MIGRATION MODELS AND THE ATHAPASKAN DIASPORA
AS VIEWED FROM THE COLORADO HIGH COUNTRY

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ABSTRACT
Like all migrations, the movement of Athapaskans from their northern homeland into the area they occupied at the time of contact was the end result of a combination of social and environmental factors. Human migrations are rarely the product of unilinear movement of population; they are instead the product of a complex sequence of stages usually involving back and forth movement of both people and information. Proto-Apache sites in Colorado provide evidence for both chain and reverse migration strategies used by Athapaskans to move through and ultimately occupy high-elevation landscapes, presumably aided by high-latitude adaptations retained from their northern homeland.
Introduction

The entry of Athapaskans into the Southwest and Southern Plains is one of the few cases of undisputed migration in American archaeology (Wilcox 1981: 213). The modern Navajo and Apache are descendants of people that began a series of migrations sometime before A.D. 1000 and eventually arrived in their modern homelands prior to A.D. 1550. There is abundant data that supports this contention, primarily the linguistic similarities between Southwest Apachean speakers and Athapaskan speakers from west-central Canada (Hoijer 1956). The question of when and why these people left their homeland in what is now northern Canada and interior Alaska and what path these people took on their journey south has long been debated (Huscher and Huscher 1942; Opler 1983; Schlesier 1994; Tweedie 1968; Wilcox 1988; papers in Towner, ed., 1996). Their migration is incompletely understood because the physical evidence for it in the archaeological record is minimal. However, recent discoveries at archaeological sites in the Southern Rocky Mountains and western High Plains of Colorado and Wyoming demonstrate a 14th to 15th century Athapaskan appearance in this region. In this paper, we provide a brief overview of these new data in order to set the stage for a discussion on early migration patterns along Colorado’s Front Range (We explored the context and material culture of these sites in greater detail in Gilmore and Larmore 2005).

Researchers have focused on two potential routes for Athapaskan migration through the western US – an Intermountain route south through eastern Utah and Colorado’s western slope and Rocky Mountains (e.g., Huscher and Huscher 1942); and the second through the western High Plains (e.g. Gunnerson 1960). In this paper, we propose that significant migration occurred along Colorado’s Front Range and western plains margin (Figure 1), a route that splits the difference between the two previously proposed routes. Migration is rarely simple and unidirectional in nature, and we believe that the migration of the Proto-Apache was o different. To support this contention, we examine the existing archaeological record for clues regarding different push and pull factors affecting Proto-Apache migration, as well as what structure this migration might have taken. Anthony (1990; 1992), classifies different migration structures that should be identifiable using archaeological data. Based on his examples, we believe that evidence from the Colorado High Country (above 8000 ft, 2440 m in elevation) supports chain migration, leap-frogging, and return migration.
In order to put this migration in context, we examine the cultural, temporal, demographic and environmental circumstances in which this migration took place. First, and most importantly, we need to identify Athapaskans in the archaeological record.

**Cultural Context**

Several archaeological complexes have been identified as possibly representing the archaeological manifestation of Athapaskans on the plains. In past decades, the Avonlea phase of the Northern Plains has been attributed to early Athapaskans (e.g. Davis 1988), although this interpretation has fallen out of favor in recent years (Reeves 2003; Walde 2003). Another archaeological culture that has been assigned an Athapaskan ethnic affiliation is the Dismal River Aspect of the Central Plains of Nebraska, Kansas and eastern Colorado. This archaeological unit was assigned a proto-Apache ethnic affiliation by Gunnerson in his 1960 synthesis, based on both archaeological and ethnohistoric data. The Dismal River Aspect has been variously dated between circa A.D. 1625 and 1750 (Brunswig 1995; Gunnerson 1960).

**Diagnostic Material Culture**

As described by Gunnerson, the core of the Dismal River Aspect was located in western Nebraska and northwest Kansas (Figure 2), where people lived in small villages or isolated habitation structures, relied in part on corn horticulture, made small side- and un-notched projectile points and culturally diagnostic bi-pointed bifaces with central lugs (Gunnerson 1960, 1969, 1979). Ceramics associated with these sites were Lovitt Plain and Simple Stamped types (Gunnerson 1960; Hill and Metcalf 1941). These vessels were constructed by accretion (with rare coiled examples), finished by grooved or thong-wrapped paddle and anvil, and then smoothed, or in some cases, burnished or scraped (Gulley 2000). Since Gunnerson’s synthesis, the Dismal River Aspect has been divided (based on ceramic and other criteria) into three variants (Figure 3). The eastern variant consists of the originally defined Dismal River Aspect found on the Central Plains of Kansas and Nebraska. Sites of the western variant are found on the High Plains and in the Southern Rocky Mountains of Colorado and Wyoming, and sites of the southern variant are found in southern Colorado and northern New Mexico (Brunswig 1995).

Contrary to the more sedentary eastern Dismal River people of the Central Plains, western Dismal River people employed a hunting-gathering economy with no evidence of architecture and little evidence of corn horticulture. Both of these populations manufactured Lovitt Plain and Lovitt Simple-stamped gray ware, with cord-marked pottery also occurring at sites of the western variant. People of the distinct southern variant relied on both semi-sedentary and nomadic hunting and
gathering economies, constructed small adobe and infrequently masonry habitation structures (Gunnerson 1979), and manufactured micaceous plain ware types distinct from Lovitt types. This was designated Sangre de Cristo micaceous ware, with temporally sequential Ocate micaceous and Cimarron micaceous types, the latter closely resembling historic Jicarilla ceramics (Gunnerson 1979:167-168).

Although some have questioned the uncritical equating of all Dismal River manifestations with proto-Apache groups (Gulley 2000), several lines of evidence suggest that the proto-Apache were a part of the Dismal River cultural pattern. Not the least of these is that the geographic location, temporal span, and ethnohistoric accounts all corroborate this assertion.

If we do accept the Dismal River Aspect as an archaeological phenomenon that represents, at least in part, proto-Apachean occupation of the Central Plains we have to ask the question: Since the eastern Dismal River Aspect is indisputably a proto-historic phenomenon, what were Athapaskans doing for the 400 years between entering the northern Rocky Mountains circa A.D. 1200, and their hypothesized appearance as the eastern Dismal River Aspect on the Central Plains ca. A.D. 1625? The answer to this question may lie in evidence from recent investigations at sites found in the High Country of Colorado.

**Proto-Apache Sites in the Colorado High Country**

Although Dismal River pottery has been identified in eastern Colorado and Wyoming in dozens of undated surface artifact scatters over the past five decades, it is only within the last decade that archaeologists have obtained a significant number of absolute dates and substantial information from excavated contexts (Figure 4, Table 1). Material from nine dated sites provides data from which to identify and reconstruct early Athapaskan migration along Colorado’s Front Range (Gilmore and Larmore 2005). These sites provide a remarkably tight cluster of dates with an associated one-sigma calibrated date range of A.D. 1410-1630, which falls at the transition between the Middle Ceramic and Protohistoric periods (Clark 1999; Gilmore 1999). Significantly, most of these sites are found in the high country between 8,000 and 11,300 ft (2440-3440 m), and most are situated in relatively isolated areas of low site density and what is perceived by the modern eye to be limited resources. Collectively, these sites contain material culture very similar to that of the eastern Dismal River Aspect, and provide the evidence for early Athapaskans and their movement along the Front Range.
Table 1.  
Dated Western Dismal River Sites in Colorado and Wyoming

<table>
<thead>
<tr>
<th>Site</th>
<th>Site Name</th>
<th>Lab #</th>
<th>Dating Method</th>
<th>Radiocarbon Age &amp; 2-sigma age range*</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>5BL6094</td>
<td>Devil’s Thumb</td>
<td>AA-22853</td>
<td>14C</td>
<td>350 ± 50 BP (A.D. 1450-1640)</td>
<td>Kindig 2000</td>
</tr>
<tr>
<td>5LR318</td>
<td>Lawn Lake</td>
<td>Beta 144870</td>
<td>AMS Carbon residue</td>
<td>540 ± 50 BP (A.D. 1300-1445)</td>
<td>Brunswig 2001</td>
</tr>
<tr>
<td>5PA1764</td>
<td>Pinnacle</td>
<td>Beta 172328</td>
<td>AMS</td>
<td>470 ± 60 BP (A.D. 1310-1630)</td>
<td>Tucker et al. 2005</td>
</tr>
<tr>
<td>5PA1764</td>
<td>Pinnacle</td>
<td>-</td>
<td>TL on soil Blue OSL</td>
<td>A.D. 1354-1496</td>
<td>Tucker et al. 2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>TL on soil IRSL</td>
<td>A.D. 1134-1226*</td>
<td></td>
</tr>
<tr>
<td>5TL3296</td>
<td>Eureka Ridge</td>
<td>Beta 187965</td>
<td>AMS Crushed sherd</td>
<td>410 ± 30 BP (A.D. 1430-1620)</td>
<td>Gilmore and Larmore 2005</td>
</tr>
<tr>
<td>5TL3296</td>
<td>Eureka Ridge</td>
<td>Beta 187966</td>
<td>AMS Crushed sherd</td>
<td>460 ± 40 (A.D. 1400-1615)</td>
<td>Gilmore and Larmore 2005</td>
</tr>
<tr>
<td>5DA272</td>
<td>Franktown Cave</td>
<td>AA-60690</td>
<td>AMS Crushed sherd</td>
<td>643 ± 48 (A.D. 1280-1400)</td>
<td>Gilmore 2005</td>
</tr>
<tr>
<td>5DA272</td>
<td>Franktown Cave</td>
<td>AA-60694</td>
<td>AMS corn</td>
<td>380 ± 34 (A.D. 1440-1630)</td>
<td>Gilmore 2005</td>
</tr>
<tr>
<td>5DA272</td>
<td>Franktown Cave</td>
<td>AA-60695</td>
<td>AMS corn</td>
<td>293 ± 36 (A.D. 1485-1660)</td>
<td>Gilmore 2005</td>
</tr>
<tr>
<td>5SH2373</td>
<td>Arroyo del Arenal</td>
<td>Beta-209450</td>
<td>AMS Crushed sherd</td>
<td>380 ± 50 (A.D. 1430-1640)</td>
<td>Larmore 2008</td>
</tr>
<tr>
<td>5LA1052</td>
<td>McKenzie Canyon</td>
<td>DIC-322</td>
<td>14C date bone</td>
<td>600 ±55 (A.D. 1290-1420)</td>
<td>Nowak and Kingsbury 1979</td>
</tr>
</tbody>
</table>

The complete projectile points from these sites are stylistically similar to other small side- and tri-notched points that are ubiquitous on the western High Plains during the latter part of the Late Prehistoric and Protohistoric periods (Figures 5-6). Some of these points have distinct single spurs on the base (Figure 5a, 6a-e, 6h), a stylistic element found on some Protohistoric points in western Canada (Figure 7) that has been cited by some as being diagnostic of Athapaskan technology (Ormerod 2004:82). Artifact assemblages from two of the Colorado sites, Eureka Ridge and Arroyo del Arenal, also contain double-bitted bifaces similar to those Gunnerson (1960, 1969; 1979) considered diagnostic of Dismal River material culture (Figure 8).

The lithic raw materials found at Eureka Ridge are diverse, and represent half a dozen sources within a 50 kilometer radius. This represents a mature knowledge of the region and its resources, which suggests that the residents of Eureka Ridge (and perhaps their immediate ancestors) were not newcomers to the region. Exotic materials from sources up to 250 kilometers
away such as obsidian from the Jemez Mountains and Alibates chert represent long distance
transport (Figure 4).

The most compelling evidence for a cultural association between the three Dismal River
variants is found in the ceramics. Most of the vessels documented at Eureka Ridge were
manufactured by patch accretion, with some inconclusive evidence that a few were constructed by
coiling. The vessel walls were relatively thin, and the interior and exterior surfaces were finished
by different methods, including wiping, scraping, and shaping by thong or cord-wrapped paddle and
anvil (Figure 9). Some of the rims were burnished when leather hard, as indicated by the sheen
visible on the edge of the rim in Figure 9b. Many of the Eureka Ridge sherds exhibit almost
completely obliterated parallel vertical lineations suggesting simple stamping, which has been used
as a defining trait of Lovitt Simple Stamped. A small number of the sherds at Eureka Ridge exhibit
partially obliterated fine cord-marks, although they are otherwise technologically indistinguishable
from the other sherds. Decorative elements in the form of parallel diagonal tool impressions were
found on the rims of vessels from Eureka Ridge and the Devil’s Thumb Trail site (Kindig 2000).
Recently, an Ocate Micaceous vessel been finished by wiping both the interior and exterior surfaces
was recovered from Arroyo del Arenal (Larmore 2005, 2008; Reed 2007). Marks on the exterior of
this vessel suggest that it was also cord-marked and then the cord-marks were partially obliterated
by wiping (Figure 10). A crushed sherd AMS date of 380 BP (A.D. 1430-1640, two-sigma
calibrated range) is extremely early for the Ocate micaceous type.

Crucial to evaluating the timing for early Athapaskan migration are the associated AMS
(accelerator mass spectroscopy) and radiocarbon dates. The vast majority of absolute dates
associated with sites representing the Athapaskan migration and occupation of the Rocky Mountain
and plains margin have been generated during the past ten years, and are almost all direct dates on
diagnostic ceramics and their residues.

Temporal Context

Prior to the development of AMS dating methods which allow dating of small amounts of
organic material, few dates were available from the relatively recent and often shallowly buried
archaeological sites associated with the Athapaskan diaspora. These sites are often found as surface
scatters on stable surfaces, and so lack the intact features in undisturbed stratigraphic contexts that
often contain sufficient charcoal for traditional radiocarbon dating. Direct dating of cooking
residues on ceramics and dates from the organic material remaining within the paste from the
The manufacturing process itself derived from crushed ceramic sherds represents a small but powerful data set. The summed probability of 13 of the 14 AMS and standard radiocarbon dates associated with nine western Dismal River Aspect sites or other sites attributed to Athapaskans gives us a good idea of when Athapaskan groups occupied the area of interest. These people were apparently in the mountains and on the plains margin by A.D. 1400 (possibly much earlier), and had apparently left the area by A.D. 1650 (Figure 11). What is perhaps most interesting is that this occupation pre-dated the eastern Dismal River occupation of the Plains by more than 200 years. So how is it that proto-Apache people found themselves in the High Country of Colorado by the 15th century? And what is the relationship between these people and the people of the later eastern and southern Dismal River variants?

We believe that the answers to these questions lie in the coincidence of several factors. Beginning in the 12th century A.D., a convergence of population, cultural, and environmental forces created the ideal situation for small groups to move into and through the mountains and plains margin from the north.

**Population Context**

Several factors, including traditional northern Athapaskan subsistence strategies (utilizing resources available in a broad range of elevation zones), regional population dynamics and paleoenvironmental conditions would have facilitated Athapaskan movement to the south. Proxy measures of hunter-gatherer population measured by the summed probability distribution suggest that the resident human population in eastern Colorado began a precipitous decline starting A.D. 1150, and 300 years later was as small as it had been during the Late Archaic, 1500 years previous. (Gilmore 2004, 2008b) (Figure 12). Archaeological evidence suggests that the both the Upper Republican occupants of northeastern Colorado and the Apishapa occupants of southeastern Colorado had abandoned the eastern part of the state between ca. A.D. 1300 and 1350 (Baugh 1996; Gilmore 1999; Kalasz et al. 1999; Scheiber 2005; Scheiber and Reher 2007). Consequently, the hypothesized entry of small bands of Athapaskans into eastern Colorado at this time was probably uncontested by highly dispersed or absent local populations. This scenario of both a relatively rapid and uncontested migration and subsequent residence in the area by small, highly mobile groups would explain the relative paucity of archaeological evidence for Athapaskans along this migration route. However, our inability to recognize Athapaskans in the archaeological record could also help to explain this seeming lack of evidence. As will be discussed below, the structure of migration
would also have determined the character of the sites left behind by migrants, and this would have contributed to their archaeological invisibility.

The population context in the foothills and along the plains margin was one possibly important pull factor that influenced the timing and location of migration. However, environmental conditions were also favorable for the migration of Athapaskans.

**Paleoenvironment Context**

Between the 13\textsuperscript{th} and 15\textsuperscript{th} centuries, paleoenvironmental records throughout the West document a period of transition between the Medieval Climate Anomaly (MCA) and the Little Ice Age (LIA) (Benedict 1973, 1985; Bradley 2000; Broecker 2001; Cook et al. 2004; Cook et al. 1999; Laird et al. 1998, 1996; Mann and Jones 2003; Woodhouse et al. 2002; Woodhouse et al. 1998). Based on the aggregated records of paleoenvironment based on eolian activity, northern plains lake sediments and tree rings on the Northern and Central Plains, the MCA (ca. A.D. 950 – 1450), was characterized by generally dry conditions, an increased frequency of drought, and greater inter-decadal variability in climate (Gilmore 2008a). In contrast, the LIA (ca. A.D. 1450 – 1850) was a period of cooling temperatures, increased effective moisture and, from the mid A.D. 1500s to the mid 1700s, decreased inter-decadal variability of climate.

Based on tree-ring records, the reconstructed Palmer Drought Severity Index (PDSI) for areas that cover portions of the southern Rockies and High Plains of Colorado indicates an episode of increased drought frequency and severity from A.D. 900 – 1500 that appears to correlate with the MCA and the early part of the LIA (Cook et al. 2004, 2007) (Figure 13). These changes are also reflected in the paleoenvironmental records from sediments in small fens and marshes on the Western High Plains (Gilmore 2008a; Gilmore and Sullivan 2006; Sullivan and Gilmore 2006a, 2006b). Dryer conditions and increased frequency of severe drought would have made the mountains, which were less affected by drought than the lower elevations, an attractive refuge from harsher conditions on the plains. All of these factors set the stage for the Athapaskan entry into the area.

During the latter portion of the MCA between A.D. 1250 and 1450, conditions were cool and relatively dry, and climate variability was high. After A.D. 1500, most paleoenvironmental records indicate an increase in effective moisture along the western Plains/Mountains margin and High Plains of eastern Colorado, and variability of climate was somewhat less (Gilmore 2008a). Greater variability in climate makes resources less predictable on a year to year or season to season basis, which effectively lowers human carrying capacity.
The transition from the warm and dry but relatively unstable climate of the MCA to the cooler, wetter and somewhat more-stable climate of the LIA may have provided the push factors for both the abandonment of eastern Colorado by plains adapted Upper Republican and Apishapa people and the subsequent movement of Athapaskans adapted to high latitude and high altitude environments from the cooling northern Rockies and Northwest Plains into eastern Colorado (Figure 14). The abandonment of eastern Colorado by previous occupants also provided the pull factor—it provided Athapaskan migrants populations on the move somewhere to move to.

A Scenario for Athapaskan Migration: The Turbulent 12th and 13th Centuries

The following scenario considers evidence of movements of population ancestral to the eastern Apache, and does not consider the proto-Navajo or Dinétah, who appear in the archaeological record of northwest New Mexico by the early 1500s. Linguistic evidence suggests that the migration of the people ancestral to the Navajo, San Carlos, Chiricahua, and Mescalero occurred earlier from that of the Jicarilla and the Lipan, although these groups maintained some contact (Hoijer 1971). This separation during migration may have been geographic as well as temporal, with the ancestors of these different groups taking different migration routes south.

As mentioned before, evidence for the movement of several other groups in addition to the Athapaskans appears in the archaeological record dating to the 12th and 13th centuries. During the 12th century, Numic people had expanded out of the Great Basin and the northern Colorado Plateau into northwestern Colorado (Reed 1994), and the Ancestral Puebloans were well established throughout the Four-Corners area, and populations were increasing (Lipe and Varian 1999) (Figure 15). Although population east of the Rocky Mountains was apparently declining by the mid 12th century (Gilmore 2004, 2008b), it was still relatively high, and Upper Republican people had expanded west from their core area in Nebraska and Kansas into northeastern Colorado (Gilmore 1999; Scheiber 2005, Wood 1971). By the 12th century the Apishapa had been well established in small hamlets along the tributaries of the Arkansas River in southeastern Colorado for several hundred years, and Sopris phase people were also living in small hamlets along the upper Purgatoire River (Kalasz et al. 1999).

During the 13th century, Numic peoples continued to expand into the Wyoming basin and up to the Continental Divide in northwestern Colorado (Reed 1994) (Figure 16). Toward the end of the 13th century, the Ancestral Puebloans abandoned the area north of the San Juan River, and traded a relatively dispersed settlement pattern for one consisting of large aggregated villages (Cordell 1995). The dispersed Upper Republican settlements of the High Plains of Colorado were also
abandoned, and presumably these people returned to the Upper Republican core area on the Central Plains. The Apishapa remained in the Arkansas River Valley, but they too were moving from smaller dispersed hamlets into larger aggregated settlements (Kalasz et al. 1999).

By the middle of the 14th century the Upper Republican people had abandoned their core area and may have moved east and participated in the development of the proto-Pawnee Loup River/Itskař phase, or possibly moved to the northeast to the Missouri River Valley as part of the Initial Coalescent Tradition (although where these people actually ended up is unclear) (Steinacher and Carlson 1998), and the Apishapa disappear from the Arkansas Basin, possibly absorbed into Caddoan groups to the south and east (Gunnerson 1989; Kalasz et al. 1999) (Figure 17). As resident populations in eastern Colorado declined or immigrated, Athapaskans moved into the area from the north. These small groups presumably moved down the base of the Rockies from the north, using a system of seasonal transhumance, which took advantage of the high altitude resources that are most similar to the high latitude resources of their ancestral homeland and less affected by the dryer climate on the plains at this time. The proto-Apache had little competition from the highly dispersed groups that remain at lower elevations, and no competition at all for the upland resources east of the Continental Divide.

Between A.D. 1400 and 1500, Athapaskans moved into the southern Plains and Southwest and came into contact with Puebloan groups, forming beneficial and increasingly intensive trade relationships with these sedentary horticulturalists (Habitch-Mauch 2005, 1992). It is during this time that the proto-Apache most likely moved into their historic territories, although presumably the boundaries between these groups remained fluid. As populations expanded and occupied territory to the south, proto-Apache groups continued to reside in the mountains and plains of eastern Colorado for the next 150-250 years. These occupations are recognized archaeologically as the western Dismal River culture exemplified by Eureka Ridge and the other dated High Country sites indicated by red stars, and by the lower elevation sites indicated by green stars in Figure 18. The presence of exotic materials at these sites such as obsidian from Obsidian Cliff in the Yellowstone area of Wyoming and Montana and from the Jemez Mountains of northern New Mexico, as well as Alibates chert from the Texas Panhandle speaks to the continued movement of individuals, groups and materials both north and south along the original migration corridors (Figure 19). This movement of material is best explained by intra-group contact and not trade between different ethnic groups due to the probable lack of any other groups besides Athapaskans on the western High Plains after about A.D. 1350. More important than the movement of material was the
movement of information and ideas. Evidence for the continued exchange of information and ideas between people living in different areas is found in the ceramics recovered from these sites, which reflect the influence of potters from areas as diverse as the western High Plains and the Rio Grande Pueblos. The diffusion of technology mirrors the even broader geographic distribution of new words coined for novel concepts introduced after European contact. For instance, the construction of the term “horse” from the term for “dog,” is common to the lexicons of Athapaskan groups from the south to the north, and it thought to have spread from the point where the horse was first encountered by the Southwestern Apacheans to the northern Athapaskans (Brugge 2008). This suggests that at least indirect contact was maintained between northern and southern groups from the time of the initial migration through the early contact period. This is consistent with glottocronological estimates of no more than 600 years of separation between the Northern and Southern Athapaskans (Hale and Harris 1979; Hoijer 1956).

Between A.D. 1550 and 1650 proto-Apachean groups left the mountains and High Plains, possibly due to a combination of push and pull factors. Hypothetical push factors are cooling temperatures in the mountains associated with the LIA, coupled with the expansion of Numic groups beyond the Continental Divide and onto the eastern slope of the Rocky Mountains. Possible pull factors that pulled the proto-Apache toward the plains were increasing effective moisture coupled with low population density (Gilmore 2008b) (Figure 20).

An increase in effective moisture after A.D. 1500 allowed highly mobile, mountain adapted people who had established trade relationships with horticulturalists and who perhaps had some experience growing corn to move out onto the plains, adopt an economy much more reliant on food production and lead to less mobility. The people who occupied the small hamlets and villages on the Central Plains of Nebraska and Kansas are identified in the archaeological record as the eastern Dismal River Aspect, which dates to A.D. 1625-1725.

It is unclear what happened to the Dismal River culture after A.D. 1725, but some have speculated that Athapaskans were driven off the Central Plains at this time by the south and east movement of the Comanche, the south and west movement of the Pawnee, and the French and Spanish (J. Gunnerson 1979). From this point, these migrants may have moved to the Southern Plains and were absorbed into the Jicarilla (Gunnerson and Gunnerson 1971; D. Gunnerson 1974), possibly the Llanero band of the Jicarilla, while others could have become part of the Lipan (J. Gunnerson 19789:163). It is also during this time (after A.D. 1700) that the northern Navajo move
from southwestern Colorado south to join their relatives in the Dinétah region (Wilshusen and Towner 1999) (Figure 21).

**The Structure of Migration**

Migration is the permanent change of residence, and is usually a response to a number of push and pull factors, and is the end result of a conscious analysis of the associated costs and benefits to the migrants. People do not move somewhere at random, they move to places where there is opportunity, and for which they already have information. They also migrate following identifiable patterns, and the structure of the migration into Colorado from the north is suggested by the nature and location of Western Dismal River sites.

Long-distance migration is dependent on the long-distance transmission of information, and this is gathered by scouts, which studies of modern migration have shown are usually male. These highly mobile, small groups of males would have left ephemeral traces of their passage in the archaeological record of the region, and so at best this initial stage of information gathering would be represented by small, low density lithic scatters with a paucity of diagnostic artifacts, which would make both temporal and ethnic assignment difficult if not impossible. Thus, the nature and structure of scouting parties would make them often invisible archaeologically. However, the information gathered by scouts regarding potential migration destinations would be communicated back to the place of origin, and, based on observations of initial migrants, the groups that followed the scouts would have been more demographically complex, although still composed almost exclusively of young adults. The sites representing these groups would have a higher density and diversity of cultural material.

Sites like Eureka Ridge with more diverse assemblages representing repeated use by these larger, more demographically diverse groups through time may be evidence for chain migration or leap-frogging. Both of these modes of migration involve the movement of people, usually young adults and some young families, from the point of origin to a predetermined point already determined by scouts. These groups are usually followed by additional migrants, often relatives or those possessing other close social ties to the original migrants. The uniformity of most of the ceramic vessels from the several occupations of the Eureka Ridge site suggests ties between the potters that are closer than simply a shared tradition, and perhaps even represent potters from a single family lineage. Anthony (1990) suggests that the archaeological pattern produced by leap-frogging should resemble islands of settlement in desirable locations separated by significant
expanses of unsettled, less desirable territory. This fits Eureka Ridge, although as mentioned above the desirability of the location is not readily apparent to the modern eye.

Most migratory streams develop a counter-stream moving back to the migrant’s place of origin. Return migration, may be represented by transfers of materials that have otherwise been interpreted as long-distance trade, when in fact they represent material carried by return migrants. This is possibly represented by the previously mentioned exotic lithic materials from New Mexico and Texas at Eureka Ridge. Ideas are also brought with return migrants, and the diagnostic single-spurred projectile point in central British Columbia may have its origin in older points from the Northern Plains and the High Plains and High Country sites in eastern Colorado.

Conclusions

There is a growing body of evidence that people possessing technologies reflecting those of people occupying both the plains and Southwest people were living in the mountains and plains margin of eastern Colorado and Wyoming by the early 15th century. Similarities in material culture with both northern Athapaskans and the Protohistoric Jicarilla suggest that these people were the ancestors of some, if not all, of the Southern Athapaskans. The geographic distribution and material content of the sites left by these people provide data that allows for a critical examination of the cultural and environmental context of their migration from their ancestral homeland to the Southwest and Southern Plains, as well as the structure of these migrations. The evidence suggests that the migration of small bands of Athapaskans was apparently through the foothills and plains periphery, and may have been facilitated by the decline of the relatively large resident populations of less mobile hunter-gatherers. This migration occurred prior to A.D. 1500 (and possibly much earlier), during a period of increased frequency and severity of drought recorded throughout the West. This episode of warmer, dryer conditions is associated with the Medieval Climate Anomaly. A warm, dry and highly variable climate made the higher elevations of the foothills and mountains more hospitable, and favored Athapaskan adaptations to high latitude environments that were easily transferable to high elevation environments of the sparsely populated foothills and plains margin. As the eastward expansion of Numic peoples forced the western Dismal River Athapaskans out of the territory they had occupied for the previous 200-250 years, the amelioration of drought conditions after A.D. 1500 allowed those remaining in eastern Colorado to move out to the Central Plains and there adopt a semi-sedentary horticultural economy recognized archaeologically as the eastern Dismal River Aspect.
Figure 1. Hypothesized Athapaskan migration routes through the Intermountain and Great Plains (black) and the Plains Margin corridor hypothesized here (red).
Figure 2. Core and periphery of the Dismal River Culture, based on Gunnerson (1960). Red stars indicate the location of the excavated larger villages or hamlets.
Figure 3. Distribution of prehistoric Athapaskans based on ceramic wares. Based on the discussion in Baugh and Eddy (1987) and Brunswig (1995).
Figure 4. Location of dated Western Dismal river sites in Colorado and Wyoming discussed in the text. Red stars indicate high elevation sites (>2500) and green stars indicate low elevation camps (<1900 m).
Figure 5. Projectile points from Western Dismal River sites. a. Eureka Ridge site, 5TL3296 (Gilmore and Larmore 2005); b. Arroyo del Arenal site, 5SH2373 (Larmore 2005); c. Petsch Spring site, 48LA303 (drawing adapted from Reher 1971).
Figure 6. Small side-notched projectile points from the Franktown Cave site, 5DA272 (Gilmore 2005).
Figure 7. Athapaskan projectile points from the Protohistoric Chinlac site in central British Columbia (Ormerod 2004).
Figure 8. Bi-pointed bifaces with central lugs or “double bitted drills” diagnostic of Protohistoric Athapaskan material culture. a. Eureka Ridge site (5TL3296); b. Arroyo del Arenal site (5SH23730); c. Drawings of examples of this artifact type from the Glasscock site, 29MO20 (j) and the Sammis site, 29CX68 (k) in northeastern New Mexico (adapted from Gunnerson 1979, Figure 4). Both of the New Mexico sites are cross-dated to the early 1700s (Gunnerson 1969).
Figure 9. Ceramic sherds from the Eureka Ridge site. a. Artifact Concentration 1; b. Artifact Concentration 5; c. Artifact Concentration 3. Note the burnished facet on the lip of b, and the diagonal tool impressions on the rim of c.
Figure 10. Cord-marked micaceous sherd from the Arroyo del Arenal site (5SH2373). Exterior is to the left.

Figure 11. Summed probability of 13 of the 14 AMS and standard radiocarbon dates associated with Western Dismal River sites in Colorado and Wyoming. One date from the Petsch Spring site with large standard deviation (420 ± 220) (A.D. 1240-1954) was not included in this analysis.
Figure 12. Comparison of summed probability distributions of radiocarbon dates for eastern Colorado with the summed distribution of western Dismal River dates. This pattern suggests that Athapaskan populations entered eastern Colorado at a time when resident population numbers were in steep decline.
Figure 13. Reconstructed Palmer Drought Severity Index for areas designated in Figure 18. Red indicates periods of drought.

Data from Cook et al. (2004)
http://www.ncdc.noaa.gov/paleo/pdsidata.html
Figure 14. Comparison of proxy population in eastern Colorado with paleoclimate episodes. The Medieval Climate Anomaly is characterized by generally dryer but less variable conditions, while the Little Ice Age is characterized by cooler, moister but more variable conditions.
Figure 15. Geographic distribution of cultures recognized in the 12th century A.D. archaeological record in the Plains and Rocky Mountains.

Figure 16. Geographic distribution of cultures recognized in the 13th century A.D. archaeological record in the Plains and Rocky Mountains.
Figure 17. Geographic distribution of cultures recognized in the 14th century A.D. archaeological record in the Plains and Rocky Mountains. Large blue arrows indicate direction of movement of Athapaskans through the plains margin and mountains, smaller arrows indicate seasonal transhumance between High Country summer camps and plains margin cold weather camps.

Figure 18. Geographic distribution of cultures recognized in the 15th century A.D. archaeological record in the Plains and Rocky Mountains. Red stars designate High Country Athapaskan sites; green stars designate lower elevation cold season camps. Arrows indicate movement of Southern Athapaskans into historic geographic distribution.
Figure 19. Geographic distribution of exotic lithic materials found at western Dismal River sites in Colorado.
Figure 20. Geographic distribution of cultures recognized in the 16\textsuperscript{th} and 17\textsuperscript{th} century A.D. archaeological and historical record in the Plains and Rocky Mountains. Western Athapaskans move from the western part of their territory to the Central Plains ca. A.D. 1500 due to both eastern expansion of Numic populations and amelioration of climate.

Figure 25. Geographic distribution of cultures recognized in the 18\textsuperscript{th} century A.D. archaeological and historical record in the Plains and Rocky Mountains. The Eastern Dismal River people abandon the Central Plains ca. A.D. 1725 due to continued eastern and southern expansion of Numic populations. These Athapaskans are absorbed into the Jicarilla as the Llanero band and/or become the band recognized historically as the Kiowa-Apache or Plains Apache.
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