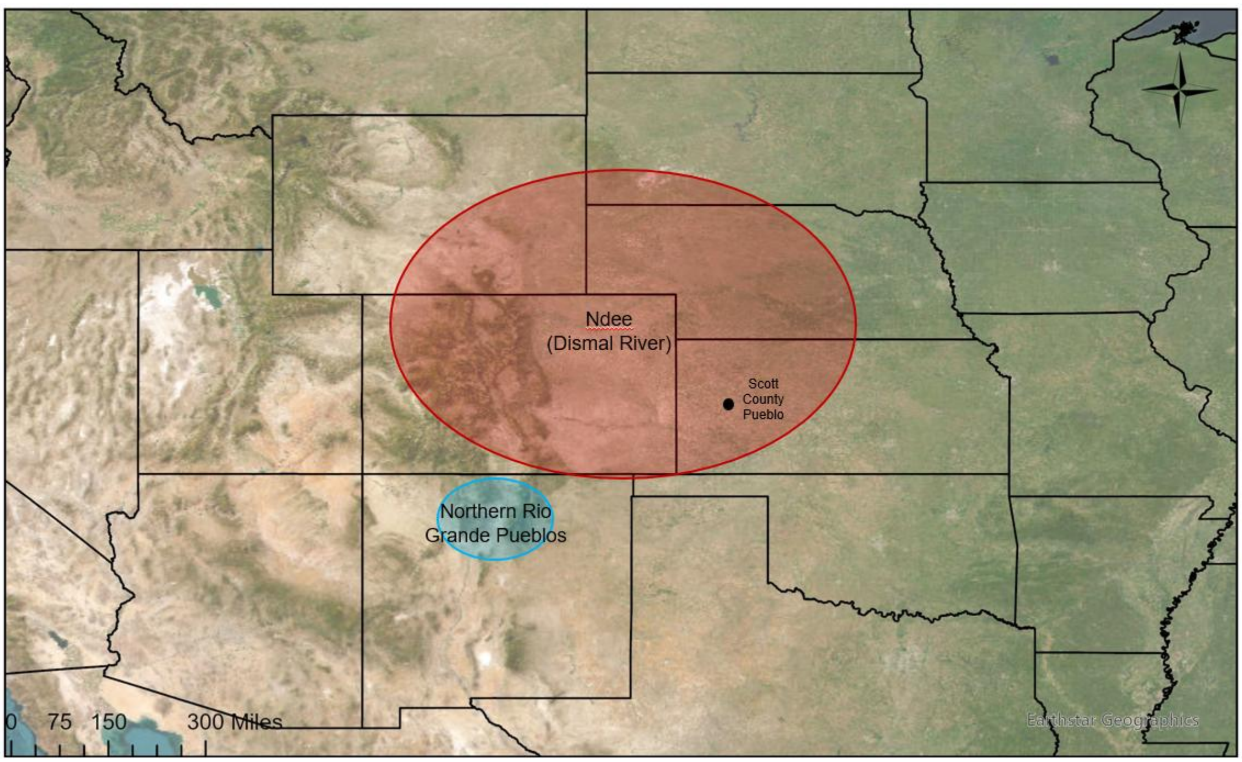

Figure 1. Location of the Scott County Pueblo (14SC1) in relation to the distribution of Ndee and Northern Rio Grande Puebloan groups.

Providing Context for Puebloan Movement and Migration

For centuries prior to the arrival of the Spanish and other colonial powers in the Americas, there were well-developed exchange systems between mobile communities living on the Great Plains and more sedentary Puebloans occupying the American Southwest (Barr 2005; Brosowske and Bevitt 2006; Eiselt and Snow 2017; Kidder 1932; Snow 1981; Wedel 1967, 1982). While communities in both regions benefited from the movement of desirable material cultural, food in particular, these relationships would have also facilitated the movement of ideas, knowledge, people, and alliances that would have strengthened social and economic networks across both regions and provided protection or safety during times of scarcity or conflict (Kulischeck 2003). This remained the case after the arrival of the Spanish. It would take several decades for colonial influence to significantly disrupt Indigenous lifeways, but when violence and demands on colonial resources became too great, many Puebloans engaged with long-held practices of mobility, regional relocation, and migration to seek refuge from the Spanish (Kulischeck 2003, 2010; Trabert et al. 2023; Wilcox 2014). While some migrants who chose this path established new settlements, others relied on existing alliances with neighboring communities and even those farther away in nearby regions. For example, members of the Tewa, Tiwa, Tano, and Keres moved into Hopi territory (Dozier 1954; Spicer 1962), while others lived with more mobile groups like the Dene (Navajo) (Forbes 1994; Preucel 2002; Towner 1996).

Increased Puebloan mobility led to several changes in the American Southwest, including, in some cases, the intensified relationship between Puebloans and Plains communities as goods *and* people began to move in greater frequency to the Plains (Barr 2005). Historic records indicate Puebloans fled as far as “El Cuartelejo,” a vaguely referenced region that modern historians interpret not as a specific place but rather a large region encompassing parts of

Nebraska, Kansas, Colorado, and New Mexico (see Hill et al. 2018 for an overview of the historic accounts). The Puebloan architecture farthest away from the American Southwest is site 14SC1, a seven-room masonry pueblo known to locals as either the Scott County Pueblo or El Cuartelejo (Figure 2). Archaeological dates place the arrival of fleeing Puebloan migrants between AD 1630-1660 where they immediately began to coexist with Ndee who had been there as early as AD 1470 (Hill et al. 2018). Although there has been well over a century of research examining the origins of the pueblo (Martin 1909; Wedel 1950; Willliston 1899; Williston and Martin 1900; Witty 1971, 1983), scholarship in the last decade has developed a strong body of evidence to support that not only did Puebloan migrants from the Northern Rio Grande not only build the pueblo in Ndee territory (Beck and Trabert 2014; Hill et al. 2018; Trabert et al. 2023; Wilfong and Hill 2022), but they also integrated into the local Ndee community both during and after the closure of the pueblo (Beck et al. 2016; McGrath et al. 2017; Trabert 2018).

Figure 2. The reconstruction of the Scott County Pueblo (14SC1) completed by Witty and the Kansas Historical Society in 1970.

Previous Research

The Scott County Pueblo (14SC1) has long been a source of fascination and speculation for the public and scholars alike. Although residents in the area had long known about the pueblo and collected cultural materials there for years, University of Kansas paleontologists Samuel W. Williston and Handel T. Martin became the first to formally investigate the pueblo on the banks of the Ladder Creek in the 1890s (Martin 1909; Williston 1899; Williston and Martin 1900). These early investigations identified features and artifacts that were indicative of a significant Puebloan occupation or influence on the inhabitants, including but not limited to a seven-room masonry pueblo, rectangular slab-lined hearths, mealing bins, raised sleeping benches, obsidian, shell, and distinct ceramics from the Northern Rio Grande region. They uncovered little to no evidence for a Ndee presence at the site, though later excavations revealed additional features and artifacts consistent with a Dismal River presence that existing prior to and during the occupation of the pueblo (Gunnerson 1987; Wedel 1959; Witty 1971, 1983). Based on the archaeology and historic accounts of the previously mentioned "El Cuartelejo" region, twentieth century scholars often assumed that the site dates between AD 1680 and 1706, when residents from Taos and Picuris pueblos reportedly fled to this region in response to the Pueblo Revolt (Martin 1909; Wedel 1950; Williston 1899; Williston and Martin 1900; Witty 1971, 1983). They similarly assumed that at least some of the people at 14SC1 originally came from the Northern Rio Grande region (Opler 1982, 1983; Wedel 1950, 1959; Witty 1971, 1983); however, others speculated different origins (e.g., Gulley 2000; Gunnerson 1960, 1987, 2006).

Although the pueblo has been investigated for more than a century, previous researchers did not seriously consider how the influx of Puebloan migrants and their subsequent occupation had on the Ndee populations already living in the region. More recent scholarship has reevaluated and expanded on previous archaeological research with updated interpretative frameworks that center Indigenous experiences and the complex ways people maintain, manipulate, and express their identity and cultural practices in multicultural situations (Beck and Trabert 2014; Beck et al. 2016; Hill et al. 2018; Hill and Trabert 2018; McGrath et al. 2017; Trabert et al. 2016; Wilfong and Hill 2022). These studies focus on the pueblo and other sites in the area to reveal in more detail how migrants from the Northern Rio Grande arrived prior to the Puebloan Revolt, as early as AD 1630, and integrated into the local Ndee community. In addition to 14SC1 containing evidence for both Puebloan and Ndee lifeways, sites post-dating the pueblo show an interesting mix of creolized practices as people maintained both Ndee and Puebloan-style material culture, including locally made Puebloan-style ceramics at sites with Ndee pottery and architecture. Evidence of Puebloan influence at Ndee sites is, however, limited to western Kansas and did not occur until the Spanish arrived and subsequently colonized the Northern Rio Grande region (Trabert 2015, 2017).

The archaeological evidence in the Ladder Creek Valley, spanning from just before the construction of the pueblo to occupations after its closure, suggests multigeneration continuities and transformations for its occupants. The valley is a multicultural, negotiated space where Puebloan migrants and Ndee residents navigated new forms of community through everyday decisions regarding foodways, technological production, and settlement. Sarah Trabert (2015, 2017) was the first to conceptualize the Ladder Creek Valley as a middle ground on the colonial periphery; a spatial metaphor turned theoretical framework Richard White proposed in 1991 to describe the negotiations between Indigenous peoples and French colonists in the Great Lakes region. The material evidence for these negotiations is clear the pueblo and those sites that post-date its occupation. Sarah Trabert, Matthew E. Hill, and Margaret Beck (2023) further frame the movement of Puebloan migrants to western Kansas as part of a broader Puebloan dispersal, or diaspora, in which migrants maintained connections to homeland traditions while adapting to life with the local inhabitants. This makes the Ladder Creek Valley a rare case for tracing how mobility, refuge, and long-distance ties could generate durable, locally grounded forms of hybridity and community formation, traceable through the material culture left behind in the archaeological record.

Technological Change and Transitions in a Colonial Context

Historically, anthropologists have relied on dichotomies and acculturation frameworks to model the effects of colonialism and culture contact. These models assume a more passive group would immediately absorb into the larger power, a relationship that would be reflected by an abrupt replacement of technology in the archaeological record (Cordell and Yannie 1991; Diamond 1997; Mullins and Paynter 2000; Rodríguez-Alegría 2008). However, as we see in the Ladder Creek Valley case study, colonial contexts are more complicated than European powers coming into direct contact with one group, and unidirectional assumption of culture change rarely reflect the nuanced social negotiations that take place in multicultural communities (e.g., Bernard 2008, Graesch et al. 2010; Lightfoot 2003; Lightfoot et al. 1998; Voss 2005).

To better capture complex social negotiations, I follow in the footsteps of modern scholars, including those researchers familiar with the pueblo who use concepts such as daily practice (*habitus*) and identity construction to frame technological change and transitions (Trabert 2017). These studies embrace technology as more than just tool use and manufacturing techniques by considering the social and cultural context of the production, use, maintenance, and discard of the objects (Dobres 1995, 2000; Dobres and Hoffman 1994; Lemonnier 1986;

Pfaffenberger 1988, 1992; Rogers 1990, 1993; Sassaman 2000). Relevant context includes knowledge, tradition, culturally specific norms, gendered bodies, and social relationships of production. Understanding the active social and cultural aspects of technology is even more critical when studying colonialism, when people are experiencing social and environmental stress. Engaging with technology, both in use and its transformation, is a daily process in ever-changing contexts. As Kenneth Sassaman argues, "People actively create and recreate the structures that influence or impede technological change" (2000:164). Archaeologists are able to trace transitions *or* lack thereof to identify Indigenous responses to the consequences of colonialism.

In the edited volume *Stone Tool Traditions in the Contact Era*, Charles R. Cobb (2003:1) argued, "Studies about the spread of European exploration and colonialism—particularly in the Americas—have paid relatively little attention to the shifts in the role of stone technology among Indigenous groups." His statement remains true more than 20 years later. For many, lithic technology remains theoretically and methodologically behind other material classes and is confined to an explicitly utilitarian context; a way to adapt to environmental circumstances. However, the case studies in Cobb's (2003) edited volume and others present a more complex reality, reinforcing the idea that lithic technologies reflect complex social relationships and cultural negotiations in the colonial context. Communities may choose to maintain, adopt, alter, or otherwise transform lithic strategies to accommodate new circumstances (Peck et al. 2019; Rodríguez-Alegría 2008; Silliman 2005; Vehik 2002, 2012; Vehik et al. 2021).

Building on evidence that migrants integrated into local communities, I argue lithics are socially embedded materials that can register negotiations of continuity and change in a multicultural colonial landscape. Choices about how to procure raw materials, which materials are preferred, how cores are reduced, what forms are maintained through resharpening, and when tools are discarded are not only technical problems; they are practices embedded in learning networks, mobility routines, labor organization, and access to people and places. These choices can also respond to colonial entanglements indirectly, through shifts in exchange relationships, new constraints on movement, changing demands for production (e.g., intensified hide processing), or altered access to quarries and knappable stone. Therefore, studies of lithic technology must incorporate an agency forward approach to analysis that examines the entire process of procurement, production, use, maintenance, and discard; the steps of a chaîne opératoire (Bar-Yosef 1991; Sellet 1993). Rather than focusing on archaeologically assigned typologies, attribute and raw material analyses are well equipped for capturing subtle aspects of each artifact's lifecycle and addressing questions about technological transitions in multicultural contexts.

Research Objectives and Hypotheses

A growing body of research explores the breadth and complexity of colonial experiences, and this research contributes to this discourse by examining Indigenous responses to those colonial processes. To do so, I focus on the cultural changes the Ndee community of Ladder Creek Valley experienced in response to Spanish colonial activities in the American Southwest and the responding Puebloan diaspora. I operate under the understanding that people have socially reinforced knowledge that informs and is reproduced through daily practice, including the *chaîne opératoire* of lithic technology. My research reports the results of an in-depth attribute and raw material analysis of all the provenienced lithic artifacts from four archaeological sites, focusing on site 14SC1 and three nearby sites occupied following the closing of the pueblo, to identify transformations in the technology of either group. In doing so, I examine 1) how the lithic technology at the pueblo varies across proveniences and/or changes over time, 2) if lithic technology at the pueblo shares more similarities with a Puebloan or Ndee influence, and 3) in what ways the lithics at the pueblo compare with the assemblages at sites that post-date its closure. Based on these comparisons, I have developed the following hypotheses that can be tested using lithic data:

Hypothesis 1: Limited sociotechnical exchange within lithic production

If Puebloan migrants and local Ndee communities interreacted but maintained largely separate technological lithic learning traditions, then lithic assemblages associated with the pueblo should show continuity in production over time. Formal tool morphology, retouch patterns, reduction strategies, and maintenance practices would remain relatively consistent, even if other forms of interaction are evident. Raw material use may shift somewhat in response to local availability, but technological choices would primarily reflect established Puebloan practices rather than substantial adoption of local Ndee strategies. Ndee-style lithics may appear from exchange, but these would be relatively few in number compared to the lithics Puebloans produced themselves.

Hypothesis 2: Selective sociotechnical exchange

If interaction involved practical cooperation, shared access to landscapes, and limited exchange of technical knowledge, then some minor evidence for lithic change should appear across provenience areas. More flexible or situational choices such as raw material selection, raw material use, expedient tool production, or recycling practices, may change before practices such as formal tool morphology or reduction techniques. The assemblage may show some convergence with Ndee technological strategies, while still mostly retaining elements of Puebloan lithic practice.

Hypothesis 3: High degree of sociotechnical exchange

If Puebloans and Ndee communities experienced a high degree of sociotechnical exchange, then later assemblages should show stronger technological convergence or mixing. This may include changes in formal tool frequencies, retouch location and intensity, reduction strategies, tool maintenance, recycling, and raw material preferences. Assemblages postdating the pueblo occupation may show characteristics of combined or hybridized strategies.

Organization of the Dissertation

Chapter 2 presents a cultural overview of Ndee occupation of the Great Plains and more specifically the Ladder Creek Valley case study area. In this, I assess the archaeological and ethnographic evidence that indicate Ndee communities embraced practices that led to, on occasion, multicultural relationships and fluid social boundaries with neighboring communities. I also present existing scholarship that has contributed to our understanding of the relationship between Ndee living in Ladder Creek Valley and the Puebloan migrants who arrived during the seventeenth century.

Chapter 3 explains the applicability of modern colonial theoretical frameworks to the Ladder Creek Valley case study by presenting a multiscalar approach, including middle grounds, creolization, and agency. These work in tandem with Indigenous-centered responses to colonial consequences that provide context for the Ndee response to the arrival of Puebloan migrants and the validity of studying lithics as a significant data source for understanding colonial contexts.

Chapter 4 summarizes what is currently known about Dismal River lithic technology and provides a brief overview of Puebloan lithics to establish the comparative and interpretive context for the lithic analysis.

Chapter 5 outlines the methods I used in this dissertation. This research centers lithics as objects that embody social relationships and are critical to the reproduction and negotiation of everyday practices and belief systems. As such, I completed both a detailed attribute and raw material analyses to better understand the cultural decisions influencing the chaîne opératoire and how these may have changed as Ndee and Puebloan communities negotiated their positions and relationships in Ladder Creek Valley. Chapter 6 presents the results of the attribute and raw material analyses for the stone tools.

Chapter 7 draws on these results and published records to expand on our current understanding of the relationship between Ndee and Puebloan communities within the Ladder Creek Valley from the early seventeenth century through the late eighteenth century. Themes within this chapter include the relevance of lithics to social identity, cultural change, interactions, and the indirect effects of European colonialism.

Chapter 2: Ndee on the Plains and the Scott County Pueblo

Standing as the most northern and eastern representation of Southwestern architecture in the country, what remains of the Scott County Pueblo (14SC1), a seven-room masonry pueblo, has captured the attention of scholars and the public alike for decades, if not centuries. However, the material remains are only one manifestation of a much more complicated point in history. After the Spanish arrived in the American Southwest in 1539, Spanish actions began to encroach on the daily lives of the people living in the region, both Puebloans and Athapaskan speakers (Ndee and Navajos, referred to in this dissertation as Diné) (Kulisheck 2003, 2010). Although Indigenous responses to Spanish control varied, some opted to engage in long-held mobility practices that redefined their social and cultural landscapes. This included a small contingent of Puebloans who found sanctuary on the plains of western Kansas, where they lived alongside the local Ndee community for several generations (Hill et al. 2018; Trabert 2017; Trabert et al. 2023). The result of this movement had lasting impacts not only on the Puebloan community but also on the local Ndee who faced the consequences of colonial action without so much as encountering a Spaniard.

In this chapter, I provide an overview of significant events that occurred following the Spanish colonialism of the American Southwest, specifically focusing on Indigenous responses to colonial actions and how existing social networks and practices precipitated Puebloan movement to the Plains. I then provide relevant background information on Ndee, non-Navajo Athapaskan speakers, populations living on the Plains. Known archaeologically as the Dismal River Complex (AD 1300-1750), I describe the material culture associated with this group, focusing on sites in western Kansas, including the Scott County Pueblo, which represent cultural contact with fleeing migrants from the American Southwest. Finaly, I provide an overview of the Dismal River sites that I reference in this project.

Indigenous Responses to Spanish Colonial Action in the American Southwest

The arrival of Puebloan migrants to western Kansas was not a coincidence but instead the product of long-enduring connections among Puebloan communities of the American Southwest and more mobile populations living across Great Plains (Figure 1\3). Archaeological sites in both regions contain exchange items such as ceramics, lithic material, maize, shell, and bison that indicate a thriving exchange network existed for hundreds of years – if not longer (Barr 2005; Brosowske and Bevitt 2006; Eiselt and Snow 2017; Kidder 1932; Wedel 1967, 1982). These networks served several purposes, among them that Puebloans relied on these relationships to supplement or support their subsistence strategies. Many Indigenous communities in the American Southwest relied predominately on small-scale farming to produce the food and resources necessary for their survival; however, the environment periodically led to limited and irregular distribution of resources, which left them vulnerable during times of social and environmental stress (Kulischeck 2003). Their participation in larger exchange networks kept their relationships with neighboring communities strong and provided them with necessary support and resources to sustain themselves during those times of scarcity (Kulischeck 2003, 2010). Highly mobile peoples like Ndee, whose communities lived across the American Southwest and Great Plains, were well suited for driving these multicultural exchanges across pueblos and nearby regions, with some individuals acting as traders who moved among settlements to facilitate the movement of goods and ideas (Eiselt et al. 2023). It is important to note that traders, almost universally, establish fictive or real kin relationships with trading partners to ensure strong exchange alliances (Seymour 2023:401). While Ndee visited Puebloan communities in the Rio Grande region, it is also quite possible that some of them stayed and formed multicultural households within Puebloan settlements.

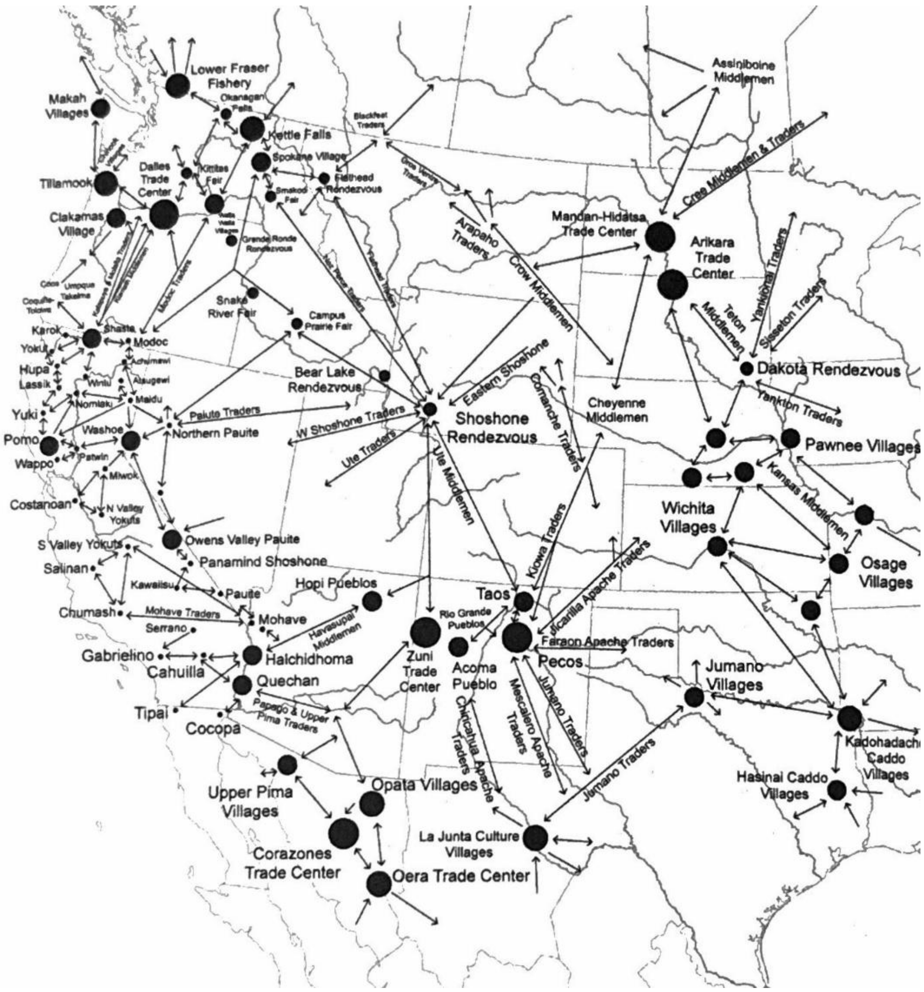

Figure 3. Exchange networks on the Central and Southern Plains. Map from Trabert and Hollenbeck 2021.

The relationships that existed among communities across the American Southwest and Plains did not dissipate with the arrival of the Spanish. Conquistadors first arrived in the Northern Rio Grande region between 1539 and 1542, but took several decades for Spanish influence, including the construction of settlements and missionaries, to significantly disrupt

Indigenous lifeways (Kulischeck 2003, 2010). Eventually, violent encounters, disease, and excessive demands on Indigenous land, labor, and resources did contribute to an overall demographic decline. However, historic records indicate that population loss may not have been as drastic as previously assumed, leading scholars such as Jeremy Kulischeck (2003, 2010) and Michael Wilcox (2014) to argue that the emphasis on European actions like the introduction of disease may have been overstated. Rather, Puebloans likely engaged with long-held practices of mobility, regional relocation, and migration to separate themselves from Spanish influence to maintain autonomy (Stark et al. 1995; Zedeño 1995).

In the 300 years following the arrival of the Spanish, pueblo numbers declined by more than 50%; however, this was as much a product of Indigenous social and political reorganization as European colonial structures (Kulischeck 2010). To increase their control of the region, the Spanish participated in efforts to consolidate Indigenous settlements, creating multi-ethnic communities whose practices were a mixture of multiple Indigenous and Spanish practices (Spielmann 2018). Some Puebloans fled in response to these and other Spanish efforts. While some of these migrants established new settlements on the periphery of Spanish control (Liebmann et al. 2005), others would join at least temporarily other communities, forming blended social groups (Anderson 1999; Herr and Clark 1997; Liebmann and Preucel 2007). Within the first several centuries of Spanish occupation, Puebloans such as the Tewa, Tiwa, Tano, and Keres moved into Hopi territory (Dozier 1954; Spicer 1962) or took up residence with more mobile groups like the Ndee or Diné (Forbes 1994; Preucel 2002). Evidence for the latter includes multiple sites with both Puebloan architecture and Athapaskan material culture (for detailed description of pueblitos, see Carlson 1965, Marshall and Hogan 1991, and Towner 1996).

Indigenous resistance to Spanish colonial actions was varied and complex. For those living in close proximity to settlements and missions, colonial powers and institutions were pervasive, with missionaries occasionally living within pueblos and governments increasing labor demands. Blatant resistance to Spanish control was often met with retaliation, so many embraced more creative and nuanced forms of resistance, such as practicing traditional foodways and other forms of material production visible only within the home (Aguilar and Preucel 2019; Liebmann et al. 2017; Spielmann et al. 2006; Wilcox 2009). Those living on the periphery of Spanish control had the freedom to resist the Spanish more outright, with violent actions becoming increasingly common as tensions escalated (Herr and Clark 1997; Liebmann 2012; Liebmann and Preucel 2007). Conflict between the Spanish and Indigenous communities reached a breaking point in the seventeenth century when Pueblo leaders and their Ndee allies organized what is considered by many to be one of the most successful Indigenous revolt in the history of North American colonialism (Liebmann 2012; Wilcox 2009). After years of discontent and rallying communal efforts, the pueblos led a coordinated attack on Spanish settlements, causing the death of approximately 400 people and the widespread destruction of Spanish towns and resources (Liebmann 2008). In response, the Spanish left northern New Mexico for nearly 12 years, which provided space for the local Indigenous communities to revitalize their culture and rebuild their communities without Spanish interference. A second revolt occurred in 1696, nearly four years after the Spanish re-established themselves in the region (Wilcox 2009). This action was significantly less successful than the original movement, and the Spanish regained control by the end of that same year.

The effects of Spanish colonial actions are difficult to measure. Although Indigenous people in direct contact with the Spanish bore the extent of colonial control and consequences more harshly than those living more distant from colonial structures, communities situated on the periphery still experienced uncertainty and fluctuation that required a wide breadth of social responses. Many relied on existing social relationships to bolster their numbers, maintain trade relations, and retain important cultural practices (Aguilar and Preucel 2019; Liebmann et al. 2017). As previously mentioned, the complex exchange and social networks that had long connected diverse groups across and beyond the American Southwest offered communities within the region more opportunities to escape or respond to colonial activities. Nomadic Ndee and Diné communities living in the American Southwest in particular were better able to endure the challenges of Spanish occupation by moving across the landscape and integrating others into their community, cementing those social bonds through kinship relations (Kulischeck 2010). The connection between the Jemez and Diné, for example, is clear not only in historic records but also by the fact that descendants of the Jemez who remained with the Diné now form the Maitheshkizh Clan, or Coyote Pass People (Kulischeck 2010; Parsons 1927).

The impacts of Spanish colonialism for people living in the Northern Rio Grande and broader Southwest region are extensive and well-documented. These people suffered extensive cultural, economic, and demographic distress that continues to affect Indigenous peoples living in that region today. However, it would also be fair to state that the effects of Spanish colonial action on their neighbors living on periphery of Spanish control are still relatively unknown. Archaeological evidence and oral histories support the premise that Puebloan mobility led to, in some cases, the intensified relationship between Puebloans and Plains communities as goods *and* people began to move in greater frequency to the Plains (Barr 2005). Yet the material evidence of these transformations appears more ephemeral across areas like the High Plains, requiring scholars to be creative and intentional with their interpretations. Known archaeologically as the

Dismal River complex, Ndee communities living across the plains present an apt case study to examine the indirect effects of colonialism, particularly given their participation in Puebloan exchange networks and the movement of Puebloan groups from the Rio Grande into their territory.

Ndee on the Plains

In the previous section, I briefly addressed the complexity of Indigenous responses to Spanish colonial actions in the American Southwest; however, the ripple effects extended far beyond the immediate sphere of Spanish influence. To fully capture this, I now turn my attention to the Ndee communities living across the Great Plains, whose adaptive strategies and cross-cultural exchanges offer a compelling case study for examining the broader impacts of colonialism. Today, Ndee are known as a group of Indigenous peoples with deep histories in the American Southwest, primarily inhabiting regions of present-day Arizona, New Mexico, and parts of northern Mexico (Brant 1951; Hoijer 1938; Ingstad 1945; Opler 1940; Perry 1980). Comprised of several distinct linguistic and cultural groups, including the Western, Chiricahua, Mescalero, Jicarilla, Lipan, and Plains Apache (also known as Kiowa-Apache), they historically led semi-nomadic lifestyles, relying on hunting, gathering, and occasionally horticulture for subsistence (Brant 1951, Hill et al. 2022; Jordan 2008). Although a Ndee occupation of the American Southwest is well-recorded through oral histories, Spanish historic accounts, and archaeology, these same lines of evidence suggest that some Ndee communities also had a long-standing occupation of the Great Plains region that overlapped temporally with their occupation of the American Southwest.

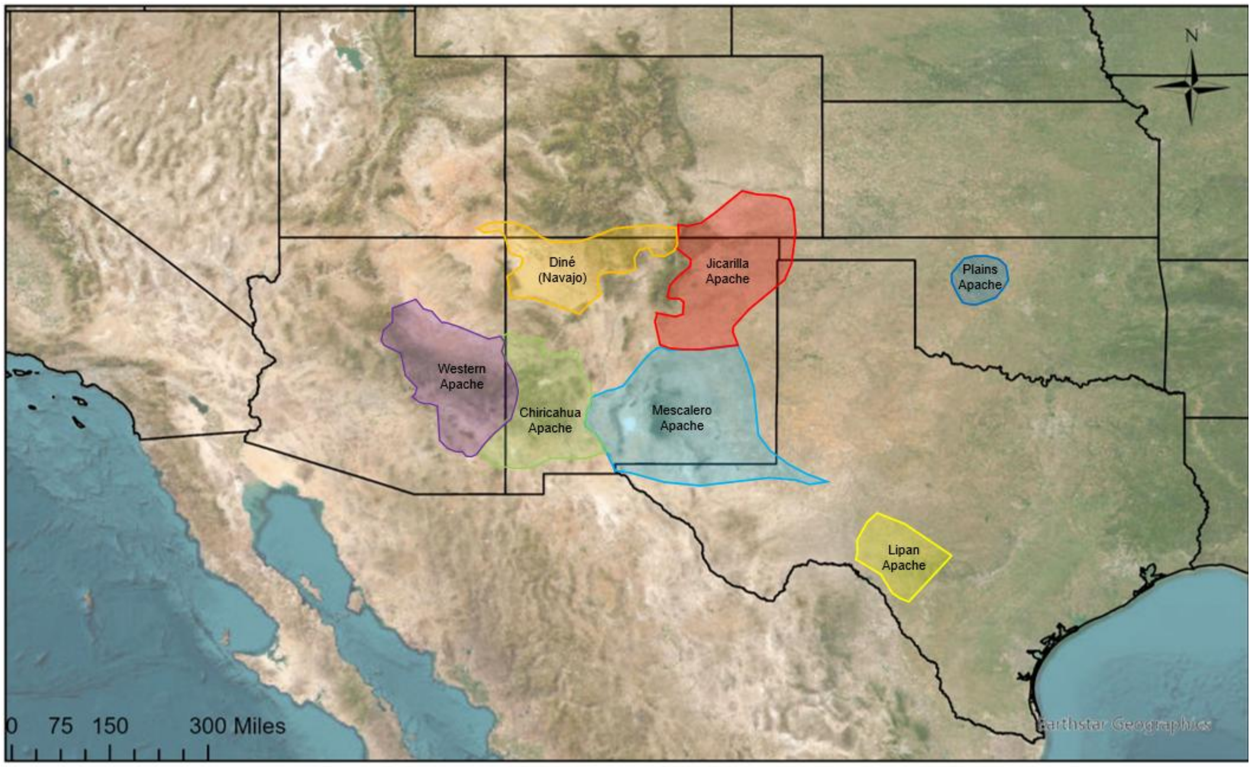

Figure 4. Historic distribution of Ndee and Diné communities. Adapted from Snoek et al. 2022.

Spanish, French, and American records from as early as the sixteenth century offer some of the only ethnohistoric evidence of ancestral Ndee occupying portions of the Great Plains (Bittle 1962; Davis 1988; Stokely 2003). Accounts from the sixteenth to eighteenth centuries almost universally describe only brief encounters with highly mobile bison hunters or hearsay from other Native American communities, which offer very little reliable information about the daily lives of Ndee communities except to offer clues as to their geographic distribution. The names writers used to describe Ndee communities were varied, including Querecho, Vaquero, Faraon, Cuartelejo, Paloma, Paduca, and Gataka, which makes it all the more difficult to piece together all accounts from this era, particularly as the Europeans and Americans producing the writings were not always well informed about Native Americans in the region. Ethnographic work from the mid-twentieth century offers a bit more detail in this regard (e.g., Bittle 1962; Davis 1988; Stokely 2003). Modern Plains, Lipan, and Jicarilla Apache see themselves as the direct descendants of Ndee who lived on the Plains and share stories that reference life on the prairie (Figure 4; Jordan 2008), though ethnographic accounts are largely limited to the Plains Apache and their history with the Kiowa in the Black Hills region of the Northern Plains (e.g., Brant 1951).

While ethnographic and historic accounts provide some detail about the lifeways of Ndee living across the Plains, scholars turn to the archaeological record to gain a better understanding of these communities before and after the arrival of the Spanish and other European entities. The consensus among archaeologists is that the Dismal River complex represents Ndee culture on the Great Plains (Eiselt et al. 2023; Hill et al. 2022; Hill and Trabert 2018; Welch et al. 2017). First identified in the 1930s from a handful of surface artifact scatters along the Dismal River in Hooker County, Nebraska, there are now approximately 250 formally recorded archaeological sites with a Dismal River affiliation across portions of southeastern Wyoming, eastern Colorado, western and central Nebraska, and western Kansas (Figure 5; Hill et al. 2022). Dismal River archaeological sites across the western Plains and Rocky Mountains date as early as the thirteenth century, while sites across the Central Plains date within a couple of centuries after this initial arrival (Beck et al. 2024; Eiselt and Darling 2012; Hill et al. 2022). Evidence for Dismal River occupations have been found in a wide variety of topographic settings. Larger sites interpreted as villages are common on open terraces along perennial springs, while other sites have been identified on the shores of lakes and ponds or in the west, in blowouts, rock shelters, and on butte tops (Wedel 1986:140).

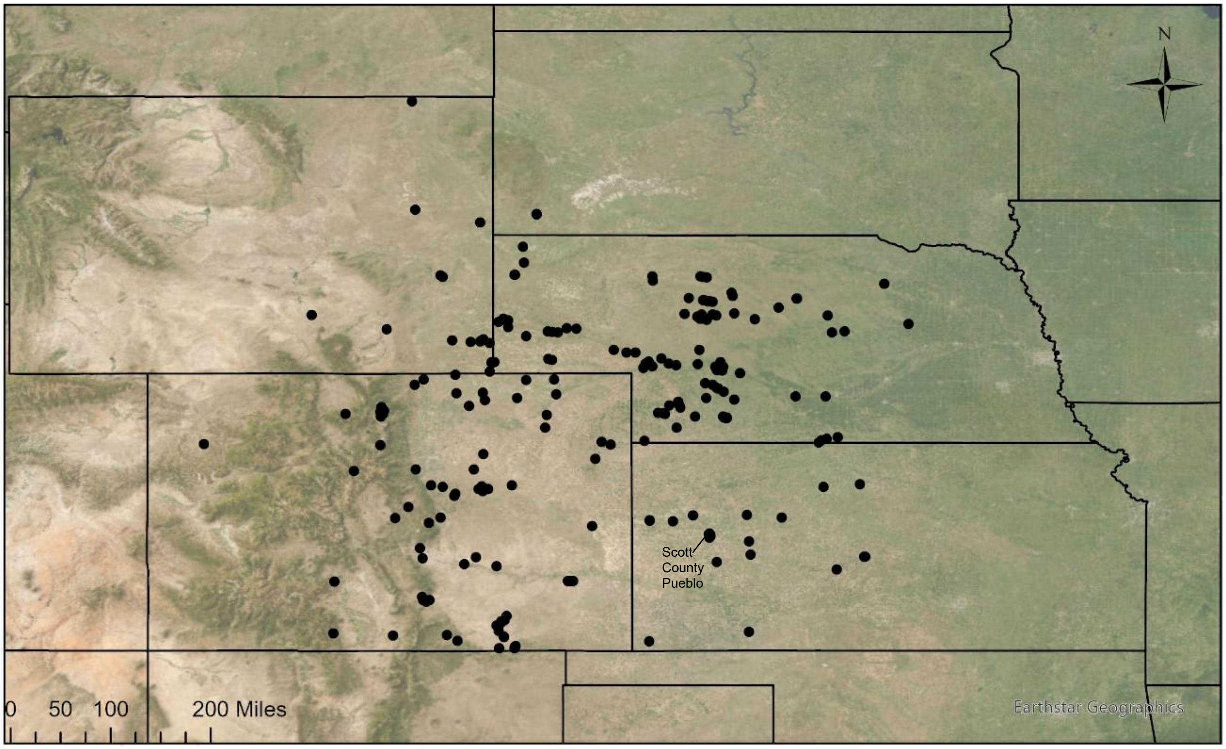

Figure 5. Recorded Dismal River archaeological sites.

Athapaskan migration studies suggest that groups of Ndee people arrived in the Great Plains and the neighboring American Southwest region following a migration south from northwestern region of North America, where the greatest diversity of Athapaskan and related languages is still present (Achilli et al. 2013). The initial catalyst of this movement is believed to have been a substantial volcanic event in AD 846-848, the east lobe White River Ash eruption (WRAe), which spurred groups of Athapaskan speakers to migrate out of the subarctic region and across the American West (Kristensen et al. 2019; Eiselt et al. 2023). As these groups dispersed, they encountered new landscapes, interacted (and possibly intermarried) with other Indigenous communities, and adopted new technologies and subsistence strategies. Scholars have proposed that cultural flexibility and kinship practices allowed Ndee communities to thrive in diverse social and physical landscapes from the Great Basin to the American Southwest to the Great Plains (Ives 1998, 2010). The Plains would have been attractive when Ndee communities first arrived in the area. The ecosystem and opportunities for trade with horticultural societies appealed to some of the migrating populations, such that they adopted a plains lifestyle emphasizing communal bison hunting and interregional exchange (Eiselt and Snow 2017).

As previously stated, archaeologists have recorded approximately 250 Dismal River archaeological sites; however, the nature of the cultural material is such that it is possible this number is inflated (Hill et al. 2022). As one would expect with highly mobile groups, most of the recorded sites are sparse artifact scatters interpreted as ephemeral camps or resource processing areas. The material culture at these sites is often homogeneous, consisting primarily of a few lithic tools and debris found across the surface or shallowly buried (Hill et al. 2022). Although ceramics are a strong indicator of cultural affiliation for this complex, sherds are not present at many of the sites, and when they are discovered, the artifacts are often small, fragmentary pieces that can be difficult to interpret (Trabert 2015). There are a few larger Dismal River sites that archaeologists excavated in the 1930s-1960s in Nebraska and Kansas that do possess more material evidence for Dismal River occupation, including structures and thousands of artifacts, such as lithics, ceramics, faunal remains, and other occupational debris (e.g., Champe 1946; Hill and Metcalf 1941; Strong 1935; Wedel 1940, 1959). Archaeologists interested in defining the archaeological complex have relied heavily on the data from these sites to describe it (Brunswig 1995; Scheiber 2006), including generalizations about the housing forms, baking pits, micaceous ceramics, and diet represented at the sites (see Table 1 for descriptions). However, reinvestigations by Matthew E. Hill, Jr. and Sarah Trabert (2018) have shown that these lines of evidence may not be as emblematic of Ndee culture as previously thought.

Table 1: Summary of Presumed Diagnostic Dismal River Material Culture

Material Type	Previously Described Diagnostic Attributes	Updated Interpretations
House Form	Small, circulate wickiup structures (4-6 meters) with five interior posts and unlined central hearth (Gunnerson 1960). Based on White Cat Village (14HN37) and Lovitt (25CH1).	House forms are highly variable in nature. Small (2.5-4 meters), subcircular to subrectangular, and constructed at the surface or in a shallow depression (Hill and Trabert 2018).
Baking Pits	Large straight-sided baking pits with small openings and wide (>1 meter) bases (Gunnerson 1960, 1968; Wedel 1959, 1986).	Baking pits are highly variable in nature. Hill and Trabert (2018) argue they are not a diagnostic attribute of Dismal River complex.
Ceramics	Dismal River Gray Ware ceramics are diagnostic (Brunswig 1995; Wedel 1959). They have thin walls, smooth or stamped surfaces, and fine sand temper. Micaceous ceramics are similarly manufactured but lack polished surfaces and have mica/arkosic sand temper. Acquired through exchange with Ndee and Puebloans in Southwest.	Dismal River Gray Ware and Micaceous ceramics are both diagnostic. In disagreement with other scholars, Trabert and colleagues (2016) argue that micaceous ceramics are made by Ndee groups living in or near the Rockies of Colorado or the Laramie Mountains in Wyoming.
Diet	Semisedentary horticulturalists with an emphasis on big game hunting (Gunnerson 1968, 1987). Gunnerson (1987) suggested lack of fish remains represents food taboos. Opler (1982, 1983) argued Dismal River sites could not be Ndee due to consumption of dog and mussels.	Horticulture is present in eastern sites more than western (Hill et al. 2022). Lack of fish may be due to excavation techniques, such as lack of screening (Hill and Trabert 2018). Consumption of dogs and mussels is not universal to all Ndee groups; therefore, it does not preclude affiliation.

Presumed archaeological traits, such as baking pits and five-post houses, may be an oversimplified approach to identifying Dismal River material culture, but there are patterns in site function, land use, and subsistence that offer some insight into the archaeological record. For example, eastern Dismal River sites indicate a more sedentary lifestyle, with groups building wickiups and supplementing their hunting and gathering with horticulture practices (Hill and Trabert 2018; Hill et al. 2022). Houses tended to be circular and 2.5-4 meters in diameter with a variable number of supporting posts; not strictly five, as previously stated by Gunnerson (1960, 1968). Central hearths are common (Hill and Trabert 2018). A few houses have burned support poles surrounding the outside edge of the house floor, indicating similar construction to Ndee wickiups in the American Southwest. Large Dismal River sites contain multiple pits and/or trash middens, regardless of the presence of housing structures. Some pits are large thermal features (1-3 meters in depth), while others are a third to half the size, unburned, and filled with artifacts (Hill and Trabert 2018). Maize macrobotanicals have been found at several eastern Dismal River sites, including the Scott County Pueblo, Humphrey, Lovitt, and White Cat Village (Adair 1992, 2003; Gunnerson 1960; Hill and Trabert 2018). Eastern sites in Nebraska and Kansas also have evidence of Ndee use of European materials, such as glass beads, gunflint, metal axes, knives, and conical tinklers (Champe 1949; Gunnerson 1060; Wedel 1959, 1986). However, the small number of such items implies that access to these materials was regionally variable and restricted, selective, or mediated through Indigenous middle groups rather than widely adopted into daily life and practices.

Dismal River groups living in the western extent of their territory practiced a more mobile lifestyle, which left a sparse archaeological record (Brunswig 1995; Trabert 2015). The archaeological sites are smaller, with a lower frequency of artifacts, and lack semipermanent housing. Although there is no evidence to support circular wickiup style structures, there are 18 sites across Colorado, Wyoming, and western Nebraska with evidence for stone tipi rings (e.g., Andrefsky 1990; Gebhard et al. 1964; Greer 1966; Kalasz et al. 1999; Kingsbury and Gabel 1983; Kingsbury and Nowak 1980; Lyons and Johnson 1994; Page 2009; Reher 1973; Steege 1969; Tucker et al. 2005). Evidence also suggests that Dismal River occupants took advantage of rock shelters that occur more frequently in the west, although these also appear to represent short-term residences or activity areas. The Dismal River component at these sites often overlays older Upper Republican, Woodland, and Archaic occupations (Gilmore et al. 2005; Trabert 2015). While the western Central Plains typically do not receive enough precipitation to support horticulture, macrobotanicals indicate that at least some Dismal River groups used or potentially grew maize (Ellwood 2010; Gilmore et al. 2005).

It is important to mention here that very little research has been done examining Dismal River lithics, despite the prevalence of this material type at affiliated sites. While studies continue to illuminate our understanding of site-focused lithic procurement, production, and use, there is not currently sufficient comparative data to complete a comparative analysis. As of now, there are references to Ndee communities using expedient lithic technology, but more commentary has been devoted to exploring potential diagnostic tool forms. For example, James Gunnerson (1960, 1969, 1979) suggested that double-bitted bifaces may be diagnostic of the Dismal River complex. Similar artifacts have been identified at two Dismal River sites in Colorado: Eureka Ridge (Gilmore and Larmore 2005) and Arroyo del Arenal (Larmore 2008). Deni J. Seymour (2002, 2004, 2012) also reported seeing similar artifacts at contemporary Cerro Rojo sites in New Mexico, suggesting that the biface could be a shared Ndee technology.

Projectile points recorded at Dismal River sites are stylistically similar to other side- and tri-notched points found at sites across the Western United States during this time period, though there is enough repetition to suggest that a single spur on the base could be a stylistic element common to Dismal River sites and other Athapaskan sites in western Canada (Gilmore and Larmore 2012; Matson and Magne 2010). More broadly, Athapaskan sites in western Canada and the Great Basin have also yielded tabular bifaces, or chithos, which appear to have been a common tool for women processing hides (Reilly 2015). These tools are not described as appearing frequently among Dismal River sites but may be an indicator of a Ndee affiliation. Further research, including that completed in this dissertation, will be essential for exploring this aspect of Dismal River lifeways moving forward.

It is not uncommon for Dismal River sites to include materials attributed to earlier cultural complexes, including Upper Republican components. However, there is relatively little evidence to suggest to that Ndee people interacted or lived with other communities who occupied or seasonally visited the Plains – a contrast to other Ndee populations living in, for example, the Promontory Cave system in the Great Basin who interacted and likely intermarried with local communities (Ives 2014; Ives et al. 2014; Ives and Janetski 2022). The Scott County Pueblo (14SC1) and nearby sites are exceptions to this rule. Evidence from these locations suggests the presence of people and material culture from the Northern Rio Grande region of the American Southwest, despite no indication of a Puebloan presence at other Dismal River sites (Beck and Trabert 2014; Beck et al. 2016; Beck et al. 2024; Hill et al. 2018; Trabert 2014, 2015, 2017, 2018; Wilfong and Hill 2022). Archaeological evidence ca. AD 1605-1635 suggests that people from one or more Northern Rio Grande communities joined the local Ndee populations and built a seven-room masonry pueblo right on top of a previous Ndee wickiup occupation (Beck and

Trabert 2014; Hill et al. 2018; Trabert et al. 2022; Wilfong and Hill 2022). The presence of Puebloan migrants remains the most compelling and distinct evidence for the effects of Spanish colonialism on Ndee populations.

"El Cuartelejo": The Scott County Pueblo (14SC1)

Locals who are familiar with the Scott County Pueblo (14SC1) refer to the site as "El Cuartelejo." The significance of this name has not been lost on archaeologists interested in interpreting the structure and its occupants. In the seventeenth and eighteenth centuries, Spanish writers used the term "El Cuartelejo" to describe portions of the Great Plains located just northeast of the Rio Grande pueblos where some residents moved to escape Spanish colonial control (Bolton and Marshall 1921; Dunn 1915; Gunnerson 1979; Gunnerson and Gunnerson 1971; Hodge 1900). The first recorded movement took place around AD 1639 when people from Taos fled the Spanish. Though Spanish Franciscan missionary Escalante wrote about the event nearly 100 years after the fact (Gunnerson 1987), his correspondence indicates that they "withdrew to the buffalo plains and fortified themselves at a place which afterwards on this account was called El Cuartelejo" (Silvestre Velez del Escalante, letter, April 2, 1998, in Twitchell 1914:279-280). Several years after this movement, Juan de Archuleta returned some of the Taos migrants to New Mexico (Twitchell 1914). In AD 1662, Governor Peñalosa retrieved additional Taos residents who had reportedly been living with Ndee groups for roughly 20 years (Forbes 1960).

Following the aftermath of the AD 1680 Pueblo Revolt, the Spanish withdrew from the American Southwest for over a decade, which allowed Indigenous populations an opportunity to rebuild their communities. However, this peace was relatively short-lived. According to Diego de

Vargas, people from the Picuris, Taos, and Tewa pueblos fled to the Plains as the Spanish military again advanced into the Northern Rio Grande region in late October of AD 1696 (Forbes 1960). It is unclear what conditions these communities lived in. A decade after leaving, community members still at the Picuris pueblo reportedly told Juan de Ulibarrí that their families were now captive of the "heathen Apache tribes of the plains and Cuartelejo" (Thomas 1935:61). Following an expedition to the Plains, Ulibarrí returned with 62 Puebloans in AD 1706, which is also the last time El Cuartelejo is described in reference to Puebloans. El Cuartelejo in these documents likely refers to a region encompassing parts of Nebraska, Kansas, Colorado, and New Mexico rather than a specific location (Gunnerson 1979). None of these records specifically reference the Scott County Pueblo, but the seven-room pueblo is likely within the "El Cuartelejo" region referred to in Spanish documents. Williston and Martin (1900) and Wedel (1959) have used these documents to interpret the site's chronology and significance. While it is likely that the migrants who constructed 14SC1 are from either Taos or Picuris pueblos, recent radiocarbon dating suggests the arrival of these migrants may have predated the movement described in the documents (see descriptions of chronology on page xx; Hill et al. 2018).

Archaeological Investigations of 14SC1

In 1898, University of Kansas paleontologists Samuel W. Williston and Handel T. Martin became the first to formally investigate the Scott County Pueblo on the banks of Ladder Creek in western Kansas (Martin 1909; Williston 1899; Williston and Martin 1900). However, locals had been aware of and collecting artifacts from the location for decades before their arrival. Over the course of three weeks, these early investigations identified features and artifacts indicating a significant Puebloan occupation or influence on the inhabitants (Figure 6). The structure was approximately 16x11 meters in size, while the stone walls (made of stone taken from nearby hills) measured approximately 0.75 meters above the ground surface with a thickness ranging from 0.45 to 0.60 meters (Martin 1909; Williston and Martin 1900). The walls and floor were lined with adobe. Some adobe at the site had impressions suggesting the roof may have been made of willow poles or brush covered in adobe. Williston and Martin (1900) identified charcoal and burnt adobe that led them to believe that the structure had been catastrophically destroyed by a fire. They also recorded charred maize throughout the pueblo (with the exception of Room VII), with some rooms containing a layer as thick as 10-13 centimeters. Room V contained nearly five bushels of maize (176 kg). Scholars later interpreted this as a ritual closing of that space (Beck et al. 2023). In the American Southwest, layers of maize cobs, ears, kernels, and/or cornmeal have been deposited, burned or unburned, as offerings or sacrifices during ritual closures meant to protect sites from malevolent forces (Adams 2016; Adler 2021; Walker and Berryman 2023).

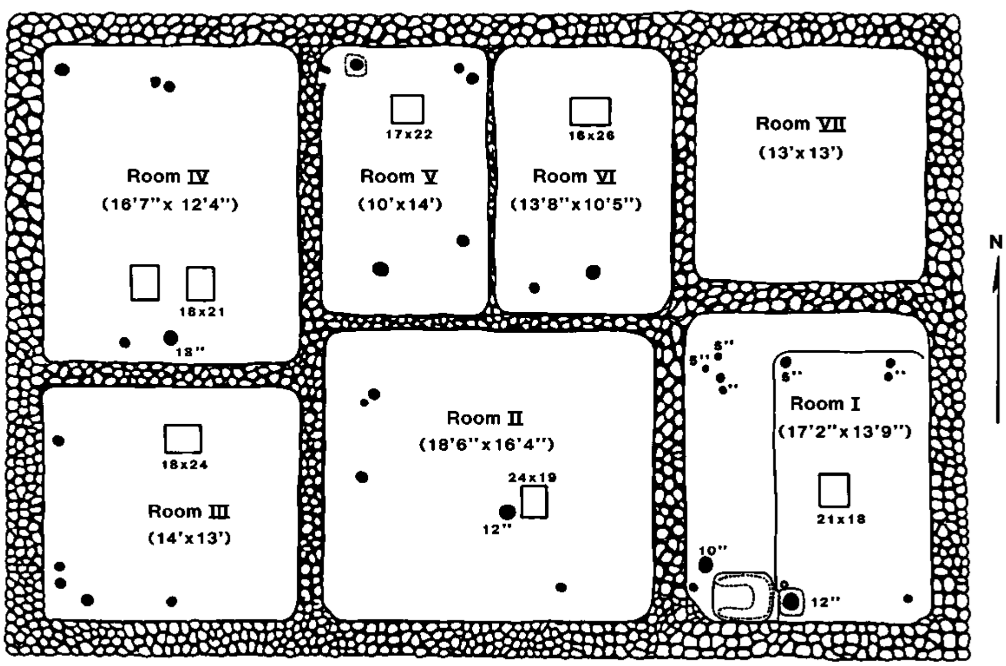

Figure 6. The 1898 floor plan of the Scott County Pueblo (14SC1) produced by Williston and Martin. Illustration adapted from Martin 1909.

Features within the seven rooms of the pueblo include rectangular slab-lined hearths, mealing bins, a small oven, and a raised sleeping bench. Williston and Martin (1900) describe two posts, which may be the remains of an entrance ladder, in the northeast corner of Room I. It is worth mentioning here that a local resident informed Martin of the remains of an old irrigation ditch that had been used and expanded upon by early Euroamerican settlers. It is unclear what relationship this feature may have had with the occupants of the pueblo. By the side of the building, Williston and Martin (1900:127) recorded "two large, hollowed out places, which had probably been used for the puddling and mixing of the adobe employed in the construction of the building." They also identified evidence of several smaller buildings of indiscernible size and shape nearly 100 meters south of the pueblo. No artifacts or stone were present, suggesting the structures were made exclusively from adobe. Both buildings also had evidence of fire, though little description is recorded about these features.

Willison and Martin (1900) recorded significant quantities of artifacts on or near the floor of the pueblo and from feature fill. These included shell, obsidian, ceramics, and seeds that are clearly of Southwestern origin. Other lithics, ceramics, and faunal remains are from the Plains or are more ambiguous in nature. Despite the presence of some Plains artifacts, Williston and Martin (1900) wrote very little about a Ndee presence at the site; however, they did record descriptions of three or four small circular structures approximately 20-25 meters north of the pueblo, which were aligned east-to-west and separated from one another by only a short distance. It is unclear if any excavation took place in these locations, but Williston and Martin (1900) tentatively interpreted the structures as tipis. Subsequent archaeological work failed to relocate any evidence of these features, which Wedel (1939) believed were destroyed by farming operations. Based on the remains, Williston and Martin proposed that Taos or Picuris migrants from the Northern Rio Grande constructed the pueblo after fleeing the Spanish in the late seventeenth or early eighteenth centuries (Martin 1909; Williston 1899; Williston and Martin 1900).

In 1939, Waldo Wedel carried out fieldwork at the Scott County Pueblo for approximately three weeks over the summer (Figure 7). His excavations included a trench (18x14 meters) extending north from the northwest corner of the pueblo, two irregularly shaped pits to the south of the pueblo, and an undisclosed number of test pits. The excavations to the south of the pueblo, which Wedel (1959) refers to as Test No. 1, revealed an elliptical basin (2.5x5 meters) filled with significant amounts of faunal remains and charcoal, with lesser quantities of ceramic sherds, projectile points, scrapers, and lithic debris. An iron awl was located on the floor of this feature. While the purpose of the feature is not entirely clear, the presence of at least four postholes and the absence of any hearths led Wedel (1959:428) to speculate that the feature may represent a temporary habitation, "perhaps a summer shelter". Excavators identified two additional features within several meters of the potential habitation: a circular, bell-shaped pit and an irregularly shaped cache pit. Artifacts in the bell-shaped pit included sherds, scrapers, yellow ochre/clay, a tubular bone bead, two scapula hoes, a fragment of a clay pipe bowl, a bone awl, three unidentified bone objects, and a shell disk bead. The irregular pit was filled with ashes, charcoal, faunal remains, stones, and other debris, potentially representing floor sweep. Artifact deposits from these excavations were predominately between 0.25 to one meter below the ground surface.

Twenty meters south of the pueblo, Wedel (1959) excavated an additional basin feature (Test No. 3), similar to the basin excavated in Test No. 1. The feature contained deposits of ash,

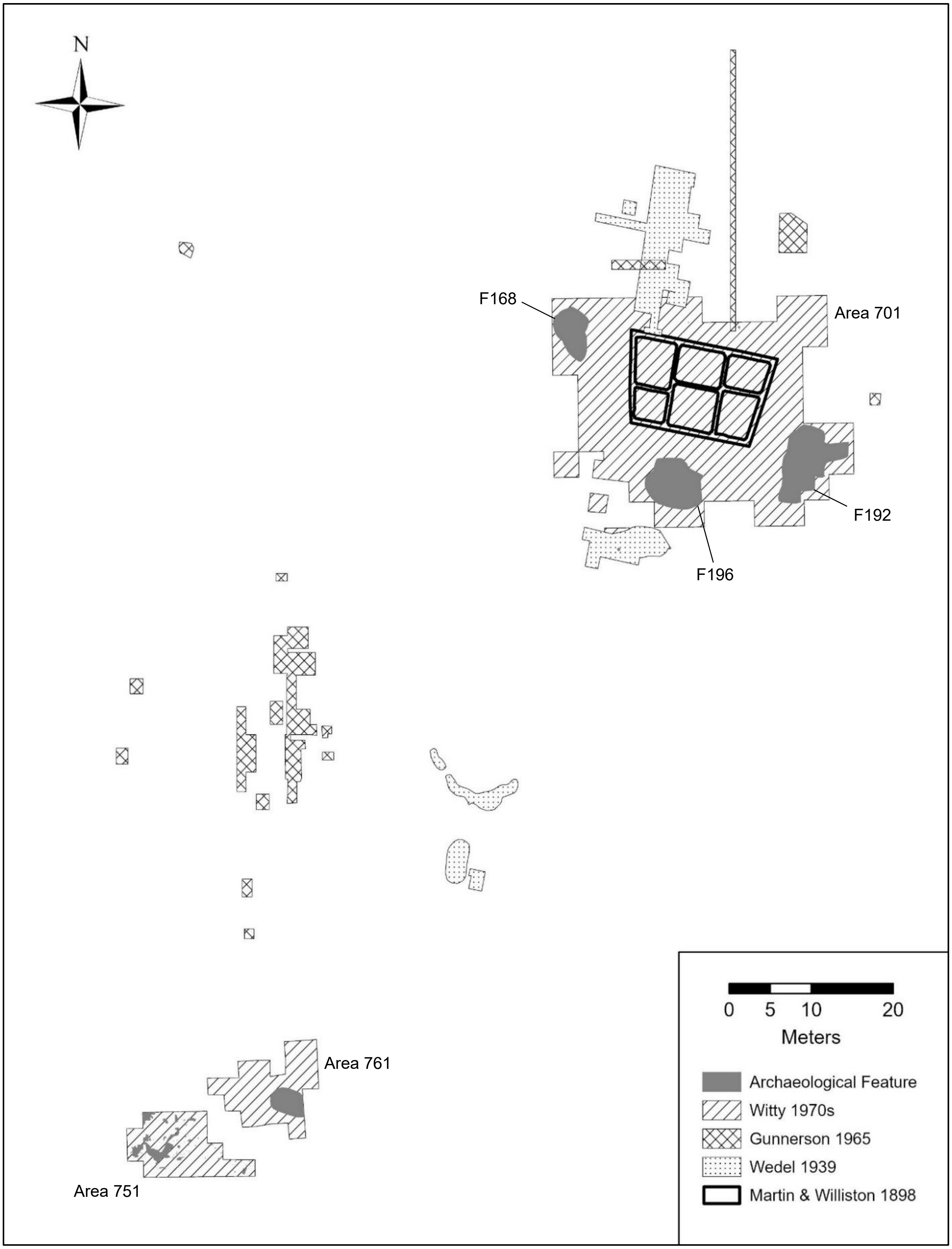

Figure 7. Scott County Pueblo (14SC1) site map identifying excavation areas.

charcoal, burnt grass, maize remains, and other vegetation fragments. Six articulated bison vertebrae were identified near the south wall of the feature. Additional refuse included sherds, bone tools, faunal remains, and stones. Wedel (1959:433) suggested this feature was a hearth or floor of another cooking feature. Within one meter from this feature, Wedel and his team identified another pit, mostly devoid of artifacts, with evidence for hot or prolonged fires. In Test No. 2, the team excavated a substantial area to the north of the pueblo, nearly 90 square meters (Wedel 1959:429). These excavations revealed significant quantities of cultural material approximately 45-50 centimeters below the ground surface, including artifacts, burned areas, hearths, and refuse concentrations. The presence of a few glass beads and iron indicates this area dated after the arrival of Europeans to the continent. Wedel (1959:432) proposed that this concentration of cultural material represented an outdoor cooking area for the occupants of the pueblo, though Puebloan artifacts were scarce. Based on his fieldnotes, however, it seems likely that they excavated below the pueblo living surface. Later excavations by Witty (1975, 1983) revealed evidence for an earlier Dismal River occupation underneath the pueblo. It is likely much of the material culture from Wedel's excavations is affiliated with this earlier occupation.

In contrast with Williston and Martin’s interpretations, Wedel (1940, 1959) argued that there was little evidence for a Puebloan influence at the site, beyond the presence of the pueblo itself and a few scattered Olivella shells and clay pipe fragments of typical Rio Grande style. His excavations did not yield any diagnostic Southwestern ceramics. However, a later visit to the site with A.T. Hill did reveal several painted sherds on the surface. The scarcity of Southwestern artifacts convinced Wedel that the pueblo represented a local occupation, though we can reasonably conclude that his intrusion into earlier Dismal River deposits proportionately reduced the presence of Puebloan artifacts he encountered during fieldwork. Despite a general persistence in emphasizing the Plains-like features at the site, Wedel's opinions did fluctuate over time, and he later acknowledged that the architecture and many of the features at the site were likely Puebloan in origin and affiliated with Puebloan migrants fleeing Spanish control (1959).

Local interest in the Scott County Pueblo continued throughout the twentieth century and spurred on avocational digging at the site in the 1940s and 1950s. Several individuals within the community expressed interest in developing the Scott County Pueblo as a tourist destination, with a strong desire to reconstruct the pueblo itself. In 1958, newspaper editor John Boyer published an article in the *Scott City News Chronicle* suggesting that plans to excavate and reconstruct the pueblo were imminent and later admitted via letter that he and his sons had cleared enough of the debris to expose "a few rocks to give the tourists something to look at" (letter from J.A. Boyer to R.H. Wilmeth, 17 June 1959, quoted in Hawley 2005). This gained the attention of Roscoe Wilmeth, an archaeologist with the Kansas State Historical Society (KSHS), who eventually chose to excavate Room V of the pueblo. His intention was to further examine Plains-Puebloan interactions at the site but also to encourage dialogue with locals and deter them from digging at the site in the future. Unbeknownst to Wilmeth, locals had already extensively dug out the site in 1945 with additional looting taking place in the years leading up to his visit (Hawley 2005; Witty 1983:103). The 1945 activities revealed a stone-lined box hearth in Room VII, suggesting the original 1898 excavations were not deep enough to reach the original floor. While Wilmeth was able to relocate several features, most of the walls and floors had received extensive damage from previous excavations and looting. He also found artifacts below the level Williston and Martin had identified as the pueblo's floor, confirming the pueblo's floor was below those initial excavations (Hawley 2005).

Relatively little information is known about the fieldwork James Gunnerson completed in the summer of 1965, though there are brief references to his work in his later publications (e.g., Gunnerson 1987, 2006). Most of the information I have about Gunnerson's fieldwork is from working with members of the University of Iowa research team who have spent years scouring through archives and piecing together details for their own research (e.g., Beck et al. 2016; Mraz 2010; Trabert 2015; Wilfong and Hill 2022). Most of the current understanding of Gunnerson's work comes from artifact catalogues and a single excavation map. Based on the available information, it appears there were three parts to the 1965 excavations (Wilfong and Hill 2022). The first area is located northeast of the pueblo and contains features 6-14 and 47-49. Gunnerson used the term "feature" liberally, applying it to both excavation areas and cultural features such as hearths, middens, and artifact concentrations. The map suggests Features 6, 7, 9, 10, 47, and 48 represent excavation units and test trenches excavated to a depth between 0.3 and 1.2 meters below the ground surface. Feature 7, a narrow (1x6 meter) trench likely bisected Wedel's Test No. 2 excavation area, suggesting a greater likelihood of Dismal River affiliated artifacts from these units. The second excavation area is approximately 50 meters southwest of the pueblo and includes Features 15, 16, and 18-46. Gunnerson's map indicates that he identified a "use surface," likely an occupation level or level of higher artifact density approximately 0.15-0.3 meters below the ground surface. The final excavation area is approximately 55 meters northwest of the pueblo and consists of a single unit, Feature 17. In 2022, Faith Wilfong and Matthew E. Hill published the results of four accelerator mass spectrometry dates from bison remains identified north (Features 6 and 10) and south (Features 33 and 38) of the pueblo that indicated both excavation areas have deposits that predate and postdate the construction of the pueblo.

Based on their analysis, the older phase dates approximately cal AD 1625-1460, while the more recent phase dates to cal AD 1635-1665.

Thomas Witty and the KSHS conducted the most extensive excavations at the pueblo in 1970, 1975, and 1976 (Witty 1971, 1975, 1983). This included a complete re-excavation of the original pueblo structure. In the first year of excavation, Witty (1971) concluded that very little of the original pueblo wall remained, though at least a portion of each of the hearths (with one exception) was found in situ. As Wilmeth had previously indicated, most of the pueblo was disturbed due to looting and previous excavations, and Witty encountered relatively little in the way of tools and refuse along the excavation floor. However, the excavations did reveal some intact cultural deposits, including postholes (some with bone wedges) adjacent to the southern wall of the pueblo that may be the footprint of a ramada. Figure 8 shows a modern interpretation of this feature. Additionally, Witty excavated below the pueblo floor and discovered what appeared to be a Dismal River roasting pit between Rooms VI and VII. The excavations also extended the excavation areas to the east, west, and south of the pueblo. Most cultural materials were recovered from these areas, including Dismal River Gray Ware, micaceous pottery, Puebloan pottery, projectile points, drills, bifaces, bone scapula hoes, awls, bone beads, etc. In 1971, the KSHS began efforts to reconstruct the pueblo, rebuilding the walls to several feet in height and outlining features, including placing coffee cans where known post holes were excavated. The reconstructed pueblo is still visible today (Figure 1).

In 1975, Witty (1975) and KSHS returned to the pueblo and excavated Area 751, an excavation block approximately 100 meters south of the pueblo where Williston and Martin (1900) reported smaller buildings constructed from adobe. The excavation area included 28 units in a 10x10 square foot area. These were excavated approximately 30 centimeters below the ground surface. They recovered some stone from this area, but there was not enough evidence to identify a structure outline. Recovered artifacts include scrapers, bifaces, projectile points, faunal remains, and ceramic sherds. The second area excavated in the 1975 season was Area 752 located southwest of the reconstructed pueblo. Three two-meter square units were dug to depths of 30 centimeters below the ground surface. Recovered materials included projectile points, scrapers, and other worked pieces of stone. Witty (1975, 1976) hypothesized the remains from both excavation areas represented a Dismal River component. However, based on the multiyear project, Witty (1983) accepted that the pueblo structure was built and used by migrants from the Northern Rio Grande region.

Figure 8. Modern interpretation of the Scott County Pueblo displayed at the reconstruction.

Current Interpretations and Redating the Pueblo

The Scott County Pueblo (14SC1) has been a focus of formal research for over a century, with Williston and Martin's 1898 excavations marking the earliest documented investigations. Research from the twentieth century laid the foundation of our understanding of not only the occupation of the pueblo but the nature of a Ndee occupation of the Plains. However, updated interpretative frameworks and methodologies led archaeologists to re-examine the nature of the pueblo and how it related to the broader social landscape. For the last few decades, researchers at the University of Iowa and University of Oklahoma have reanalyzed the material collections and excavation records to provide a clearer understanding of the pueblo occupation, develop a chronology for the site, and explore identity, particularly in multicultural contexts. To accomplish this, a number of material studies have been conducted to investigate the technological strategies of Puebloan and Ndee groups with an emphasis on identifying culturally unique modes of procurement, production, and use (e.g., Beck et al. 2024; Beck et al. 2016; Beck and Trabert 2014; Hill et al. 2018; Hill and Trabert 2018; McGrath et al. 2017; Trabert 2015; Trabert et al. 2017; Trabert et al. 2022; Wilfong and Hill 2022). Special attention was paid to identifying hybrid techniques that may result from contact between the two cultural groups.

In 2018, Hill and colleagues published an updated chronology of the pueblo (Figure 9). Their results confirmed that the cultural concentration below the pueblo does in fact represent a Ndee occupation of the site, predating the arrival of Puebloan migrants. According to the data, this level began sometime between AD 1410 and 1640 (Beck et al. 2024; Hill et al. 2018) and is associated with Dismal River material culture, including evidence of a wickiup structure and micaceous ceramics. These ceramics were likely made in the foothills of the Rocky Mountains or near the Laramie Mountains, suggesting movement or interactions with groups living on or near

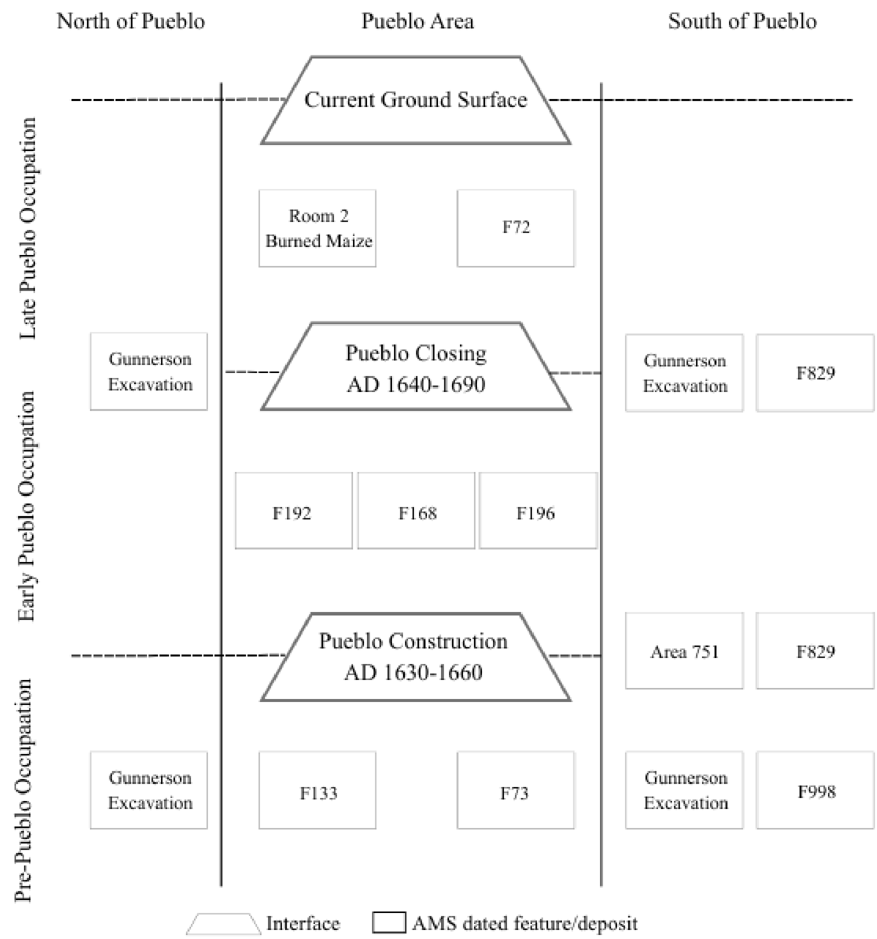

Figure 9. Idealized stratigraphic relationship among features at the Scott County Pueblo (14SC1). Dates and relative stratigraphy from Bayesian analysis from Hill et al. 2018 and Wilfong and Hill 2022. Adapted from Hill et al. 2018.

the Rocky Mountains (Trabert et al. 2016). Around AD 1630-1660, migrants from the Northern Rio Grande region joined the local Ndee community and constructed the seven-room masonry pueblo on top of the previous occupation (Beck and Trabert 2014; Hill et al. 2018; Trabert et al. 2022; Wilfong and Hill 2022). These dates align with the earliest recorded migration of Northern Rio Grande residents to “El Cuartelejo” around AD 1639 (Gunnerson 1987). The burning of the pueblo occurred between AD 1640 and1690. This event was likely a ritual closure, based on similar practices from the American Southwest (Adams 2016; Adler 2021; Beck et al. 2024; Hill et al. 2018; Walker and Berryman 2023). The refined timeline challenges previous interpretations that tied the pueblo more directly to the movement of people responding to the Pueblo Revolt of 1680 (Beck and Trabert 2014; Beck et al. 2016; Hill et al. 2018).

While the majority of ceramics recovered at the pueblo are Dismal River Gray Ware, reanalysis of the collections from 14SC1 identified Northern Rio Grande ceramics (Tewa Red and Kapo Black wares) and locally made copies of Puebloan utilitarian vessel forms within the same contexts (Beck and Trabert 2014; Beck et al. 2016; Trabert 2015, 2017; Trabert et al. 2016). Less than one percent of the ceramics from Wedel and Witty's excavations were manufactured in the Northern Rio Grande. Trabert (2019:12) argued the 600-kilometer (373 mile) distance between the Ladder Creek Valley and the Northern Rio Grande would have made it "difficult for migrants to maintain a steady influx of objects and foods from their homes." Instead, Puebloan potters maintained their traditional knowledge and manufacturing skills to produce Northern Rio Grande forms locally, including short-upright jars and bowls (Trabert 2015, 2017, 2019). Puebloans relied more heavily on bowls for preparing and serving food tha Ndee counterparts, which leads to distinct ceramic assemblages (Beck and Trabert 2014; Trabert 2015). The bowl-to-jar ratio at the Scott County Pueblo was 2:1, which is similar to other Northern Rio Grande assemblages (Beck and Trabert 2014). In contrast, Ndee sites in the region have much lower bowl-to-jar ratios at 0.26 or lower (Trabert 2017). Wedel's excavations north of the pueblo also have a lower bowl-to-jar ratio, comparable to Dismal River sites regionally (Beck and Trabert 2014). This is consistent with the interpretation that Wedel (1940, 1959) excavated into the Dismal River occupation at the pueblo. The ceramics at the Scott County Pueblo also indicate that the occupants produced utilitarian pottery using blended manufacturing techniques, combining Puebloan practices of coiling, slipping, and polishing with new techniques of hand building and burnishing that they likely picked up from the local Ndee community (Beck and Trabert 2014; Trabert 2017).

Wilfong and Hill (2022) examined the faunal assemblage from Gunnerson's excavations to gain further insights into subsistence strategies at the site. Based on their analysis, they concluded that bison were central to subsistence at the site with medium-sized artiodactyls and smaller prey, including deer, pronghorn, turtles, and canids (likely domestic dogs) supplementing their diet. Other species such as eagles, foxes, and badgers were present but likely not used as food sources. The overall use of prey is broadly similar to other Dismal River sites across the plains, including 14SC409 (Hill and Trabert 2018), White Cat (Gunnerson 1960), Humphrey (Bozell et al. 2021), Lovitt (Hill and Metcalf 1941), and Petch Spring (Reher 1973). Although some Scott County Pueblo residents came from the Northern Rio Grande, the subsistence strategies represented at the pueblo differ from typical patterns seen at pueblos in the American Southwest. Northern Rio Grande faunal assemblages have higher frequencies of deer, pronghorn, and rabbits with a much more modest use of bison (Wilfong and Hill 2023). Rodents and other small-bodied animals are present in moderate quantities and frequently consumed.

Gunnerson's northern excavation at the pueblo likely overlapped the same trash midden Wedel (1940, 1959) encountered during excavation. Radiocarbon dates suggest this area predates the construction of the pueblo. Yet faunal evidence from both the north and southwest areas is remarkably similar, especially in the utilization of bison, which suggests a consistent subsistence strategy across the site's occupation (Wilfong and Hill 2022). If this is the case, Puebloan migrants appeared to have adapted to local resources much like the Ndee community they joined. While large-game procurement was a significant component of the site's occupational history, the charred corn at the site also indicates the occupants supplemented their diets with maize horticulture. The variety of maize at the site is a Great Plains variety similar to those recovered from Lovitt (25CH1) and Nichols (25DN1). Plant remains at the site also include watermelon and other melons like cantaloupe (Adair 1992). Watermelon is a Spanish import that Puebloans grew in villages across the Northern Rio Grande by the late sixteenth century or early seventeenth century.

Relatively little is known about the lithics at the Scott County Pueblo. In 1997, Todd Butler defended his master's thesis examining the relationship between raw material selection and tool forms from the Witty (1970, 1975, 1976) excavations. Locally available Smoky Hill jasper accounts for nearly 62% of the assemblage and far exceeds the other raw material types in the assemblage. Other raw material types present included Alibates, quartzite, chalcedony, basalt, and unidentified cherts. Harder materials like Alibates and basalt appeared to be preferentially selected for certain tool types like scrapers and projectile points. Overall, the assemblage emphasized formal tool production with moderate amounts of informal tools consistent with hunting and hide scraping activities. In comparison with other sedentary and semi-sedentary sites on the Great Plains, the pueblo had a higher frequency of informal tools. Then undergraduate Veronica Mraz (2010) completed a debitage analysis with the artifacts from Gunnerson's excavations and found that mostly late stage production occurred at the site.

Although it is not entirely unclear what happened to the pueblo occupants, Trabert (2019:108) argues that "the distance paired with unrest from Spanish interference and their construction of a permanent pueblo home makes it unlikely that this was a temporary move." At least some migrants from the Northern Rio Grande region and their descendants chose to remain in the area and integrate into the local Ndee community. Sites post-dating the pueblo (14SC304 and 14SC409) show an interesting mix of creolized practices as people maintained both Dismal

River and Puebloan material culture, including locally made Puebloan-style ceramics at sites with Dismal River pottery and architecture (Beck et al. 2016; McGrath et al. 2017; Trabert 2015). Evidence of Puebloan influence at Dismal River sites does appear to be limited to the Ladder Creek Valley.

Trabert (2015, 2017) argues that the Ladder Creek Valley represents a middle ground. White (1991) first coined the term to describe contextually specific interactions between French colonists and Indigenous people near the Great Lakes. However, scholars like Trabert have successfully applied the metaphor to conceptualize how people with diverse histories and interests actively negotiate economy, power, status, and identity. Building on this, Trabert, Hill, and Beck (2023) situate the Puebloan presence in the Ladder Creek Valley within a broader Puebloan diaspora that recognizes that migrants did not sever ties to their homelands but rather carried them forward into social negotiations with local Ndee. The Ladder Creek Valley is a strong case study to understand how pluralistic communities produce forms of hybridity, which develop in place over time and are still traceable though material culture in the archaeological record.

Below I briefly describe the archaeological investigations at the sites (Figure 10).

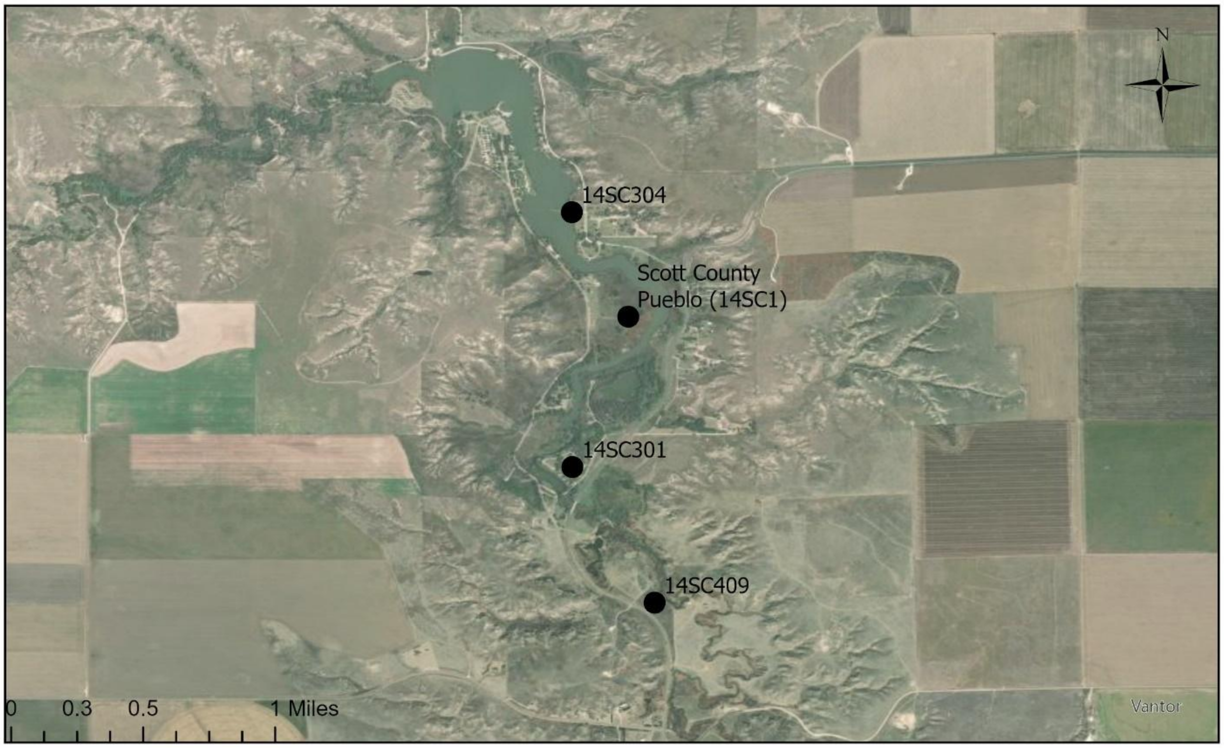

Figure 10. The Scott County Pueblo and Dismal River sites pre- and post-dating the pueblo.

14SC301 (formerly 14SC102 and 14SC103)

Site 14SC301 is located near the southern end of Scott State Park on a terrace adjacent to the east side of Ladder Creek, approximately 1,000 meters south of 14SC1. A relatively large occupation, the site is thought to encompass approximately five hectares (12.3 acres). The site was heavily disturbed throughout the twentieth century, primarily due to its continued use as a campground for Scott State Park. Today, the site is marked by concrete camping pads, fireplaces, picnic tables, shower and toilet facilities, and a number of different roads. Highway K-95 runs through the eastern half of the site. The remains of an early twentieth century railroad cut are also present across the archaeological site. Previous use of the area included a pasture where bison were allowed to graze (Gunnerson 1969).

Gunnerson first recorded the occupation in 1965 as two archaeological sites, 14SC102 and 14SC103; however, he acknowledged that the close proximity and dense cultural presence meant that the two sites might share one unified boundary (Gunnerson 1969). Upon revisiting the site in 1970, Witty (1985) confirmed the areas overlapped and reassigned the site number 14SC301. Very little is recorded of the early archaeological fieldwork at the site. Gunnerson (1969:48) identified a "limited" artifact scatter west of the railroad cut in the campground, which included Dismal River sherds. He assigned this area 14SC102. The area immediately surrounding the railroad cut was designated 14SC103 due to the presence of a baking pit with a human burial removed by collectors in 1951 (Gunnerson 1969; Witty 1973, 1975). During his investigations, Gunnerson also excavated a roasting pit. Previous investigations by Wedel and A.T. Hill also revealed hearths and roasting pits in the area (Wedel 1959:435-437). Wedel identified hearths and a partially disturbed baking pit on the same terrace. He also indicated that Hill had previously located a roasting pit west of the railroad cut.

In 1969, the Kansas Highway Commission constructed Highway K-95 as an access loop down through the valley and park, crossing the terrace Gunnerson had previously identified as sites 14SC102 and 14SC103 (Witty 1985). To assess the damage from the construction of the highway, Witty visited the site in the summers of 1970 and 1971. The new road cut had exposed a storage pit and several hearths. Witty also identified lithic debris, several pottery sherds, and small plain, triangular, and side-notched projectile points consistent with a Dismal River occupation. Additional testing in 1971 revealed the remains of a roasting pit on the western edge of the terrace. During the seventies and eighties, the park proposed the construction of RV parks near the southern portion of the camping area. Witty visited the area twice more in 1976 and 1983 to assess the impact the construction would have on the archaeological site. New investigations revealed additional surface materials as well as sub-surface deposits, including charcoal and burnt earth between 20 and 25 centimeters below the ground surface. The RV park was relocated due to avoid further damaging the site.

In 2009, the Kansas Archaeological Training Program (KATP) completed a survey that substantially increased the site's known area east of K-95 to the boundaries currently on file at the Kansas Historical Society. Surveyors collected nearly 300 artifacts, including red-slipped and black-slipped pottery, a triangular projectile point, a scraper, a spokeshave, bifaces, debitage, shell, and bone (Hoard 2009). Scott State Park proposed the addition of electrical outlets to the southern two rows of campsites at the campgrounds. To test for significant cultural impacts, the 2009 KATP crew completed 25 shovel tests in three transects across the proposed project area. They identified cultural material in two of the 25 shovel tests. The first positive shovel test was nearest to Ladder Creek and contained three flakes and bone fragments. The second positive test contained a modified flake. All cultural materials were found at approximately 35 cm below the ground surface indicating there may be an intact cultural level present at that depth.

14SC304 (formerly 14SC111)

Site 14SC304 is located on a terrace extended out into Lake Scott (formerly Ladder Creek). The site was likely occupied around AD 1680-1730, placing it near the last occupation or after the closure of 14SC1 (Hill and Trabert 2018). Like many of the sites in the area, Scott State Park constructed modern facilities including a fishing pier and bathrooms within the site boundaries, which has led to significant disturbance. James Gunnerson initially recorded the site as 14SC111 and completed surface survey and limited excavations in 1965 (Gunnerson 1968, 1987, 2006). He identified a light scatter of artifacts and charcoal along the western edge of the access road that crossed the site. Though relatively little is known about Gunnerson's initial excavations, his notes indicate that his crew excavated two large trenches, 65 and 42 feet respectively, and two test excavation units of unknown size. During this process, the team uncovered a buried feature that Gunnerson identified as a Dismal River aspect structure (approximately 3.6 meters in diameter) that had a central hearth, five-post perimeter, and central post. Artifacts recovered in the excavation include debitage (predominately Smoky Hill jasper), a single end scraper, three side scrapers, a sandstone grinding slab, sandstone abraders, and a possible hammerstone. The crew also recovered mica-tempered potsherds: 77 red-slipped and 813 gray-slipped. Gunnerson (2006) believed these red-slipped sherds were locally made, imitation Tewa Pueblo redware, which he labeled Leadbetter Red.

Following Gunnerson's excavations, Witty led fieldwork at the site several times over the next several decades. A series of surveys in the 1970s revealed ceramic sherds, faunal remains, and debitage eroding from the access road and along the edge of the shoreline due west of the public restroom. While no excavations took place during the 1970s, Witty led limited testing in the spring of 1985 following the park's proposed construction of a modern fishing pier on the site, which included 30 Oakfield coring probes and a single 0.5 x 1.0 meter test unit that was excavated up to 20 centimeters below the ground surface. The cores revealed a charcoal layer present between 30 and 35 centimeters below the ground surface, while the test unit produced both charcoal and a steel metal pin that Witty believed was from Gunnerson's original excavations. Witty also noted that the access road, a loop going through the site, had gotten larger since his original fieldwork in the 1970s and that there was a distinct drop in the number of surface artifacts visible at the site. The shoreline had also eroded approximately 1.5 meters into the lake within the last decade. This prompted Witty (1985) to hypothesize that relatively little was left of the site in 1985.

Archaeologists with the Kansas State Historical Society (KSHS) conducted fieldwork in 2009 following the proposed construction of rental cabins at several sites across the park (Hoard 2009). Upon visiting 14SC304, they noted that significant changes had occurred since Witty's excavations in 1985, including the construction of a modern fishing pier, installation of barbeques and firepits, expansion of the road, and the placement of bathroom facilities near or on top of the Dismal River structure Gunnerson excavated in 1965. Matthew E. Hill and Sarah Trabert (2014) from the University of Iowa disputed this point, arguing that photographs and field notes from Gunnerson's excavations indicate that the structure was located slightly south and west of the newly constructed bathrooms. The KSHS survey of the area expanded the site boundaries and included 123 bucket auger tests near and within the site. Of the 123 augers, 23 (18.7%) were positive for cultural materials. The crew identified lithics, bone, and charcoal in these auger tests, which suggested that intact deposits exist at a depth of 20-60 centimeters.

To further explore the nature of the site's occupation, Hill and Trabert completed fieldwork at the site several years following the KSHS testing. In 2011, they completed GPR of the site and drafted a topographic map of the area. Two geophysical grids were set up south and east of the house Gunnerson excavated, based on Hill and Trabert's assumption that it is located near but not under the modern bathroom facilities. The GPR survey revealed six anomalies that had the potential to represent subsurface archaeological deposits at depths of 0.14 to 1.62 meters below the ground surface (Hill and Trabert 2014; Trabert and Hill 2013). In 2013, I joined Hill and Trabert as an undergraduate student at the University of Iowa and helped complete additional fieldwork at the site. This included conducting additional pedestrian survey and placing seven bucket augers in the areas where GPR anomalies had been identified the year prior. The surveyors recovered lithic debris (n=6), all Smoky Hill jasper. Two tests were positive for cultural material: two flakes at 0-18 centimeters. Based on these results, Hill and Trabert (2014) concluded that the anomalies likely did not represent buried cultural deposits, further supporting previous research that suggests much of the site has been destroyed or covered by recent constructions. Radiocarbon dates indicate that the occupation was occupied between AD 1680 and 1740 (Trabert et al. 2017).

14SC409

Site 14SC409 is located on the west side of Ladder Creek on a terrace sloping slightly up to the west. The site was originally recorded in 1976 by archaeologist Terry Howell as a small artifact scatter over two acres, though the artifacts were concentrated in one area. The surface materials identified at the site included two cord marked ceramics and a small quantity of lithics, faunal remains, and shell fragments (Hoard 2009). In 2009, archaeologists and volunteers with the Kansas State Historical Society (KSHS) completed additional fieldwork at the site, including survey and minimal excavation. The initial survey found the site to be significantly larger than Howell initially recorded (nearly nine acres), expanding the boundaries north and west, across the road to the south, and a short distance up a bluff. Investigators identified a significant quantity of surface materials, including Puebloan-style pottery.

Project leads set up a 20-meter square grid and initiated test excavations within the artifact concentrations and at the grid corners, opening 18 units. Excavations revealed a vertical artifact concentration at 17-22 centimeters below the ground surface, containing Dismal River pottery, red-slipped Puebloan-style pottery, a projectile point fragment, a drill, a spokeshave, four biface fragments, 13 scrapers, a core, lithic debris, faunal remains, a French gunflint, and Olivella shell beads. French gunflints of this nature date to 1675-1800 (Hoard 2009). Below the artifact concentration, they exposed a large cluster of rocks from the nearby hills. Excavators used an Oakfield probe to test below the rock and found faunal bone approximately 50-60 centimeters below the ground surface. Despite the recovery of bone, time constraints did not allow them to investigate the feature further (Hoard 2009). Based on the artifacts at the site and the lack of additional features, Hoard (2009) hypothesized that the site was a short-term occupation or resource processing area.

The site gained the attention of researchers from the University of Iowa who revisited the site in 2013, 2014, 2015, 2023, and 2024. In the summer of 2013, a small crew of students and faculty established a new grid that transected key areas of the previous excavation and opened a 2x3 meter excavation block above the rock feature. Excavations recovered 428 artifacts consistent with those found previously. Rodent activity at the site caused significant displacement of artifacts, though some intact post-holes were identified (Hill and Trabert 2014). The excavation extended the visible boundary of the rock feature, but time constraints prevented investigators from completing this work. Instead, the feature was revisited in 2014, when portions of a human cranium were identified, approximately two centimeters below the Kansas excavations. Based on instructions from the State Archaeologist and the Kansas Unmarked Burials Board, the remains were left in place, and no additional work is to be completed in that area of the site. The sex, age, ethnicity, or cause of death for the individual is not known; however, the tightly flexed position appears to be consistent with Ndee burial practices (see Trabert and Hill 2017 for further discussion of the burial and Dismal River burial practices).

Based on the artifacts and postholes, it is likely that the individual was laid to rest inside a camp and that the site was closed after this event.

In 2015, University of Iowa researchers revisited the site with Rory Becker (Eastern Oregon University) and Adam Wiewel (University of Arkansas) to complete small-scale geophysical survey. The focus of the survey was to identify possible features at the site, including the stone-lined burial to determine if similar features may be present (Becker and Wiewel 2015). The survey covered an area of 800 square meters with magnetic gradiometry, earth resistance, and aerial photography. None of the geophysical techniques detected anomalies consistent with a stone-lined burial. No other anomalies consistent with a feature occurred.

In February 2020, the KSHS led an investigation at the site in anticipation of a June 2020 Kansas Archaeology Training Program (KATP) field school. Investigators completed 125 shovel tests across a significant portion of the site, at 20-meter intervals (Skov 2020). Tests were generally excavated to 50 centimeters. They identified 115 artifacts, including lithic tools, debris, bone, shell, sherds, and burned limestone. Artifact concentrations were identified just north of previous excavations, including near the burial. They identified a possible feature approximately 30 meters west of the artifact concentration, which yielded burned limestone. The site was assessed as eligible for the National Register of Historic Places. No fieldwork took place in the summer of 2020 due to the Covid-19 pandemic. The University of Iowa conducted field schools in 2023 and 2024 during which they re-surveyed the site and opened units around the concentrations identified in KSHS fieldwork. The results of these excavations have not yet been released. Radiocarbon dates from the site indicate it was occupied after the closure of the pueblo between AD 1680 and 1740, approximately the same time as 14SC304 (Trabert et al. 2017).

Conclusion

The Scott County Pueblo (14SC1), and to an extent the Ladder Creek Valley, is a compelling representation of the far-reaching effects of Spanish colonialism on Indigenous communities living beyond the American Southwest. As this chapter has discussed, the movement of Puebloan migrants to the Plains was not an isolated event but part of a broader response to Spanish encroachment. Puebloans utilized long-standing mobility practices and interregional networks to escape the effects of colonialism, including violent encounters, disease, cultural suppression, and demands on Indigenous resources. However, the arrival of Puebloans to the Ladder Creek Valley of western Kansas not only affected the migrants but also the local Ndee, who navigated the ripple effects of Spanish actions without direct contact. The material culture at the pueblo and associated sites provides insights into the negotiation of identity and daily practice for these communities in the face of colonialism.

Chapter 3: The Reverberating Effects of Colonialism

Colonialism is a complex process involving not only territorial acquisitions and the establishment of colonies but also the ensuing social, economic, political, and demographic disruptions experienced by Indigenous groups (Cipolla and Hayes 2015; Ferris 2009; Gosden 2004; Panich and Gonzalez 2021; Panich and Schneider 2015; Paterson 2011). This complexity, along with the significant variation in how colonialism unfolded—depending on the timing, location, and powers involved—make defining the terms "colonialism" and "colonization" challenging. Michael Dietler (2010:18) offers a flexible definition, describing colonialism as “the projects and practices of control marshaled in interactions between societies linked in asymmetrical relations of power and the processes of social and cultural transformation resulting from those practices.” This definition broadens the concept of colonialism to include relationships that do not necessarily involve direct territorial subjugation, contrasting with "colonization," which more specifically refers to the act of expanding territorial control and imposing political authority over foreign lands and peoples (Dietler 2010:19).

For centuries, the prevailing narratives of colonialism were shaped by the written records of non-Indigenous narrators whose perspectives favored the interests of colonial powers. As a result, the complex and varied responses of Indigenous peoples to colonial pressures were reduced to simplified portrayals of passivity or resistance (Noelli and Ferreira 2007; Panich and Gonzalez 2021; Ojala 2019; Rubertone 1996, 2000; Silliman 2009). This oversimplification extended to early archaeological and anthropological scholarship, which framed Indigenous communities as unchanging, passive actors in the face of colonial dominance. Models like acculturation and core-periphery relationships reinforce the notion of unidirectional culture change, focusing on colonial structures as the primary drivers of transformation (Brittain and

Clack 2022; Cipolla 2021; Gravina et al. 2022; Liebmann 2013; Sobel 2012). However, as postcolonial and Indigenous-led scholarship has gained prominence, the emphasis has shifted toward recognizing the agency, adaptability, and resilience of Indigenous communities (Cipolla 2013; Panich et al. 2018; Panich and Gonzalez 2021; Sallum and Noelli 2020). These groups actively engaged with colonial forces, employing strategies such as adaptation, negotiation, and resistance to maintain cultural continuity while navigating the pressures of colonialism (Alexander 2019; Beaudoin 2013; Borck and Mills 2020; Card 2013; Dietler 2010; Orser 2006; Panich et al. 2018; Sallum and Noelli 2020). Rather than viewing colonialism as a one-sided process, contemporary studies highlight it as a multifaceted and entangled phenomenon in which Indigenous groups played active roles in shaping their responses. Concepts like ethnogenesis, hybridization, creolization, and entanglement now frame the ways in which Indigenous peoples negotiated their identities and material practices in colonial contexts (Brittain and Clack 2022; Card 2013; Cipolla 2017; Cipolla and Hayes 2015; Forde 2017; Liebmann 2015; Loren 2015; Panich and Gonzalez 2021; Silliman 2015; Trabert and Bethke 2021; Van Valkenburgh 2013; Voss 2015).

Archaeologists rely on material culture analyses to investigate Indigenous responses to colonialism. A useful framework for these studies is exploring the chaîne opératoire, which begins with raw material procurement and continues through production, maintenance, use, and eventually discard. This approach emphasizes that technological processes embody the choices individuals and communities make each day as well as capturing responses to broader social and political pressures, such as those associated with colonialism. Lithic artifacts in particular provide important insights into daily practice as they reflect technological knowledge, familiarity with available resources, material selection, and patterns of cultural transmission. While studies of colonial contexts have primarily focused on continuity and change in ceramics and architecture, exploring lithic technological studies through an analysis of the chaîne opératoire has significant potential to expand understandings of colonial interactions, particularly as they are often the most abundant artifact category at archeological sites. Recent research has successfully identified shifts in raw material procurement and use that reflect changes in exchange networks and access to resources (Buscaglia 2017; Rodríguez-Alegría 2008; Silliman 2015; Sobel 2012; Zeitlin 2015). However, other analyses focused on lithic morphology and frequency increasingly reveal the potential for lithics to contribute to broader understandings of colonial contexts (Cassell 2003; Johnson and Parish 2020; Vehik et al. 2021).

This chapter explores colonialism for communities on the periphery of direct colonial control, such as those in the Ladder Creek Valley. By examining both direct and indirect effects of colonialism, the discussion focuses on the ways Indigenous peoples maintained and transformed their cultural practices in response to shifting social and political landscapes. Technology, including lithic technology, serves as a key line of evidence in this exploration, which offers insights into how Indigenous groups selectively adapted or maintained traditional practices amidst colonial pressures.

Conceptualizing Colonialism in Archaeology

Historic accounts of colonial action were predominantly written by non-Indigenous authorities including officials, missionaries, and explorers whose narratives were inherently framed within their own positionality as foreign bodies. These accounts typically focus on matters of importance to colonial administrators, such as taxation, geography, trade, and the perceived threat posed by Indigenous communities (Panich and Gonzalez 2021; Ojala 2019;

Scheiber and Mitchell 2010). Authors specifically wrote these documents to emphasize information that would enable the infiltrating power to extract resources, manage populations, and secure colonial control. While it is true that some of these historic accounts attempted to document the cultural practices and beliefs of Indigenous groups, they were riddled with misinformation and ethnocentrism, frequently blending distinct communities together or presenting inaccurate representations (Ojala 2019). Importantly, these accounts rarely explored genuine Indigenous experiences and instead leaned into stereotypes of Indigenous inferiority, which portrayed Native peoples as uncivilized, resistant to progress, and in need of control or conversion. Such simplifications ignored the diverse and complex responses Indigenous populations had in navigating the pressures of colonialism. Indigenous communities were not static or homogeneous; they employed a range of strategies in response to colonial encroachment, including adaptation, negotiation, and resistance (Borck and Mills 2020; Cipolla 2017; Dietler 2010; Ferguson 1992; Groover 2000; Mullins and Paynter 2000; Orser 2006; Panich et al. 2018; Paterson 2011; Rubertone 2000). Despite the richness of these responses, early records framed Indigenous peoples as passive subjects and deferred their experiences to the narratives of the colonizers.

Early archaeological and anthropological research did not stray far from these colonial narratives. Much of the early scholarship portrays Indigenous communities as passive actors and emphasizes the dominance and agency of the colonizers while treating Native societies as unchanging, monolithic populations subjected to foreign powers. These included models centered on assimilation, acculturation, and the dichotomies of core versus periphery prevalent in World Systems Theory (Deagan 1998; Dietler 2010; Ethridge 2009; Gonzalez and Panich 2021; Groover 2000; Paterson 2011; Rubertone 2000; Silliman 2009; Stein 1999; Wallerstein 1980).

This research framed Indigenous societies as being on the receiving end of a unidirectional process of domination, control, and assimilation, with little recognition of Indigenous agency; a framework that has been critiqued as grossly oversimplifying the dynamics of culture change (Knapp 2016; Noelli and Ferreira 2007; Panich and Gonzalez 2021; Ojala 2019; Rubertone 1996, 2000; Silliman 2009). The focus remained on colonial structures such as missions, forts, and European goods as the primary agents of change (Silliman 2015). This one-sided portrayal failed to capture the profound and varied effects that colonialism had on the lived experiences Indigenous populations. While the arrival of the Spanish undeniably brought significant disruptions through the introduction of new technologies, diseases, economic systems, and conflict, Indigenous responses were more complex and varied than simplified models of control and conquest suggest (Cipolla and Hayes 2015; Clack and Brittain 2022; Panich and Gonzalez 2021). Native communities did not simply submit to or resist colonialism in binary terms. Instead, they employed a wide range of strategies, sometimes concurrently, to navigate these changes, including but not limited to selectively adopted foreign practices, forming strategic alliances, or relocating away from colonial centers.

Beginning at the end of the twentieth century, scholarship has increasingly drawn from postcolonial studies to correct earlier oversights (Alt 2006; Given 2004; Gosden 2004; Harrison 2014; Lydon and Rizvi 2010; Montgomery and Colwell 2019; Mrozowski et al. 2015; Panich et al. 2018; Panich and Gonzalez 2021; Silliman 2015; Stockhammer 2012). Researchers now recognize that Indigenous communities actively shaped their responses to colonial forces and negotiated the terms of their engagement rather than acting as passive recipients of foreign influence. The varied and complex experiences of Indigenous peoples cannot be fully captured by early, oversimplified narratives and models of control. Instead, they require a more nuanced understanding of colonialism as a complex process that involves imposition, adaptation, resistance, and cooperation, with Indigenous peoples playing an active role in shaping the course of their histories (Panich and Gonzalez 2021). The concepts archaeologists have applied to better understand the dynamic nature of Indigenous negotiation within colonial contexts include frameworks such as ethnogenesis, hybridization, creolization, coalescence, and agency (Brittain and Clack 2022; Card 2013; Cipolla 2017; Dietler 2010; Loren 2015; Panich and Gonzalez 2021; Paterson 2011; Rubertone 2000; Silliman 2015; Stewart 2016; Voss 2015).

By foregrounding Indigenous agency in colonial studies, scholars are better able to capture the breadth and complexity of strategies that Native populations employed to navigate colonialism. Rather than a single event, colonialism unfolded as an uneven process of coerced and negotiated entanglements that reworked kin ties, economies, governance, and ceremonial life across household, village, and regional scales. Within this shifting field, Indigenous peoples pursued diverse responses, including increasing their reliance on exchange networks, selectively adopting foreign practices and materials to fit existing cultural frameworks (Cipolla 2017; Delsol 2020; Dietler 2010; Ehrhardt 2013; Griffitts 2013; Keehnen and Mol 2020; Legg et al. 2019; Walder 2019), aggregating social groups (Bernard 2008; Gosden 2004; Smoak 2006; Weisman 2007), creating hybrid communities (Card 2013; Cipolla 2017; Gosden 2004; Peelo 2011; Silliman 2015; Voss 2015; Weisman 2007), migration and dispersal (Church et al. 2021; Cipolla 2017; Hayes 2015; Trabert et al. 2023), and resistance (Borck and Mills 2020; Cusick 2000; Liebmann and Preucel 2007; Orser 2006). Material culture, especially technologies embedded in daily practice like ceramics or lithics, offer a glimpse into community responses (Silliman 2015).

Indirect Effects of Colonialism

The previously mentioned effects of colonialism are not isolated. Although people in direct contact with Europeans may have felt the extent of these consequences more than those living distant from European settlements, communities situated outside formal colonial borders still experienced uncertainty and instability that affected their everyday lives. These rippling effects traveled through social and economic exchange networks quickly, carried by the movement of people, goods, pathogens, animals, and ideas (Bethke 2017; Delsol 2020; Dietler 2010; Ethridge 2009; Harrison 2014; Lightfoot et al. 2013; Mathwich 2021; Panich 2017; Panich and González 2021; Silliman 2015; Stewart 2016; Stockhammer 2012; Vehik et al. 2010). Colonial actions, and Indigenous responses to them, could disrupt established exchange networks or in some cases, strengthen and expand traditional patterns of resource acquisition. For example, Elizabeth Sobel (2012) identified an increase in obsidian artifacts at Chinookan sites on the Northwest Coast, which suggests intensified participation in regional exchange networks. In other cases, shifting demands and alliances resulted in communities relying on more easily accessible or less desirable lithic raw materials (Bagley et al. 2014; Hart and Dillon 2019; Hull and Voss 2016; Zeitlin 2015). These dynamics altered, sometimes permanently, subsistence strategies, mobility, and household labor; reconfigured intercommunity alliances; and reshaped how people materialized identity, status, and belonging.

Scholars are still exploring how these indirect effects manifest in the archaeological record. However, research is increasingly revealing that these indirect effects are visible as complex, patterned changes across archaeological sites rather than a single, obvious occurrence. From a landscape perspective, the aggregation or dispersal of settlements and changing land use patterns can be strong indicators of an Indigenous response to colonial influence (Bethke 2016, 2020; Church et al. 2021; Liebmann 2021). While populations within or near colonial centers exhibited dramatic responses to colonial action, changes farther away from the periphery were often the result of shifting demands in exchange networks or the introduction of new goods and technologies. For many, the arrival of the horse, for example, fundamentally shifted how communities traveled across the landscape and participated in conflict and exchange (Bethke 2016, 2020; Mitchell 2015; Sobel 2012). Within settlements, shifting organization, structures, and features like fortifications or new dietary patterns can be indicators of cultural shift (Panich and Gonzalez 2021; Sallum and Noelli 2020; Voss 2015). Exchange items such as glass beads, metals, and livestock appear in places with little or no direct European presence, while local styles persist or blend with nonlocal foreign forms (Delsol 2020; Howey 2011; Panich 2014, 2017; Walder 2019). Shifting raw material use and procurement provides insight into changes brought on through colonialism (Sobel 2012; Zeitlin 2015). While these may present as subtle changes in daily practice, collectively they can reveal how people navigated the new risks and opportunities presented to them.

The demographic displacement of Indigenous populations was one of the most significant social changes to occur in the face of European colonialism of North America. Across the continent, Indigenous populations migrated farther into the interior to avoid European and later American control and violence. This movement caused fleeing migrants to encroach on their neighbors' territories (Cipolla 2017; Gosden 2004; Kulisheck 2003, 2010; Rothschild 2006). For many, the displacement of communities into neighboring regions escalated tensions as migrants entered populated landscapes and competed for resources and participation in exchange systems (Hayes 2015; Liebmann 2021). While conflict or distance persisted for many, some migrants were able to support themselves in these new lands by living alongside allies. In the American

Southwest, the fallout of the Pueblo Revolt led many Puebloan refugees to move into Dinetah territory (Preucel 2010; Van Hoose 2008; Wilshusen 2010), while in California, Spanish actions drove coastal groups inland where they formed maroon communities with other displaced groups (Bernard 2008). In multicultural contexts such as these, individuals would have actively negotiated meaning, practices, and power as they encountered new people, ideas, and technologies. Outcomes of these prolonged interactions range across a spectrum from maintaining distinct cultural and ethnic boundaries to selective adoption and adaptation to the emergence of hybrid traditions and eventual creolization that reconfigured identities, lifeways, and material practices.

Given these realities, considerations of agency, practice, consumption, and creolization are essential for understanding the indirect effects of colonialism, which contributed to social, economic, political, and demographic changes in societies living beyond formal colonies. The indirect or down-the-line effects offer insights into the extent and intensity of change, providing a more comprehensive picture of what it truly meant for a region or continent to experience colonialism.

Creolization and New Community Formation

Creolization refers to the process by which distinct cultural groups, primarily in colonial or post-colonial contexts, come into contact and create new, hybrid cultural forms and identities as a result of intense social, economic, and political interactions between distinct groups (Mullins and Paynter 2000). In colonial contexts, people displaced by colonial actions often moved into regions that were already occupied by other social groups. Although small in scale, these encounters took place within heterogeneous, dynamic communities where individuals negotiated, mediated, and resisted power imbalances in their daily lives (Baron and Cara 2011; Card 2013; Carr 2012, 2022; Cohen and Sheringham 2008; Crowder 2020; Funari and Carvalho 2022; Hofman et al. 2022; Lightfoot 1995; Maier 2015; Mullins and Paynter 2000; Rosén-Wiksten 2023; Silliman 2020; Stewart 2016; van Pelt 2013; Van Valkenburgh 2013). Within these spaces, people had the ability to shape new traditions that diverged from the original cultural practices of any group. While cultural values were retained in these negotiations, the expression of these ideals and behaviors often led to the formation of creolized communities (Brittain and Clack 2022). While the concept of creolization has been critiqued (Cusick 2000; Hauser 2017; Palmié 2006), Groover (2000) highlights that the concept of creolization is intentionally broad as the adaptability of the term enables researchers to consider different situations in which cultural blending and the formation of new identities occur (Brittain and Clack 2022; Hofman et al. 2022). How creolization is defined and applied depends on the specific historical and social circumstances under investigation (Brittain and Clack 2022; Hauser 2017). This wide applicability makes creolization a powerful concept for understanding the dynamics of cultural exchange and identity creation in colonial and post-colonial contexts.

Creolization results in fluid cultural boundaries where people from different backgrounds creatively blend their traditions, which ultimately creates unique combinations of architectural styles, artifact forms, and daily practices (Brittain and Clark 2022; Hauser 2017; Limmer 2021; Rodning 2009; Voss 2005). These creolized communities did not simply adopt a "dominant" culture; instead, all participants contributed to hybridized forms that were distinct from their original traditions. In their discussion of the Mississippian Shatter Zone, Ethridge (2009) and Shuck-Hall (2009) stress that contact with Europeans did not destroy Indigenous societies but rather contributed to the transformation and reformation of social institutions. Communities like the Alabama and Coushatta used marriage and complex kinship systems to strengthen social ties that allowed them to maintain social cohesion and adapt to changing political and economic landscapes. Communities would have negotiated new social relations on a daily basis that could have led to extreme or subtle changes in their communities.

Archaeologists have described the locations of creolization as shatter zones, frontiers, borderlands, hinterlands, and middle grounds. Each of these spaces has unique criteria, reflective of the colonial processes at work. The importance of local histories and restricted circumstances by which each form makes it difficult to apply these theoretical models beyond specific places and times. Prior research in the Ladder Creek Valley provides context for how occupants negotiated daily practices and identity in the multicultural setting (e.g., Beck et al. 2024; Beck et al. 2016; Beck and Trabert 2014; Hill et al. 2018; Hill and Trabert 2018; McGrath et al. 2017; Trabert 2015; Trabert et al. 2017; Trabert et al. 2023; Wilfong and Hill 2022). The appearance of both Ndee and Puebloan practices at the same occupations suggests the local population, migrants, and perhaps even their descendants selectively continued or altered certain aspects of their daily lives. This evidence indicates the Ladder Creek Valley functioned as a middle ground where culturally distinct communities navigated coexistence and eventually gave rise to a creolized community.

Defining the Middle Ground

The concept of "middle ground" has emerged as a vital framework for understanding colonial interactions. Richard White first introduced the term in his 1991 volume *The Middle Ground: Indians, Empires, and Republics in the Great Lakes Region, 1650-1815* as a spatial metaphor to understand the complex and contextually specific interactions between Indigenous peoples and French colonists in the Great Lakes region of French Canada. He argued that the middle ground was a space where no single group could dominate the other (i.e., a rough balance of power), leading to negotiation, or mediation, for both economic and social advantage. This process produced new forms of cooperation and interaction (Gosden 2004; White 1991). Such interactions were critical in reshaping social, economic, and political relationships, even though both sides had the potential to misunderstand the other's values and intentions. While White originally conceived the middle ground as a metaphor specific to the Great Lakes context, archaeologists and historians have since adapted the concept as a theoretical tool to conceptualize places where Indigenous and colonial actors interacted, negotiated alliances, and exchanged elements of their cultural practices and identities (Dietler 2010; Gosden 2004; Malkin 2002; Trabert 2017; van Dommelen 1997, 2012). This framework allows archaeologists to explore intersecting processes of meaning-making, performances, and communication that arose in these encounters, as competing interests and identities come together to navigate power imbalances and misunderstandings (Dietler 2010:354; White 1991).

In a follow-up to his 1991 publication, White (2006) argued that archaeologists had misunderstood the original application of the middle ground and that it had never been intended as a theoretical concept. Instead, he argued it was a metaphor explicitly for the Great Lakes context his book described. Despite his own reservations, he reluctantly acknowledged that the middle ground is a process that could be replicable in other spaces and time; however, he and other scholars such as Vine Deloria (2006) debated the success of such applications (Deloria 2006; White 2006). Deloria (2006) argued lack of understanding of White's original intent had led many archaeologists to over-simplify and misapply the concept to describe *any* Indigenous-colonial encounter. Despite this critique, many scholars have found value in using the middle ground to conceptualize understanding multicultural contexts stemming from colonial entanglements, even beyond direct colonial control.

For this research, I follow Trabert's (2015, 2017) framing of the Ladder Creek Valley and return to White's (1991) original definition of middle ground as a "the place in between: in between cultures, peoples, and in between empires and nonstate world of villagers" (XXVI). He situated this space both in time and in reference to European colonialism by arguing that middle grounds existed before colonialism and represented a place for people to interact with one another. These spaces later served as stages for European expansion and the displacement of Indigenous peoples (Parker 2006; White 1991). When archaeologists consider the effects of colonialism, it is essential to recognize that much of the interaction and change taking place outside of colonial borders stem from Indigenous communities occupying the same physical and social space. For millennia, the Great Plains has been central to many exchange networks where people, materials, and ideas were shared with communities from neighboring regions (Barr 2005; Brosowske and Bevitt 2006; Eiselt and Snow 2017; Kidder 1932; Wedel 1967, 1982). However, the arrival of Europeans, including the Spanish in the American Southwest, led to an increase in the number of migrants seeking refuge from the Spanish in neighboring regions like the Great Plains.

Great Plains communities experienced significant social, economic, and demographic change in the wake of European colonial activities. Although Ndee communities rarely encountered Spanish explorers in their ancestral homelands of modern-day Kansas, Nebraska, Colorado, and Wyoming, archaeological evidence points to existing relationships with neighboring Plains groups and the American Southwest (Gunnerson 1960; Hughes et al. 2019; Reher 1973; Trabert 2015). These long-standing connections entangled Ndee communities with the broader colonial processes affecting the Southwest, through economic changes and demographic shifts as people left Puebloan settlements. To best understand how colonialism impacted Ndee communities living on the Great Plains, the Ladder Creek Valley of western Kansas should be conceptualized as a middle ground where different people, cultural practices, and technology intersected to create an "in between."

Daily Practice and Chaîne Opératoire

While archaeology focuses heavily on the material remains of past societies, the study of objects and features serves as a pathway to infer past behaviors and practices. Asa Berggren and Liv Nilsson Stutz (2010:173) emphasize that, due to the limitations of the archaeological record, researchers focus more on the activities people engaged in rather than the deeper meanings behind those actions. Meaning is continuously created, reinterpreted, and transformed through daily practices, and this embodied knowledge reflects broader cultural and community structures. Daily life is, therefore, a critical reflection of the organizational principles and cultural norms of a society. Through their practices, people engage with material culture to assert identity and respond to shifting conditions (Borck and Mills 2020; Card 2013; Cipolla 2017; Lightfoot 2015; Peelo 2011; Sallum and Noelli 2020). These practices are reproduced and sometimes changed unconsciously, guided by what Bourdieu (1977, 1990) and Ortner (1984) refer to as *habitus*, the ingrained behaviors shaped by the cultural environments in which people are raised.

While habitus explains many ingrained practices, scholarship has also recognized that cultural change can be a conscious and deliberate process (Borck and Mills 2020; Card 2013; Joyce and Lopiparo 2005; Overholtzer 2012). In contrast with Bourdieu's (1977, 1990) emphasis on unconscious and internalized behaviors, Giddens (1979) argued that human practices were goal-oriented and that individuals knew how to act based on a nondiscursive understanding of social institutions (Dornan 2002). Archaeologists utilizing practice theory challenge the assumption that cultural change is always unconscious and emphasize that material culture should be viewed as an active medium through which people construct identity and transform their practices in response to new events (Lieb 2008; Peelo 2011; Stone 2015). In colonial contexts, for example, Native communities may have redefined cultural practices and reordered their daily lives to navigate the changes brought on by European colonialism (e.g., Borck and Mills 2020; Cipolla 2013; Roslund 2022; Sallum and Noelli 2020). Identities and practices are historically constructed; they are not static. Material culture provides a means to investigate the ways in which groups actively chose to retain traditional practices or make changes (Card 2013; Overholtzer 2012; Peelo 2011).

Culturally embedded practices are reflected in how individuals organize their spaces and define their daily domestic activities. This patterned behavior extends to the techniques people use to create and use tools, vessels, and other artifacts, which can be understood through the concept of the chaîne opératoire; the sequence of steps involved in the production, use, and discard of objects (Atalay and Hastorf 2006; Bar-Yosef 1991; Borck and Mills 2020; Dietler and Herbich 1998; Hofman et al. 2022; Lightfoot et al. 2010; Sallum and Noelli 2020; Sellet 1993). The chaîne opératoire can lead to valuable insights into how individuals make decisions about the raw materials they select, the tools they use, and the specific techniques they apply in crafting objects. These choices, while sometimes unconscious, are deeply informed by the cultural traditions and practices of their communities (Borck and Mills 2020). Therefore, each object or artifact reflects the decisions of each group, household, or person who interacted with it (Mullins 2011).

Manufacturing practices for everyday items tend to be conservative as they reflect socially structured behaviors tied to a group's daily routines (Graesch et al. 2010; Rothschild 2006). Even when groups move into new regions, their material culture—whether in the form of architecture, vessel styles, tool-making techniques, or artifact forms—often maintain continuity, which offers archaeologists insight into group identity and the role of daily practices in preserving cultural traditions. At the same time, people can mobilize material culture to negotiate everyday practice and to signal, contest, or reinforce their positions within society (Borck and Mills 2020; Chenoweth 2009; Sallum and Noelli 2020; Stone 2015). This is also true of space, and by extension, architecture as a form of material culture. By analyzing the chaîne opératoire, archaeologists can reconstruct the decisions and actions involved in creating artifacts and relate these to broader cultural practices, particularly as changes do arise in response to intense cultural contact when "people will reconstitute and reinterpret cultural practices in ways that both makes sense of 'others' and best suit their own interests" (Lightfoot et al. 1998:201). Through repetition, new practices become normalized, lend permanence to new social arrangements, and mute contradictions or tensions (Stone 2015).

In the nineteenth century, the Russian-American Company dispatched Native Alaskan men to labor at Fort Ross where many established joint households with Native Californian women (Lightfoot 2003; Lightfoot et al. 1998). In these colonial settings, everyday practice and material culture were the means through which people negotiated structure and asserted positions. Women's influence was most visible in domestic routines such as cooking, cleaning, and the organization of residential space, while men's influence appeared at the scale of neighborhood planning and settlement orientation. Household foodways and material culture were selectively combined into hybrid practices that remained conservative enough to signal enduring identities but reflected Native Californian, Native Alaskan, and Russian preferences. Through the repetitive use of space, practice, and material culture, Indigenous households adapted to new arrangements and reinforced social identities despite colonial oversight. This case study demonstrates the complex ways in which routine material practices both preserve continuity and actively renegotiate practice in a multicultural community.

Technological Studies

Colonial contexts are inherently complex, particularly in multicultural communities or those living on the periphery of colonial control where people negotiated shifting power dynamics, identities, and material culture on a daily basis (Lightfoot 2015). By incorporating concepts such as daily practice and habitus, archaeologists have developed methodological approaches that move beyond static typologies or unidirectional change to examine how people reconstituted and reinterpreted cultural practices through routine engagements with material culture. These methodologies underscore that technological choice is embedded in socially structured routine and are key arenas in which colonial negotiation unfolded. Building on this foundation, the following section considers how practice-based approaches offer a more refined framework for understanding technological change in colonial settings.

European Goods as Proxies of Colonial Influence ("Standard View")

Historically, anthropologists and archaeologists have relied on dichotomous models such as acculturation to explain the effects of colonialism and culture contact. These frameworks assumed that Indigenous communities would quickly and passively absorb the "more sophisticated" technologies, of a dominant colonial power and treated the presence of this material culture in the archaeological record as a proxy for the degree of colonial influence (Deagan 1998; Deetz 1963). Archaeologists have long thought that this relationship would be reflected in the archaeological record through the abrupt replacement of traditional technologies with those introduced by Europeans (Cobb 2003; Cordell and Yannie 1991; Diamond 1997; Mullins and Paynter 2000; Rodríguez-Alegría 2008). However, colonial contexts are far more complicated than simple models of technological replacement. By examining how Native communities engaged with Western goods, scholars can better understand how technology is socially meaningful and actively negotiated over time. These processes of negotiation extend beyond Western goods to include toolkits introduced by neighboring and migrant populations, as well as existing Indigenous toolkits, which could be reconfigured, combined, or transformed in response to new social, political, and environmental challenges (Ehrhardt 2013; Sobel 2012).

Studies of technological change in colonial contexts have been framed by what Pfaffenberger (1992) calls the "Standard View" of technology, which emphasizes tools and techniques as rational solutions to environmental challenges. Within this framework, colonial encounters are measured in degree of technological replacement or acculturation. A common assumption, for example, is that metal tools quickly replaced lithics because of their perceived efficiency and superiority (Cobb 2003; Diamond 1997; Rodríguez-Alegría 2008). However, a growing body of research challenges this perspective and reveals that Indigenous communities often continued to use traditional technologies well into the colonial period, even while selectively incorporating new materials such as metal or glass (Ehrhardt 2013; Griffitts 2013; Martindale and Jurakic 2015; Scheiber and Finley 2010; Silliman 2010). Rather than simple replacement, these patterns reflect processes of adaptation, resistance, and identity formation, as communities blended new materials with established technological practices to meet changing social, cultural, and political circumstances.

Moving Beyond Western Goods as a Metric of Colonial Change

To better capture responses to colonialism, scholars have turned to concepts such as habitus and identity construction to frame technological changes and transitions in colonial contexts. These studies embrace technology not merely as the production and use of tools but rather as part of a broader social and cultural process that embodies community knowledge, identities, and power relations. Certain material cultural "were crucial to the reproduction of everyday practices and belief systems" (Cobb 2003:2). Understanding technology in this way involves considering the entire lifecycle of objects or the chaîne opératoire within their specific cultural contexts (Borck and Mills 2020; Dobres 1994, 2000; Sallum and Noelli 2020; Trabert 2017). This approach highlights that decisions surrounding technology are never purely functional but are deeply intertwined with social relationships, gender roles, and cultural values.

In colonial contexts where individuals and communities are under significant social and environmental stress, technological practices become revealing. As Kenneth Sassaman (2000:164) points out, "People actively create and recreate the structures that influence or impede technological change." By analyzing technological transitions (or the lack thereof), archaeologists can trace how Indigenous communities responded to the pressures and opportunities introduced through colonialism. Engaging with technology in this way stipulates that changes are not passive byproducts of colonialism but instead dynamic and deliberate means through which people negotiated their identities and their interactions with colonial powers (Cobb 2003).

Archaeological studies have revealed the importance of technological studies focused on pottery manufacturing and architecture for understanding colonial negotiations (e.g., Borck and Mills 2020; Hofman et al. 2008; Hofman et al. 2022; Lightfoot et al. 1998; Manem 2017; Roux 2019; Sallum and Noelli 2020; Trabert 2015; Voss 2005). In ceramics, decisions throughout the procurement and production process are highly visible and tied to use and cultural beliefs, including the selection of clay and temper, shaping the piece, finishing, firing, and design. Although some pottery is highly visible due to its use in public spaces, most is contained within the home and tied to the daily practices of the people, usually women, who produce, use, and eventually discard the pieces (Roux 2019). Ethnographic and archaeological work has shown that ceramics are highly conversative over time but that changes in procurement or design are easily identified. Similarly, architectural decisions are equally informative. Although settlement design, layout, and structure are more visible to the public, archaeologists have identified that differences on a multiscalar approach can provide insights into identity and power dynamics in multiethnic communities (Lightfoot et al. 1998). While the visibility of changes like creolization across a community is dependent on the number of carriers of a technical tradition and the size of the "transmission network" (Hofman et al. 2022:280), a close examination of the chaîne opératoire reveals how communities responded to changing environments while maintaining cultural continuity, showing that material culture is not just about utility but rather a reflection of identity and practice across time and space.

The Role of Lithics in Colonialism Studies

Despite the success of ceramic and architectural analyses in identifying Indigenous responses to colonialism, particularly in multicultural contexts, other prominent technologies such as lithics remain underutilized in colonial studies. There are practical reasons for this imbalance. Ceramics and architecture are additive technologies with expansive design opportunities, while chipped stone technology is a reductive technology. In addition, the ubiquity and broad formal similarity of lithic technologies across western North America during this period further hampers efforts to distinguish culturally specific practices or changes over time. These challenges, combined with a relatively small body of literature connecting lithic practice to social identity, have limited the role of lithics in colonial studies. Yet analyses of ceramics and architecture frequently employ a chaîne opératoire approach, which can similarly provide valuable insights when applied to lithic technologies.

However, research has shown that patterns in technological change are highly variable within colonial contexts, and scholars cannot fully understand colonial contexts without the exploration of multiple lines of evidence (Cobb 2003). Lithics are one of the most prevalent material types in the archaeological record and should not be disregarded in discussions of colonialism. Lithics research broadly provides powerful evidence to suggest that lithics can reflect learning networks, mobility strategies, and power negotiations when evaluated systematically (e.g., Barfield 2016; Bolus 2016; Close 1978; Cooley 2017; Greaves 1982; Kearns 1996; Matson and Magne 2007; Pitblado 2003; Uthmeier 2016; Vehik et al. 2021; Weissner 1983, 1985; Wright 2016). There is little reason to assume that lithic studies cannot apply these methods and those commonly used in ceramic analyses to assess technological change and continuity in colonial contexts. Taken together, these material analyses provide complementary lines of evidence to explore Indigenous responses to colonialism.

Lithic Technology in Colonial Contexts

While lithics have the potential to speak to Indigenous responses to colonialism, historically studies of contact era sites relied on the proportion of Western goods in Native American contexts as a proxy for assimilation or cultural conservatism (Cobb 2003). However, there are studies that explore the retention or transformation of lithic technology in colonial contexts (Buscaglia 2017; Hull and Voss 2016; Johnson and Parish 2020; Lightfoot and Gonzalez 2018; Martindale and Jurakic 2006; Mrozowski 2020; Panich 2016; Panich et al. 2018; Silliman 2010, 2020), which identify lithic technology as "more than just a way of doing things with stone. It also is a tangible way of acting out culture. During the Contact era, objects in stone had functional uses, but they were further used to manipulate, to signify, to resist, and to negotiate" (Cobb 2003:11). For example, at the Rancho Petaluma in California in the nineteenth century, Native Americans were still living as laborers in conditions that resembled the mission system (Silliman 2003). However, despite or perhaps because of their immersion into the Spanish community and access to Western technology, the workers continued to use lithics for a variety of household tasks; an action Silliman (2003) suggests asserted their identity away from their homelands within the multiethnic community.

Archaeological studies have found great success identifying changes in lithic procurement and use in colonial settings. A case study in Xaltocan, Mexico, reveals that communities continued to produce and use obsidian tools well into the colonial period (Rodríguez-Alegría 2008). Colonial action did not impact the type of technology produced but instead the source of obsidian people could access for tool production. Additionally, Susan Vehik's (2002, 2012; et al. 2021) research revealed changes in Wichita scraper technology related to their participation in the hide exchange, which had intensified due to colonial demand.

The intensification of scraper production is also apparent at sites in the American Southeast and Alaska (Cassell 2003; Johnson and Parish 2020). Among other changes, scrapers became more expediently made to increase the productivity of hide processing. These examples illustrate how the production and use of stone tools were intertwined with broader social and political dynamics.

Multicultural communities were common in colonial settings, and material culture with distinct cultural markers such as ceramics and architecture have been indispensable for tracing how groups interacted, maintained boundaries, or formed creolized communities. Lithics are less frequently incorporated into colonial studies, yet archaeologists examining other time periods and regions have demonstrated that they can successfully identify separate technological traditions among distinct social groups. To do so, they have applied two primary methodological strategies: detailed attribute analysis of single artifact classes and assemblage-level comparisons of toolkits. In British Columbia, R.G. Matson and Martin Magne (2007) distinguished migrant Athapaskan groups from local Plateau Pithouse Tradition communities through subtle stylistic choices in projectile points, shifts in the presence and frequency of specific tool classes, and differences in raw material use. This two-pronged approach has also been successful in differentiating Diné (Navajo) and Nūche (Ute) technological strategies at affiliated sites in the American Southwest based on frequency in lithic forms and classes in site-level assemblage (Kearns 1996). This approach works well in contexts where there is overlap in tool morphologies.

Attribute analysis of individual lithic tool classes such as projectile points have proven particularly effective, even without assemblage-level analysis. For example, Bonnie Pitblado (2003) examined both stylistic techniques and the overall chaîne opératoire of projectile points from Colorado and Utah to identify land-use and occupational patterns of the Southern Rocky Mountains during the Paleoindian period. Their study and others suggest projectile points are particularly fruitful in identifying culturally specific preferences, likely due to the higher frequency of stylistic characteristics visible on each artifact (Wiessner 1983, 1985). Taken together, these studies show that lithic methodologies, especially when combining attribute- and assemblage-level analyses, provide a useful tool for identifying Indigenous responses and social dynamics in colonial settings and for understanding how distinct cultural groups negotiated newfound proximity under colonialism.

As Dobres (2000) and Ingold (2007) point out, technological decisions are not just about the relationship between people and objects but also about the relationships between people. Changing access to materials and decisions about tool production and use can affect on social structures, gender roles, and cultural identities. To truly understand the role of stone tools in these contexts, I argue archaeologists must adopt an agency-focused approach to technological analysis. This involves examining the entire chaîne opératoire. By focusing on attributes and raw materials, rather than static typological forms, researchers can better capture the subtle ways in which Indigenous communities adapted their technologies to meet the challenges of a changing world, including the processes of cultural contact, either with Indigenous or European groups.

Conclusion

The reverberating effects of colonialism extend far beyond direct encounters between Indigenous peoples and colonial powers, influencing communities through complex social, economic, political, and demographic disruptions. By moving beyond more simple models of acculturation and unidirectional culture change, scholars acknowledge the nuanced strategies

Indigenous peoples employed to navigate colonial pressures. Concepts like creolization and the middle ground offer valuable frameworks for understanding how communities, like those in the Ladder Creek Valley, negotiated new identities and social relations amidst the challenges of colonial entanglements. Recognizing the agency, adaptability, and resilience of these communities challenges earlier narratives that portrayed Indigenous peoples as passive recipients of change. Instead, there are a diversity of responses, including adaptation, negotiation, and resistance that highlight their active role in shaping their own histories. By centering Indigenous perspectives, archaeologists can develop interpretations that honor the complexity of these experiences. This approach not only enriches our understanding of the past but also contributes to ongoing efforts to decolonize archaeological practice and acknowledge the enduring impacts of colonialism on Indigenous societies.

One of the most effective ways to investigate these processes as they operated in the past is through the study of technology, which provides a material lens into how Indigenous peoples responded to shifting social and cultural landscapes. By examining the production, use, and modification of tools and other artifacts, archaeologists can trace the ways in which communities strategically adapted or resisted colonial influences while maintaining or transforming their cultural practices. While most studies examine ceramics and architecture, lithics offer a complementary but often overlooked line of evidence for examining the down-the-line effects of colonialism. In colonial studies, the focus has frequently been on European-introduced materials like metal tools, while stone tools are sometimes neglected. However, lithics provide critical insights into how Indigenous communities navigated colonial pressures, selectively adopting, adapting, or maintaining traditional practices. By analyzing lithic production, use, and modification, archaeologists can better understand how communities like those in Ladder Creek

Valley engaged in technological strategies that reflect broader processes of cultural negotiation and resilience. Ultimately, incorporating lithics as a complementary line of evidence not only deepens our understanding of colonial encounters but also challenges oversimplified narratives of technological replacement. In this research, I analyze the lithics at the Scott County Pueblo as a complement to existing research and material analyses.

Chapter 4: Dismal River Lithic Technology

Technological systems take shape through the choices people make as they engage with materials in dynamic social contexts (e.g., Dobres 2000; Lightfoot et al. 1998). How those objects are created, used, repaired, and discarded leave physical imprints in the world. While archaeologists, particularly in multicultural settings, often turn to ceramics as indicators of change and continuity within societies, lithics too reflect daily practice, *habitus*, which informs our understanding of how societies responded to the pressures and opportunities of colonialism. Lithic attributes carry information about style, procurement, reduction sequences, use, and discard (Hiscock and Tabrett 2010; Sullivan and Rozen 1985; Wiessner 1984), which speak to identity, social relations, economics, mobility, and the social importance of technological systems. To examine change and continuity in the context of colonialism, archaeologists must carefully examine the entirety of the chaîne opératoire of lithic systems as a complement to other lines of evidence.

While the Spanish occupied the American Southwest, the Ladder Creek Valley in western Kansas was home to local Ndee populations and at least one small group from the Northern Rio Grande region of New Mexico. This multicultural setting provides a rich context for better understanding the vast yet varied effects Spanish colonialism had outside of their sphere of direct influence. The ceramics indicate that Puebloan women may have intermarried with the local Ndee population, which reinforced close social ties and possible creolization between the two communities (Beck and Trabert 2013; Trabert 2015). In this research, I rely on the lithics as a complementary line of data to expand our current understandings of the Ladder Creek Valley as lithics not only capture additional aspects of daily practice for the occupants of these spaces but also expand beyond female-centered experiences. Ceramics are traditionally produced and used by women (Arnold 1985; Bunzel 1929; Eiselt and Darling 2012; Mills and Crown 1995; Shafer 1985), while lithics may be variably used by all individuals within the community.

My research provides a detailed analysis to evaluate continuity and change in lithic technological strategies represented in the Ladder Creek Valley over time; however, I also draw from the work of other archaeologists to relate this work to the broader context of Dismal River technological strategies. In this chapter, I summarize what we currently understand about Dismal River lithic technology and consider what we might expect from a migrant household from the Northern Rio Grande in the American Southwest.

Dismal River Lithic Assemblages

Chipped stone is the most abundant artifact type in Dismal River assemblages, yet relatively little is known about the lithic technological strategies the artifacts represent. Gunnerson (1960, 1987) and Wedel (1959, 1968) have provided the most comprehensive descriptions of common tool forms and use patterns in the archaeological record to date. Dismal River lithic technology reflects a flexible and pragmatic approach to tool production consistent with the mobile lifeways of Ndee communities during the Late Prehistoric and Protohistoric periods. Of course, exceptions exist. While short-term camp sites dominate the record, sites such as White Cat Village (25HN37) and the Humphrey site (25HO21) suggest long-term or repeated use with more diverse lithic inventories. In general, toolkits across Dismal River affiliated sites emphasize hunting, butchering, and skin-working (Wedel 1961), with assemblages composed of a mix of expedient flake tools and curated formal implements. These include small projectile points, bifaces, scrapers, drills, and gravers.

Curated tools exhibit evidence for persistent retouch and maintenance over time and are more likely to be made from nonlocal or exotic materials. At Eureka Ridge (5TL32) in Colorado, Gilmore and Larmore (2005) identify a nearly exhausted double-bitted biface made from Texas Alibates, which they argue shows evidence for curation practices. Artifacts with multiple and distinctly worked edges are also common and underscore the multifunctionality present in Dismal River toolkits. As part of my undergraduate Honor's thesis, I completed a microwear analysis on a sample of scrapers from 14SC409, which showed hide, bone, and wood polish, sometimes overlapping or on the same tool (Cooley 2014). It is likely Dismal River communities created toolkits that allowed for multifunctionality and ease of transport.

Both Gunnerson (1987) and Wedel (1959:580) describe the lithics at Dismal River sites as similar to other Plains traditions but generally cruder in manufacture. This pattern is consistent with descriptions of other Athapaskan groups. Hester (1962:55), for example, remarked that the "impression remains that the Navajos were little concerned with the specific form of the stone artifacts used." It is possible there was a widespread tendency among Athapaskan groups to prioritize utility and availability over consistent artifact form. Additionally, Gunnerson (1987) reports that Dismal River groups often recycled or scavenged lithics on the landscape and would repurpose artifacts within their own toolkits. This is a trait observed ethnographically with other mobile hunter-gatherers, including Dene and Nūche (Ute) (Kluckholm et al. 1971; Stewart 1942).

For Dismal River groups, formal tools were often transported to sites already shaped and were retouched as needed. This is consistent with a scarcity of cores and primary reduction debitage in assemblages. The Eureka Ridge site (Gilmore and Larmore 2012) and numerous Sandhills sites (Bozell et al. 2021) exhibit assemblages that are primarily composed of non-cortical flakes and finished tool fragments, indicating that raw material was procured elsewhere, likely during hunting, foraging, or residential relocation, and not through dedicated quarrying. This pattern is repeated at other Nebraska and western Kansas sites, where localized procurement reflects mature environmental knowledge and reinforces the interpretation of embedded acquisition strategies (Bozell et al. 2021; Butler 1997; Cooley 2014; Mraz 2010; Trabert et al. 2014).

Curated nonlocal materials also appear in small but consistent quantities at Dismal River affiliated sites, including Alibates from the Texas Panhandle, Knife River chalcedony from North Dakota, and obsidian from the Jemez Mountains or Yellowstone region (Bozell et al. 2021; Brunswig 2012; Butler 1997; Gilmore and Larmore 2005, 2012; Hoard 2009; Hughes et al. 2019; Reher 1973; Trabert et al. 2017). These materials were likely acquired through long-distance mobility or exchange within Ndee communities or with their neighbors. The high frequency of nonlocal materials supports Dismal River participation in broader social networks spanning the Central and Southern Plains, the Rocky Mountains, and the American Southwest (Hughes et al. 2019).

Despite the importance of lithic artifacts in the Dismal River record, regional comparison of lithic assemblages remain limited. Undoubtedly, one of the reasons for this lack of comparison is the nature of the data. Most sites are ephemeral lithic scatters consists predominately of debitage, and there is significant variation in reporting and analysis done for each site. While there are a number of reports that focus on site-level analyses (e.g., Bozell et al. 2021; Gilmore and Larmore 2005; Hill and Trabert 2014; Reher 1973; Zeimens 1975), most of the available data are limited to the information provided in sites files, which vary by state, project protocol, and the archaeologist’s experience, theoretical orientations, methods, and perceptions of chipped stone artifact classes. In the site forms I reviewed, terms such as “chopper” and “preform” are inconsistently applied, and many assemblages are recorded simply as having “numerous flakes” without context or typological analysis. These discrepancies impact the ability to complete a systematic analysis based on this data.

This chapter focuses on synthesizing what is currently known about Dismal River lithic tool types and production strategies, drawing from both primary and secondary sources. Many of these artifact types and attributes are not unique to the Ndee, and it is not my intent to imply that they are diagnostic to the exclusion of other groups or cultural complexes.

Projectile Points

Dismal River assemblages are dominated by small, triangular projectile points that are typically unnotched with straight to moderately concave bases (Gunnerson 1987:104; Wedel 1959, 1986). Side-notched projectile points form a substantial minority of most assemblages, while stemmed and basal-notched forms are uncommon but not fully absent from sites (Figure 11). Occasionally, projectile points with a single side-notch have been recorded at Dismal River affiliated sites. While this characteristic has yet to be formally explored, Robert Bozell and colleges (2021) attributes the appearance of a single side-notch to points being broken in the process of being reworked or unfinished during production. Gunnerson (1987) describes Dismal River projectile points as expedient or less meticulously manufactured than those that have been produced by neighboring protohistoric Plains communities; an observation that has been cited in other literature. However, an analysis exploring how Dismal River projectile points are less worked or refined than those produced within other communities has never been formally published.

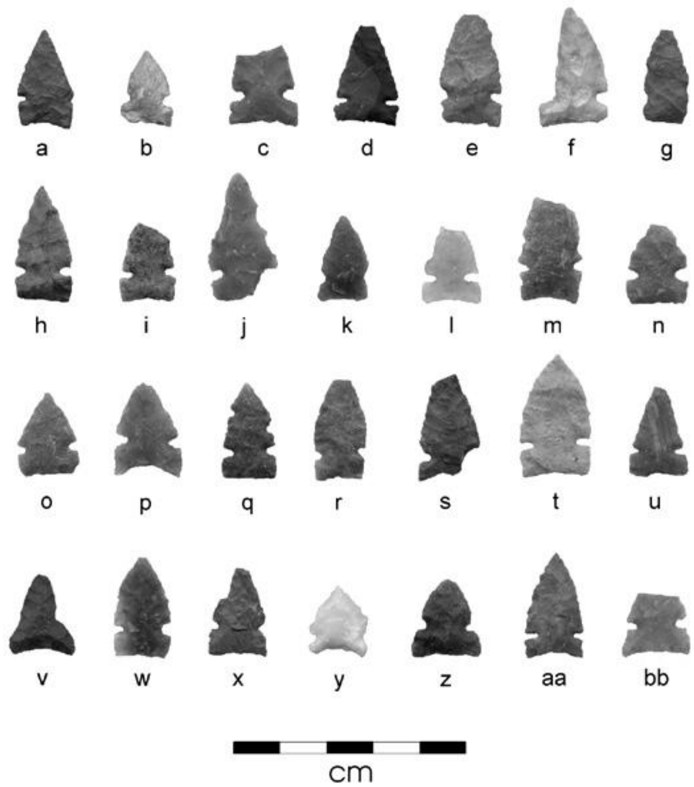

Figure 11. Small side-notched projectile points from the Franktown Cave Site (5DA272). From Gilmore and Larmore 2012.

Projectile points were commonly produced through irregular pressure flaking; however, pieces with more deliberate, patterned flake scars have also been recorded (Gunnerson 1987; Zeimens 1975). Irregular or convenient reduction and shaping of this nature often preserves the original flake morphology, which produces a D-shaped cross-section (flat to concave ventral surface, convex dorsal surface). Across recorded archaeological sites, many specimens show impact fractures or evidence for edge rejuvenation (Bozell et al. 2021; Zeimens 1975). Most projectile points lack basal grinding, and it is common for the basal corners to point sharply down. Archaeologists have reported “miscellaneous” or unique projectile point shapes at archaeological sites across the Dismal River ancestral territory. Gunnerson (1987) attributes these forms to curation or scavenging behaviors where Dismal River peoples picked up and reemployed older lithics they encountered on the landscape. Richard Hughes and colleagues

(2019:13) identified an obsidian tool in Nebraska with flake scars showing variable patterns of weathering or patination. The original flakes surfaces were more weathered than the retouch along the edge, which they argued represented recycling in the archaeological record. Recycling is a behavior that appears to be common among multiple hunter-gatherer groups, including Nūche across the Rocky Mountains and Colorado Foothills (Kearns 1996; Kluckholm et al. 1971; Stewart 1942).

Archaeologists have reported the occasional appearance of projectile points with a single spur on the base. This stylistic element is also seen on some protohistoric points in western Canada and may be considered diagnostic of Athapaskan technology (Gilmore and Larmore 2012:47-48; Matson and Magne 2007; Omerod 2004:82). Kevin Gilmore and Sean Larmore (2012) report projectile points with a single spur at sites in the Colorado Rockies and foothills, including Eureka Ridge (5TL3296), Arroyo del Arenal (5SH2373), and Petsch Spring (5LA303). While the single spur has the potential to be a diagnostic feature, it is not commonly recorded at Dismal River affiliated sites.

Bifaces

Bifaces in Dismal River contexts are highly variable, expedient to formal tools. Well-finished knives are uncommon in most assemblages. Instead, minimally worked bifaces and modified flakes are more frequent. When formal knives occur, they vary in shape (e.g., lanceolate, oblong, quadrilateral) and sometimes show beveling on either the distal or proximal end (Wedel 1959). In the archaeological record, many bifaces are represented by tips and basal fragments with heavy use-wear, consistent with recurrent use and repeated resharpening rather than frequent replacement (Wedel 1959:594). Where reported, debitage assemblages at Dismal

River sites are dominated by late-stage thinning and shaping flakes with low amount of cortex, which suggests bifaces commonly arrived at sites as preforms or finished tools and were maintained to exhaustion at camp (e.g., Gunnerson 1960; Bozell et al. 2021; Reher 1973). Site-level analyses reinforce this interpretation.

At the Humphrey site (25HO23) in Nebraska, knappers worked imported materials into biface preforms and a limited number of finished knives (Bozell et al. 2021). In southeast Wyoming, bifaces are present but often fragmentary with a mix of local and nonlocal materials represented (Reher 1973). In a broad comparative analysis that included the Scott County Pueblo and sites affiliated with other Plains communities, Butler (1997) argued that site function influences biface morphology with semi-sedentary sites having a higher concentration of curated bifaces made on high quality or exotic materials, while more ephemeral camps, especially those near raw material sources, emphasize expedient biface production and use. At Dismal River sites, toolkits consistently feature curated pieces with frequent edge renewal. Cutting and chopping tasks were most often accomplished using large flakes with little modification, tabular pieces with a retouched edge, or cruder bifacial implements where material availability permitted (Gunnerson 1987).

Scrapers

Scrapers are among the most abundant artifacts in Dismal River toolkits. Plano-convex end scrapers with steep, unifacial working edges are common in assemblages. These artifacts are typically only worked at the distal end of a flake tool with only minimal shaping elsewhere (Gunnerson 1987; Wedel 1959, 1986). Site forms and reports typically refer to the presence of these tool forms as “snub-nose” scrapers due to their compact size and steep, unifacially worked edge. Among Dismal River assemblages, there is a particularly high frequency of “thumbnail” scrapers: small, heavily retouched tools with evidence for significant edge wear and reduction. These scrapers have been reduced to a size comparable to an adult’s thumbnail. At Dismal River sites in the sandhills of Nebraska, Bozell and colleagues (2021) reports high frequency of flakes from the rejuvenation of scrapers. Gilmore and Larmore (2005) and Reher (1973) report similar patterns in the debitage assemblages at sites in Colorado and Wyoming. These patterns indicate a curated approach to scraper use and repair. End scrapers with a small graver spur opposite the working edge may be a diagnostic form for the time period (Bozell et al. 2021; Cooley 2014; Gunnerson 1987; Trabert et al. 2014; Wedel 1959; see Ludowicz 1980 and Magne and Ludowicz 1984 for Athapaskan examples). Gunnerson (1987) argues these are diagnostic of the complex, though they are relatively rare in appearance.

Figure 12. End scrapers from Dismal River affiliated sites in Ladder Creek Valley.

Side scrapers are common across Dismal River sites, though they tend to be more expedient in form and function than end scrapers (Figure 12). These tools are typically made on flakes with unifacial retouch along one or occasionally two lateral margins (Gunnerson 1987).

This retouch could be described as “nibbling” and is not as invasive as the retouch scars observed on the retouched edge of end scrapers. Many side scrapers show wear consistent with both cutting and scraping tasks, and several combine scraping edges with shorter, sharpened segments suited for slicing or sawing (Bozell et al. 2021). Unlike end scrapers, side scrapers rarely exhibit formal rejuvenation, which suggests use as quickly produced, task-flexible implements. Side scraper morphology aligns with broader Plains traditions, but Gunnerson (1987) argues Dismal River forms are often lighter and thinner. These scrapers may have served as part of curated gear sets as tools that could be rapidly prepared for specific tasks like hide thinning, wood trimming, or bone shaping, and discarded or recycled after short periods of use (Bozell et al. 2021; Wedel 1959).

Site forms and reports describe combination tools with multiple worked edges creating end-scraper/spokeshave (scraper with a lateral or proximal edge with steep concave edge) or end-side scraper combinations (scraper with lateral edges that have steep retouch). Bozell and colleagues (2021) reports multiple artifacts combining scraping, cutting, and spokeshave facets at the Humphrey site in Nebraska. A more complex example comes from site 14SC106 in western Kansas:

> One crude end-side scraper had been made on a blade with one nearly flat face. One end had been worked carefully to a snub nosed scraping edge and both sides (one now broken) had been carefully worked to side scrapers. The scraping edges on one side and the end met in a smooth curve while the side met the end at a point forming an angle of about 60°. The scraping edges [show] considerable dulling. Near the base of the complete side is a concave section, probably a “spoke shave.” Thus this one artifact, 45 x 30 x 11 mm., had apparently been five tools in one -- two side scrapers, end scraper, graver and “spoke shave.” Such combination tools are common Dismal River artifacts. (site form)

While the exact method of hafting is unknown, some archaeologists have suggested that antler tips, possibly notched or modified for hafting, may have been used to secure scrapers and blades for increased leverage or comfort during use (Gunnerson 1987; Wedel 1959). Although it is possible not all scrapers were hafted, microwear analysis from 14SC409 indicates hafting occurred on at least some of the implements (Cooley 2014).

Tabular Bifaces, "Chithos"

Several scholars including Gunnerson (1954) have identified tabular bifaces as one of just a few potentially diagnostic stone tool forms shared across Athapaskan communities; however, the basis of these speculations is from brief or vague observations rather than a systematic comparison of artifacts. Records of this tool form are typically sparse and informal, often a singular line in a chapter or article discussing the presence or absence of the tool at a site. There are likely several reasons for this. First, there are relatively few recorded sites that have confirmed the presence of tabular bifaces within the collections. Second, the definition of the tool form itself is ambiguous. Anthropologists have broadly referred to tabular bifaces as *chithos*, an Athapaskan term for skin softeners in hide production tool kits (Eyman 1986; Ludowicz 1980; Magne and Ludowicz 1984; Shinkwin 1979). Figure 13 shows examples of these tools. Ethnographic accounts and use wear analysis suggest they were traditionally used in the "terminal stages of softening leather through finer abrasion" (Ives 2020:107). Over the years, the term has been used interchangeably to described retouched tabular implements as well as retouched and nonretouched cobble and boulder spalls (LeBlanc 1984; Workman 1978).

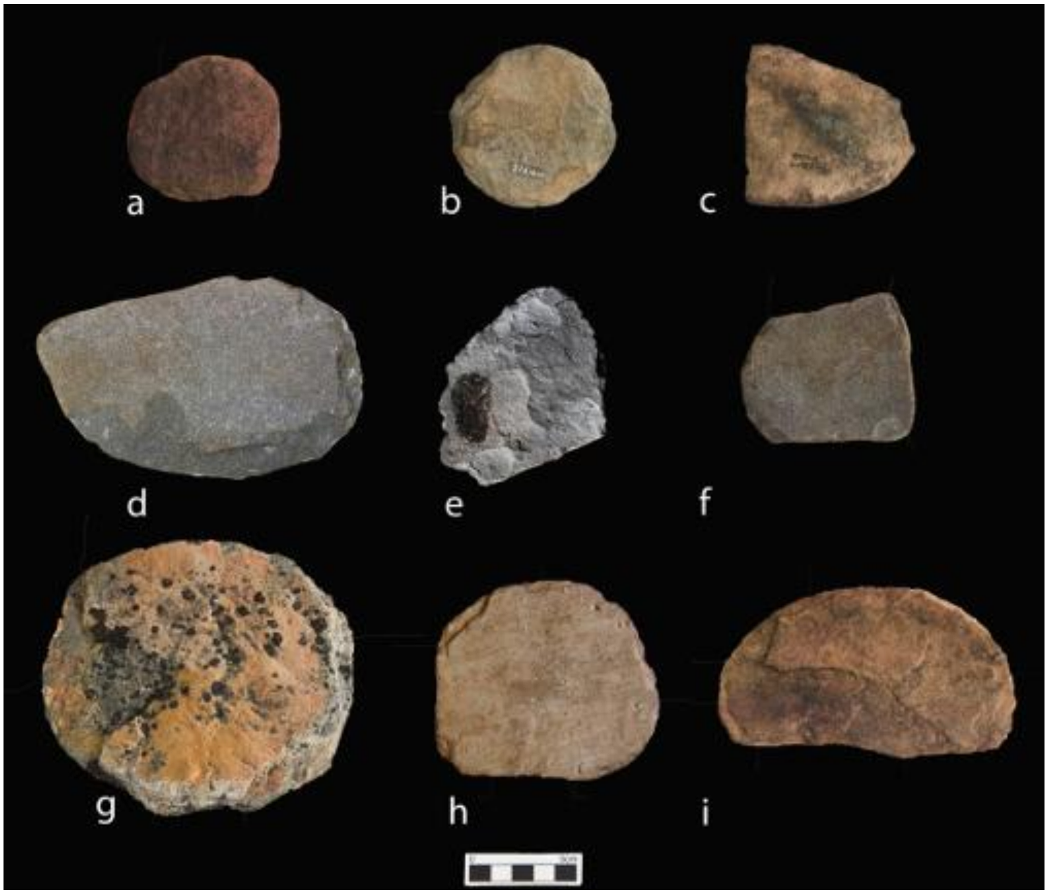

Figure 13. Tabular bifaces from archaeological and ethnographic contexts in the American Subarctic. From Reilly 2015.

The simple and expedient nature of these tools has likely played a role in the ambiguous nature of the category and the lack of archaeological research. In fact, I can point to no more than a handful of articles that reference these tools in any detail (c.f., see Aileen Riley's thesis on hide tanning in contemporary and past communities). Riley (2015) describes the tabular bifaces as thin, flat lithics that are bimarginally worked to create a convex edge. The tools are nearly always retouched along the longest length or the circumference of the piece, creating an ovoid or D-shape. More round or irregular shapes occur occasionally (Ives 2020). They are typically made of raw materials such as schist, gneiss, slate, or sandstone (Ives 2020; Reilly 2015). Jack Ives (2020:107) indicates the tools can be made expediently, but women may have curated preferred tools through multiple generations. According to ethnographic work, a woman may only go through one or two tools in her lifetime, though the number may vary as items become lost or broken (Reilly 2015:37-38). Once the tools were no longer functional, they would be left in a "good place, a place of meaning." According to Reilly's ethnographic work, women may even have been buried with some of her tools, including the chithos.

Double-bitted Drills (or double-bitted bifaces)

Double-bitted drills, also known as double-bitted bifaces, are uncommon but potentially diagnostic tool forms (Figure 14). Gunnerson (1987:105) describes the artifact form as resembling "two plain-shafted drills joined base to base, with one, two, or four lugs (projections) near the middle." Most pieces are lenticular to oval in cross-section, and many are recovered snapped through the midsection or at a lug. Gunnerson (1987:105) noted that double-bitted drills are typically made of a raw material too soft for heavy perforation. Occurrences are sparse but geographically broad, with artifacts reported at Eureka Ridge (5TL3296) and Arroyo del Arenal (5SH2373) in Colorado (Gilmore & Larmore 2012) and at 48AB301 in Wyoming (site file; Zeimens 1975). Similar forms are documented at Athapaskan-affiliated Cerro Rojo complex sites in New Mexico, including the Glasscock site (29MO20) and the Sammis site (29CX68) (Gunnerson 1968). The opposed layout would have allowed rapid bit reversal when one end dulled or broke, and the lugs could have served as hafting anchors. However, no use-wear analyses have been published on these artifact types, and interpretations remain speculative.

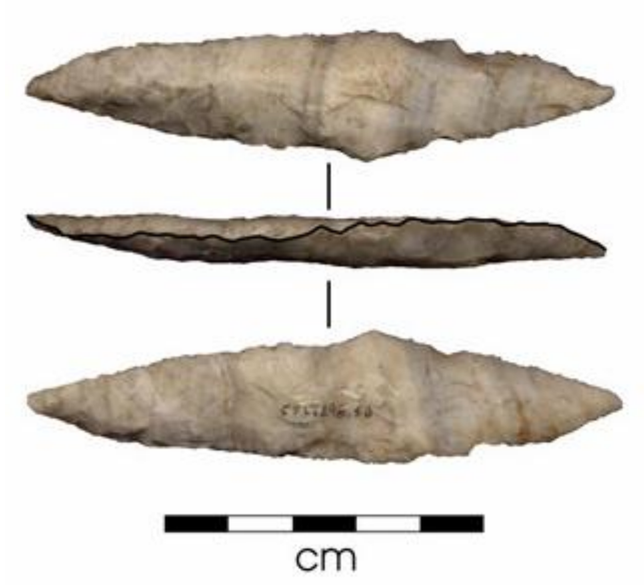

Figure 14. Double-bitted drill recovered at Eureka Ridge (5TL3296). From Gilmore and Larmore 2005.

Drills, Gravers, and Spokeshaves

Drills, gravers, and burins do appear at Dismal River sites, even though they are not the most common tool forms recorded in assemblages. These tool forms are produced on flakes or made from reworked projectile points but can and do exist as combination tools. Drills appear in moderate frequency at Dismal River affiliated sites and exhibit some variability in form (Gunnerson 1987; Wedel 1959, 1961). The most common type is the expanded-base drill, which features a narrow, pointed bit produced through steep retouch (Figure 15; Gunnerson 1987; Wedel 1959, 1985). For these forms, the shaft or base is minimally modified, which produces a T-shaped or flared profile. They were likely hafted (Zeimens 1975). Other drill forms include straight-sided, cigar-shaped forms and cruder drills made on thin flakes with only light shaping (Gunnerson 1960, 1987; Wedel 1959, 1985). There are a number of reported drills or gravers that repurpose triangular projectile points thinned along one margin to create a functional bit or spur (e.g., Bozell et al. 2021). A smaller number of drills have lateral tangs (Bozell et al. 2021; Wedel

1959; Zeimens 1975). The cross-sections of drills vary from round to diamond-shaped (Zeimens 1975). In general, working is concentrated at the bit where use wear and polish is sometimes visible on the tip (Bozell et al. 2021; Gunnerson 1987).

Figure 15. Expanded base drill from the Scott County Pueblo (14SC1).

Gravers occur as short, steep spurs on flakes or retouched tools. As previously mentioned, end scrapers with a small graver spur opposite the working edge could be diagnostically Dismal River (Gunnerson 1987); however, these are relatively rare in assemblages. More often than not, gravers are present on large flakes or were made by retouching the distal end of a projectile point. Spokeshaves are steeply retouched concavities along the lateral or proximal edge of a flake or scraper. They occur at Dismal River sites but are certainly not the most common tool form (Bozell et al. 2021; Cooley 2014; Hoard 2009; Reher 1973). Both are produced with a minimal amount of work (Gunnerson 1987:105).

Cores

Cores are sparse in Dismal River assemblages and vary in their morphology. Information about cores primarily comes from sites forms. Reported cores typically range from small, multiplatform polyhedral cores to irregular flakes or tabular cores. Cores are often worked until near exhaustion. The absence of cores at most sites is likely reflective of raw material availability, site type, and mobility strategies. Based on analysis of debitage of Dismal River affiliated sites, late-stage reduction flakes are the most common debris found at both ephemeral and long-term occupations (Bozell et al. 2021; Cooley 2014; Gilmore and Larmore 2005; Mraz 2010; Trabert et al. 2014; Zeimens 1975), which suggests that people arrived with blanks, preforms, and finished tools and invested their efforts in keeping edges alive. The Humphrey site in the Sandhills is the clearest example of this pattern. Despite more than 10,000 flakes, analysts recorded only one core, and debitage skews to tiny, non-cortical thinning and maintenance flakes (Bozell et al. 2021). This is not always the case, however.

In southeastern Wyoming, sites in the Pine Bluff have a higher frequency of polyhedral cores, consistent with the proximity to workable stone. For instance, 48LA308 produced two polyhedral cores alongside large struck flakes used for retouch; 48LA310 yielded three polyhedral cores together with retouched cutting flakes and small choppers; 48LA316 has an irregular polyhedral core plus numerous manufacture and retouch flakes; and 48LA312 lists polyhedral cores among the artifacts on site. These are compact, multi-platform pieces rather than big quarry nodules, and they occur with assemblages rich in expedient edge work, which is what you might expect at short-term camps. (Reher 1973)

Raw Material Use and Exchange

When considering Dismal River raw material use and procurement strategies it is important to keep two points in mind. First, Dismal River sites occur across a diverse landscape with varying access to desirable raw material. Second, Dismal River sites represent variable mobility strategies depending on the landscape, with eastern sites showing more sedentary practices and western sites reflecting higher degrees of mobility. These factors greatly influence the types and distances of material represented in Dismal River assemblages. Additionally, the distinction between "local" and "nonlocal" is rarely defined in site forms and older reports, which makes consistent interpretations difficult across Dismal River affiliated sites. Even so, broad trends are visible.

Most Dismal River affiliated sites present evidence of primarily local procurement strategies that are consistent with embedded procurement strategies and mature knowledge of local outcrops. Dismal River communities likely collected lithic raw materials as part of other substance or mobility-related activities, which meets expectations for highly mobile groups (Bozell et al. 2021; Mraz 2010). Procurement appears flexible and opportunistic rather than shaped by exclusive reliance or preference for specific source areas. Procurement would have been constrained by local availability and supplemented with curated, nonlocal tools. Formal tools were frequently made from local materials and maintained through intensive resharpening and edge rejuvenation. This reduced the need for long-distance transport of raw cobbles. As previously discussed, cores are rare in Dismal River assemblages, and the debitage reflects late-stage reduction and maintenance of the lithics at the site (Bozell et al. 2021; Cooley 2014; Gilmore and Larmore 2005; Mraz 2010; Trabert et al. 2014; Zeimens 1975).

Archaeological sites across Kansas, Nebraska, Colorado, and Wyoming indicate that at least 75% of lithic materials are locally obtained with more ephemeral sites showed upwards of 90% of materials from within 20-50 kilometers (e.g., Bozell et al. 2021; Brunswig 2012; Cooley 2014; Gilmore and Larmore 2005, 2012; Mraz 2010; Reher 1973; Zeimens 1975). Sites also show a high frequency of local gravels quarried from streams and rock beds. At the same time, curated items from nonlocal materials indicate connections to more distant sources, either through direct procurement or exchange. At Eureka Ridge (5TL3296), artifacts included raw materials that were sourced up to 250 km away, such as Alibates from Texas and obsidian from the Jemez region (Brunswig 2012; Gilmore and Larmore 2005, 2012). Similarly, Texas Alibates and chalcedony from South Dakota are present at the same sites in the Ladder Creek Valley of western Kansas (Cooley 2014; Hoard 2009; Mraz 2010). While mobility could account for the presence of these nonlocal materials, a sophisticated exchange network of Dismal River groups both internally and with their neighbors is more likely.

Obsidian is rare in Dismal River assemblages but does offer insight into mobility and exchange systems. Currently, there are at least 42 Dismal River affiliated sites with recorded obsidian, which accounts for more than 63 geochemically sources artifacts (Appendix X). Approximately 69% of the reported artifacts source to obsidian sources in the Jemez Mountains of New Mexico, including Cerro del Medio, Cerro Toldeo, and Valle Grande, while the remaining 31% source to the Intermountain region that includes Wild Horse Canyon, Utah; Malad, Utah; Brown's Beach, Nevada/Idaho; and Obsidian Cliff, Wyoming. Archaeologists in Kansas have reported several Dismal River affiliated sites in Kansas with obsidian artifacts, which are from the Jemez Mountains (Hoard et al. 2008). In contrast, the Hooker site (24HO3) in central Nebraska shows a greater representation of obsidian from sources west of the site

(Hughes et al. 2019). Along the Front Range, the Eureka Ridge site contains obsidian from Jemez, while the Pinnacle site links north to Obsidian Cliff (Brunswig 2012; Gilmore and Larmore 2005; Tucker et al. 2005). This is an indication that at least two long-distance corridors intersect Dismal River territory: a southwestern, Pueblo-facing corridor and a western/northern one tied into the Snake Rivers and Yellowstone areas.

Functionally, obsidian appears mostly as curated tools carried in and maintained on sites, with late-stage use and resharpening represented in the debitage. There are limitations to any interpretations made with such a small data source. The Wyoming entries remain untested, and the patterns are heavily weighted by site, with most of the sample site coming from just a select-few occupations (site files; Larson et al. 1992; Reher 1973, 1980; Zeimens 1975:23, 34, 36). Even with those limitations, the data suggests a well-networked, exchange system where Dismal River communities living across different spatial and temporal contexts engaged in variable exchange with their regional neighbors. More than one pattern of obsidian use and conveyance likely existed (Hughes et al. 2019).

Characteristics of Puebloan Lithic Technology

Puebloans in the American Southwest experienced earlier and more intense disruption from Spanish colonialism than Indigenous communities living on the Plains; however, relatively little is understood about how their lithic technological systems changed in response to colonialism (Compton 2017). There are no records indicating forced or coercive lithic production as part of the encomienda system, and according to Trigg (2005), lithic manufacture and use continued to be important for Puebloan life. While raw material acquisition was disrupted for some Puebloan communities (Boulanger et al. 2022), most lithic traditions appear to be conservative and experienced relatively little change (e.g., Compton 2017). The Puebloans living in the Northern Rio Grande region engaged in lithic technological strategies common for sedentary societies. The lithic technological strategy emphasizes expedient production and maintenance, and habitation sites are more likely to record debitage from all stages of reduction (Jeancon 1923; Wendorf 1953).

While "crude" modified flakes and flake tools are common, there are a number of tool forms that are commonly recorded at Puebloan sites in the Northern Rio Grande, including a diverse range of projectile points, bifaces, knives, hoes or grubbing tools, narrow picks, drills, and axes (Bryan 1939; Jeancon 1923; Snow 1981; Wendorf 1953). Projectile points exhibit great variety of forms ranging from unnotched and notched to triangular, leaf-shaped, and serrated edged heads (Wendorf 1953). Points are typically well made with observable flaking patterns. Thin, triangular points with a slightly convex or concave base and side notches are the most common style of projectile point (Brew 1946; Hibben 1937; Jeancon 1923; Morris 1939; Wendorf 1953). Corner-notching does occur. While most of the projectile points are small for bow and arrow technology, larger spearheads are recorded at pueblos across the Northern Rio Grande (Jeancon 1923). Based on conversations with Tewa elders, it is possible larger projectile points were produced for ceremonies. Jeancon (1923:19) recovered spear points from the Chama Valley that he interpreted as "too small for a full-sized spearhead and too large for an arrowhead. They range from 63 to 89 mm. in length."

Bifaces are diverse in form and function. Reports record bifaces that are ovoid in nature as well as stemmed knives that are asymmetrical and likely hafted. Bifaces appear infrequently due to Puebloan reliance on more expedient flake technology (Compton 2017). Axes are also common within Puebloan contexts and range from crude to well-made, polished specimens

(Jeancon 1923; Wendorf 1953). These tools typically have one sharp edge that is straight to convex. Two-headed axes are also reported at lesser frequency but are rumored to only be used for war (Jeancon 1923). Several reports comment on the shape of drills (e.g., Cameron and Young 2015; Kidder 1932; Lekson 1997; Roxlau et al. 1997), which are typically T-shaped, narrow and cylindrical, or thick-shafted, rectangular forms. However, Anne Compton (2017) reports a high frequency of microdrills for beadwork at Pueblo San Marcos, which are produced on the distal portion of a flake. Similar to small projectile points, these pieces are highly standardized and are produced on the distal end of a flake.

Lithic procurement within the Northern Rio Grande appears to prefer local resources found in nearby cobble beds and primary outcrops (Bryan 1939; Jeancon 1923; Kidder 1932; Snow 1981). However, there are exceptions to this procurement pattern. At Pueblo San Marcos, residents could obtain a diverse assortment of usable material from the immediate landscape, including chert, quartzite, and some fine-grained basalt (Compton 2017); however, there was a disproportionately high concentration of Pedernal chert and obsidian from approximately 25 km west of the site. A higher frequency of Pedernal and obsidian also occurs at Picuris Pueblo between the fourteenth and sixteenth centuries, which could be a result of alterations to lithic procurement and regional exchange behaviors (Adler and Dick 1999). During this same time, nonlocal materials from the Texas Panhandle and Central Plains also increase in appearance after the arrival of the Spanish appears to cause an intensification of the Plains-Southwest exchange system (Barr 2005; Brosowske and Bevitt 2006; Eiselt and Snow 2017; Kidder 1932; Snow 1981; Wedel 1967, 1982).

Comparing Dismal River and Puebloan Lithic Technologies

Both Dismal River and Northern Rio Grande Puebloan lithic technologies are grounded in expedient strategies, but they express distinct adaptations shaped by different mobility patterns, community organization, and land use. Dismal River assemblages are composed of expedient flake tools made from locally available materials such as chert, chalcedony, and quartzite. Their technology reflects a more mobile lifestyle; however, Dismal River groups living in Kansas and Nebraska were more prone to engaging in slightly more semi-sedentary lifestyles than the highly mobile strategies these groups employ in Colorado and Wyoming, which appears to be reflected in slight differences in lithic strategies (Hill and Trabert 2018). Dismal River communities employed diverse toolkits composed of formalized, maintainable implements, including projectile points, bifaces, scrapers, and drills. Tabular bifaces and double-bitted bifaces may be diagnostic of Dismal River occupations (Gunnerson 1987). The projectile points commonly found at Dismal River sites differ in morphology, production technique, and reduction sequence from the broader range of point types recorded at Puebloan sites in the American Southwest. The debitage at these sites is consistent with late-stage reduction and retouch, suggesting most initial reduction occurred outside of habitation sites. Cores are rare, which combined with curated tools and heavy resharpening, indicates logistical foraging patterns where tools were made to be portable, multifunctional, and repairable.

Puebloan assemblages, while similarly grounded in expedient core-and-flake technology, reflect a more sedentary mobility strategy. Tool manufacture typically occurred on-site, and most lithic production reflects action to address immediate needs within the village. More formal tools, including bifaces, axes, hoes, and microdrills, appear in Puebloan contexts but generally reflect specific tasks or craft production, such as bead working or felling wood (Compton 2017;

Jeancon 1923; Wendorf 1953). The consistent presence of these tools across residential settings suggests that, while lithic technology remained important even under Spanish colonialism, its organization was structured around household provisioning and low-risk local procurement.

Dismal River and Puebloans both demonstrated flexible raw material procurement strategies. Local materials dominate assemblages in both traditions but also have nonlocal resources obtained through exchange or embedded mobility practices. Both communities seemingly selected specific raw material types for their performance or importance for certain tool forms or completing specific tasks (e.g., Butler 1997; Compton 2017; Wendorf 1953). However, the intensification of the Southwest-Plains exchange system after the arrival of the Spanish appeared to at least marginally alter raw material procurement by increasing the frequency of nonlocal materials and tool forms (Barr 2005; Brosowske and Bevitt 2006; Eiselt and Snow 2017; Kidder 1932; Snow 1981; Wedel 1967, 1982). According to Wedel (1959:597):

> Many of the items Dismal River shares with Great Bend [ancestral Wichita] and other neighboring complexes also occur in late stages of the Pueblo sequence in the upper Rio Grande region. At Pecos, for example, the occurrence of chipped end scrapers, side scrapers, beveled knives, serrate bladed metapodial fleshing tools, rib wrenches, cancellous bone paint applicators, and epiphyseal hide dressers is viewed as evidence of contacts with Plains Indians (Kidder, 1932, pp. 44, 235, 238, 241); and these types at Pecos occurred either exclusively, or in greatest frequency, in the later Glaze levels, which would be roughly concurrent with the Great Bend, Lower Loup, and Dismal River complexes in the Central Plains.

The convergences suggest shared technological knowledge. It is possible the exposure to the technologies and overlap in expedient strategies would have allowed for points of commonality between the Ndee and Puebloan communities living in the Ladder Creek Valley. However, there are aspects of the chaîne opératoire that appear to be distinct between the two groups and are already recorded in the appearance or absence of tool forms and morphology of shared technology such as projectile points.

Conclusion

In this chapter, I have summarized the lithic technological strategies of Dismal River groups on the Great Plains and Puebloans from the Northern Rio Grande region of the American Southwest. These communities likely interacted with one another for centuries, if not longer, as part of an enduring exchange system between the American Southwest and the Plains, which would have moved people, thoughts, and ideas that would have influenced daily practice of both groups (Barr 2005; Brosowske and Bevitt 2006; Eiselt and Snow 2017; Kidder 1932; Snow 1981; Wedel 1967, 1982). The Ladder Creek Valley represents a unique example of direct, multigenerational cultural contact between Ndee and Puebloan migrants, and evidence of this close relationship is already apparent in the presence of artifacts representing both Plains and Puebloan cultural traditions (Cooley 2014; Gunnerson 1960; Hill and Trabert 2014; Hoard 2009; Trabert 2015; Trabert et al. 2014; Wedel 1959, 1961).

In their early investigations of the pueblo, Wedel (1959, 1960) identified the Scott County Pueblo as Dismal River based on general artifact similarities to Plains traditions, while Gunnerson (1960) argued for stronger Southwestern influence, citing formal tools and nonlocal materials such as obsidian; however, neither provided detailed analysis of the lithic attributes underlying their interpretations. Subsequent studies of lithic assemblages at the pueblo discuss the raw material use at the pueblo as evidence that the occupants primarily procured local material from within 20-50 km of the site and preferentially selected materials for certain tool forms and tasks (Butler 1997; Mraz 2010). Little has been done to fully explore the extent of interaction between Puebloans and Ndee. To complement this data, my dissertation focuses on a detailed study of these sites to better understand the relationship between these communities. In the remaining chapters, I discuss the results of an attribute-level approach to see changes across contexts at pueblo and nearby sites to see if there is evidence suggesting extended periods of contact or hybridity in the lithic technological strategies.

Chapter 5: Methods

The effects of colonialism, whether direct or indirect, are profound and far-reaching. However, identifying the full extent and nature of these consequences is challenging in the absence of direct accounts from Indigenous narrators. Written records from colonial contexts are predominatedly authored by non-Indigenous authorities and centered on taxation, trade, or administrative matters, which marginalize or misrepresent Indigenous experiences (Ojala 2019:185). In contrast, archaeology facilitates a more nuanced understanding of colonial dynamics, filling in the gaps of historical narratives by examining material remains that capture the lived experiences of Indigenous peoples, even those beyond the reach of colonial control.

This chapter details the methods I used to investigate the lithic assemblages from the Scott County Pueblo (14SC1) and affiliated Dismal River sites to examine how Ndee communities responded to colonial disruptions, such as the arrival of Puebloan migrants from the Northern Rio Grande. Lithics are the most common artifact type at Dismal River occupations, including the sites included in this study. Chipped stone would have been integral to the daily practices and technological strategies of the local Ndee population as well as the Puebloan migrants. By analyzing formal tools such as projectile points, bifaces, scrapers, tabular bifaces, and cores, I identify patterns of tool procurement, production, use, maintenance, and discard that may reflect broader social and cultural changes triggered by colonialism. This analysis offers insights into how these communities adapted their material practices in the face of colonial pressures, including disrupted trade networks, increased violence among some communities, the spread of disease, and the arrival of Puebloan migrants.

In this chapter, I provide a detailed account of the methodologies I employed, including the qualitative and quantitative variables recorded for lithic analysis, the sampling strategy, and the comparative framework used to trace variations over time and between sites. This approach not only enhances our understanding of how lithic technologies were influenced by colonialism but also contributes to broader discussions about Indigenous resilience and adaptation during this period.

Site Sampling and Provenience Information

The lithic assemblages included in this study come from multiple excavations and occupations. Because excavation strategies, documentation standards, and provenience recording varied across prior investigations, it was necessary to standardize and consolidate these contexts into broader categories for analysis. This section outlines the sampling strategy used in this dissertation, the criteria for artifact inclusion, and the provenience groups I used.

Data Collection

For this study, I recorded both quantitative and qualitative variables for the formal lithic tool assemblages from four sites: 14SC1, 14SC301, 14SC304, and 14SC409. The study included a total of 2,845 artifacts (Table 2), including projectile points, bifaces, scrapers, formal tools, and debitage. As discussed in Chapter 3, the pueblo (14SC1) was excavated multiple times, which produced over 10,000 artifacts, most of which are debitage. These assemblages are curated across multiple institutions: materials from Gunnerson and Witty's excavations are housed at the Kansas State Historical Society, those from Williston and Martin at the University of Kansas, and Wedel's collections at the Smithsonian Institution. For this analysis, I focus specifically on formal lithic tools and cores recovered during Gunnerson and Witty's excavations. While I had originally intended to include the debitage in my analysis, the Kansas State Historical Society requested the return of all borrowed collections from researchers and institutions for an internal audit, and therefore, I was unable to complete my analysis of the debitage. Additionally, I have not yet received permission to access Wedel's collections at the Smithsonian. Future interpretations of the pueblo would benefit from additional analysis of this material.

Table 2: Summary of Artifacts Included in this Dissertation

Tool Form	**14SC1**	**14SC301**	**14SC304**	**14SC409**	**Total**
Projectile Points	524	5	4	2	**535**
Biface	347	5	0	4	**356**
Cores	33	2	0	12	**47**
Scrapers	507	11	1	15	**534**
Drill	51	1	0	1	**53**
Graver	13	0	0	0	**13**
Spokeshave	1	2	0	0	**3**
Debitage	-	439	67	497	**1304**
Total	**1777**	**465**	**72**	**531**	**2845**

To be included in the analysis, the artifacts had to meet two requirements. First, accurate provenience information had to be available from the site records to ensure proper chronological and spatial comparison. Only artifacts recovered from controlled excavation contexts were included in the sample, ensuring that each piece could be properly contextualized with stratigraphy and site layout. I did not include surface collected artifacts from the analysis for this reason. Second, the artifacts had to be sufficiently complete to allow for accurate identification and measurement. For example, projectile points needed to retain a substantial portion of the base and hafting element so that key attributes, such as basal width and shape, could be reliably recorded. I outline the specific requirements for each artifact type in more detail below.

Quantitative data collection focused on the precise measurement of each artifact's dimensions and weight. Using digital calipers, I recorded dimensions to the nearest tenth millimeter to capture overall size and tool proportions. I recorded each artifact's weight using a digital scale to the nearest tenth of a gram. To ensure consistency and minimize measurement error, I was the sole person responsible for measurements and used the same instruments to reduce investigator errors. In addition to quantitative measurements, I also documented key qualitative attributes for each artifact. These observations varied by tool type (see below for more details); however, details related to the type of raw material and evidence for heat treatment were recorded for all artifacts included in the study. Because investigator errors in the recording process are inevitable, I discarded individual observations from specific quantitative analyses if they had suspected errors, such as a missing decimal point or attribute. A large sample size can absorb some amount of error without it affecting statistical outcomes and inferences. Rather than deleting problematic or suspected errors from the dataset entirely, I omitted observations from specific descriptive categories. For example, if the length of a complete projectile point was incorrectly recorded, the artifact was omitted from length metric analysis but would appear in projectile point counts. These differences, as well as specific analytic comparisons, resulted in some variability in the artifact counts.

Provenience at the Scott County Pueblo

For the Scott County Pueblo lithic analysis, I condensed individual excavation units and feature-level records into a set of provenience areas. These broader spatial groupings were defined using the original excavation documentation and were designed to preserve the integrity of meaningful activity areas (e.g., interior room contexts, extramural deposits, and large midden/borrow-pit features) while minimizing noise introduced by uneven excavation coverage and mixed stratigraphic contexts. I use these proveniences to complete a spatial and temporal analysis of the lithics at the pueblo. Table 3 summarizes these proveniences and presents relative occupation periods and dates from Matthew E. Hill and colleagues' radiocarbon dating of the site

Table 3: Scott County Pueblo (14SC1) Provenience Areas and Dates

Provenience	Description	Occupation Period	Reported Date Ranges	Citation
Area 701	Pueblo excavation area	Pueblo		Hill et al. 2018
Area 751	South of pueblo artifact concentration	Early Pueblo	AD 1512-1601, AD 1616-1655	Hill et al. 2018
Area 752	Pueblo excavation area	Pueblo		
Area 761	South of pueblo artifact concentration	Early Pueblo	AD 1450-1640, AD 1520-1670	Hill et al. 2018
Feature 133	Roasting pit beneath pueblo	Pre-Pueblo	AD 1472-1639	Hill et al. 2018
Feature 168	Borrow pit/midden adjacent to pueblo	Early Pueblo	AD 1521-1577, AD 1584-1591, AD 1784-1796	Hill et al. 2018
Feature 192	Borrow pit/midden adjacent to pueblo	Early Pueblo	AD 1514-1599, AD 1617-1663	Hill et al. 2018
Feature 196	Borrow pit/midden adjacent to pueblo	Early Pueblo	AD 1513-1600; AD 1616-1660	Hill et al. 2018
North of Pueblo	Gunnerson Excavation North of Pueblo	Mixed Context	AD 1522-1572, AD 1629-1655, AD 1636-1665, AD 1783-1795	Wilfong & Hill 2022
South of Pueblo	Gunnerson Excavation South of Pueblo	Mixed Context	AD 1457-1637, AD 1513-1600, AD 1616-1660, AD 1642-1698,	Wilfong & Hill 2022
West of Pueblo	Gunnerson Excavation West of Pueblo	Unknown	No direct radiocarbon date	

(Hill et al. 2018; Wilfong and Hill 2022). The proveniences represent a range of contexts associated with the pueblo structure and nearby artifact concentrations. Although the pueblo was likely constructed between AD 1630 and 1660, historical records indicate construction probably occurred after the Taos Pueblo migration in AD 1639 (Hill et al. 2018). The closing of the pueblo occurred between AD 1640 and 1720; however, there is a higher probability that the pueblo was closed prior to AD 1696 (Hill et al. 2018).

Witty's excavations of the pueblo are represented by Area 701 and Area 752. Area 701 is the largest excavation area included in this analysis and has the largest lithic assemblage (n=570, 39.4%). Because only a limited number of architectural elements documented during Martin and Williston's earlier excavations survived, it is difficult to determine a precise age for all artifacts recovered from this context. However, charred material from the burned pueblo floor, likely associated with ritual closure, and a corn sample from Feature 72, a small circular pit, suggest a later occupation or closure of the pueblo.

Area 751 and Area 761 are excavation blocks located south of the pueblo and date primarily to the early occupation of the site. Area 751 produced one radiocarbon date, while Area 761 contains three dated contexts. According to these dates, Area 751 may represent a Dismal River occupation predating the pueblo, although it could also reflect early pueblo use. Area 761 contains several important features, including Features 998 and 829. Feature 998 is a straight-sided pit measuring 51 centimeters in diameter and 44 centimeters deep located at the base of the cultural deposits in the excavation area. The feature lies approximately 60 centimeters below the original ground surface and directly beneath Feature 829, a large trash midden measuring 4.2 meters long and 2.0 meters wide. The only lithic artifact from Feature 998 included in this study is a core, while the remaining artifacts derive from Feature 829 or surrounding deposits. Feature 829 is likely associated with the early use of the pueblo. According to radiocarbon dates, Area 751 may reflect a Dismal River occupation of the site but could equally be associated with early use of the pueblo.

Features 168, 192, and 196 are three large trash-filled borrow pits located immediately outside the pueblo structure (Hill et al. 2018). These irregularly shaped pits measured approximately 6.5 × 4.1 m, 8.7 × 8.5 m, and 7.2 × 5.7 m, respectively, and were roughly 0.5–0.6 meters deep. Hill and colleagues (2018:63) suggest these depressions were likely borrow pits created during pueblo construction and were filled quickly because the of hazard they posed to residents. Radiocarbon dates from bison remains indicate these features were likely used during or shortly after pueblo construction (Table 3).

Feature 133 is a circular, straight-sided roasting pit approximately 67 centimeters in diameter and 24 centimeters deep. The feature is located under the pueblo floor, directly beneath the stone wall separating rooms six and seven of the pueblo (Witty 1983:105). Radiocarbon dates indicate the feature predates the pueblo and is associated with a Dismal River occupation dating between approximately AD 1470 and 1640. Although the feature contains a low artifact count (n=2), it was included because it represents the only definitively pre-pueblo context in the assemblage.

Gunnerson excavated three areas north, south, and west of the pueblo. Wilfong and Hill (2022) obtained four dates from bison remains from north of the pueblo (Features 6 and 10) and southwest of the pueblo (Features 33 and 38). As previously stated, the provenience information for Gunnerson's excavations is sparse, and depth is not known for these samples. The radiocarbon results suggest some contexts predate the approximate AD 1640 construction of the pueblo, while others postdate it. No direct radiocarbon dates are available for the area west of the pueblo;

however, artifacts from this context were still recorded despite the low artifact count (n=2). For analytical purposes, these excavation areas were grouped into three broader categories: North of the Pueblo, South of the Pueblo, and West of the Pueblo.

Area 752, Feature 133, and West of the Pueblo each contain fewer than 10 artifacts. Although these contexts were recorded and included in the broader discussion of the assemblage, they were excluded from statistical comparisons between proveniences to avoid disproportionately influencing the results.

Artifact Analysis

In the sections below, I discuss the specific methods I used to complete the raw material and attribute analyses for the formal tools and debitage included in this study.

Raw Material Analysis

Identifying the raw material of each artifact is paramount to understanding the decisions communities made related to procurement and technological strategies, and more specifically, how these may have changed in the face of shifting socio-cultural dynamics (Buscaglia 2017; Hull and Voss 2016; Panich 2016; Panich et al. 2018; Silliman 2003). In this analysis, most of the materials are attributable to the Great Plains, a region where "localized deposits of good lithic material are separated by vast areas with little to no lithic availability" (Holen 2001:89). These include sources of Niobrara chert from north-central Kansas and south-central Nebraska (Holen 1991:401; Carlson and Peacock 1975; Vehik and Baugh 1994:263), Florence A chert from south-central Kansas and northern Oklahoma (Blasing 1986; Haury 1984), and Alibates from west Texas (Holen 2001). The locations of these sources are visible in Figure 16. With few exceptions, these materials are identifiable at a macroscopic level, though black light and microscopic examination can provide additional information for those that are not (Hofman et al. 1991). Due to the relative homogeneity of the raw material in the collections, I was able to reasonably identify the raw material source of artifacts based on physical differences in color, banding, texture, and inclusions. Comparisons were made with existing type collections housed at the Oklahoma Archeological Survey, the Sam Noble Oklahoma Museum of Natural History, the University of Wyoming Archeological Repository, and various faculty labs at the University of Oklahoma and the University of Iowa. My confidence in these identifications is also based on personal experience completing fieldwork and lab analysis for sites across the region.

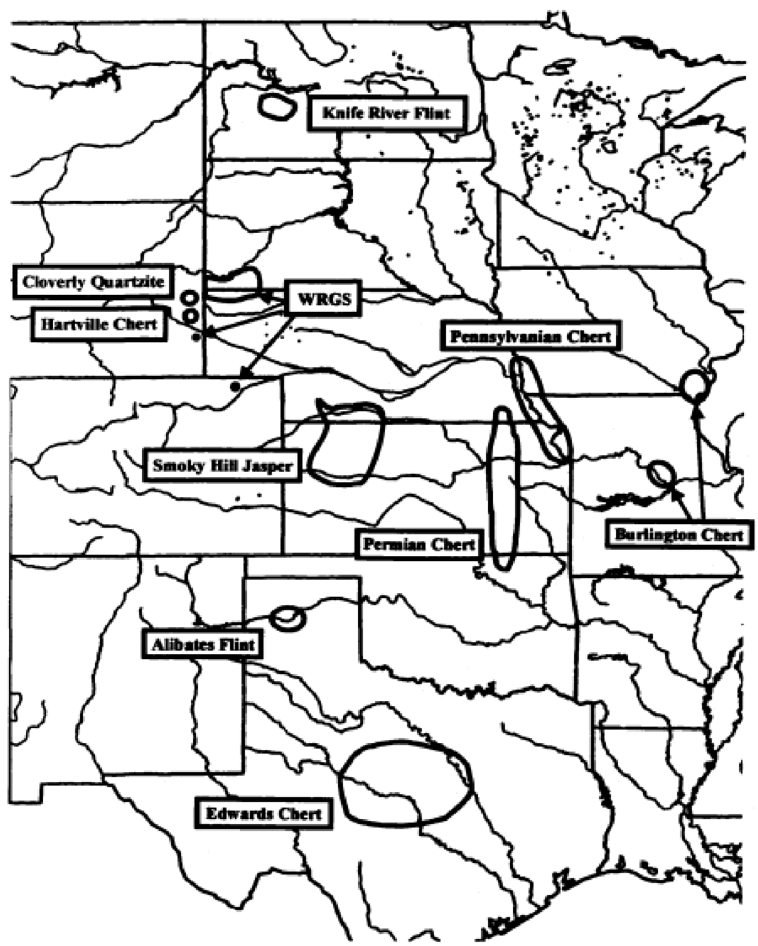

Figure 16. Locations of outcrops of lithic raw materials across the Great Plains. From Holen 2001.

It is reasonable to note here that scholars have, with varying degrees of success, developed microscopic and geochemical approaches to sourcing raw materials to increase the accuracy of raw material identification and narrow the geographic origin, including petrography (e.g., Dalpra and Pitblado 2015), ultra-violet fluorescence (e.g., Hofman et al. 1991), and trace-element analysis (e.g., Pitblado et al. 2013; Sanchez de la Torre et al. 2020). Unfortunately, several factors limit the applicability of these approaches, including the relative heterogeneity of the mineral composition, overlapping chemical composition, and wide geographic distribution. With raw material sources on the plains being relatively scarce and discrete, it is not too difficult to reliably identify more local raw material source areas with accuracy using macroscopic techniques alone (Holen 1991, 2001). In contrast, sourcing igneous rocks like rhyolite and obsidian through trace-element analysis is relatively inexpensive and very accurate. The homogeneous and geographically restricted nature of most igneous flows allows particular localities to be pinpointed far more readily than sedimentary or metamorphic cherts and quartzites, which can and do outcrop over extensive regions and vary chemically to a great degree. All of the igneous materials from this study have already been sourced (Hoard et al. 2008), so I use that data to supplement my own macroscopic observations.

I expanded my raw material identifications to incorporate additional qualitative variables. This approach served multiple purposes, including reducing personal bias in the analysis of the data and capturing more clearly the diverse characteristics of each raw material source. Smoky Hill Jasper, for instance, predominately occurs in a range of yellow to brown colors but can also naturally exist in red, green, purple, white, and black. Color is a strong indication of quality with dark brown varieties as strong, high-quality materials and light yellows as softer varieties (Holen 1991). Banding is not uncommon with this chert variety, though swirls and consistent coloring frequently appear in the formations (Wright 1985). To capture these differences, I recorded supplementary details such as color (including banding or mottling) and grain. I also recorded the presence of cortex and whether or not I observed evidence for heat treatment.

The amount of cortex on a stone tool can provide valuable information about its manufacturing process and history. When removed from a bedrock deposit (outcrop or quarry), nodules of chert retain an outer cortex of limestone or other sedimentary materials (Whittaker 1994). The presence or absence of cortex is often an indicator of how extensively the tool was worked, and therefore, what strategies and time investment were implemented. In this study, I indicated the presence or absence of cortex and approximately what percentage was still visible on the dorsal side of each piece. I included cortex present on the striking platform for these measurements.

Although not necessary for processing all lithic raw material types, it is not uncommon for modern and past flintknappers to heat treat their raw material source to alter the quality of the stone so it is easier to flake (Whittaker 1994). Many archaeological sites on the Plains show evidence for heat treatment (Butler 1997); however, the presence or absence of this practice is often dependent on the quality of stone, intended use of the final tool, and the desired time investment. To identify changes in heat treatment at the Scott County sites, I recorded the presence or absence of heat treatment for each of the lithic artifacts. Identifying heat treatment for the materials most common in this study can be done by assessing macroscopic variables, including color, texture, and occasional deformities in the rock, such as cracking or potlidding, that occur when exposed to exceedingly high temperatures. Cracking and Potlidding are often the product of improper heat treatment or burning.

Color change appears to be the most obvious indicator of heat treatment as materials like Smoky Hill Jasper and Florence-A chert change from their natural color to a pink or dark red (Mraz 2010; Vehik 2021). This identifier can be complicated when materials like Smoky Hill and Alibates exist in pinks, reds, and purples; however, my personal experience suggests that, within these collections, change in coloration from heat is often unevenly distributed throughout the material, creating variation in intensity or concentration that does not occur naturally. Inclusions in the materials also remain the same, offering additional insights. I also recorded when it evidence for heat treatment was indeterminate. Although texture can supplement color identification, I have found that determining whether a surface is lustrous or waxy is more difficult than recognizing color change and does not always occur with heat treatment (Vehik 2021). It is, however, a useful complement to color data.

Cores

Cores represent the starting point for tool production, offering insights into the procurement and reduction strategies employed by both Ndee and Puebloan flintknappers. The cores in this analysis were predominately informally or randomly flake cobbles, but overall, there was variety in size, shape, and reduction intensity that represented differences in how efficiently the material was utilized. I recorded 15 qualitative and quantitative variables for this analysis. This included the type of core, flintknapping issues, intensity of reduction, and size.

Core type included the classification of each artifact based on its general morphology, such as tested cores, globular, single platforms, opposed platforms, centripetal, flake, or bifacial. Categories were based on the orientation and direction of flake removal. For example, if platform scars were opposed, perpendicular, non-perpendicular, or there was a single platform. I also determined the classification based on the overall morphology of the piece.

During the analysis of cores, I recorded flintknapping-related problems or concerns to understand the challenges encountered by toolmakers during the reduction process. These types of concerns could include evidence of repeated hinges or step terminations, exhausted material, unrenewable platform, crazing due to heating or freezing, or outrepasses. These problems not only reflected the skill and decision-making of the flintknapper but also the quality of the material and limitations of the core as it was reduced. I recorded the intensity of flintknapping problems as having no concerns except exhaustion, one flintknapping concern (other than exhaustion), or multiple flintknapping concerns.

I measured reduction intensity to infer the efficiency of material removal. This included several variables including the number of striking platforms recorded on the piece and the number of negative flake scars, which indicated each core's degree of reduction. Cores with fewer flake scars and striking platforms and more cortex were interpreted as less worked, while those with more extensive removal represented more heavily exhausted pieces.

For each artifact, I recorded the maximum dimension of the core. The maximum width was measured perpendicular to this length. I recorded the maximum thickness at the intersection of these two values. I also weighed each piece to the nearest tenth of a gram. I also recorded the length of the three longest flake scars. Recording the longest flake scars provided important insights into the scale of flake removals and the overall efficiency of the reduction process. Longer flake scars suggest that the flintknapper was able to remove substantial portions of the core material with each strike, indicating a more controlled and effective reduction strategy and for better materaill. By capturing the lengths of the three longest flake scars, I was able to assess the degree of skill involved in the knapping process and how thoroughly the raw material was utilized. This information also helped indicate whether the core was still being actively worked or nearing exhaustion.

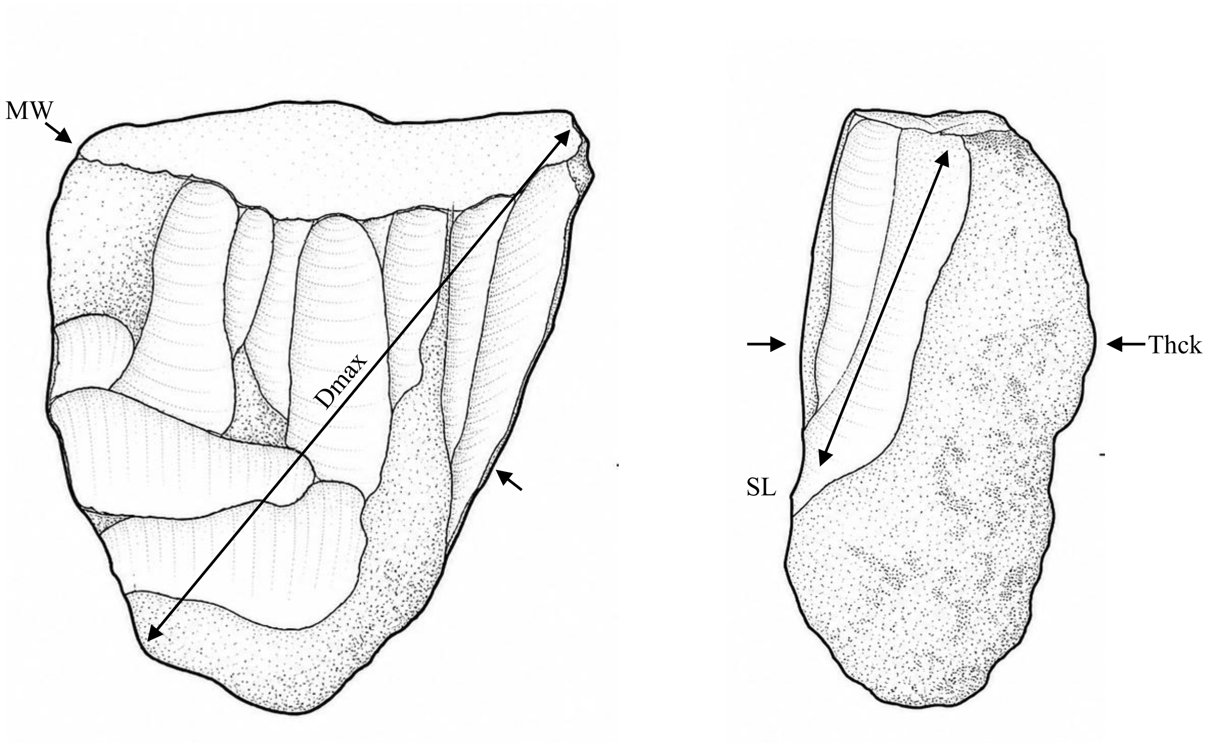

Figure 17. Core attributes measured for this research.

Table 4. Core Quantitative Attribute Definitions

Code	Definition
Dmax	Maximum dimension
MW	Maximum width
MT	Maximum thickness
SL	Maximum length of longest flake scars, taken for top three
SC	Number of scars removed
WT	Weight

Projectile Point Analysis

Projectile points dating to the Late Precontact period are notoriously difficult to assign to a specific cultural affiliation. Many Indigenous populations used similar lithic technologies across vast regions, resulting in significant overlap in the form and style of projectile points

(Frison 1971; Matson and Magne 2007). Although the overall shape of points may be similar, flintknappers living together engaged with the materials in a culturally specific way, producing a unique chaîne opératoire, that should be visible in attributes related to procurement, production, maintenance, use, and discard. These data are beset harnessed through a more detailed attribute analysis will provide a better comparison of practices between groups or across time.

Many variables, both quantitative and qualitative, speak to the decisions within chaîne opératoire that at least sometimes may reflect culturally distinct decisions. For this analysis, I selected the attributes based on their potential to successfully identify patterns in multicultural contexts. Specifically, I identified attributes from Bonnie Pitblado's procedure in *Late Paleoindian Occupation of the Southern Rocky Mountains* (2003), which I successfully adapted and applied in my Master's thesis, and R.G. Matson and Martin Magne's examination of Athapaskan projectile points in *Athapaskan Migrations* (2012) and tailored them to the projectile point styles common at the sites in the Ladder Creek Valley. For this analysis, I selected 28 attributes that I recorded for each projectile point. Most relevant were blank form, flaking pattern, flaking intensity, hafting element, morphology (metric attributes), and reworking. I elaborate on each of them below.

The blank form can identify whether a projectile point was produced on a biface or flake blank. To ascertain this information, I recorded the longitudinal cross-section of each projectile point. Projectile points manufactured from a biface are typically symmetrical, while those made on flake blanks often exhibit more variability and asymmetry in their cross-section. This can include a D-shaped appearance or even twisting, a common characteristic in more expediently made points. Some projectile points made on flake blanks retain visible attributes of the flake, including but not limited to the platform, bulb of percussion, flaking scars, or even unmarred ventral or dorsal surfaces. I recorded evidence of these features for each artifact. Indeterminate blank forms were labeled as such.

Flaking patterns represent the specific techniques and methods used to shape and refine the point. Flaking patterns observed in this research include collateral, parallel-horizontal, parallel-oblique, chevron or "V" shaped, parallel, and random. It was also common for projectile points in this study to have substantially different patterns on each side, which I recorded as such.

I measured flaking intensity to infer the relative amount of energy the flintknapper expended in the production of each projectile point. In an idea borrowed from Pitblado (2003), the amount of energy invested in the piece should be reflected in the number of flakes removed from each surface. The more energy expended, the more flakes removed. The flaking intensity was measured by an index that took measured the total number of flake scars along one margin of a projectile point and divided it by the overall length of the point. The values for the two margins were averaged. A large index value indicates that more flakes were removed and more energy was expended in production. A small index value indicates fewer flakes were removed and the flintknapper expended less energy on production. Reworked edges were not considered.

I recorded several attributes related to the hafting element. Ascertaining the overall shape of the base is important because the base is the most diverse element for projectile points. Trips are the same, but bases can be convergent to divergent, stemmed to lanceolate, concave to convex, etc. For this assessment, I recorded the basal outline and sides to identify if they were concave, convex, or straight. The basal corners were identified as sharp, round, or one of each. Notches were categorized based on their location (side, corner, or base) as well as the number of notches on the point. This information provides a general morphology for the projectile point and offers insights into the amount of energy the flintknapper expended while producing the point. For example, additional modification with notching showed greater energy output. When partial bases were encountered, symmetry was assumed, unless there was clear evidence suggesting otherwise.

As previously mentioned, projectile points needed to be mostly complete (>80%) to be included in this study, and I excluded all midsection and tip fragments, because they could not be measured for basal width. In taking measurements, a base line was established by orienting the projectile point base along a horizontal line, so that the longitudinal axis of the projectile point formed a right angle with the base line. This occasionally meant that only one corner was placed on the line. The basal width included the distance between the two corners. When there were rounded or otherwise indistinct corners, the basal width was measured where the sides formed a tangent to the radius of the curvature (Pitblado 2003). Basal concavity or convexity depth was measured from the base line to the highest point in the curve. I assigned positive numbers for convex bases, negative for concave, and a zero value for projectile points with straight bases.

To better understand the dimensions of the piece, I recorded the maximum dimension (not technical length), maximum width, and maximum thickness. Additional measurements were taken including the length of the longest side. In situations where the sides were concave or convex, I obtained the length by using a string and measuring it when straight. The length of the blade was measured from the tip of the point to the base of the blade, excluding the hafting element. The base of the blade was defined as the portion of the point that extends from the tip to the start of the notching or basal area where the point would have been hafted, often distinguishable by a change in angle relative to the basal line or a shift in concavity. I recorded maximum thickness and width of the blade.

If a projectile point had side notches, I measured the minimum distance between the two. I did not record this measurement for points with basal notching or only one side notch. The thickness of this area, referred to as the neck, was also recorded. The weight was also recorded for each point.

Reworking attributes included the resharpening of the tip, reformulation of the base, reworking of the blade, reworking to form another tool such as a scraper or graver, and any combination of these types of retouch. I recorded the presence/absence of rework, intensity of rework, and nature of retouch. I qualified intensity of rework as no rework, one form of rework, or multiple forms of rework. The nature of retouch included the following categories: no rework, rework for continued use as a projectile point, and rework for use as a different tool, such as a graver or scraper. Projectile points included in this class had to show clear morphological alteration to be classified as such.

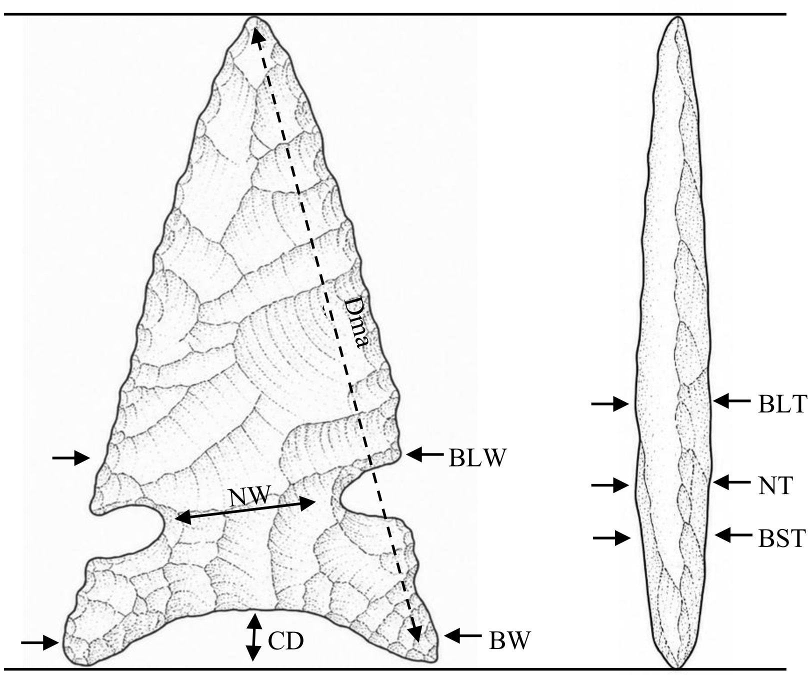

Figure 18. Projectile point attributes measured for this research.

Table 5. Projectile Point Quantitative Attribute Definitions

Code	Definition
Dmax	Maximum dimension taken from the basal line to the tip
Length	Length of the longest side from corner to tip
BLght	Blade length from the tip to the hafting implement, parallel to the longitudinal axis
SC	Number of scars originating along one face of side measuring for length
BW	Base width across corners if sharp or taken tangent to curved corners
BLW	Maximum width of the blade, perpendicular to longitudinal axis
NW	Minimum distance between notches
MW	Maximum width of point perpendicular to longitudinal axis
CD	Concavity/convexity, measured baseline to apex of base
MT	Maximum thickness of point
BLT	Maximum thickness of the blade
NT	Maximum thickness of the neck
BST	Maximum thickness of the base
WGT	Weight

Biface Analysis

In this study, bifaces displayed considerable variability in size and shape across the assemblage, reflecting a wide range of probable functions and production techniques. Bifaces lacked distinguishing features associated with a hafting element that made more typological classifications of projectile points possible. Regardless, there are both quantitative and qualitative variables within bifaces that reflect patterns in production. For this analysis, I selected 16 attributes that reflect decision making for the production, use, maintenance, and discard of each artifact. This included biface form, flaking pattern, flaking intensity, morphology (metric attributes), and flintknapping problems.

Unlike projectile points, bifaces were not confined to a single cultural or functional form, making it essential to record their general shape and their cross-sectional profiles. I observed the shape of the biface from a planar perspective and recorded each as square, cone-shaped, pointed oval, wide oval, small and round, triangular, or amorphous, with more irregular or expediently made forms falling into the latter category. For each biface, I also recorded both the longitudinal and transverse cross-sections to assess the overall morphology and flaking style. These were recorded as d-shaped/asymmetrical, ovoid, lenticular, diamond, parallelogram, or other.

Flaking patterns represent the specific techniques and methods used to shape and refine bifaces. The patterns observed in this research included parallel, collateral, and random flaking, among others, reflecting diverse approaches to tool production. It was common for bifaces to exhibit different flaking patterns on each side, which were recorded accordingly. The variability in flaking patterns suggests that bifaces were shaped based on a combination of raw material availability and intended use.

To assess the relative effort invested in the production of bifaces, I measured flaking intensity. Modifying Pitblado's (2003) approach for projectile points, I recorded the number of flakes removed from each surface. I calculated flaking intensity by dividing the average number of flake scars along one margin by the biface's overall length. Higher index values indicate greater energy expenditure and more extensive flake removals, while lower values suggest less intensive production efforts. Reworked edges were excluded from this analysis to ensure that only the original production effort was captured. Additionally, I recorded the size of the largest flake scar on both faces to capture the scale of flake removals and better understand the reduction techniques. The weight of each biface was also recorded to provide further insights into material use and reduction strategies.

As with projectile points, bifaces needed to be sufficiently complete for proper identification and measurement. This was crucial to avoid misidentifying fragments as other tool types. Due to the symmetrical shapes, it did not make sense to orient them in a particular way. Therefore, I focused on maximum measurements of length, width, and thickness to gain an understanding of the overall shape and size of each piece. Because I was not recording technical lengths or measurements of the hafting element, bifaces did not have to be as complete as projectile points to be included. Bifaces required an estimated 50% of their original shape to be included in the analysis.

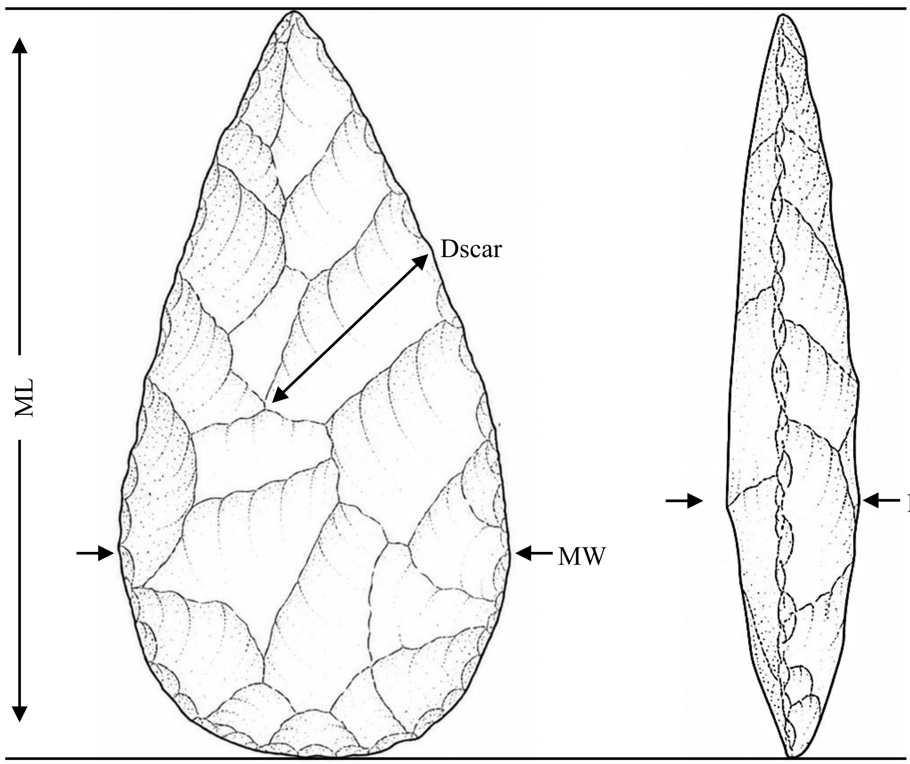

Figure 19. Biface attributes measured for this research.

Table 6. Biface Quantitative Attribute Definitions

Code	Definition
Dmax	Maximum dimension taken from the basal line to the tip
ML	Maximum length
MW	Maximum width
MT	Maximum thickness
SCF	Number of retouch scars, per face
Dscar	Maximum dimension of scar size, per face
WT	Weight

Scraper Analysis

The scrapers included in this study are primarily flake tools with steep marginal retouch on either the distal (end scraper) or lateral (side scraper) edges of the flake, though several artifacts had steep marginal retouch along the proximal end of the piece. Regardless of the location of retouch (end or side scrapers), the tool outline was consistent across most tools: triangular to ovoid with the lateral edges expanding outward from the proximal end toward the broader distal end. The edges are typically convex, with most retouch occurring on the dorsal surface, with many exhibiting evidence for extensive retouch (a snub-nose shape). I focused on 20 qualitative and quantitative attributes that would highlight the production, use, maintenance, and discard of each tool. This included the type and extent of marginal retouch. This analysis was based on Vehik's (2002, 2012) and my own Master's thesis research.

To determine the type of marginal retouch for each scraper, I recorded the number, type, form, location, and angle of the retouch along the edges. To begin, I counted each edge that was reworked or used as a tool. Edges with continuous modification around the circumference were recorded as such. For type of retouch, I identified the type of retouch for two edges as either flat, steep, or other. Most of the scrapers had marginal retouch along the lateral edges and distal end. For these artifacts, I selected the distal end and one of the lateral edges as a representative of the type of modification on a piece. For example, end scrapers often had steep retouch along the distal end of the piece and flat retouch along the lateral edges. I also recorded the form of the retouch for the two edges as either convex, concave, or straight and smooth or denticulate. The location of retouch was recorded for each of the two edges. I recorded the orientation of the retouched edges as simple, inverse, bifacial, alternating, or other. Finally, I determined the angle of each edge by visually estimating the angle. If the entire circumference of the tool retained the same type of retouch, only one "edge" was recorded.

Because most of the scrapers were produced on flake blanks, I oriented each artifact by positioning the platform at the "top." Technical length was perpendicular to the center of the platform, following the direction of the force on the piece. The technical width was taken halfway down the technical length, while the technical thickness was measured at the intersection of these two variables. To better record the overall morphology of the piece, I also recorded the maximum dimension, width, and thickness for each scraper. For artifacts that retained a platform, I recorded the platform depth and width. I recorded the weight for each artifact.

Related to the extent of retouch, I counted the number of retouch scars along the two identified edges and divided this number by the length of each edge. To calculate the length of the two identified edges, I either recorded a straight-line measurement using calipers or used a string to gauge the length depending on the concavity of the edges. I also divided the length of the retouched area on an edge by the total length of the edge. I also recorded the average scar length of the retouch scars along the two edges. To calculate average scar length, I selected three scars and averaged these dimensions.

To be included in the study, I only utilized scrapers that were mostly intact or complete. Based on my personal observations and readings (e.g., Vehik 2018), it was difficult to recognize broken scrapers, even if I was examining the same piece at different points in time. Fragmentary end scrapers retaining the modified distal end with steep retouch is the exception to this observation.

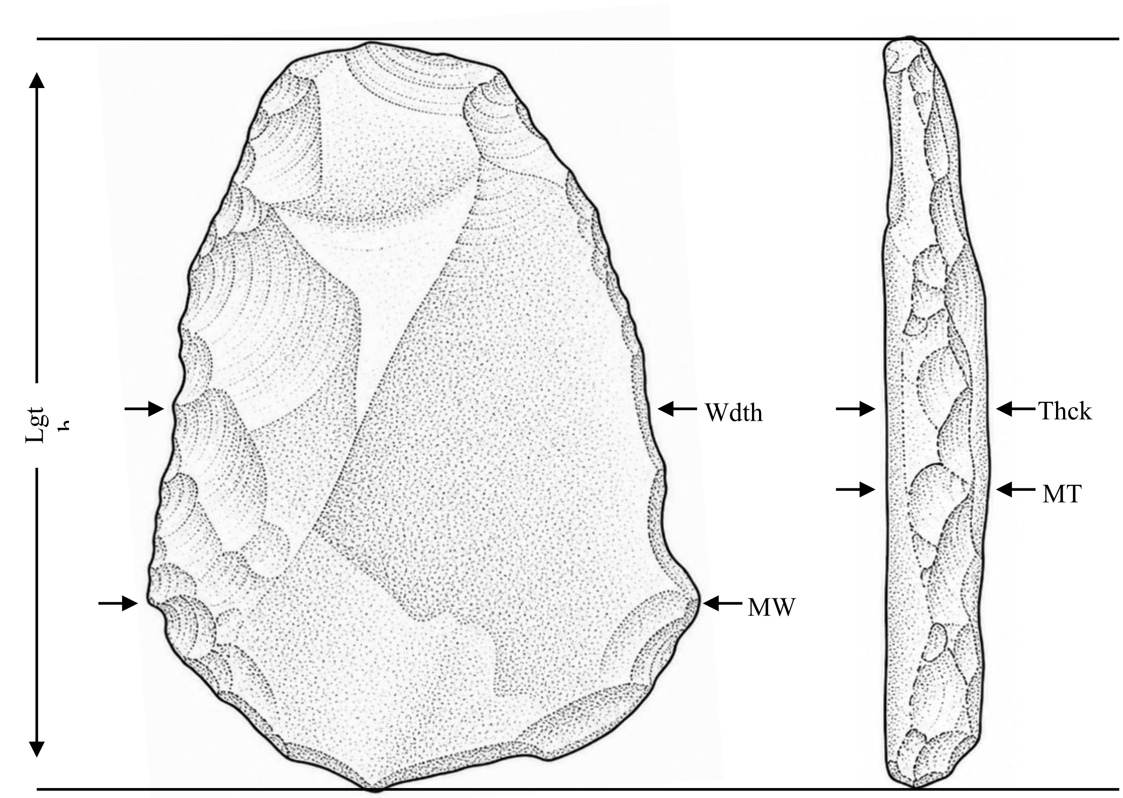

Figure 20. Scraper attributes measured for this research.

Table 7. Scraper Quantitative Attribute Definitions

Code	Definition
Lgth	Technical length, in case of flakes
Wdth	Technical width, in case of flakes
Thck	Technical thickness, in case of flakes
Dmax	Maximum dimension
MW	Maximum width
MT	Maximum thickness
Pwp	Platform width, for tools made on flakes with platform still present
Pdp	Platform depth for tools made on flakes with platform still present
WT	Weight
DS	Number of dorsal scars
RS	Number of scars comprising retouched edge
SL	Average scar length, sample three scars
LRet	Length of edge units
TLR	Total length of edge
Rat	Ratio of LRet/TLR

Tabular Bifaces

While this research categorizes broad categories of tools and bifaces as is typical for the field, I chose to isolate and analyze tabular bifaces separately due to their distinct morphology and significance as a potential marker of Athapaskan identity. My assessment focused on recording variables related to type and extent of marginal retouch for comparative analysis. I assessed marginal retouch type by recording variables such as the type, form, location, and angle of retouch along the edges as qualitative data. The type of retouch indicated whether the piece was flat, steep, or had a different type of retouch. The form of retouch was recorded as two separate variables. The first included whether the retouched edge was convex, straight, or concave. The second included whether the retouch was smooth or denticulate. As many of the pieces were produced on slabs of lithic material rather than flakes, I identified the longest edges as the lateral edges with no distinction between distal or proximal end. The location of retouch was identified as lateral, end, or circumference of the tool. The angle of a worked edge was measured by visually estimating the angle between the two flaked surfaces of the tool at several representative points along the edge. I selected three locations along the length of the worked edge to capture any variation in angle, ensuring that the measurement reflected the overall sharpness and retouch intensity.

I examined the extent of marginal retouch by counting the number of flake scars on each face and averaging their maximum lengths. I also calculated the percentage of the tool edge that had been modified by measuring the length of the retouched edge and dividing it by the total edge length. Given that the edges were often curved or rounded, I again used string to measure these lengths. Finally, I measured the maximum dimension, maximum thickness, and weight of each specimen to understand the overall size of the tool. Due to the subjective nature of orienting these pieces, I did not include technical lengths in the analysis.

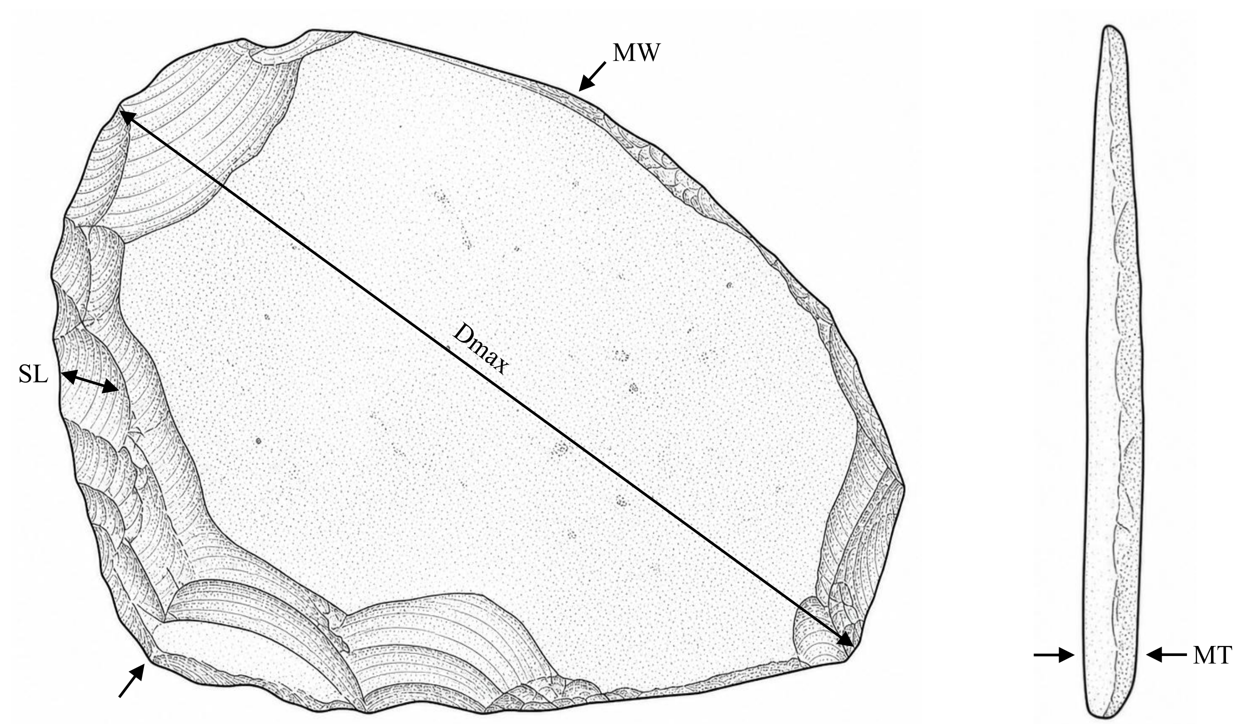

Figure 21. Tabular biface attributes measured for this research.

Table 8. Tabular Biface Quantitative Attribute Definitions

Code	Definition
Dmax	Maximum dimension
MW	Maximum width
MT	Maximum thickness
WT	Weight
RS	Number of scars comprising retouched edge
SL	Average scar length, sample three scars
LRet	Length of edge units
TLR	Total length of edge
Rat	Ratio of LRet/TLR

Formal Tools

In addition to projectile points, bifaces, scrapers, and cores, the lithic assemblages contained several tools that did not fit neatly into these categories. I recorded similar information for these tools, including forms that served specialized or multifunctional purposes. Examples of these include drills, gravers, choppers, and spokeshaves. To capture the decisions and practices associated with these formal tools, I recorded 21 qualitative and quantitative attributes for each artifact. I did not include modified flakes in this analysis, because they represent minimal retouch and do not display the uniform or formal characteristics associated with distinct tool types. While they are not included here, I believe future comparisons would benefit their inclusion. To be included in this study, artifacts had to have distinct morphology and extensive retouch that aligned with each of the formal tool categories. Those with minor, discontinuous, or indistinguishable retouch were not included. For this analysis, I recorded the tool type, type of modification, and extent of modification.

First, I identified the number of edges reworked or used as tools. Artifacts with continuous reworking were recorded as having reworking around the circumference of the tool. After identifying the number of worked edges, I recorded the type of modification or tool for two of these edges. This could include drill, graver, chopper, burin, spokeshave, scraper, or biface. Scrapers and bifaces were only included in this category if multiple tool forms were identified here. For example, Athapaskan scrapers occasionally have burins or perforators at the proximal end of the piece. This captured the diverse forms represented in broad categories.

To better understand the morphology of the piece, I recorded the type of modification that had occurred, including the type, form, location, and angle of retouch along the two identified worked edges. I identified the type of retouch as flat, steep, or other forms like notched or stepped. I also recorded the form of the retouch as two forms. First, I identified if the retouch was convex, concave, or straight. Second, I recorded if it was smooth or denticulate. This helped determine not only the shape of the artifact but also the flintknapping decisions. Additionally, I recorded the orientation of the retouched edges as simple, inverse, bifacial, alternating, or other and determined the angle of each edge. I visually estimated the angle of each edge of retouch by identifying where the two faces met and what angle they formed perpendicular to this point. If the entire circumference had the same type of retouch, only one edge was recorded.

For tools produced on flake blanks, I oriented each artifact by positioning the platform at the top and lining the midline or technical length as perpendicular to the center of the platform, following the direction of force on the piece. The direction of force was determined using the ventral surface. I recorded technical width at the point halfway down the artifact and technical thickness at the intersection of these two values. Technical length was only recorded for pieces with clear orientation, either flaking attributes or the presence of a hafting element. For artifacts with a hafting element, I followed the same procedure used to orient and measure projectile points. I determined the technical length by orienting the base along a horizontal line, also referred to as a basal line. The corners were placed on this line. If the corners were not symmetrical, the corner that would create a midline perpendicular to the basal line was selected. For technical width, I recorded the width halfway up the piece and measured technical thickness at the intersection of those values. I only measured technical lengths for artifacts that were mostly intact (>80%) or complete.

Regardless of completion, I recorded the maximum dimension, width, and thickness for all artifacts. For artifacts retaining a platform, I recorded the thickness and depth of that element. I recorded the weight of each artifact.

To assess the extent of retouch, I counted the number of retouch scars along both identified edges and divided this count by the total length of each edge. The length of the edges was measured either with calipers for straight edges or with a string for more concave edges.

Additionally, I calculated the proportion of each edge that had been retouched by dividing the length of the retouched area by the total edge length. To estimate the average scar length, I selected three representative retouch scars from each edge and averaged their measurements.

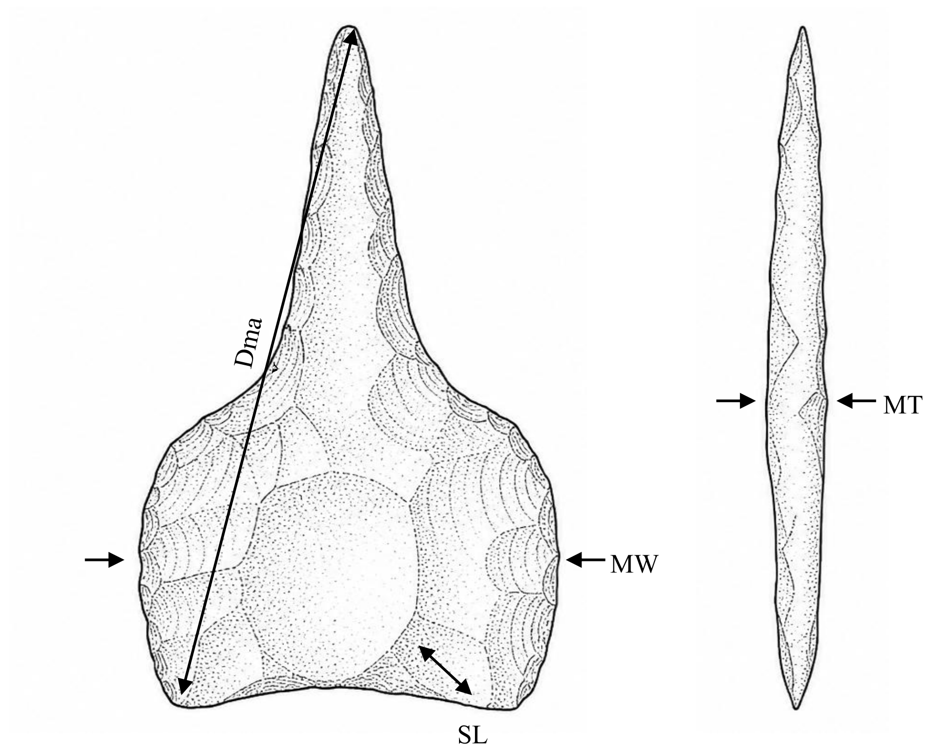

Figure 22. Formal tool measured for this research.

Table 9. Formal Tool Quantitative Attribute Definitions

Code	Definition
Lgth	Technical length, in case of flakes
Wdth	Technical width, in case of flakes
Thck	Technical thickness, in case of flakes
Dmax	Maximum dimension
MW	Maximum width
MT	Maximum thickness
Pwp	Platform width, for tools made on flakes with platform still present
Pdp	Platform depth for tools made on flakes with platform still present
WT	Weight
DS	Number of dorsal scars
RS	Number of scars comprising retouched edge
SL	Average scar length, sample three scars
LRet	Length of edge units
TLR	Total length of edge
Rat	Ratio of LRet/TLR

Debitage

Because of the reductive or subtractive nature of lithic technology, debitage is often the most abundant material within a lithic assemblage, especially when the entire chaîne opératoire sequence is represented. Debitage refers to the pieces of raw material removed from a core or tool during the process of reduction. This includes complete flakes, flake fragments, and angular debris. Morphologically, a complete flake must have a platform and a termination as well as clear dorsal and ventral surfaces. In contrast, a flake fragment will be missing either the distal termination, the proximal striking platform, or both. I consider flakes with crushed or collapsed platforms complete flakes in this analysis. Angular debris or shatter is the shatter removed from a core or tool, typically simultaneously with flakes. This artifact lacks clear ventral and dorsal surfaces as well as a platform. I only include angular debris in aggregate summaries.

For this study, I recorded 16 qualitative and quantitative variables for this analysis. This included the type of debitage, platform type and condition, intensity of reduction, and size to characterize reduction strategies and tool production behaviors. I first oriented the piece and identified the flake type as either complete, broken, fragmented, split, or shattered. To identify the amount of effort exerted in prepping the flake during flintknapping, I recorded the type of and condition of the platform. Platform condition could be cortical, plain (single facet), dihedral (two facets), faceted, crushed, a single point or line, and missing. I also recorded if the platform was ground or nibbled to strengthen it or worn as if to suggest removal from an exhausted tool edge. Other attributes related to flintknapping process including the use of hard or soft hammer percussion and stage of reduction were recorded including the presence or absence of platform lipping, eraillure scars, and a bulb of percussion.

For flakes, I oriented each artifact by positioning the platform at the top and lining the midline or technical length as perpendicular to the center of the platform, following the direction of force on the piece. The direction of force was determined using the ventral surface. I recorded technical width at the point halfway down the artifact and technical thickness at the intersection of these two values. Technical length was only recorded for pieces with clear orientation, either flaking attributes or the presence of a hafting element. For technical width, I recorded the width halfway up the piece and measured technical thickness at the intersection of those values. I only measured technical lengths for artifacts that were mostly intact (>80%) or complete. Regardless of completion, I recorded the maximum dimension, width, and thickness for all artifacts. For artifacts retaining a platform, I recorded the thickness and depth of that element. I recorded the weight of each artifact.

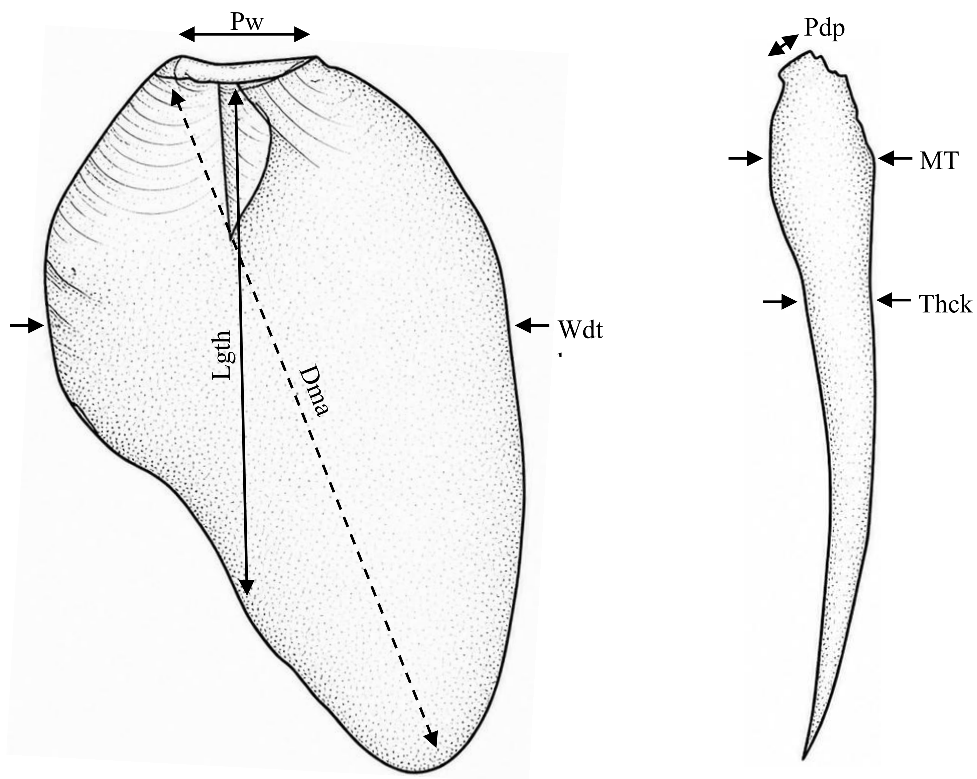

Figure 23. Debitage attributes measured for this research.

Table 10. Debitage Quantitative Attribute Definitions

Code	Definition
Lgth	Technical length, in case of flakes
Wdth	Technical width, in case of flakes
Thck	Technical thickness, in case of flakes
Dmax	Maximum dimension
MW	Maximum width
MT	Maximum thickness
Pwp	Platform width
Pdp	Platform depth
WT	Weight
DS	Number of dorsal scars

Conclusion

This chapter outlines the methodological framework I used to evaluate how lithic technologies at the Scott County Pueblo (14SC1) and affiliated Dismal River sites (14SC301, 14SC304, and 14SC409) may reflect Ndee responses to colonialism, including the arrival of

Puebloan migrants. Building from the premise that lithics can register shifts in procurement, production, maintenance, and discard, I developed a consistent attribute-based approach across tool classes and restricted the dataset to artifacts with reliable provenience and sufficient completeness for measurement and classification. I paired quantitative (metric) data with qualitative observations (e.g., flaking pattern and intensity, retouch form and extent, knapping problems, cortex, heat treatment) to compare chaîne opératoire within and between the sites.

Chapter 6: Results

Lithic technology provides a productive line of evidence for evaluating the degree and nature of contact between Ndee communities and Northern Rio Grande Puebloan migrants in the Ladder Creek Valley. Lithic analayis can operate at multiple scales, treating artifacts as the outcomes of discrete knapping decisions or as expressions of broader technological routines shared across contexts and through time. Patterns of procurement, production, maintenance, and discard can signal continuity in practice, while discontinuities may reflect shifts in organization, social relationships, or economic conditions (Compton 2017; Steffen et al. 1998). In this chapter, I apply this logic to the Scott County Pueblo (14SC1) assemblage to evaluate whether lithic practices vary among proveniences in ways consistent with changing technological organization during the pueblo's occupation.

To do so, I analyzed the 14SC1 lithic assemblage with an emphasis on provenience-based comparisons as a proxy for spatial and temporal patterning. Radiocarbon dates and contextual information produced by Matthew E. Hill and colleagues (Hill et al. 2018; Wilfong and Hill 2023) provide a framework for understanding when features and provenience areas were in use and for identifying deposits that represent mixed contexts. By comparing artifact frequencies, tool morphology, and raw material utilization across proveniences, I assess whether different parts of the site capture meaningful differences in chaîne opératoire and toolkit form that could reflect technological shifts associated with cultural contact. Of course, differences may reflect distinct activity areas, refuse histories, or depositional processes expected in a long-term occupation; however, differences may also reflect interaction with local Ndee groups through exchange, learning, or cohabitation. Accordingly, while the primary focus of this chapter is on chaîne opératoire, I also identify a small set of potentially diagnostic tool forms that may reflect Puebloan or Dismal River traditions.

An Introduction to the 14SC1 Assemblage

In the Scott County Pueblo (14SC1) assemblage, I analyzed 1,777 lithic artifacts, including projectile points, scrapers, bifaces, tabular bifaces, cores, and other tools. The "other tools" category includes drills, gravers, and spokeshaves. Tools were recovered from thirteen proveniences at the pueblo (n=1447). Table 10 shows the variability in artifact frequency across proveniences where the artifacts were recovered (see Table 3 for provenience information). Artifact frequencies and weights are uneven and differentially distributed across the provenience areas. The average count of artifacts per provenience unit is 132; however, there is a significant range in numbers. Area 701 is the excavation block over the pueblo itself and has the highest frequency of artifacts by count (570) and weight (6051.6 g). However, Feature 196 and Feature 168 represent the second and third highest frequencies of artifacts by count. Together, the three proveniences with the most artifacts by count account for over 70 percent of all lithics analyzed in this research. In contrast, artifact counts in Area 752, Feature 133, and Gunnerson's excavation block West of the Pueblo were low, with fewer than 10 lithic artifacts each.

The artifact weights show a similar pattern but highlight differences in artifact mass between proveniences. The mean weight of artifacts per provenience is 2009.2 grams. Area 701 still represents the largest collection of artifacts by weight at 6051.6 grams, or 27.4 percent of the collection. However, Gunnerson's excavation block South of the Pueblo contributes a disproportionate amount of total weight (4829.2 grams, 21.9%) for the relatively low number of artifacts (127). The two heaviest artifacts in the collection, cores weighing 1179.3 grams and

500.2 grams, come from South of the Pueblo and account for nearly 35 percent of the weight from the provenience area.

Table 11. 14SC1 Artifact Counts and Weights per Provenience Area

Provenience	**Lithic Count**	**Lithic Weight (g)**	**Percent by Count**	**Percent by Weight**
Area 701	570	6051.6	39.4%	27.4%
Area 751	43	330.0	3.0%	1.5%
Area 752*	7	27.9	0.5%	0.1%
Area 761	72	738.4	5.0%	3.3%
Feature 133*	2	38.1	0.1%	0.2%
Feature 168	177	4017.0	12.2%	18.2%
Feature 192	129	1118.0	8.9%	5.1%
Feature 196	279	3907.5	19.3%	17.7%
North of Pueblo	39	1019.1	2.7%	4.6%
South of Pueblo	127	4829.2	8.8%	21.9%
West of Pueblo*	2	24.6	0.1%	0.1%
Total	1446	22101.4	-	-

Table 11 and Table 12 list the frequencies by count and percentage of lithic artifact types in each provenience. There is considerable variability in frequencies of artifact types both within and across provenience areas. Area 701 and Feature 196 are both dominated by projectile points, 42.1 percent and 40.5 percent respectively, but include substantial portions of scrapers and bifaces, which suggest broadly comparable tool kits across the proveniences. In contrast, Feature 168 and Gunnerson's excavation blocks North of the Pueblo and South of the Pueblo have a higher frequency of scrapers within the proveniences, over 35 percent, with lower representation of projectile points, less than 25 percent. Additionally, the number of cores North of the Pueblo, though relatively comparable to other proveniences in count, account for nearly 12.8 percent of the artifacts in the area. This is a significant jump from the other areas and features where cores count for less than three percent of each provenience. Overall, however, cores account for the lowest frequency and percentage of the lithic categories, with no more than eight cores identified in any provenience area or feature.

Table 12. 14SC1 Lithic Type Counts by Provenience Area

Provenience	Projectile Points	Scraper	Biface	Tabular Biface	Other Tools	Core	Total
Area 701	240	153	119	14	36	8	**570**
Area 751	19	9	8	3	4	0	**43**
Area 752*	4	1	2	0	0	0	**7**
Area 761	27	23	15	1	4	2	**72**
Feature 133*	1	1	0	0	0	0	**2**
Feature 168	42	73	45	9	4	4	**177**
Feature 192	59	27	30	6	7	0	**129**
Feature 196	113	85	65	4	5	7	**279**
North of Pueblo	6	14	11	2	1	5	**39**
South of Pueblo	13	60	39	4	4	7	**127**
West of Pueblo*	0	2	0	0	0	0	**2**
Total	**524**	**448**	**334**	**43**	**65**	**33**	**1447**

Table 13. 14SC1 Lithic Type Percentages by Provenience Area

Provenience	Projectile Points	Scraper	Biface	Tabular Biface	Other Tools	Core
Area 701	42.1%	26.8%	20.9%	2.5%	6.3%	1.4%
Area 751	44.2%	20.9%	18.6%	7.0%	9.3%	0.0%
Area 752*	57.1%	14.3%	28.6%	0.0%	0.0%	0.0%
Area 761	37.5%	31.9%	20.8%	1.4%	5.6%	2.8%
Feature 133*	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%
Feature 168	23.7%	41.2%	25.4%	5.1%	2.3%	2.3%
Feature 192	45.7%	20.9%	23.3%	4.7%	5.4%	0.0%
Feature 196	40.5%	30.5%	23.3%	1.4%	1.8%	2.5%
North of Pueblo	15.4%	35.9%	28.2%	5.1%	2.6%	12.8%
South of Pueblo	10.2%	47.2%	30.7%	3.1%	3.1%	5.5%
West of Pueblo*	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Total	**36.2%**	**31.0%**	**23.1%**	**3.0%**	**4.5%**	**2.3%**

To evaluate if these observations reflect meaningful differences rather than sampling variation, I completed a Fisher's Exact test for all proveniences with total artifact counts above

20, which excluded Area 752, Feature 133, and West of the Pueblo from the analysis. The results indicate there is a significant association between the tool categories and proveniences ($p<0.0001$), which supports the interpretation that artifact distributions vary systematically across provenience areas and features. Overall, an examination of the contingency table indicates that the significant results reflect the same trends observed in Table 11. For example, Area 701 contains a higher number of projectile points (observed=238, expected=204) and other tools (observed=36, expected=26) relative to expectation, while Feature 168 shows an overrepresentation of scrapers (observed=73, expected=55) and a corresponding underrepresentation of projectile points (observed=42, expected=64). Similar departures are evidence in Gunnerson's excavation blocks North of the Pueblo and South of the Pueblo where scrapers, and cores in the case of the North of the Pueblo area, distinguish these proveniences from the rest of the site. Together, these results indicate that the variability summarized in Table 11 is statistically meaningful and likely reflects differences in activity areas, discard practices, or depositional histories across the site.

Table 13 summarizes the counts and weights of different raw material identified at the pueblo. Smoky Hill silicified chalk dominates the assemblage (n=990,67.2%) and accounts for an even larger frequency of the artifacts by weight (16773.7 g, 73.5%). This is likely due, in part, to the heavier weight of Smoky Hill cores in the collection. Florence A chert (n=144, 9.8%) and Alibates (n=97, 6.6%) occur in notable quantities compared with other nonlocal materials. Based on this information, locally available Smoky Hill materials are accessible and preferred for most lithic production and discard at the site, while Florence A chert and Alibates numbers suggest consistent, though secondary, use of the materials relative to Smoky Hill silicified chalk. Several raw materials show observable differences between their proportions by count versus weight, which likely reflects variation in blank side, reduction intensity, or the types of artifacts made from each material. For example, chalcedony represents approximately 5.5% of the collection by count but contributes relatively little mass to the collection (365.1 g, 1.6%), which is consistent with chalcedony occurring primarily as small or more reduced artifacts. In contrast, quartzite comprises a small number by count (n = 47, 3.2%) but a larger share by weight (1,225.7 g, 5.4%), suggesting fewer but comparatively larger or thicker artifacts. A smaller portion of the assemblage consists of cherts of unknown origins (n=41, 2.8%). Finally, although the "Other" category represents a small number of artifacts in the assemblage (n=24, 1.6%), it includes a diverse set of materials across a broader geographic range, including Edwards chert from central Texas (n=8), Knife River flint from west-central North Dakota (n=2), obsidian from the Jemez Mountains of New Mexico (n=7; sourcing published in Hoard et al. 2008), and a single Pedernal chert core from north-central New Mexico. This category also includes minor occurrences of quartz.

Table 14. 14SC1 Raw Material Counts and Weights

Raw Material	**Lithic Count**	**Lithic Weight (g)**	**Percent by Count**	**Percent by Weight**
Smoky Hill	990	16773.65	67.2%	73.5%
Florence	144	1487.95	9.8%	6.5%
Alibates	97	1067.42	6.6%	4.7%
Chalcedony	81	365.1	5.5%	1.6%
Basalt	52	795.5	3.5%	3.5%
Quartzite	47	1225.7	3.2%	5.4%
Unknown	41	385.2	2.8%	1.7%
Other	24	718.2	1.6%	3.1%
Total	**1476**	**22818.72**	**-**	**-**

Table 14 and Table 15 summarize the distribution of raw material by provenience, both with count and percentage of the provenience. As previously indicated, Smoky Hill silicified chalk dominates the assemblage (n=974, 67.3%) and is the primary material in every provenience with meaningful sample size, ranging from 56 to 82 percent of each provenience area. Florence chert forms the next largest component overall and is especially prominent South of the Pueblo (15.0%), suggesting either greater access to Florence material, greater use of those tools, or differential discard in that area relative to other units. In contrast, Alibates chert is unevenly distributed across the provenience areas and features, with more represented in midden/borrow pit contexts, Feature 168 (13.0%) and Feature 196 (14.3%). Alibates are entirely absent North of the Pueblo (13.0%) and rare South of the Pueblo (0.8%). Chalcedony, basalt, and quartzite occur in low to moderate proportions, less than six percent, and vary somewhat across proveniences. For example, Area 751 has comparatively elevated frequencies of chalcedony (n=4) and quartzite (n=4) each at 9.3 percent each. Unknown and other material categories remain consistently small in frequency overall.

To evaluate whether the observed differences were significant, I compared the raw materials by count across the recorded proveniences. Because several cells in the contingency table have expected counts below five, I relied on Fisher's Exact test rather than a chi-square test to account for the low cell values. I also excluded proveniences with counts below 20, including Area 752, Feature 133, and West of the Pueblo. The results indicate that the variation of raw material categories across proveniences is very significant ($p<0.0001$). The association between raw material and provenience is driven primarily by a non-uniform distribution of Alibates across units, especially in Area 701, Feature 168, and Feature 196. Comparisons of these values within the contingency table indicate that there were more Alibates

Table 15. 14SC1 Raw Material Counts by Provenience Area

Provenience	Smoky Hill	Florence	Alibates	Chalcedony	Basalt	Quartzite	Unknown	Other	Total
Area 701	385	58	19	38	22	20	18	10	570
Area 751	24	5	2	4	2	4	2	0	43
Area 752*	5	1	0	0	1	0	0	0	7
Area 761	48	7	2	7	3	2	3	0	72
Feature 133*	2	0	0	0	0	0	0	0	2
Feature 168	118	10	23	6	9	6	3	2	177
Feature 192	92	15	8	5	2	3	1	3	129
Feature 196	173	23	40	13	11	7	8	4	279
North of Pueblo	32	1	0	1	1	0	2	2	39
South of Pueblo	93	19	1	6	0	3	3	2	127
West of Pueblo*	2	0	0	0	0	0	0	0	2
Total	**974**	**139**	**95**	**80**	**51**	**45**	**40**	**23**	**1447**

Table 16. 14SC1 Raw Material Percentages by Provenience Area

Provenience	**Smoky Hill**	**Florence**	**Alibates**	**Chalcedony**	**Basalt**	**Quartzite**	**Unknown**	**Other**
Area 701	67.5%	10.2%	3.3%	6.7%	3.9%	3.5%	3.2%	1.8%
Area 751	55.8%	11.6%	4.7%	9.3%	4.7%	9.3%	4.7%	0.0%
Area 752*	71.4%	14.3%	0.0%	0.0%	14.3%	0.0%	0.0%	0.0%
Area 761	66.7%	9.7%	2.8%	9.7%	4.2%	2.8%	4.2%	0.0%
Feature 133*	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Feature 168	66.7%	5.6%	13.0%	3.4%	5.1%	3.4%	1.7%	1.1%
Feature 192	71.3%	11.6%	6.2%	3.9%	1.6%	2.3%	0.8%	2.3%
Feature 196	62.0%	8.2%	14.3%	4.7%	3.9%	2.5%	2.9%	1.4%
North of Pueblo	82.1%	2.6%	0.0%	2.6%	2.6%	0.0%	5.1%	5.1%
South of Pueblo	73.2%	15.0%	0.8%	4.7%	0.0%	2.4%	2.4%	1.6%
West of Pueblo*	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	**67.3%**	**9.6%**	**6.6%**	**5.5%**	**3.5%**	**3.1%**	**2.8%**	**1.6%**

observed in Feature 168 (observed=23, expected=19) and Feature 196 (observed=40, expected 12) than expected. Additionally, there were fewer Alibate artifacts in Area 701 than expected (observed=19, expected=38). Other departures from expectation were present across the proveniences, but these deviations were comparatively small and did not contribute as strongly to the overall significance as the pronounced, uneven distribution of Alibates across proveniences. Overall, the departures indicated are consistent with differences among proveniences in access to, use of, and/or discard of materials.

Cores

From the assemblage analyzed for this study, I identified 33 core artifacts, including one that lacks adequate provenience information. The core assemblage from the Scott County Pueblo is dominated by Smoky Hill silicified chalk. By count, Smoky Hill materials account for 26 cores (78.8%), and by mass, it accounts for nearly 75 percent of the assemblage. These numbers are not surprising. Smoky Hill materials are more locally available than others identified at the site, and therefore, are more likely to arrive at the pueblo as cores rather than preforms or formal tool forms. The remaining materials only occur at low frequencies, but their weights suggest that even nonlocal materials can arrive in crude or large cobble form. For example, the single Pedernal core, and only Pedernal artifact identified in the analysis, represents 7.6 percent of the total weight at 422.3 grams. This is significantly above the average core weight of 168.1 grams. Quartzite cores are also heavy, with a mean weight of 297.5 grams, and contribute to 10.7% of the total weight of the total core weight despite representing only two artifacts. Meanwhile, the only chalcedony core is relatively small (38.7 grams). This discrepancy could be due to its original source. Chalcedony is found in small cobbles, which would obviously restrict the form and amount of procurement. Overall, however, these numbers suggest procurement strategies focused on reducing local materials at the site.

Table 17. 14SC1 Total Core Counts and Weights by Raw Material Type

Raw Material	Lithic Count	Percentage by Count	Total Weight (g)	Percentage by Weight	Average Core Weight (g)
Basalt	3	9.1%	367.7	6.6%	122.6
Chalcedony	1	3.0%	38.7	0.7%	38.7
Pedernal	1	3.0%	422.3	7.6%	422.3
Quartzite	2	6.0%	595.0	10.7%	297.5
Smoky Hill	26	78.8%	4123.1	74.3%	158.6

Core morphology indicates flexible and expedient reduction strategies rather than a single standardized approach. Multidirectional cores are most common (n=16, 48.5%) and account for 46.3% of the assemblage weight. Tested cobbles (n=8, 24.2%) are less frequent but disproportionately heavy, comprising 30.5% of total weight and exhibiting the highest mean weight of 187.9 grams. Seven of these cobbles are Smoky Hill silicified chalk. This combination implies that flintknappers may have been choosier with local materials given their availability and discarded cores while large due to flaws or unfavorable properties. Bifacial cores (n=9, 27.3%) contribute 23.2 percent of the total weight of the core assemblage, indicating that a substantial portion of core reduction proceeded through more formal and conservative reduction strategies that would have supported the production of relatively standardized blanks or bifacial thinning flakes. Taken together, the mix of multidirectional, tested, and bifacial cores suggests that flintknappers at Scott County Pueblo employed both opportunistic reduction and more structured bifacial methods.

Table 18. 14SC1 Total Core Counts and Weights by Core Type

Type	Lithic Count	Percentage by Count	Total Weight (g)	Percentage by Weight	Average Core Weight (g)
Multidirectional	16	48.5%	2566.6	46.3%	160.4
Tested Cobble	8	24.2%	1691.4	30.5%	187.9
Bifacial Core	9	27.3%	1288.8	23.2%	161.1

Spatially, cores occur across multiple proveniences, but the distribution by count and weight suggests differences in discard practices. The most cores were recovered from Area 701 (n=8, 25.0%); however, the provenience area only represents 20.8% of the total core weight. Average core weight is close to the average at 138.9 grams. Feature 196 has nearly as many cores (n=7) but a much smaller portion of the assemblage weight (601.1g, 11.3%). The average weight of a core is much smaller in this area as well at 85.9 grams, which is consistent with later-stage reduction debris or the discard of smaller, more intensively used cores. As mentioned earlier in the chapter, South of the Pueblos stands out for the presence of heavy cores; in fact, the two heaviest artifacts in the entire assemblage are cores from this provenience area. Feature 168 shows a similar but smaller result with most of the weight coming from Smoky Hill silicified chalk and basalt. Overall, the proveniences imply that heavier, less-reduced cores (and possibly initial testing/early reduction) were concentrated South of the Pueblo and in Feature 168, while Area 701 and Feature 196 contain higher frequencies of lighter cores more consistent with later-stage reduction and discard. While the types of cores represented across the provenience areas are similar, it is worth noting that bifacial cores are only present in Area 701, Feature 168, and Feature 196. These proveniences include the pueblo and adjacent middens/borrow pits. Areas north and south of the pueblo do not contain bifacial cores.

Table 19. 14SC1 Total Core Counts and Weights by Provenience

Provenience	Lithic Count	Percentage by Count	Total Weight (g)	Percentage by Weight	Average Core Weight (g)
Area 701	8	25.0%	1111.5	20.8%	138.9
Area 761	2	6.3%	197.1	3.7%	98.6
Feature 168	4	12.5%	980.2	18.4%	245.1
Feature 196	7	21.9%	601.1	11.3%	85.9
North of Pueblo	5	15.6%	342.9	6.4%	68.6
South of Pueblo	6	18.8%	2102.4	39.4%	350.4

Projectile Points

At the Scott County Pueblo, projectile points are the most common formal tool. I analyzed 524 projectile points from the pueblo. Three were not included in the provenience comparisons due to insufficient provenience information. Of this collection, 274 projectile points are complete and 134 are basal fragments, while the remainder are tips, midsections, or split laterally. Consistent with the other tool forms, the inhabitants of the pueblo preferentially produced projectile points from Smoky Hill silicified chalk (n=322, 61.5%) and Florence A chert (n=61, 11.6%). Overall, projectile points also show a stronger emphasis on comparatively fine-grained materials than other tool forms, including higher frequencies of chalcedony (n=47, 9.0%) and obsidian (n=6, 1.2%) than all artifacts encompass (Table 20). In contrast, Alibates were relatively uncommon among projectile points (2.1%) despite being more prominent in the assemblage as a whole (6.6%). Alibates is a relatively hard raw material and can be more difficult to reduce through flintknapping, particularly when producing thin, formal artifact forms. Additionally, Alibates appears to have been preferentially directed toward other tool classes at the site, especially scrapers, so its heavier representation in those categories likely contributes to its comparatively low frequency among projectile points.

Table 20. 14SC1 Raw Material Composition of Projectile Points

Raw Material	**Lithic Count**	**Complete Count**	**Broken Count**	**Lithic Count**	**Complete**	**Broken**
Smoky Hill	332	161	171	62.2%	58.8%	65.8%
Florence	61	38	23	11.4%	13.9%	8.8%
Alibates	11	5	6	2.1%	1.8%	2.3%
Chalcedony	47	25	22	8.8%	9.1%	8.5%
Basalt	34	19	15	6.4%	6.9%	5.8%
Quartzite	27	13	14	5.1%	4.7%	5.4%
Unknown	15	11	4	2.8%	4.0%	1.5%
Other	7	2	5	1.3%	0.7%	1.9%
Total	**534**	**274**	260	-	**-**	**-**

Table 21. 14SC1 Summary Statistics of Complete Projectile Points by Raw Material

Complete	Number	Length (mm)	SD	Mean Width (mm)	SD	Mean Thickness (mm)	SD	Concavity (mm)	SD	Mean Weight (g)	SD
Smoky Hill	161	22.7	5.3	13.6	8.3	3.2	0.8	0.5	1.5	0.9	0.9
Florence	38	21.4	4.0	12.7	2.1	3.3	0.6	0.2	1.2	0.8	0.4
Alibates	5	20.1	3.1	11.3	1.3	3.2	0.4	0.9	0.8	0.6	0.4
Chalcedony	25	21.7	5.5	12.7	2.8	3.1	1.3	0.3	1.1	1.0	1.3
Basalt	19	24.7	15.5	14.1	7.5	3.6	1.6	0.3	0.8	0.8	0.4
Quartzite	13	23.1	6.5	14.7	3.7	3.5	1.2	0.6	1.0	1.5	1.8
Unknown	11	25.2	5.6	12.9	1.6	3.6	1.6	0.2	1.0	1.1	0.8
Other	2	18.4	0.8	10.2	1.1	2.5	0.1	2.8	-	0.6	0.1
Total	**274**	**22.6**	6.4	**13.4**	6.8	**3.2**	1	**0.4**	1.3	**0.9**	0.9

Table 21 summarizes metric variation among complete projectile points by raw material and indicates that projectile point manufacture at Scott County Pueblo produced a broad range of artifacts. Across complete points (n = 274), mean dimensions are 22.6 mm in length, 13.4 mm in width, and 3.2 mm in thickness. These averages largely reflect the dominance of Smoky Hill silicified chalk (n = 161), which closely matches the assemblage-wide averages. Differences by material are subtle but suggest variation in production consistency and robustness. Florence A chert projectile points are slightly smaller on average and show comparatively low variability, which could indicate more standardized production or more constraints on blank selection and reduction strategies for the flintknapper. In contrast, quartzite points tend to be wider, thicker, and heavier. Basalt points exhibit especially high length variability, implying a more heterogeneous subset. Overall, the table suggests that raw material choice shaped minor differences in standardization and tool mass, while point form remained broadly consistent across the assemblage.

The projectile point assemblage is dominated by triangular, unnotched forms (n = 314; 74.8%). Side-notched points represent a substantial minority (n = 98; 23.3%), while corner-notched and basal-notched forms are rare (n = 4, 1.0%). Table 22 provides a summary of the overall sizes of complete projectile points by notching style. For all measurements of the artifacts, the data skewed right and was nonparametric. I completed a Wilcoxon Rank sums test to compare the maximum measurement values for side-notched and unnotched projectile points, as corner-notched and basal-notched point categories were too low for statistical comparison and their means likely reflect small-sample effect rather than significant results. The analysis showed a significant difference in maximum dimension ($Z=-2.89879$, $p=0.0019$), maximum width ($Z=-2.61369$, $p=0.0045$), maximum thickness ($Z=-3.70425$, $p<0.0001$), and weight ($Z=-3.72039$,

Table 22. 14SC1 Summary Statistics of Projectile Points Forms

Complete	**Number**	**Length (mm)**	**SD**	**Mean Width (mm)**	**SD**	**Mean Thickness (mm)**	**SD**	**Concavity (mm)**	**SD**	**Mean Weight (g)**	**SD**
Unnotched	199	22.8	5.4	13.7	7.6	3.3	1	0.4	1.4	1.0	1.1
Side-Notched	68	20.9	3.9	12.1	1.6	2.9	0.4	0.7	0.9	0.7	0.3
Basal-Notched	3	27.2	4.9	13.6	1.8	3.6	1.2	-0.5	0.6	1.2	0.7
Corner-Notched	3	44.0	36.8	25.2	16.8	5.3	3.7	-0.7	1	1.3	0.9
Total	**274**	**22.6**	6.4	**13.4**	6.8	**3.2**	1	**0.4**	1.3	**0.9**	0.9

$p<0.0001$). On average, side-notched projectile points are smaller than unnotched projectile points and showed greater consistency with lower standard deviations than the other projectile point forms. Additionally, a chi-square analysis indicates there is a significant relationship between notching and concavity ($\chi^2 = 10.453$, $p=0.0054$). Side-notched projectile points had a higher frequency of concave bases (n=52, 62.7%) than unnotched projectile points (n=128, 42.7%). Unnotched projectile points have a higher rate of straight (n=136, 45.3%) and convex (n=36, 12.0%) bases than side-notched projectile points. There is not a significant difference in the depth of concavity between side-notched and unnotched points ($Z=1.4$, $p=0.1587$). Corner-notched and side-notched projectile points were generally convex. Raw material composition is broadly similar for unnotched and side-notched projectile points ($p=0.5961$). No visible differences do not meet the threshold for statistical significance.

To evaluate whether the complete projectile point assemblage varied across provenience areas, I compared metric attributes by provenience. Table 23 summarizes projectile point dimensions by provenience. Although there are some apparent differences in the descriptive statistics among proveniences, Kruskal–Wallis tests indicate no significant relationship between provenience and maximum dimension, maximum width, maximum thickness, or concavity. A significant association initially appeared between provenience and artifact weight ($H = 17.4819$, $p = 0.0145$); however, post hoc Tukey–Kramer comparisons did not identify any significant pairwise differences or coherent groupings, suggesting that this result should be interpreted with caution. Overall, the assemblage is characterized by small, lightweight points, shaped by the largest samples (Area 701, n = 122; Feature 196, n = 62). Notching and raw material categories likewise do not appear to vary significantly by provenience, reinforcing the broader conclusion that projectile point form and material choices were largely consistent across excavation contexts

Table 23. 14SC1 Summary Statistics of Projectile Points by Provenience

Complete	Number	Length (mm)	SD	Mean Width (mm)	SD	Mean Thickness (mm)	SD	Concavity (mm)	SD	Mean Weight (g)	SD
Area 701	122	21.8	4.6	13.3	9.3	3.1	0.7	0.5	1	0.8	0.6
Area 751	8	22.7	7.0	11.7	0.9	3.4	1.7	0.0	0.7	0.9	0.8
Area 752	3	18.0	7.0	10.7	1.4	3.0	0.4	0.4	0.6	0.5	0.4
Area 761	11	22.2	6.1	12.7	2.7	2.8	0.6	0.5	0.9	0.8	0.8
Feature 133	1	24.4	-	16.0	-	3.5	-	0.0	-	1.6	-
Feature 168	27	25.5	12.7	14.7	6.5	3.5	1.5	0.1	1.2	1.0	1.1
Feature 192	27	22.2	5.0	12.8	3.5	3.3	0.9	0.3	1.2	1.0	1.1
Feature 196	62	22.7	4.6	13.4	2.5	3.4	1	0.6	2	1.0	0.9
North of Pueblo	5	28.1	16.4	15.6	7.4	4.2	2.3	-1.0	0.7	2.4	3.9
South of Pueblo	5	26.5	3.2	15.4	1.2	3.5	0.2	0.1	0.6	1.3	0.2
Total	**274**	**22.6**	6.5	**13.4**	6.9	**3.3**	1	**0.4**	1.3	**0.9**	0.9

and that any minor differences observed in Table 23 likely reflect sample size effects and depositional mixing rather than meaningful differences.

To ensure I was not masking any variability by combining all projectile points together, I repeated the comparisons above for each of the two largest sub-samples: side-notched and unnotched projectile points. Across the analysis, results were broadly consistent; metric dimensions and categorical attributes did not differ significantly among proveniences, even when side-notched or unnotched points evaluated separately. The lone exception to this was basal width among unnotched points. Because basal width measurements were non-normally distributed, I evaluated differences among proveniences using a Kruskal–Wallis test, which indicated a significant effect (H = 17.4819, p = 0.0145). Tukey–Kramer post hoc comparisons uggest this is driven primarily by a difference in mean basal width between Feature 196 (13.5 mm) and Feature 192 (12.0 mm), while the remaining proveniences share connecting letters and are not statistically distinguishable from either group. The larger basal widths in Feature 196 may reflect a slightly different mix of unnotched triangular forms or differences in hafting and maintenance trajectories; points produced on larger blanks or discarded earlier in their use-life may retain broader bases, whereas more heavily reworked pieces can become narrower at the base.

Scrapers

In the Scott County Pueblo assemblage, I identified 463 scrapers, or approximately 31.4 percent of the total tool assemblage. This is the second largest tool category behind projectile points. Of that total, 366 artifacts (79.1%) were end scrapers, 59 were side scrapers (12.7%), and 38 were unidentifiable fragments (8.2%). There are 297 (64.3%) complete scrapers. Scrapers were made expediently on flakes, often with flake features such as platforms, bulb of percussions, and eraillure scars still present. End scrapers are notable for their steeply retouched distal end, while side scrapers have steep but less invasive retouch along one or both lateral edges. Across the pueblo assemblage, end scrapers typically account for more than 90 percent of each provenience area or feature. Side scrapers occur only in low numbers and appear across the site rather than clustered in a particular context. The highest representation of side scrapers occurs in Feature 192 (12.5%); however, this only reflects two artifacts. Differences are driven by low sample number, but even without those proveniences, there does not appear to be significant differences in scraper form across proveniences ($\chi^2 = 10.6$, $p = 0.1027$).

Table 24. 14SC1 Scraper Forms by Provenience

Provenience	**End Scrapers**	**Side Scrapers**	**Total**	**End Scrapers**	**Side Scrapers**
Area 701	95	5	100	95.0%	5.0%
Area 751	4	0	4	100.0%	0.0%
Area 761	13	1	14	92.9%	7.1%
Feature 133	0	1	1	0.0%	100.0%
Feature 168	48	5	53	90.6%	9.4%
Feature 192	14	2	16	87.5%	12.5%
Feature 196	52	4	56	92.9%	7.1%
North of Pueblo	11	0	11	100.0%	0.0%
South of Pueblo	35	1	36	97.2%	2.8%
Total	272	19	291	-	-

The majority of scrapers were produced from Smoky Hill silicified chalk (n=291, 62.9%) and Alibates (n=64, 13.8%), and Florence A (n=36, 7.8%). Other material types occur in low frequencies and include basalt, chalcedony, Edwards chert, granite, Knife River chalcedony, quartz, and quartzite. There are significant differences in raw material presence between end scrapers and side scrapers (Table 25). Smoky Hill silicified chalk accounts for nearly 80 percent of side scrapers. While most end scrapers were produced using Smoky Hill materials (n=217, 59.3%), there is greater diversity in the materials represented in comparison with side scrapers. Alibates is the second most common material overall (n = 58) and contributes similarly to both end scrapers (13.7%) and side scrapers (13.6%). Florence A chert is present primarily among end scrapers (8.5%) and is less common among side scrapers (3.4%). Several materials like chalcedony, unknown cherts, and other material types like Edwards chert occur only among end scrapers in this sample, while basalt and quartzite appear in very small numbers in both forms.

Table 25. 14SC1 Raw Material Frequencies by Scraper Form

Complete	**End Scraper**	**Side Scrapers**	**Total**	**End Scrapers**	**Side Scrapers**
Smoky Hill	217	47	264	59.3%	79.7%
Florence	31	2	33	8.5%	3.4%
Alibates	50	8	58	13.7%	13.6%
Chalcedony	23	0	23	6.3%	0.0%
Basalt	6	1	7	1.6%	1.7%
Quartzite	9	1	10	2.5%	1.7%
Unknown	21	0	21	5.7%	0.0%
Other	9	0	9	2.5%	0.0%
Total	**366**	**59**	**425**	**-**	**-**

To see if this difference is significant, I completed a chi-square analysis for the most common raw material categories: Smoky Hill silicified chalk, Alibates, Florence A, and condensed the remainder into an “other” category. The analysis indicates there is a significant relationship between raw material and scraper form ($\chi^2 = 12.201$, $p = 0.0067$). The biggest driver of significance is the representation of Smoky Hill materials. For example, there were more Smoky Hill side scrapers than expected (observed=47, expected=37). Although end scrapers and side scrapers show overlapping raw material choices, they differ in both raw material emphasis and average size. Metric values for end scrapers are broadly similar across raw

Table 26. 14SC1 Summary Statistics of Complete End Scrapers by Raw Material

End Scrapers	Count	Percent	Length (cm)	SD	Mean Width	SD	Mean Thickness	SD	Mean Weight	SD
Smoky Hill	162	58.3%	44.4	12.3	27.5	5.4	11.8	3.8	18.0	10.1
Alibates	39	14.0%	40.7	10.7	27.4	3.8	10.7	5.1	14.2	5.9
Florence	24	8.6%	41.3	10.3	28.0	8.3	10.9	3.7	17.1	13.7
Other	53	19.1%	41.9	15.5	27.9	7.4	12.8	15.1	18.7	17.3

Table 27. 14SC1 Summary Statistics of Complete Side Scrapers by Raw Material

Side Scrapers	Count	Percent	Length (cm)	SD	Mean Width	SD	Mean Thickness	SD	Mean Weight	SD
Smoky Hill	14	73.7%	73.5	27.9	36.1	5.1	10.9	4.3	28.3	23.7
Alibates	3	15.8%	49.8	8.8	32.4	2.0	11.6	3.7	18.9	5.6
Florence	1	5.3%	28.9	-	-	-	6.0	-	5.4	-
Other	1	5.3%	86.7	-	30.9	-	16.4	-	45.5	-

materials. Despite the small sample size, side scrapers are notably larger-bodied than end scrapers, especially among Smoky Hill silicified chalk artifacts, which have higher mean length, width, and weight than Smoky Hill end scrapers.

While Smoky Hill silicified chalk dominates the entire assemblage, there are several trends in the other material types that vary by provenience area or feature. For example, Alibates are concentrated in Feature 168, Feature 192, and Feature 196 but are scarce in Gunnerson's excavation block South of the Pueblo (n=1). South of the Pueblo instead has a higher frequency of Florence (n=9), while Area 761 has a higher frequency of chalcedony (n=5) relative to other proveniences. To determine if these results were significant, I condensed the raw material groups into four categories (Smoky Hill silicified chalk, Alibates, Florence, and Other) and completed a chi-square analysis. I only included proveniences where artifact counts were greater than 20. The test indicates a significant relationship between raw material group and provenience (χ^2 =73.900, $p < 0.0001$). Although Smoky Hill chert remains the dominant material overall, the significant result is driven by variation in the nonlocal categories. Feature 196 contains substantially more Alibates than expected (observed=28, expected 12), while South of the Pueblo shows Alibates as relatively absent relative to expectation (observed=1, expected=8) and a relative emphasis on Florence A chert. Similarly, Area 701 had fewer Alibates than expected (observed=12, expected=22).

When considered alone, end scrapers show the same significance (χ^2 = 60.351, $p < 0.001$). Alibates are overrepresented in Feature 196 (observed=26, expected=9) and absent South of the Pueblo (observed=0, expected=8). Area 701 also has fewer Alibates than expected (observed=9, expected=17). Florence A chert is overrepresented South of the Pueblo (observed=9, expected=4) and underrepresented in Feature 196 (observed=1, expected=5). Similarly, there are more other

Table 28. 14SC1 Scraper Raw Materials by Provenience

Provenience	Smoky Hill	Florence	Alibates	Chalcedony	Basalt	Quartzite	Unknown	Other	Total
Area 701	111	14	12	7	2	5	12	4	**167**
Area 751	7	2	1	0	0	1	1	0	**12**
Area 752	1	0	0	0	0	0	0	0	**1**
Area 761	14	3	0	5	1	0	1	0	**24**
Feature 133	1	0	0	0	0	0	0	0	**1**
Feature 168	56	1	17	3	2	1	1	1	**82**
Feature 192	22	2	17	2	0	2	1	1	**47**
Feature 196	55	2	28	1	0	1	3	0	**90**
North of Pueblo	11	0	0	0	1	0	2	2	**16**
South of Pueblo	46	9	1	4	0	2	1	1	**64**
West of Pueblo	2	0	0	0	0	0	0	0	**2**
Total	**326**	**33**	**76**	**22**	**6**	**12**	**22**	**9**	**506**

materials in Area 761 and North of the Pueblo than expected, while they are underrepresented in Feature 196 (observed=5, expected=12). Side scrapers do not show a significant relationship between raw materials and provenience areas (χ^2 = 24.933, p =0.1268).

Because end scrapers and side scrapers varied significantly in size, I compared the size of scrapers across proveniences independently. Among complete end scrapers, metric averages are broadly consistent across contexts, but there are a few provenience-level differences. Feature 196 and South of the Pueblo scrapers tend to be larger and heavier than scrapers in other proveniences. South of the Pueblo has the greatest mean thickness (11.5 mm) and high variability in size. In contrast, Area 761 and Feature 192 have lighter end scrapers on average. To determine if these differences were statistically significant, I completed analyses for length, width, thickness, and weight. Because thickness data is nonparametric, I completed a Kruskal-Wallis test, which indicated thickness does differ significantly across proveniences (H= 14.9830, p=0.0204). Tukey-Kramer post-hoc tests indicate these effects are driven primarily by the difference in size between end scrapers South of the Pueblo and those in Area 701, which are notably thinner. Both areas have reasonable overlap with the remaining proveniences. No significant relationships are detected for the remaining values. Complete side scrapers did not show significant variability across proveniences.

Bifaces

Across the Scott County pueblo, bifaces exhibit a great deal of variety both in overall shape and in the amount of effort invested in reduction and finishing. While most of the artifacts are relatively informal, expedient tools, there is a subset of more formal, carefully shaped bifaces. This variability suggests that the residents of the pueblo engaged in more expedient

Table 29. 14SC1 Summary Statistics for Complete End Scrapers by Provenience

End Scrapers	Number	Percent	Length (cm)	SD	Mean Width	SD	Mean Thickness	SD	Mean Weight	SD
Area 701	95	34.2%	42.8	14.3	27.3	5.3	8.6	2.5	16.6	11.2
Area 751	4	1.4%	39.1	15.4	29.1	3.1	9.6	1.5	17.7	12.4
Area 761	13	4.7%	40.2	9.7	26.1	5.0	7.8	2.0	13.6	5.8
Feature 133	0	0.0%	-	-	-	-	-	-	-	-
Feature 168	48	17.3%	42.1	8.8	26.3	6.8	8.5	3.1	16.3	9.5
Feature 192	14	5.0%	40.1	11.3	25.7	5.3	8.9	3.1	13.3	5.5
Feature 196	52	18.7%	44.7	12.0	28.8	4.4	9.4	2.6	18.3	8.5
North of Pueblo	11	4.0%	37.9	7.8	29.5	5.6	9.6	3.3	16.2	8.9
South of Pueblo	35	12.6%	45.5	13.4	27.1	4.2	11.5	6.2	19.8	12.8

technological strategies and that bifaces were often not produced to meet a specific form or standardized template. Instead, there are multiple trajectories of maintenance, use, maintenance, and discard. There are 346 bifaces in the collection, which include 86 complete bifaces (24.9%) and 260 fragments (75.1%). Nearly half of the bifaces were complete enough to identify the overall shape of the piece (n=156, 45.1%). While I originally recorded a greater variety of biface shapes, the overall diversity could be best captured as bifaces with a pointed end (n=72, 46.2%), rounded or oval with no significant point (n=39, 25.0%), rectangular with no points (n=29, 18.6%), or amorphous (n=16, 10.3%). The average metrics for these shapes are summarized in Table 29. Rectangular bifaces are the largest and heaviest on average, while pointed bifaces are thinner and lighter, suggesting more intensive shaping or maintenance of pointed bifaces. The standard deviations are relatively high for most metrics, especially length and weight, which suggests substantial variability within each shape class rather than standardized biface forms.

The collection of bifaces is primarily manufactured on locally available Smoky Hill silicified chalk (n=252, 72.8%) with lower frequencies of Florence A chert (n=45, 13.0%), Alibates (n=19, 5.5%), and other materials (n=30, 8.7%), including one obsidian artifact. Table 31 summarizes metrics of complete bifaces by raw material. The metrics summarized in the table indicate that the type of raw material may have influenced the overall shape of the discarded artifact. Smoky Hill silicified chalk and Florence A chert bifaces are comparable in average length, 53.1 mm, but Florence A chert bifaces are typically wider, thicker, and heavier than Smoky Hill bifaces. Alibates and chalcedony bifaces, however, are small and lighter. This result is consistent with higher quality or less common materials arriving at the pueblo as more reduced, curated tools rather than large, early-stage forms. Additionally, Smoky Hill silicified chalk and Florence A chert bifaces show substantial size variability within the raw material

Table 30. 14SC1 Summary Statistics of Complete Biface Forms

Bifaces	Number	Percent	Length (cm)	SD	Mean Width	SD	Mean Thickness	SD	Mean Weight	SD
Irregular	9	11.1%	45.2	19.4	32.3	8.3	13.3	4.5	24.0	20.1
Pointed	28	34.6%	49.4	22.7	28.6	8.5	9.5	3.9	17.8	16.4
Rectangular	10	12.3%	61.7	26.1	33.5	15.8	13.6	5.4	38.9	30.6
Rounded/Oval	34	42.0%	49.6	13.5	41.6	12.4	13.1	4.3	32.3	24
Total	**81**	**-**	**50.5**	**18.5**	**35.0**	**10.1**	**11.9**	**4.2**	**27.2**	**17.0**

Table 31. 14SC1 Raw Material Composition of Complete Bifaces

Complete	Number	Percent	Length (mm)	SD	Mean Width (mm)	SD	Mean Thickness (mm)	SD	Mean Weight (g)	SD
Smoky Hill	51	59.3%	53.1	22.3	37.1	11.7	12.4	5.1	30.7	24.8
Florence	14	16.3%	53.1	14.9	40.0	14.4	14.3	4.4	35.6	28.7
Alibates	9	10.5%	40.8	7.5	27.5	6.7	9.3	2.7	12.1	10.0
Chalcedony	3	3.5%	36.9	7.5	27.3	7.5	10.1	3.8	10.6	6.2
Basalt	2	2.3%	40.6	0.2	21.5	18.5	9.5	0.1	21.2	12.9
Quartzite	3	3.5%	56.2	3.8	29.9	2.5	9.7	4.1	17.0	6.7
Unknown	2	2.3%	40.8	22.3	31.2	11.7	9.4	5.1	12.5	8.1
Other	2	2.3%	51.2	39.9	24.7	18.2	11.4	10.8	26.3	35.1
Total	**86**	**-**	50.7	19.5	35.2	12.3	12.0	4.9	27.6	24.0

Table 32. 14SC1 Biface Form by Provenience

Provenience	Irregular	Pointed	Rectangular	Rounded/ Oval	Total	Irregular	Pointed	Rectangular	Rounded/ Oval
Area 701	8	27	12	8	55	14.5%	49.1%	21.8%	14.5%
Area 751	0	0	0	1	1	0.0%	0.0%	0.0%	0.0%
Area 752	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
Area 761	0	1	1	2	4	0.0%	25.0%	25.0%	50.0%
Feature 168	3	10	3	9	25	12.0%	40.0%	12.0%	36.0%
Feature 192	0	7	2	2	11	0.0%	63.6%	18.2%	18.2%
Feature 196	2	19	4	5	30	6.7%	63.3%	13.3%	16.7%
North of Pueblo	0	5	0	1	6	0.0%	83.3%	0.0%	16.7%
South of Pueblo	3	3	7	11	24	12.5%	12.5%	29.2%	45.8%
Total	**16**	**72**	**29**	**39**	**156**	**-**	**-**	**-**	**-**

categories, which suggests these materials were more available and spanned multiple reduction stages.

To evaluate whether there were differences in the biface assemblage across provenience areas and features, I compared both metric and categorical values. The first variable I considered was biface shape (Table 32). As previously discussed, pointed bifaces are the most common shape followed by rounded/oval, rectangular, and irregular forms. Most proveniences have the same general results, with pointed forms occurring most frequently with lower numbers of the other forms. The clearest exception is Gunnerson's excavation block South of the Pueblo, which has a much higher frequency of rounded or oval bifaces (n=11, 45.8%) and relatively few pointed forms (n=3, 12.5%). To identify if this was a statistically significant observation, I completed a Fisher Exact test, which indicated there is a significant relationship between biface shape and provenience area (p=0.0481). An examination of the contingency table shows that significance is primarily driven by South of the Pueblo, which contains fewer pointed bifaces than expected (observed=3, expected=11) and more rounded or oval bifaces than expected (observed=11, expected=6). Smaller deviations occur in Feature 196, which contains more pointed bifaces than expected (observed=19, expected=14), and Area 701, which has fewer rounded or oval bifaces than expected (observed=8, expected=14).

Flaking patterns can be a strong indicator of the level of effort or standardization that goes into biface production. To evaluate if this trait varied by provenience, I grouped observed flaking patterns into two categories: Formal and Irregular/Random. A chi-square analysis indicates a significant relationship between flaking pattern and provenience ($\chi^2 = 14.952$, $p = 0.0206$). Area 701 contains more formal flaking patterns than expected (observed=50, expected=41) and fewer irregular or random flaking patterns than expected (observed=72, expected=81). South of the Pueblo has the opposite result with fewer formal flaking bifaces than expected (observed=4, expected=13) and more irregularly flaked bifaces (observed=36, expected=27). This result likely reflects different activity and discard contexts, with South of Pueblo capturing more expedient reduction or heavily reworked tools.

For the complete bifaces in the assemblage, I compared the metric data across provenience areas and features. Table 33 summarizes the metrics for the basic measurements for complete bifaces. Feature 168 and South of the Pueblo tend to have bifaces that are larger and heavier in size than the other proveniences. In contrast, Area 701 and Feature 196 have similar dimensions and comparable average weights, which suggest broadly similar bifaces within these two proveniences. Feature 192 has the smallest bifaces on average. To determine if these observations hold statistical significance, I omitted proveniences with fewer than 20 bifaces and compared the values across provenience area. The overall measurements show a significant relationship between size and provenience area at the pueblo. Because maximum dimension and length are nonparametric, I completed a Kruskal-Wallis test for each comparison. The analyses indicate there is a significant relationship between maximum dimension ($H = 13.9156$, $p = 0.0030$) and length ($\chi^2 = 12.3047$, $p = 0.0064$) across proveniences. Tukey-Kramer post hoc analysis indicates bifaces from South of the Pueblo and Feature 168 are, on average, significantly longer than those from Area 701. Feature 196 values lie in between and are not statistically distinguishable from the other proveniences. An ANOVA one-way analysis for maximum width ($F=5.2871$, $p=0.0025$) and a Kruskal-Wallis test for weight ($H = 17.4227$, $p = 0.0006$) suggests there is a significant relationship with those values across proveniences. Tukey-Kramer post hoc

Table 33. 14SC1 Summary Statistics of Complete Bifaces by Provenience

Complete Bifaces	Number	Percent	Length (cm)	SD	Mean Width	SD	Mean Thickness	SD	Mean Weight	SD
Area 701	26	34.2%	41.2	11.7	29.1	9.4	10.4	4.4	15.4	14.1
Area 751	1	1.3%	54.8	-	32.7	-	7.7	-	14.4	-
Area 761	1	1.3%	48.4	-	37.4	-	13.8	-	26.8	-
Feature 168	11	14.5%	58.5	28.3	36.9	-	11.9	4.5	29.0	18.8
Feature 192	4	5.3%	32.7	7.5	32.4	6.0	8.9	3.5	11.4	8.6
Feature 196	15	19.7%	44.9	12.7	28.3	8.1	9.8	2.9	15.3	11.7
North of Pueblo	1	1.3%	67.5	-	43.7	-	15.9	-	53.1	-
South of Pueblo	17	22.4%	59.9	19.0	39.1	10.9	13.6	4.2	45.6	16.4
Total	**76**	**-**	**50.7**	**19.5**	**35.2**	**12.3**	**12.0**	**4.9**	**27.2**	**24.0**

analyses indicate that bifaces from South of the Pueblo are significantly wider and heavier than bifaces from Area 701 and Feature 196. Feature 168 falls in between and is not statistically distinguishable. Although an ANVOA test for maximum thickness suggested there might be significant differences across proveniences ($F=2.8515$, $p=0.0442$), Tukey–Kramer post-hoc comparisons did not identify any significant pairwise differences among proveniences, indicating that the effect is diffuse rather than driven by a specific group.

Unique Biface Forms

As previously indicated, the biface assemblage at the pueblo captures a great deal of variety in biface form, size, and reduction strategy. While many are more expedient or even amorphous forms, there are several unique bifaces within the collection that must be considered in more detail. In the collection, there are four rectangular bifaces made from Smoky Hill silicified chalk that are consistent with large, heavy drills from the American Southwest (Figure 24; Kidder 1932). The artifacts occur in Area 701, Area 761, and South of the Pueblo. All four artifacts are fragmentary so that complete measurements are not possible to quantify. However, the longest fragment is 104 mm, and several additional fragments are nearly as long (over 70 mm), despite having lost some portion of their original length. Consistent with Kidder's description, these tools are robust and thick-bodied, with blunt, rounded distal tips and proximal ends that terminate in straight transverse or slightly oblique margins. Comparable forms are not commonly identified in published descriptions of Dismal River lithic assemblages, and in my experience, I have not encountered a similar form at the Dismal River sites I have encountered. This suggests the drills could be a Puebloan form migrants continued to produce at the pueblo or a tool form produced to meet the needs of the pueblo.


Figure 24. Possible Puebloan-style drill fragment made from Smoky Hill silicified chalk.

The biface assemblage also includes a small, carefully manufactured rectangular biface made from obsidian (Figure 25). It was recovered in Area 701. The artifact is 23.0 mm in length, 11.8 mm wide, and 3.7 mm thick. It weighs 1.5 grams. The biface exhibits more formal retouch than other bifaces in the collection, with an organized flaking pattern and more flake scars than bifaces that are larger than the piece. Comparable small rectangular and ovoid obsidian bifaces have been reported from Dismal River–affiliated sites in Nebraska and Colorado (Matthew E. Hill, personal communication 2026), raising the possibility that this artifact reflects a broader technological pattern within Dismal River contexts rather than an isolated anomaly. Because the object is made from obsidian from the Jemez region, it is possible that it entered Dismal River communities already formed. It could have been produced in the Southwest and transported as a finished or near-finished piece. As a result, the appearance of this artifact at the pueblo could be the result of the migrants producing or acquiring the piece themselves or interaction with local Dismal River residents.

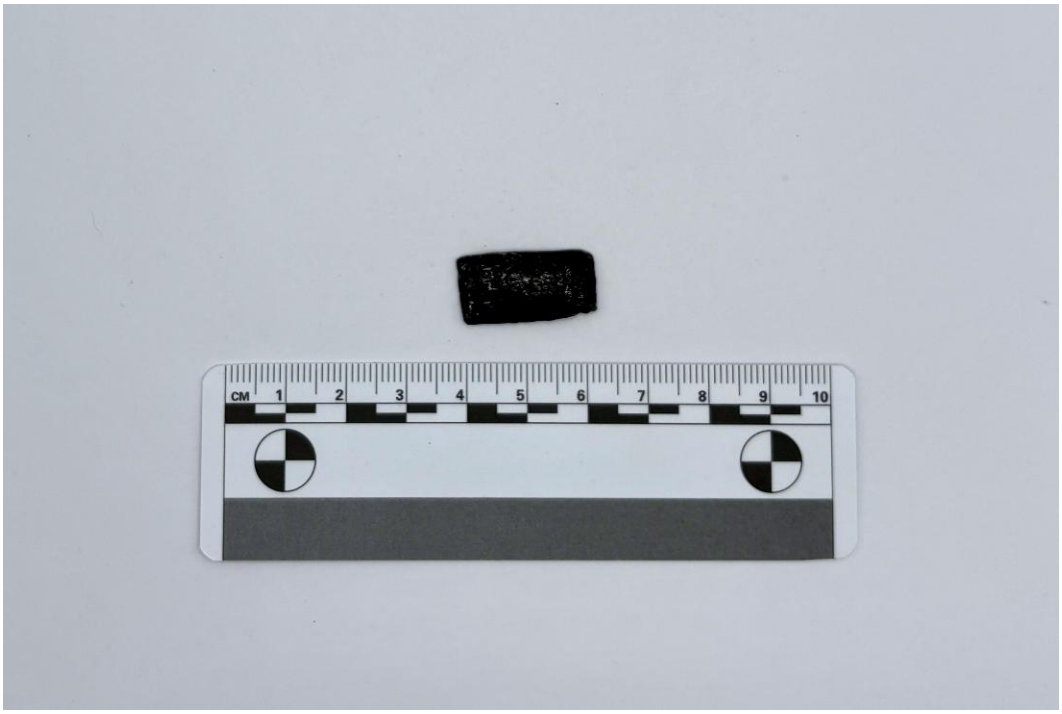

Figure 25. Small obsidian biface consistent with forms identified at other Dismal River sites.

Tabular Bifaces

In the Scott County Pueblo (14SC1) assemblage, there are 44 tabular bifaces, accounting for approximately three percent of the lithics included in this study. Within this sample, only one appeared to be a complete tool, while the remaining 43 artifacts were broken but represented at least 50 percent of the artifact (n=12, 27.3%) or were unidentifiable fragments (n=31, 70.5%). Despite the fragmented nature of these artifacts, they were easily identifiable from their form: thin, bimarginally worked pieces that create a convex edge (Figure 26). The edges either converged symmetrically into a sharp edge (n=28, 63.6%) or met asymmetrically to produce a steep angle (n=16, 36.4%). Forty-three of the artifacts were produced on thin slabs of Smoky Hill silicified chalk, while one was made from quartzite of an unknown origin. All had cortex represented on the pieces, and many of those produced on Smoky Hill material had cortex on both faces of the artifact. Five tabular scrapers (11.4%) had evidence of heat exposure, and three (6.8%) were in conclusive. The remainder showed no evidence for thermal alteration.

Figure 26. A complete tabular biface identified at the Scott County Pueblo (14SC1).

Due to the fragmented nature of the collection, I could not easily identify the average length and width of the tabular bifaces. I was only able to collect the length and width from five artifacts. Mean length was 94.2 mm, and mean width was 70.6 mm. However, the average maximum thickness of the sample was 10.8 mm with most artifacts falling between 8.7 and 12.2 mm thick. The thinnest tabular scraper was 5.1 mm thick, while the thickest was 20.2 mm.

Tabular bifaces are found throughout most of the provenience areas. Area 701 has the highest frequency (n=13, 30.2%); however, the 13 tabular bifaces still represent less than 3 percent of the tools in that area. In contrast, Area 751 only has three tabular bifaces; however, this number represents over seven percent of the artifacts in the provenience (n=71). I completed a Fisher Exact Test to evaluate whether the frequency of tabular bifaces differed significantly among the provenience areas. The test did not identify a significant association (p=0.14).

Because tabular bifaces were relatively uncommon and several provenience areas contained small counts, the Fisher's Exact Test was more appropriate than a Chi-Square analysis.

Tabular bifaces appear relatively homogeneously across provenience areas and features at the pueblo. There is very little variation in raw materials, blank form, overall size, and location and type of retouch. However, sample sizes for this artifact class are modest, which limits statistical comparison.

Other Tools

The assemblage at the Scott County Pueblo contains 51 drills, 13 gravers, and one spokeshave. In this assemblage, drills and gravers are both relatively uncommon but show strong patterning in where they occur and what raw materials they are made from. Most of the drills identified in the assemblage are expanded base drills, which feature a narrow, pointed bit produced through steep retouch. Made from a flake, the base of these forms is minimally modified. There is one example off a drill fragment that is narrow and cylindrical with a small bump at the midsection of the piece (Figure 27). This artifact is nearly identical to a form pictured in Alfred Kidder's (1932:26; Figure 10.n) volume on the excavations at Pecos. The artifact is located in Area 701 and made from Smoky Hill silicified chalk. To summarize the drills at the site, there are 22 complete drills (43.1%) in the collection, but the tool form is often represented by the tip or medial segment of the shaft (n=26, 51.0%). This is common for drill forms and is likely due to the force applied to the tool during use. Nearly all the drills are Smoky Hill silicified chalk (n=44) with a small number made from chalcedony, Alibates, Florence A chert, and basalt. Complete drills made from Smoky Hill materials are more robust on average than those made from other material types, exhibiting larger maximum dimensions and greater mass than the chalcedony examples (Table 30). Although the sample size is relatively low compared to other artifact types, these values suggest that drill manufacture and curation tended to rely on Smoky Hill silicified chalk to produce most of these tool forms.

Figure 27. Drill midsection consistent with forms documented at Puebloan sites. Recovered from Area 701 at the Scott County Pueblo (14SC1).

Table 34. 14SC1 Raw Material Frequencies of Drills, Gravers, and Spokeshave

Raw Material	**Drills**	**Gravers**	**Spokeshave**	**Drill**	**Gravers**
Alibates	2	1	0	3.9%	7.7%
Basalt	1	0	0	2.0%	0.0%
Chalcedony	3	0	0	5.9%	0.0%
Edwards	0	1	0	0.0%	7.7%
Florence	1	1	0	2.0%	7.7%
Smoky Hill	44	10	1	86.3%	76.9%

Table 35. 14SC1 Summary Statistics of Complete Drills by Raw Material

Complete Drills	**Number**	**Maximum Dimension**	**SD**	**Mean Weight**	**SD**	**Mean Thickness**	**SD**
Chalcedony	2	20.0	2.1	1.3	0.6	4.3	1.2
Smoky Hill	20	29.7	7.6	3.0	1.6	5.7	1.6
Total	**22**	**28.8**	**7.8**	**2.8**	**1.6**	**5.6**	1.6

Gravers identified in the collection appeared as a sharp point on a biface (n=7) or flakes/large pieces of shatter (n=6). Most of the gravers identified in the collection are Smoky Hill silicified chalk (n=10, 86.3%); however, there are artifacts made from Alibates, Edwards chert, and Florence A chert as well. One of the gravers also had a steeply retouched, concave edge that could be a spokeshave. There is one tool that exists as a spokeshave alone; however, when considering combination tools, the number increase. The lone spokeshave is made from Smoky Hill silicified chalk. The second tool co-existing with a graver is made from Edwards chert.

In order to identify if there were differences across provenience areas and features, I examined the spatial distribution of tool forms. Table 36 summarizes the spatial distribution of drills, gravers, and the spokeshave at the site. Drills occur in the highest frequency in Area 701 (n=24; 47.1%). This number accounts for nearly half the number of drills. A second concentration of drills occurs in Feature 192 (n=7, 13.7%), while the remaining proveniences contribute comparatively small numbers, generally fewer than four drills per provenience area or feature. Gravers are more spatially restricted than drills. Twelve of the 13 gravers were recovered from Area 701, with only a single graver in Feature 196. The spokeshave is from Area 751, while the combination graver and spokeshave is in Area 701. The tight clustering suggests activities associated with gravers of this nature were focused near the pueblo, while activities associated with drills were more widespread. The low frequency of spokeshaves suggests either that activities using this tool were infrequent at the site, carried out using other tool forms, or that spokeshaves were curated and discarded in contexts not well represented in the sample.

Table 36. 14SC1 Other Tool Distribution by Provenience

Provenience	Drill	Graver	Spokeshave	Drill	Graver
Area 701	24	12	0	47.1%	92.3%
Area 751	3	0	1	5.9%	0.0%
Area 761	4	0	0	7.8%	0.0%
Feature 133	0	0	0	0.0%	0.0%
Feature 168	4	0	0	7.8%	0.0%
Feature 192	7	0	0	13.7%	0.0%
Feature 196	4	1	0	7.8%	7.7%
North of Pueblo	1	0	0	2.0%	0.0%
South of Pueblo	4	0	0	7.8%	0.0%
Total	51	13	1	-	-

A Summary of the Pueblo

The goal of this chapter is to assess whether there are any significant differences among provenience areas that may reflect change through time or other patterned variation in chaîne opératoire; variation that could signal shifting technological strategies associated with interaction between Puebloan migrants and local Ndee communities. To address this question, I focus primarily on tool morphology and raw material utilization as indicators of patterns in procurement, production, use, maintenance, and discard. To summarize the results above simply, tool morphology is broadly consistent across the assemblage, even as individual tool classes exhibit substantial within-type variability. However, several identifiable and statistically supported differences among proveniences emerge, which I summarize below.

Across the Scott County Pueblo lithic assemblage, the most consequential result is that tool composition varies significantly by provenience ($p<0.0001$) and is driven by a handful of contexts with distinct frequencies of tools. Area 701 appears to represent a palimpsest of the pueblo occupation and is consistent with most proveniences in having a higher frequency of projectile points (42.1%) and more diverse forms represented (e.g., gravers). The clearest contrast emerges in comparison with Feature 168, Feature 192, and Feature 196, all Early Pueblo midden contexts adjacent to the pueblo. Feature 168 is distinctly scraper heavy (41.2%) and comparatively low in projectile points (23.7%), while Feature 192 is more projectile point heavy (45.7%). Feature 196 shows a clearer balance between projectile point (40.5%) and scraper (30.5%) frequencies. This implies that Early Pueblo discard was not uniform. Instead, it likely reflects spatially variable refuse accumulation or shifting activity areas during the early occupation.

Raw material utilization reinforces these observations. There is a significant relationship between raw material and provenience ($p<0.0001$) that is heavily influenced by the uneven distribution of Alibates at the site. Alibates is disproportionately represented in the Early Pueblo midden contexts, especially Features 168 (13.0%) and Feature 196 (14.3%). In comparison, Area 701 (3.3%) and North of the Pueblo (0.0%) have relatively low representation. It is possible that early migrants had greater preference for access to Alibates. There are slight differences in raw material use depending on each examined tool category, but on the whole, the patterns are captured by examining all the raw material.

The Gunnerson excavation blocks North of the Pueblo and South of the Pueblo exhibit assemblage frequencies that are distinct from the other provenience areas and features. For example, North of the Pueblo has an unusually high frequency of cores (13.8%) and scrapers (35.9%), while South of the Pueblo is the most scraper dominant provenience (47.2%) with very low projectile points. These results could certainly reflect activity areas situated farther from the main occupation of the site, the pueblo itself. However, the results could also be the result of the poor excavation records for Gunnerson's excavations, which lacked clearly defined excavation depths. Wilfong and Hill (2022) completed radiocarbon dating for both areas and found dates suitable for occupation both before during the occupation of the pueblo. The unique results in these areas could be interpreted as palimpsest assemblages, which represent at least a portion of an earlier Dismal River occupation.

Although tool morphology is broadly consistent across the assemblage, a small number of tool specific morphological attributes vary significantly by provenience. Among complete end scrapers, South of the Pueblo has the greatest mean thickness, while Area 701 are notably thinner in comparison. For bifaces, size and shape are most tied to differences with South of the Pueblo and Feature 168. Bifaces from South of the Pueblo and Feature 168 are significantly longer than those from Area 701. Bifaces from South of the Pueblo are also significantly wider and heavier than those from Area 701 and Feature 196. In contrast, projectile point morphology is stable across proveniences, except for one narrow case: among unnotched projectile points, mean basal width is larger in Feature 196 than Feature 192, though both retain overlap with the other proveniences.

While the methods of this research focus primarily on attributes associated with chaîne opératoire, I also identified several potentially diagnostic lithic artifact types that could speak, if minimally, to the interaction between the Puebloan migrants and local Ndee population. I recorded tabular bifaces recognizing they have the potential to be Athapaskan chithos. These artifacts were a relatively small, homogenous component of the assemblage but do appear at proveniences across the site. In the next chapter, I discuss in more detail how these relate to Athapaskan chithos. The assemblage also includes a few robust rectangular bifaces consistent with Puebloan-style drills, a narrow Puebloan-style drill made from Smoky Hill silicified chalk, and a small, formally worked obsidian biface. Both may reflect either migrants maintaining Puebloan tool forms or the circulation of finished/near-finished items through interaction networks linking the pueblo to broader Dismal River and Puebloan landscapes.

Comparisons with 14SC301, 14SC304, and 14SC409

As previously mentioned, there are several Dismal River sites near the Scott County Pueblo that both pre- and post-date its occupation. This research initially intended to compare the pueblo lithic assemblage to those from three other Dismal River sites: 14SC301, 14SC304, and 14SC409. While I understood the comparison would be limited by the low tool numbers at the nearby sites and differences in site type, I had hoped that a detailed attribute analysis might provide interesting insights in tool production and use that would be identifiable in a smaller sample size. That was, however, not the case. Rather than identifying unique tool forms or patterns in use, the analysis of the pueblo lithics actually revealed a great deal of variability in the assemblages, both within proveniences and tool categories. Because of lack of standardization and general overlap in Dismal River and Puebloan artifact forms, comparisons among site assemblages were not as fruitful as initially hoped. Instead, the tools identified at 14SC301, 14SC302, and 14SC409 fall within the acceptable morphological ranges documented at the pueblo.

Raw materials have observable overlap across the sites with all having high frequencies of Smoky Hill silicified chalk, Florence A chert, and chalcedony. The most obvious differences among the sites have less to do with identifiable, culturally specific production strategies than with site scale and depositional history. The pueblo was occupied much longer than any of the other sites, and therefore, captures a wider range of activities, discard pathways, and cumulative technological variation than shorter-term sites. For that reason, the comparisons were not as diagnostic as I had initially hoped for isolating contact-driven differences as the pueblo's broad morphological range tends to absorb variability that might otherwise appear distinctive. Regardless, I summarize the assemblages and how they compare below. Several of these sites like 14SC409 have had additional fieldwork since I analyzed the collections. Adding those artifacts to my analysis would create a more robust dataset for comparison. Future comparisons with more Dismal River sites would still be beneficial.

Site 14SC301

At 14SC301, the lithic assemblage is dominated by locally available Smoky Hill silicified chalk (63.7%), with smaller amounts of Florence A chert (9.7%), basalt (7.9%), quartzite (7.3%), chalcedony (5.4%), and an "other" category (6.0%). The excavated assemblage contains a substantial debitage component (n = 439), which is comparable to the debitage at 14SC409. Both emphasize later-stage production and maintenance rather than intensive early-stage cobble testing. There are relatively few formal tools at the site. Scrapers (n=11) are the most common followed by lower frequencies of bifaces, projectile points, spokeshaves, and cores. The bifaces are expedient or more crude in form, which is consistent with expedient bifacial reduction trajectories.

In comparison, the Scott County Pueblo assemblage reflects a larger and more compositionally diverse toolkit, with abundant small triangular projectile points and end scrapers, a substantial biface component, cores, drills, and gravers alongside variability by provenience in both tool-category representation and raw material utilization. The scrapers, bifaces, drills, and projectile points documented at 14SC301 fall within the range of metric and morphological variability observed at the pueblo, which is not unexpected given both the low tool counts at 14SC301 and the substantial within-type variability expressed at 14SC1. Relative to the pueblo assemblage, 14SC301 presents a more narrowly expressed technological signature: it is debitage-heavy, scraper-forward, and structured around late-stage finishing and maintenance behaviors rather than the broader range of production, use, and discard contexts represented at the pueblo.

Raw material use at 14SC301 is broadly comparable to the pueblo. Smoky Hill silicified chalk is most abundant, followed by Florence A chert and chalcedony. However, 14SC301 also shows notable contributions from basalt and quartzite that are more visible here than in many pueblo proveniences. At the pueblo, Alibates form a meaningful nonlocal component and show strong differences across proveniences.

Site 14SC304

The 14SC304 lithic assemblage represents only a sample of the artifacts recovered at the site (n=72). The assemblage is mostly debitage (n=67, 93.1%) with only five formal tools represented, including four projectile points (5.6%) and one scraper. I did not analyze any bifaces, cores, drills, gravers, or spokeshaves from the site. All of the tools were made from Smoky Hill silicified chalk (n=11, 84.7%), with only minor occurrences of other material types. The debitage is consistent with a focus on later-stage reduction. The site is the reported location of a wickup but has not been fully excavated. It is likely the sample analyzed here is a very small representation of what is actually at the site. The pueblo assemblage, unsurprisingly, represents greater variability in toolkit and raw material diversity.

Site 14SC409

At 14SC409, the lithic assemblage is dominated by locally available Smoky Hill silicified chalk (73.0%), with smaller amounts of nonlocal materials such as Florence A chert, chalcedony, quartzite, basalt, possibly obsidian, and a sizeable “unknown” category. In excavated contexts, the assemblage is primarily debitage and reflects mostly late-stage reduction: flakes are small on average, most lack cortex, and attributes are consistent with soft-hammer percussion focused on bifacial finishing and retouch rather than early-stage cobble testing. Tools are relatively rare (n = 38), and the tool kit is scraper-heavy (scrapers = 55% of tools), with only a few bifaces and very low counts of projectile points and drills.

The comparison of 14SC409 with the Scott County Pueblo is fairly comparable to what has already been said about the composition and morphology of the assemblage at 14SC301 and clearer residential function. Overall, the pueblo is much larger and has a more diverse toolkit reflective of its longer occupation. As with 14SC301, the tools at 14SC409 are low in number but do fall within the broad range of morphological and metric variability represented at the pueblo.

In comparison, the Scott County Pueblo reflects a much larger and more diverse toolkit (abundant small triangular projectile points and end scrapers, substantial bifaces, plus cores and other tool forms) and shows variability by provenience in both tool composition and raw material use. As with 14SC301, the scrapers, bifaces, and projectile points at 14SC409 fall within the broad range of morphological and metric variability represented at the pueblo—an unsurprising outcome given the low tool counts at 14SC301 and the high within-type variability at 14SC1. Relative to the pueblo, 14SC301 therefore expresses a narrower technological signature that is more debitage- and scraper-heavy, consistent with a shorter-duration or more task-focused occupation than the long-term, multi-context record preserved at 14SC1. Raw material use at 14SC409 has a higher frequency of local stone than the pueblo. In the 14SC409 assemblage I analyzed, Smoky Hill silicified chalk and Florence A chert are the two most prominent raw materials at the site, with percentages that do not diverge much from the frequencies of those raw materials at the pueblo. Nearly 78 percent of the materials at 14SC409 are relatively local. A notable difference is the appearance of Alibates at both sites. While there are Alibate scrapers at 14SC409, the number is low enough. In contrast, Alibates make up nearly seven percent of the raw materials from the pueblo.

Conclusion

To better understand how Northern Rio Grande Puebloan migrants interacted with local Ndee occupants in the Ladder Creek Valley, I completed an attribute and raw material analysis of lithic tools from the Scott County Pueblo (14SC1). Most of the tool forms represented are common in both Dismal River and Puebloan contexts, including small triangular projectile points (side-notched and unnotched), unifacially retouched end scrapers, expanded-base drills, and expedient bifaces. Although a small number of artifacts may be more diagnostic of one tradition or the other, this chapter emphasizes provenience-level differences to evaluate whether spatial or temporal variability in lithic technology might reflect interaction between migrants and local Ndee communities (radiocarbon ranges summarized in Hill et al. 2018).

Overall, tool morphology is broadly consistent across the assemblage, particularly for projectile points. For points, metric dimensions and categorical attributes are largely stable across proveniences, with notching and raw material showing no meaningful results and only a single localized exception (i.e., basal width among unnotched points). In contrast, scrapers and bifaces show more context-specific variation, with significant differences concentrated in a small number of attributes (e.g., end-scraper thickness and biface size and shape). Some degree of spatial variation is expected in a long-term occupation; however, the pronounced differences observed in Gunnerson's excavation blocks, coupled with their mixed-context radiocarbon signatures, raise the possibility that portions of those deposits incorporate an earlier Dismal River component alongside Pueblo-period materials. The next chapter builds on these results to consider what the overall consistency in lithic technology, and the few localized differences that do occur, imply for interaction and technological negotiation in the Ladder Creek Valley.

Chapter 7: The Ladder Creek Valley as a Middle Ground

This dissertation examines how Puebloan migrants and local Ndee communities negotiated identity and expressed daily practices in the context of Spanish colonial activity in the American Southwest and the Puebloan diaspora. Although the arrival of the Spanish caused a cascade of social, demographic, and economic transformations that affected Indigenous communities living across the Great Plains, there are few case studies as explicit as the arrival of Puebloan migrants to Ndee territory in western Kansas. There, the Ladder Creek Valley is a middle ground where the Puebloans migrants and local Ndee inhabitants negotiated their new social realities on a daily basis. The ceramic data from the Ladder Creek Valley archaeological sites reveals Dismal River ceramics at the pueblo and Puebloan manufacturing practices and vessel forms at sites that post-date its occupation (Beck and Trabert 2014; Trabert 2017). The evidence indicates that not only did Puebloan peoples maintain their cultural traditions when they arrived in Kansas, but they also taught their descendants, or possibly even Ndee potters, leading to the local manufacture of Puebloan-style pottery at 14SC304 and 14SC409. These sites show continuation of Puebloan and Dismal River pottery and evidence for creolized communities. However, ceramics provide just part of the picture for how these communities interacted.

Previous archaeological research in the Ladder Creek Valley has contributed analyses for ceramics, pipestone, faunal remains, botanicals, and even architecture. Yet lithics have been missing from the discussion about colonial impacts for communities living in the Ladder Creek Valley. Lithics are not only the most common artifact type at archaeological sites in the Ladder Creek Valley, they also reflect daily practice and cultural preferences. In this dissertation, I explore how an in-depth attribute and raw material analysis can inform interpretations of lithic technological strategies by examining chaîne opératoire. While I draw on interpretations of the other material types for this discussion, I approached the lithic analysis independently to minimize circular reasoning and evaluate whether the lithic data aligns with or complicates expectations built from ceramics and other datasets. In doing so, I address three questions: 1) how the lithic technology at the pueblo varies across proveniences and/or changes over time, 2) if lithic technology at the pueblo shares more similarities with a Puebloan or Ndee influence, and 3) in what ways the lithics at the pueblo compare with the assemblages at sites that post-date its closure. Below I restate the hypotheses I presented in Chapter 1 to explain patterns in the data.

Hypothesis 1: Limited sociotechnical exchange within lithic production

If Puebloan migrants and local Ndee communities interreacted but maintained largely separate technological lithic learning traditions, then lithic assemblages associated with the pueblo should show continuity in production over time. Formal tool morphology, retouch patterns, reduction strategies, and maintenance practices would remain relatively consistent, even if other forms of interaction are evident. Raw material use may shift somewhat in response to local availability, but technological choices would primarily reflect established Puebloan practices rather than substantial adoption of local Ndee strategies. Ndee-style lithics may appear from exchange, but these would be relatively few in number compared to the lithics Puebloans produced themselves.

Hypothesis 2: Selective sociotechnical exchange

If interaction involved practical cooperation, shared access to landscapes, and limited exchange of technical knowledge, then some minor evidence for lithic change should appear across provenience areas. More flexible or situational choices such as raw material selection, raw material use, expedient tool production, or recycling practices, may change before practices such as formal tool morphology or reduction techniques. The assemblage may show some convergence with Ndee technological strategies, while still mostly retaining elements of Puebloan lithic practice.

Hypothesis 3: High degree of sociotechnical exchange

If Puebloans and Ndee communities experienced a high degree of sociotechnical exchange, then later assemblages should show stronger technological convergence or mixing. This may include changes in formal tool frequencies, retouch location and intensity, reduction strategies, tool maintenance, recycling, and raw material preferences. Assemblages postdating the pueblo occupation may show characteristics of combined or hybridized strategies.

While the detailed evaluation of these expectations is presented in the chapter, the overall results are straightforward: lithic technology at the Scott County Pueblo is broadly consistent across the proveniences and time periods included in this research. The assemblage as a whole is highly variable, but provenience areas exhibit remarkably similar technological signatures. Most of the diversity is expressed within contexts rather than among them. This suggests consistent technological practices and activity signatures across the pueblo, even if several of the proveniences do represent palimpsests. Temporal comparisons likewise point to only subtle shifts that do not indicate a large-scale reorganization of chaîne opératoire or a clear directional transition in technological strategy. The lithic assemblage largely reflects expedient technological strategies that could be associated with either Puebloan or Ndee technological practice, though there are several tools at the pueblo that appear to be diagnostic drills suggestive of Puebloan lithic forms. There is also a strong representation of tabular bifaces. While these tools have the potential to be Athapaskan chithos, they are not clearly diagnostic and may reflect expedient technological decisions rather than group specific morphologies.

Of the three hypotheses I originally proposed, the data aligns more with the first: the lithic technology at the pueblo is consistent over time and space, which *could* suggest Puebloans and local Ndee maintained separate lithic technological strategies despite other material culture evidence suggesting they interacted at the pueblo and after its closure. However, this interpretation is not without limitations, especially with the available data. I discuss this issue below. This chapter explores the data from the Ladder Creek Valley to better understand the nuances of negotiation in a colonial middle ground.

The Lithic Data

Across the Scott County Pueblo assemblage, lithic technology is broadly consistent across provenience areas. This suggests consistent technological strategies and a stable chaîne opératoire despite substantial within-type variability. The most significant departures are not major shifts in tool production, which was my original expectation, but rather in provenience-level differences in assemblage composition and raw material use. Early midden contexts adjacent to the pueblo (Feature 168, Feature 192, and Feature 196) differ from one another in the relative emphasis on scrapers and projectile points. There are also subtle raw material differences; however, the most striking observation is the high frequency of Alibates that occurs in these midden deposits in comparison with other proveniences and later occupations. Nearly 75 percent of the Alibates in the assemblage come from those early midden contexts. Because these features represent early occupation of the pueblo (Hill et al. 2018), it appears the migrants either arrived with a stock of higher-quality materials or had better access to exchange routes that brought Alibates into the region, or both. Those initial stores of material would be most visible in early refuse areas and then fade as people relied more heavily on locally abundant Smoky Hill silicified chalk. While Alibates are common in small quantities at Dismal River sites in the Ladder Creek Valley, the numbers at the pueblo far exceed what is typical. The local Ndee could have provided the Alibates as a gift, but given the rarity of the item, it is more plausible that the Puebloans acquired the material themselves through exchange.

Gunnerson's excavation blocks North of the Pueblo and South of the Pueblo also stand out compositionally. Each has unusually high frequencies of scrapers relative to other proveniences, and North of the Pueblo shows an unusually high count of cores. South of the Pueblo also includes a biface component that is larger on average than other contexts, which indicates different reduction and discard behaviors in that area. While these differences could be attributed to their location outside and away from the pueblo architecture, at least some of the differences may be due to the unclear depth and context of Gunnerson's excavations. As discussed in Chapter 3, there is relatively little provenience information for the artifacts recovered from Gunnerson's excavations. Not only is there no stratigraphic data available to us today, but Gunnerson very likely intersected the same Dismal River deposits pre-dating the construction of the pueblo that Wedel excavated previously north of the pueblo. Wilfong and Hill (2022) show that both areas are chronologically mixed and have deposits that likely pre-date and post-date the construction of the pueblo. Wedel's excavations also produced ceramic proportions (bowl-to-jar) that look more like a Dismal River assemblage than a Northern Rio Grande Pueblo assemblage (Beck and Trabert 2014). Although I did not include Wedel's assemblage in this research, he reports that excavations did not recover any Florence A chert, while only one Florence A artifact was identified in my data sample. This is unusual compared with the rest of the site. Similarly, there were slight differences between the faunal composition in both excavation areas.

Most of the formal tools recovered at the Scott County Pueblo fall comfortably within the range of forms reported for both Dismal River and Puebloan tool assemblages. Scrapers, bifaces, cigar-shaped or expanded base drills, and even projectile points are morphologically similar across regions, which I why I focused on attributes rather than finished form classifications. However, I did identify a small number of potentially diagnostic artifacts present in low quantities that provide supplemental information about the occupants of the pueblo. Specifically, I identified two distinct Puebloan-style drill forms in the assemblage: large rectangular drills and one drill with a small lateral projection (bump) along the midsection. Alfred Kidder (1932:24-29) describes both in his volume on Pecos artifacts. While there are no comparable forms to the large rectangular drill in Dismal River contexts, the lateral bump on the narrow drill does bear some resemblance to artifacts recovered at Athapaskan sites called double-bitted bifaces (see Chapter 4). However, the artifact at the pueblo is generally narrower and rounder than those I have seen in assemblages (see Ives 2022:259 for a discussion of double bitted bifaces in northwestern Alberta and how they compare to Dismal River artifacts). While Wedel (1959) recovered 34 drills from his excavations (which likely reflect a Pre-Puebloan component), none of the descriptions match these two tool forms, raising the possibility that these tool forms only after the arrival of Puebloan migrants.

While the drills appear to be Puebloan-style artifacts, there is a small obsidian biface that resembles to artifacts recovered from Nebraska and Colorado (see Chapter 6). While the appearance of this suggests a Dismal River influence, the origins of the piece are somewhat ambiguous. All of the obsidian at the pueblo come from the Jemez region (Hoard et al. 2008), which is near the migrants' homeland. The artifact was recovered from Area 701 and could have been brought in any time during occupation. As a result, a Ndee association is possible, but the available evidence does not rule out alternative explanations, including Puebloan manufacture or acquisition through exchange networks linking the pueblo to the Northern Rio Grande.

Early in my analysis, I thought that tabular bifaces at the pueblo could represent Athapaskan chithos, which if correct, would provide strong evidence for interaction between Puebloan migrants and Ndee communities. However, the results of my analysis complicate that interpretation. To avoid influencing my interpretation of the site with an uncertain affiliation, I do not treat these tools as culturally diagnostic in the pueblo discussion and instead address their possible affiliation and implications in detail later in this chapter.

The small number of potentially diagnostic artifacts is not, on its own, sufficient to confirm interaction or to clarify the nature of any relationships between Puebloan migrants and Ndee communities. While there is significant overlap in Puebloan and Ndee lithic technological strategies, the consistency across contexts and presence of Puebloan-style lithics, though limited, suggest that lithic practice at the Scott County Pueblo primarily reflects Puebloan technological strategies. An exception to this is raw material procurement and use. While raw materials from the Plains and American Southwest are represented at the pueblo, the assemblage mostly consists of Plains materials, including Smoky Hill silicified chalk and Florence A chert. This pattern suggests continued connections with the American Southwest but could also reflect reliance on local knowledge or exchange. Given evidence that these groups interacted, it is reasonable to assume Ndee shared information about raw material sources with the Puebloan migrants. There is also the possibility that Puebloan migrants arrived in the Ladder Creek Valley and immediately adopted Ndee lithic technological strategies. However, given the appearance of Puebloan-style tools, this scenario is less likely.

Before moving forward, it is important to address the provenience information at the pueblo and its impact on the interpretations of this research. As previously discussed, Hill and colleagues have established a clear chronology for the occupation of the pueblo by analyzing dates, artifacts, stratigraphy, and historic documents (Hill et al. 2018; Wilfong and Hill 2022). Because the excavation areas and features included in this research date to different occupation periods, the spatial analysis comparing provenience areas also has a temporal component. However, there are limitations to this approach, including the fact that I do not have a strong representation of the Dismal River occupation predating the pueblo. Gunnerson's excavations likely penetrated the earlier component at the site but not offer a clear representation of the earliest occupation of the site. Feature 133 is the only confirmed Dismal River component, and the sample size is too small for meaningful comparison (n=2). As a result, this research provides important preliminary insights but is ultimately incomplete without comparing the lithics from Witty and Gunnerson's excavations to Wedel's. Consequently, the interpretations presented here are tentative pending further analysis and comparison.

The Ladder Creek Valley Middle Ground

The archaeological record in Ladder Creek Valley reflects direct, multigenerational integration of Northern Rio Grande Puebloan migrants into a local Ndee community, producing a negotiated middle ground with uneven but sustained evidence for creolization (Trabert 2017). The Ndee had long participated in the well-established exchange system across the Great Plains and the American Southwest. However, it was not until the Spanish arrived in the American Southwest and local communities fled as part of a larger diaspora that evidence for Puebloan influence occurs for those living in the Ladder Creek Valley (Trabert 2015). In order to flee Spanish control, a small group or family of Puebloans from the Northern Rio Grande arrived in western Kansas and built a seven-room masonry pueblo on top of a previous Ndee occupation (Hill et al. 2018). Radiocarbon dating suggests the Puebloans lived in the valley for multiple generations and remained even after the closure of the pueblo, where they continued their traditional ceramic practices (Hill et al. 2018; Trabert 2019; Trabert et al. 2023). Evidence for this is clear at Dismal River sites that post-date the pueblo. At site 14SC304, archaeologists identified a Dismal River wickiup filled with artifacts, including a significant number locally made versions of red slipped wares commonly found in Northern Rio Grande assemblages (Trabert 2017). This suggests that Puebloan and Ndee people have interacted in such a way that led to the creolization of practices over time.

When I first began this analysis, I expected to identify evidence for creolized lithic practices in the form of shifts in technological strategies and to a lesser degree, the appearance of diagnostic tool forms. However, the results of my lithic analysis at the pueblo identify neither. The lithics at the pueblo are largely similar across provenience areas, and thus to a certain degree, time. There are relatively few diagnostics forms at the pueblo, and the two possible Athapaskan tool forms I identified have complicated affiliation. Consequently, the data supports the conclusion that Puebloan migrants retained their traditional lithic practices with relatively little influence from the local Ndee community. This does not negate the other archaeological evidence. Dismal River ceramics are at the pueblo (Beck and Trabert 2014; Trabert 2017, 2019), and to a lesser degree, the faunal data suggests the migrants adapted their subsistence strategies to fit the landscape as their subsistence strategies align with those seen as Dismal River sites (Wilfong and Hill 2022). Considered together, the evidence continues to support the conceptualization of the Ladder Creek Valley as a middle ground where occupants negotiated daily practice. Rather than a uniform process of creolization across all domains, interaction appears to have been selective and uneven, expressed through the differential adoption and mixing of practices visible in ceramics, lithics, faunal remains, architecture, and other material categories. For Puebloans, lithics happened to be a more conservative practice and less likely to register social entanglements, perhaps in part because of how similar the lithic technological traditions were between the two communities.

Archaeologist have had the most success identifying responses to changing environments or even identifying distinct cultural traditions with projectile points. My analysis did not identify substantial differences in artifact type across the site, but this could be a result of who was producing the tools. While we know women hunted more than they receive credit for (Anderson et al. 2023), the men living at the Pueblo may have been responsible for producing most or perhaps all of the projectile points at the site. If Puebloan men married Dismal River women, projectile points would stay consistent, and the arrival of women would be identifiable from the appearance of chithos. Although women engage with diverse lithic toolkits, it is possible that the tools they interacted with the most, such as scrapers, were too expediently made to fully capture differences in technological strategies. Intermarriage at the pueblo would be consistent with evidence for cohabitation with migrants or their descendants at later sites. Unfortunately, the formal tool assemblages from the occupations that post-date the pueblo are too small to support robust comparison, and the degree of within-site lithic variability at the pueblo may mask differences. Therefore, additional data and comparison is necessary to provide insights into lithic technological strategies and creolization after the closure of the pueblo.

While the homogeneity observed at the pueblo may reflect genuine technological continuity, I must also acknowledge interpretive limitations or concerns that could inflate the appearance of stability. As discussed at length in Chapter 4, Ndee and Puebloan lithic strategies are both expedient and structured around flake tools. The overlaps in reduction strategies and end products between these two cultural traditions may be sufficient enough to mask interaction or shifts in technological strategies. Attribute analyses are intentionally comprehensive and aimed at identifying more subtle variations. However, the pueblo assemblage is highly variable, which means that most tools, including those from Dismal River sites postdating the pueblo, fall within the expected range of variation for morphology, size, reduction strategies, and raw material acquisition. Comparisons with other Dismal River and Puebloan assemblages may provide a more nuanced interpretation of the data in this analysis, which I discuss further in the Future Directions section below.

Tabular Bifaces

When I initially started this research, I approached the tabular bifaces at the pueblo as likely Athapaskan chithos; a thin, D-shaped lithic tool that could serve as a strong indicator of Ndee presence or cultural engagement at the site (Ives 2020). I recognized that tabular bifaces could theoretically fall within a Puebloan toolkit, but I found no clear references to comparable forms in the Puebloan literature, and colleagues specializing in American Southwest archaeology were similarly unfamiliar with the tool form. Over the course of analysis, however, my initial interpretation has become increasingly difficult to sustain without more critical consideration. Chithos documented ethnographically and archaeologically at Athapaskan sites in the subarctic are typically associated with hide working, specifically fine abrasion during later-stage hide softening, and are commonly manufactured on comparatively coarse, abrasive materials such as schist, gneiss, slate, or sandstone (Ives 2020, 2022; Reilly 2015). However, nearly all tabular bifaces from the pueblo were produced on thin slabs of Smoky Hill silicified chalk, many of which are relatively high-quality, strong materials. If these implements functioned primarily as late-stage hide softeners, a harder, sharper chert would be more likely to cut, tear, or otherwise damage a hide nearing completion rather than gently abrading it. The difference in raw material combined with the limited comparative evidence for tabular bifaces at other Dismal River sites complicates what I hoped would be a straightforward identification of a diagnostic tool form.

Patterns of breakage further contribute to this uncertainty. All but one of the tabular bifaces at the pueblo are broken. While their thinness likely made them more susceptible to snapping, the high proportion of fragments nevertheless suggests that the individuals using the tools exerted considerable force when using the tools. While a number of hide processing tasks can require a heavy hand scraping or cutting, using too much force with a sharp implement, like those found at the pueblo, does not align well with the hide-softening role described for Athapaskan chithos. At the same time, the low likelihood that these are chithos, as currently defined, does not necessarily eliminate the possibility that the tabular bifaces identified at the pueblo could still be meaningful, potentially diagnostic forms. Athapaskan communities are widely recognized for intensive hide production and for specialized toolkits for those tasks. Ethnographic accounts suggest that several hide-processing tools carry cultural or sentimental value for the women using them, and favored tools would have been curated across generations (Ives 2020; Reilly 2015).

It cannot be ruled out that the tabular bifaces may represent a variation of the chithos. Although Ndee communities on the Plains share deep histories with Athapaskans living in the subarctic, centuries of geographic separation would have created meaningful cultural distance and new material constraints. The original chithos form could have evolved or broadened in function as hide-processing practices and available raw material resources shifted. It is not unreasonable to consider that a similar tool shape may have been well suited to earlier stages of hide production when produced on a different raw material. From that perspective, the near absence of complete tabular bifaces at the pueblo is suggestive. Rather than being casually discarded, favored tools may have been removed from the site, curated, or deliberately retired elsewhere. This interpretation is compatible with Reilly's (2015:37-38) discussion of retiring tabular bifaces in a good place. It may also help explain why these tools are not represented at short-term Dismal River occupations. Of course, this line of reasoning remains tentative. These forms are rarely recorded at Dismal River sites and are not recorded at longer occupations at Dismal River villages, including the Lovitt site (25CH1) in Nebraska (Matthew E. Hill, Jr., personal communication 2026).

The tabular bifaces at the pueblo may represent expedient tools produced in response to the local properties of available stone rather than culturally specific tool tradition. Smoky Hill silicified chalk occurs locally in thin slabs. Flintknappers would have faced challenges reducing thin slabs into heavily reduced tools such as projectile points or bifaces, but the material is well suited to quick edge modification consistent with an expedient toolkit. The tabular bifaces at the pueblo had either steep or flat retouched margins, both of which occurred in relatively equal frequencies and could be used for scraping or cutting activities. Although other tools at the site could accomplish these same actions, there is no true reason why the inhabitants might not also have taken advantage of the material regardless of its morphology. It is a possibility that these forms represent an expedient solution using the material as it occurred, or the slabs may have been selected specifically because their natural form suited the intended tool design. While the pueblo tabular scrapers are unlikely to represent a chithos designed for late stage hide softening, they are still noteworthy, and I describe the implications of their presence for the pueblo and Ladder Creek Valley below. Much of this interpretation remains speculative. Without broader comparative samples and microwear analysis, I cannot say with certainty how the inhabitants used the tools, which do have interpretive implications.

If these are chithos (or another Athapaskan hide processing tool)… The presence of a diagnostic Athapaskan tool at the pueblo would carry interpretive weight. According to this analysis, there are 44 tabular bifaces distributed across multiple provenience areas and features at the pueblo. Ndee women may have used these tools in daily hide processing work, either operating alongside Puebloan women as guests or occupants integrated into the pueblo. The ceramic evidence indicates that Puebloan women or their children lived with the local Ndee population after the closure of the pueblo. Ethnographic accounts and archaeological evidence also set a precedent for Athapaskan communities creating and sustaining kinship ties through intermarriage, possibly structured around sibling sets (Ives 1998, 2011). Alternatively, there is also the possibility that Puebloan women may have observed Ndee hide-processing practices and replicated the tool form for their own use. This could explain why the materials were made from Smoky Hill silicified chalk rather than the coarser, more abrasive materials documented for subarctic examples. It is also possible that tabular bifaces entered the pueblo through exchange or gifting. The sentimental value of the tools may have made them appropriate gifts. However, exchange alone is unlikely to account for the volume of tabular scrapers at the site. Either way, recognizing the tabular scrapers as Athapaskan chithos would provide archaeological evidence for ongoing social entanglement between Puebloan and Nde groups in the Ladder Creek Valley.

If these are not chithos… There is a strong possibility that these tabular bifaces represent an idiosyncratic expedient tool forms produced by the inhabitants of the pueblo. The thin slabs of material would constrain reduction and dictate the form of the tool, which creates the relatively homogeny recorded in tool form. For migrants less familiar with the landscape, they may have selected the material for its availability despite its limiting characteristics. In this case, tabular bifaces carry limited value as cultural diagnostics and instead speak more to the expedient technological strategies the Puebloan migrants employed at the site. This suggests that lithic practices were relatively conservative or overlapping even where ceramics more clearly register interactions.

An Argument for Including Lithics in Colonialism Studies

Historically, anthropologists often explained colonialism and culture contact through rigid dichotomies and acculturation frameworks that treated change as largely unidirectional. These studies focused primarily on Indigenous communities interacting directly with colonizing powers and modeled change as abrupt replacement of traditional technologies for European ones. While the presence and integration of European goods can still be an important indicator of responses to colonialism, contemporary scholars have challenged previous frameworks and instead focused on daily practice and identity that recognize the diversity of Indigenous experiences and responses to colonialism. These studies treat technology as socially embedded, shaped by knowledge, tradition, gender, and relationships visible throughout the entire chaîne opératoire. There has also been greater recognition that communities living away from colonial powers still experienced the consequences of colonialism such as the introduction of new technologies, diseases, economic systems, and conflict.

Most recent archaeological studies examining the effects of colonialism have concentrated on high-visibility material classes that mark identity, exchange, and contact most clearly, typically ceramics and architecture (constructed space). These studies have found success in identifying how changes or continuity in material culture can represent social negotiation and identity both within and outside of the household (e.g., Beck 2009; Bernard 2008; Dietler 2010; Ferguson 1992; Groover 2000; Mullins and Paynter 2000; Paterson 2011; Rubertone 2000; Silliman 2015; Stewart 2016; Voss 2015). However, ceramics and architecture alone do not fully capture the experience of Indigenous communities experiencing the repercussions of colonialism, especially more mobile communities like those living across the Great Plains. Most seasonal or short-term camp sites contain relatively few ceramics and have more ephemeral structures, such as wickiups or tipis, which leave a more subtle footprint. For many Plains groups, lithics represent the most abundant material class people interacted with on a daily basis that remains consistently visible in the archaeological record. For this reason, incorporating lithic analysis as an independent line of evidence that could expand for understanding of the effects of colonialism.

Lithic studies in colonialism are relatively rare, and the more prominent of these still focus on the replacement or retention of lithic practices given access to or the appearance of European goods in the archaeological record. However, research over the last several decades have demonstrated with increasing complexity how beneficial lithic studies can be in informing understanding of Indigenous experiences (Cobb 2003; Cordell and Yannie 1991; Diamond 1997; Mullins and Paynter 2000; Peck et al. 2019; Rodríguez-Alegría 2008). Lithic studies broadly are becoming increasingly rich and adept at identifying minute changes in technological strategies that occur from changes to social and physical environments. In some cases, they can also distinguish between distinct ethnic groups in the archaeological record (e.g., Matson and Magne 2007). While perhaps more subtle than ceramics or architecture, lithics can indicate community identity and responses to change. This is why I chose to apply a detailed attribute and raw material analysis for this research. The relative consistency of lithics across the site complements the data produced from ceramic and faunal analyses (Beck and Trabert 2014; Beck et al. 2024; McGrath et al. 2017; Trabert 2017, 2019; Wilfong and Hill 2022) and emphasizes the complexity of social negotiations and entanglement occurring within the middle ground.

I have been transparent that the overall homogeneity of the assemblages could be an indicator that the breadth or range in artifact diversity at the 14SC1 pueblo masks evidence of cultural contact. Even so, this does not diminish the value of lithics for understanding colonialism. Instead, it points to directions for future research designed to better isolate fine-grained variability and mitigate this challenge. Moreover, interpreting the pueblo lithic assemblage as broad and diverse still contributes important information about technological practice at the site and complements the lines of evidence already developed through other material classes. At the same time, the contrast between datasets remains meaningful. The fact that lithics show no strong, unambiguous evidence for cultural contact is a consequential finding, and it supports a more nuanced interpretation of the middle ground in the Ladder Creek Valley. Together, these patterns suggest that different material domains registered interaction, learning, and identity in different ways, rather than assuming that creolization or exchange would be equally visible across all technologies. Lithics should be incorporated with more enthusiasm into colonial studies to better capture how Indigenous communities negotiated change through daily practice across diverse colonial landscape.

Future Directions

Future research regarding the occupation of the pueblo would benefit from expanding this analysis to include additional comparative datasets. In the current sample, only Feature 133 can be conclusively assigned to a pre-pueblo occupation. North of the Pueblo and South of the Pueblo may have assemblages that include artifacts from before and during the pueblo occupation, providing mixed contexts. A straightforward way to address this limitation is to incorporate a larger, more distinct Dismal River comparative sample by analyzing collections from Wedel's excavations. As discussed in Chapter 3, Wedel reported that the pueblo had little evidence to suggest Puebloan influence at the site; an interpretation that contrasts with other interpretations of the pueblo. His observation of the site reflects, at least in part, the location and depth of his excavations, which likely penetrated the earlier Dismal River occupation at the site and may therefore provide more of a "true" Dismal River assemblage. Systematic analysis of those collections would strengthen temporal inferences made in my research and allow for a more robust temporal analysis for artifacts at the pueblo. Additionally, my analysis focused on formal tools, but the pueblo assemblage also includes approximately 10,000 debitage artifacts. Puebloan and Ndee populations are known for using more expedient technological strategies that utilize more informal tools like utilized or modified flakes. To better capture the full scope of technological strategies occurring at the pueblo, future research would also benefit from a detailed debitage analysis that captures not only reduction but also flake-tool behaviors.

Current interpretations of the pueblo would also benefit from incorporating microwear analysis to more directly evaluate how tools were used and to strengthen functional comparisons across Ladder Creek Valley assemblages. Applying microwear methods to a sample of the lithics at the pueblo would provide a comparison for the microware analysis I previously completed for a sample of scrapers and debitage form 14SC409 (Cooley 2014). Microwear would be especially valuable for clarifying the role of tabular bifaces. In the discussion chapter, I hypothesized that the chert implements at the pueblo are too sharp to have served primarily as hide softeners, and therefore, may not be chithos as they exist at Athapaskan sites in the subarctic. However, this suggestion is based primarily on the type and quality of the raw material. Microwear analysis could provide more direct evidence of contact materials and motion that would allow this interpretation to be tested and provide insights into what specific activities occurred at the site.

In future research, interpretations of lithics from the pueblo would benefit from a comparative analysis with other Dismal River assemblages as well as a sample of lithics from Taos and/or Picuris contexts. Comparing the Scott County lithics to these assemblages using the analytical methods applied in this dissertation could clarify the degree of overlap between Puebloan and Dismal River lithic technologies and whether these assemblages are empirically distinguishable from one another. With access to collections from the Northern Rio Grande and additional Dismal River sites, it would be possible to evaluate whether the attributes emphasized here can reliably differentiate projectile points from Puebloan and Dismal River contexts. If there is evidence to suggest that the lithics in Puebloan and Dismal River contexts are discrete enough for comparison, the Scott County lithics could then be assessed in relation to these comparative categories. A multiple discriminant analysis (MDA) would be an appropriate approach for distinguishing lithics from Puebloan and Dismal River assemblages and for classifying the Scott County specimens relative to those reference groups. Discriminant analysis is a powerful tool for assessing separation among predefined groups, identifying which variables contribute to that separation, and assigning ungrouped specimens to the most probable group. This method was not applied in the present study, because the cultural attribution of some comparative collections is ambiguous and, in some cases, the identity of the toolmakers cannot be established with confidence.

Finally, this lithic analysis contributes to only one piece of what we can say about the pueblo and life in the Ladder Creek Valley. Existing work on ceramics, faunal remains, botanical materials, and related datasets provide critical context for interpreting chronology, interaction, subsistence practices, and site use (Adair 1992; Beck and Trabert 2014; Hill et al. 2018; McGrath et al. 2017; Trabert et al. 2022; Wilfong and Hill 2022). An important next step is a more comprehensive synthesis that evaluates how these lines of evidence align (or do not align) with the patterns documented in the lithics. Doing so would allow expectations generated from stone tool production, maintenance, and use to be evaluated alongside ceramic indicators of affiliation and exchange and faunal/botanical signals of foodways, scheduling, and local resource use. This integrative approach would strengthen interpretations of occupational history and everyday practice at the pueblo by grounding lithic patterns within a broader material and environmental record.

Conclusion

This research asks how Spanish colonialism impacted Indigenous lives beyond the margins of direct colonial control. By focusing on the Ladder Creek Valley in western Kansas, I examine how Ndee communities navigated the arrival of Puebloan migrants who moved onto the Great Plains as part of a broader diaspora produced by colonial disruption in the American Southwest. Despite its distance from colonial occupation, the Ladder Creek Valley is not a peripheral stage for colonialism; it was a consequential social landscape where people confronted new demographic realities through the negotiation of daily practice. Framed as a middle ground, the interactions of Puebloan migrants and local Ndee populations were real, persistent, and left material evidence centuries later. Archaeological investigations have shown how the material culture in the Ladder Creek Valley shows multigeneration creolization of the two communities living in the space.

To contribute to the existing research and discussion about the Ladder Creek Valley, I completed a detailed lithic study focused on attribute and raw material analyses to better identify change and continuity occurring at the Scott County Pueblo and other nearby Dismal River sites. While ceramics in the Ladder Creek Valley show the presence of Puebloan and Dismal River traditions occurring within the same space, the lithics at the pueblo are relatively homogenous over time and show a consistent commitment to expedient technology with a few possible Puebloan-style artifacts identified. That homogeneity speaks to the complexity of negotiation occurring in these middle grounds. The negotiation of daily practice, and therefore its archaeological visibility, is uneven. The different strategies observed in lithics, ceramics, faunal remains, and other material culture support this assertion. Some technologies may be conservative, highly overlapping, or simply less sensitive to the types of social learning and identity assertion that are more visible in other materials.

The Ladder Creek Valley record demonstrates that communities outside direct colonial control were not passively affected by colonialism. Indigenous communtiies actively negotiated its consequences through choices about where and with whom to live, what to make, what to keep doing, and what to learn. They relied on longstanding practices, such as mobility, and enduring social relationships that had supported them through previous experiences of uncertainty and instability. The research for this case study invites additional research that treats the far-reaching consequences of colonialism as a complex social landscape; one that archaeologists can begin to understand through careful integration of material culture datasets, including lithics, household-scale analyses, gendered labor, and mobility. This dissertation and the research that came before it is a powerful case study for understanding Indigenous creativity, resilience, and strategic decision-making in response to colonialism across North America.

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Appendix A

Table A 1. Obsidian Identified at Dismal River Affiliated Sites

Site Number	Samples	Artifact(s)	Source	References for Source Analysis
14BT404	6	Modified flakes	Unknown	Site File
14GO402	1	Triangular Projectile Point	Unknown	Site File
14LO1/401	1	Biface Fragment	Obsidian Ridge, NM	McLean 2004; Hoard et al. 2008
14LO1/401	1	Arrowpoint midsection	Wild Horse Canyon, UT	McLean 2004; Hoard et al. 2008
14LO1/401	1	Flake	Cerro del Medio, NM	McLean 2004; Hoard et al. 2008
14SC1	8		Cerro Toledo rhyolite, NM	Shackley 2005; Hoard et al. 2008
14SC1	10		Valle Grande rhyolite, NM	Shackley 2005; Hoard et al. 2008
14SC1	1		Unknown	Shackley 2005; Hoard et al. 2008
14WC39	1		Valle Grande rhyolite, NM	McLean 2004; Hoard et al. 2008
14WC6/402	1		Valle Grande rhyolite, NM	McLean 2004; Hoard et al. 2008
25CH1	6		Valle Grande rhyolite, NM	Shackley 2005; Hoard et al. 2008
25GT4	1	Drill fragment	Malad, ID	Hughes et al. 2018
25HO3	2	Drill, Flake	Cerro del Medio, NM	Hughes et al. 2018
25HO3	3	Flakes	Wild Horse Canyon, UT	Hughes et al. 2018
25HO3	4	Flakes	Malad, ID	Hughes et al. 2018
25HO3	1	Flakes	Obsidian Ridge, NM	Hughes et al. 2018
25HO3	4	Flakes	Obsidian Cliff, WY	Hughes et al. 2018
25HO3	1	Flakes	Brown's Beach, NV/ID	Hughes et al. 2018
25HO59	1	Retouched flake, scraper?	Obsidian Cliff, WY	Hughes et al. 2018

25LN31	1	Basal portion of side-notched point	Cerro del Medio, NM	Hughes et al. 2018
25LN31	1	Flake	Obsidian Cliff, WY	Hughes et al. 2018
48AB301	1	point	Unknown	Site File; Zeimens 1975:23
48AB301	1	Unifacially retouched flake	Unknown	Site File, Zeimens 1975:34
48AB301	45	Debitage	Unknown	Site File; Zeimens 1975:36
48CA258			Unknown	Site File
48CA582	2	Flake, point	Unknown	Site File; Larson et al. 1992
48CA69	1	Flake	Unknown	Site File
48LA303	1	Biface Fragment	Unknown	Reher 1973
48LA303	10	Flakes	Unknown	Reher 1973
48LA304		Flakes	Unknown	Reher 1973
5CT23	14	Flakes	Unknown	Site File
5PA1764			Obsidian Cliff, WY	Gilmore and Larmore 2005; Brunswig 2012; Tucker et al. 2005
5PE2086	1	Flake	Cerro del Medio, NM	Site File
5PE2086	3	Flakes	Unknown	Site File
5RB1787	3	Flakes	Malad, ID	Site File
5RB1787	4	Flakes	Unknown	Site File
5SH2373	1	Desert Side-notched Projectile Point	Unknown	Compass
5SH2373	1	Spokeshave	Unknown	Compass
5SH2373		Flakes	Unknown	Compass
5SH2373	1	Retouched flake	Unknown	Compass
5TL3296	7		Cerro del Medio, NM	Gilmore and Larmore 2005; Brunswig 2012
5TL3296	3		Obsidian Ridge, NM	Gilmore and Larmore 2005; Brunswig 2012